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Roles and Characteristics of the Project Manager in Achieving Success across the Project Life Cycle

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Achieving Success across the Project Life Cycle

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ABSTRACT

Ever since Pinto and Slevin (1988) identified the project manager as having more than a moderating effect on project success, researchers have been trying to unveil the identity of "successful" project managers. Studies have focused on the leadership aspects of the project manager (Shenhar et al, 1997; Pinto, 1988; and Prabhakar, 2005), but researchers have theorized that effective project management is more than just project leadership (Kotter, 2001; and Jacques, Garger & Thomas, 2008). A theoretical framework for project success is presented that reflects organizational and project characteristics, including project life cycle phase, project manager roles, and the project manager profile. The framework is derived from Shenhar et al.'s (2007) Multi-Dimensionality Theory of project success, Adams and Barndt's (1978) four-phase model of the project life cycle, and Mintzberg's (1990) Role Typology.

The purpose of this study was to explain the relationship between organizational characteristics, project characteristics, project manager roles, the project life cycle, project manager characteristics and project success. The proposed research strategy was to conduct a non-experimental, comparative (exploratory) and correlational (explanatory) online survey designed to address three research questions and to test five hypotheses. The web-based survey collected data from the entire target population of approximately 307,000 worldwide PMI project managers currently working on projects. Methods of data analysis include descriptive statistics (frequency distribution, measures of central tendency, and variability), exploratory factor analysis, internal consistency reliability (coefficient *alphas*), Pearson's *r* correlations, ANOVA, and multiple regression analysis using the stepwise (forward) method.

In this study, project manager roles explained 18% of *project success*. The entrepreneur, monitor, resource allocator, and transformational leader roles are significant explanatory variables to project success. These roles address: allocating resources, managing change, filtering information, and maintaining/increasing team cohesiveness. Implications are that effective project managers need to be good managers, as well as good leaders. They need to be able to manage change (the entrepreneur role), plan and budget work (the resource allocator role), inspire and motivate the team to action (the transformational leader role), and constantly scan, filter, and disseminate information (the monitor role).

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CHAPTER I

INTRODUCTION TO THE STUDY

Introduction and Background to the Research Problem

Despite the growing collective experience of project managers, the rapid growth in membership of the Project Management Institute (PMI), and the increase in project work being done by organizations, "project results continue to disappoint stakeholders" (Cooke-Davies, 2002, p. 185). Despite the proliferation of project management courses, books, and seminars, and the flood of project leadership material available, project managers are still failing to deliver projects on-time, within cost, and to customer specification. Ever since Pinto and Slevin (1988) identified the project manager as having more than a moderating effect on project success, researchers have been trying to unveil the identity of "successful" project managers. Who are they? How do they behave? What do they do to make their projects successful?

Classic leadership theories have been used to enhance our understanding of the project manager. Shenhar, Levy, and Dvir (1997) used Situational Leadership Theory to guide research matching project management style to project type. Pinto (1988) used Universal Leadership Behavior Theory to guide his research into Critical Success Factors of project management. Prabhakar (2005) used Transformational Leadership and Path Goal Theory to guide his research on switch leadership and project success, and found that individual consideration and idea influence were not linked to project success. Turner and Muller's (2005) study showed that intellectual competencies were negatively correlated to project success and emotional competencies were significant contributors to project success.

Recently, researchers have theorized that effective project management is more than just project leadership (Shenhar & Dvir, 1996; Kotter, 2001; and Jacques, Garger & Thomas, 2008). Turner & Muller (2005) and Kotter (2001) contend that there is a distinction between project management skills and project leadership skills. Leadership is about coping with change. Management is about coping with complexity. While project managers work in ambiguous environments, full of change; they engage in more management activities than leadership activities (Kotter, 1990).

Purpose

Studies have separately investigated the leadership role of the project manager, project manager social skills, and the relative importance of critical success factors across the project life cycle and their effect on project success. No study has integrated project manager roles and characteristics, the project life cycle, organizational and project characteristics, and project success. Additionally, no study has examined changes in the role of the project manager as the project moves through the project life cycle.

The primary purpose of this non-experimental, quantitative, exploratory (comparative) and explanatory (correlational) study was to explain the relationship between organizational characteristics, project characteristics, project manager roles, the project life cycle, project manager characteristics, and project success. This study:

1. examined the influence of organizational, project, and project manager characteristics, and project manager roles on project success; and
2. investigated whether different stages of the project life cycle resulted in the utilization of different project manager roles to achieve project success.

Research Questions

1. What are organizational characteristics, project characteristics, project life cycle stages, project manager roles, project manager profiles, and project success factors in this sample?
2. What are organizational characteristics, project characteristics, project life cycle stages, project manager roles, and project manager profiles that affect project success?
3. Are there differences in project manager roles according to organizational characteristics, project characteristics, project manager profiles, or the project life cycle stages?

Definition of Terms

Several independent variables were investigated in this study. Their theoretical and operational definitions are defined below.

Project Success

Theoretical definition. *Project success* is the set of principles or standards by which favorable outcomes can be completed within a set specification (Chan, 2001).

Operational definition. In this study, *project success* (dependent variable) was measured using the Shenhar et al.'s (2007) *Project Success Assessment Questionnaire* which contains 27 items organized into five subscales of design goals, impact to customer, impact to team, benefit to organization, and preparing for the future (see Appendix A, Part 5).

Organizational Characteristic

Theoretical definition. *Organizational characteristics* include the traits which provide information pertaining to the identity of the organization (Jackson, Schuler & Rivero, 1989). These characteristics are factors, such as culture, style, size, structure, and the level of project management maturity, which can influence the project (PMBOK, 2008).

Operational definition. In this study, the *organizational characteristics* are traits which identify the organization in which the project operates, including industry, structure, and maturity level (Ibbs & Kwak, 1997). These characteristics were measured by multiple choice items (industry and structure) and a ranked choice item (maturity level) (see Appendix A, Part 1).

Project Characteristic

Theoretical definition. *Project characteristics* are traits that differentiate projects from other organizational endeavors. These often include: objective; life span; level of involvement; and time, cost, and performance requirements (Gray & Larson, 2008).

Operational definition. In this study, the *project characteristics* are traits which identify the project the project manager is current executing on, including project type, size, budget, and duration (Shenhar & Dvir, 1996). These characteristics were measured by a multiple choice item (project type) and ranked choice items (size, budget, and duration) (see Appendix A, Part 2).

Project Life Cycle

Theoretical definition. A *project life cycle* is a collection of generally sequential project phases (PMBOK, 2008).

Operational definition. In this study, the *project life cycle* was measured using Adams and Barndt (1978) four-stage model of project phases which distinguishes among the project life cycle stages of conceptualization, planning, execution, and termination. The ranked choice item (project phase) is used to identify the phase of the project life cycle the project manager is currently working in (see Appendix A, Part 3).

Project Manager Role

Theoretical definition. *Manager Roles* are organized sets of behaviors indentified with a position (Mintzberg, 1990).

Operational definition. In this study, *project manager roles* were defined by the Managerial Work Survey (McCall and Segrist, 1980), which contains 46 items that assess the six functions (subscales) of leader, liaison, monitor, spokesperson, entrepreneur, and resource allocator (see Appendix A, Part 4).

Project Manager Profile

Theoretical definition. The *project manager profile* contains traits and skills that can be developed to successfully perform the job (Gray & Larsen, 2008).

Operational definition. In this study, the *project manager profile* is a set of characteristics that provide demographic information about the project manager, including gender, age, education, geographic region, tenure, certification status, and experience level (Alfi, 2002). These characteristics were measured by dichotomous items (gender and certification status), multiple choice items (education and region), and ranked choice items (age, tenure, courses taken, and experience level) (see Appendix A, Part 6).

Justification

The justification of the study is its significance and the extent to which this topic is researchable and feasible. Studies have separately investigated the leadership roles of the project manager, project manager skills, and the relative importance of critical success factors across the project life cycle and their affect on project success. No study has integrated project manager roles and characteristics, the project life cycle, organization and project characteristics, and project success. Additionally, no study has examined changes in the role of the project manager as the project moves through the project life cycle. The study is researchable because the concepts of the theoretical framework and hypotheses can be measured and tested. The study is feasible since it can be implemented in a reasonable time, the accessible population is available, and the cost and time to administer the online survey are manageable.

Delimitations and Scope

The study had the following delimitations:

1. The variables in this study are organizational characteristics, project characteristics, project life cycle stages, project manager roles, project manager profiles, and project success.

2. The target population was limited to project managers who are members of the PMI organization.
3. The study was restricted to active project managers with Internet access.
4. The study included participants who were at least 18 years of age and were able to read English.

Chapter I provides an introduction to the study about the relationship between organizational characteristics, project characteristics, project manager roles, the project life cycle, project manager characteristics, and project success. The purpose of the study is described. Theoretical and operational definitions are defined for each variable. Delimitations of the study are identified. The study is justifiable; it is significant, researchable, and feasible. Chapter II provides a critical analysis of the theoretical and empirical literature about organizational, project, and project manager characteristics, and project success. Chapter II also presents the theoretical framework of the study, research questions, and hypotheses identified for the study. Chapter III discusses the research design, population, sampling plan and setting, eligibility criteria and exclusion criteria, instrumentation, procedures, and methods of data analysis. Chapter IV provides the final data producing sample, answers to research questions, the results of the research hypotheses, and summary. Chapter V discusses the interpretations and conclusions, practical implications, limitations, and recommendations for future study.

CHAPTER II

REVIEW OF THE LITERATURE, THEORETICAL FRAMEWORK, RESEARCH QUESTIONS, AND RESEARCH HYPOTHESES

Review of Literature

Measures of Project Success

In its infancy, project management used simple metrics such as time, cost, and specification to rate project success. This "triple constraint" was introduced in the 1970's, and became widely used as the basis for measuring project success. If a project came in on time, within budget, and performed as expected; it was a success (Pinto & Slevin, 1988, p. 67). These metrics are "easy to use and within the realm of the project organization" (Jugdev & Muller, 2005, p. 23). Early literature focused on the execution phase; and tools and techniques used to measure the variables within this phase. The research emphasized efficiency measures and technical systems instead of behavioral or interpersonal systems – the "hard skills" vs. the "soft skills" (Munns & Bjeirmi, 1996).

Measuring project success: internal and external. Literature from the late 1980's started to "reflect a gradual trend towards including client satisfaction" (Jugdev & Muller, 2005, p. 24) as a variable in accessing project success. Pinto and Slevin (1988) introduced an integrated framework of project success. The authors proposed that project success is "composed of both internal (project) factors and external (client) factors" (Pinto & Slevin, 1988, p. 69). *Internal project factors* are the factors that the project manager has control over: time; cost; and performance. *External client factors* are use, satisfaction, and effectiveness. The authors state that the value of this model is that it "suggests an alternative to project assessment at too early a stage...By waiting until the project is up and functional, we are better able to understand the impact of the external organizational factors" (Pinto & Slevin, 1988, p. 70).

Rad (2003) also presented a methodology for measuring project success along the two different sets of attributes: the *client view*, which is focused on the deliverables (as measured by scope, quality, and client satisfaction) and the *team view*, which is focused on the means by which the deliverables are created. *Client success indicators* determine whether or not a feature is in the final deliverable. *Team success factors* focus on whether or not processes, procedures, or tools are in place to facilitate delivery of the final product. "The perception of failure and success is usually based on unspoken and personal indices; which is why two different people would access the success of the same project differently" (Rad, 2003, p. 23). The author believed there was a need for a set of performance indices to formalize and highlight a uniform and logical evaluation process.

These frameworks (Pinto & Slevin, 1988; and Rad, 2003) are socially significant and useful because they introduce the notion that different stakeholders view project success differently. Knowing this allows the team and the client to get an insight into how the other group views the project and "facilitate communication and cooperation between the client and project teams" (Rad, 2003, p. 28). Also, assessing project success from external (client) as well as internal (project team) criteria assures that varying measures of success are considered and increases likelihood of project success in the long and short term. The next set of project success frameworks distinguish success that is measured during the life of the project from success that is measured over the entire product life cycle.

Measuring project success: project and product. Munns and Bjeirmi (1996) introduced their framework to measure project success along two distinct lines: success of the project and success of the project management activities. They based this on the Standish Group study, which found that projects can succeed "even when management has failed and vice versa" (Munns & Bjeirmi, 1996, p. 81). The authors define a *project* as "achievement of a specific objective, which involves a series of activities and consumes resources" (Munns & Bjeirmi, 1996, p. 82), all to the overall benefit of the organization. *Project management* is the "processes of controlling the achievement of the project objectives" (Munns & Bjeirmi, 1996, p. 82). It is the short-term life of the project development and delivery process; concerned mainly with the triple constraint (time, cost, and standards). Project management success is a subset of project success. As such, project management techniques can be employed to ensure success, but if the project is flawed from the start, then techniques are not likely to help. Also, the team's objectives are only a subset of the overall project objective. Munns and Bjeirmi concluded that more of the responsibility for project success should reside with the client. Early decision-making by the client is important for project success, and the client has the long-term orientation. The authors state that for a true measure of project success, less attention should be given to the management and implementation aspects, and more should be given to the "economic, financial, and utilization aspects" (Munns & Bjeirmi, 1996, p. 86).

Similarly, Baccarini (1999) proposed using the logical framework method (LFM) for defining and understanding project success after a review of project management literature "provided no consistent interpretation of project success" (Baccarini, 1999, p.

25). The author highlighted research on IT projects by Wateridge (1998), where projects managers interpreted project failure as not meeting cost, schedule, and budget; while end-users' placed more emphasis on product success. Findings indicated that project managers were focused on short-term criteria (the triple constraint) as opposed to long-term criteria (delivering a product that end-users were happy with). The author proposed that project success consist of two components – project management success and product success. *Project management success* focuses on the project processes; the successful completion of the triple constraint objectives. *Product success* addresses the effects of the project's final product. Its three components are: meeting strategic objectives; customer satisfaction; and satisfying stakeholder needs related to the product. Baccarini concluded that: projects can be product failures even when the project management objectives (of time, cost, and quality) are met; project management success is subordinate to and influences product success; and project management success is viewed as the internal measure of efficiency, while project success is concerned with the project's external effectiveness. Along the same lines, Cooke-Davies (2002) introduced his model of *the "real" success factors of projects* based on his meta-analysis of 136 projects executed at 70 large European, Australian, and North American organizations. The author distinguished between *project management success* (measured against time, cost, and quality), and *project success* (measured against the overall objectives of the project).

Jugdev and Muller's (2005) article, *A Retrospective look at our Evolving understanding of Project Success,* provides a "synthesis of the literature" on the definition of project success over the past 40 years. The authors stress that the view of project success has expanded from factors only concerned with the implementation phase to those that encompass and appreciate success over the entire project or product life cycle. Moving from defining project success in terms of time, cost, and scope, to including definitions of product and service value means moving from project management providing not only tactical (operational) value, but also strategic value. Jugdev and Muller's review of over 30 articles (including major models by Munns & Bjermi, 1996; Pinto & Slevin, 1988; and Shenhar, Levy, & Dvir, 1997) resulted in a chronological view of project success over four periods: *Project Implementation and Handover* (1960s-1980s); *Critical Success Factors (CFSs) list* (1980s-1990s); *CSF Frameworks* (1990s-2000s); and *Strategic Project Management* (21st century). The following statements were significant themes in the review by Jugdev and Muller.

1. Project management is more than managing work; it is managing people to deliver results.
2. The project life cycle describes the initial, intermediate, and final project work phases. It is a subset of the product life cycle; which includes the operations and decommissioning phases. Therefore, success should not be measured at the time of project completion.
3. Project managers should be measured on more than just time, cost, and scope. They should also be measured on success after delivery, stakeholder satisfaction, and organizational contribution.
4. Project success is not just a list of CSFs, but an integrated framework of CSFs.

These models and frameworks provide a more holistic approach to project management, focusing not only on managing project objectives, but also on managing expectations of success. This discussion is socially significant to the field of project management because it provides a historical perspective from which to work when defining the factors of project success. It contributes to understanding of the context, and lends to further research. Implications for practice (as noted by the authors) include: using efficiency (time, cost, & scope) and effectiveness (customer satisfaction) measures for project success; using measures that span the entire product life cycle; being mindful that measures change over the life of the product; and maintaining effective communication with key stakeholders to achieve project success.

Concepts from evolving theories that explain project success are presented in researcher developed Figure 2-1. Traditionally, project management emphasis and focus was on the project and tasks completed during the execution phase. Success was measure by the triple constraint, and from an internal perspective. It was the short-term measure of the project manager's and project team's performance against the project plan. The project was deemed a success at project completion. We now know that project management performance is only a subset of the project. Theories now include external measures (client satisfaction, financial benefits) and metrics that extend beyond the implementation phase. These theories reflect our evolving understanding of the complexity of project success and the difficulty in measuring it.

<table>
<tr><th></th><th>Traditional Measures of Project Success</th><th></th><th>New Measures of Project Success</th><th></th><th>Evolved Measure of Project Success</th></tr>
<tr><td>Management Emphasis</td><td>On the Project</td><td>+</td><td>On the Product</td><td rowspan="9">=</td><td rowspan="9">A comprehensive measure of project success that combines the project management measures of time, cost, and scope, with the product measures of client satisfaction, utilization, and benefit to the organization. The time frame for this project success measure is both short-term (taken during the project life cycle and at the completion of the project) and long-term (assessed at some point in the future when organizational benefits can be measured).</td></tr>
<tr><td>Focus</td><td>Project Management and Implementation</td><td>+</td><td>Economic, Financial, and Utilization of Product/Service</td></tr>
<tr><td>Success Perspective</td><td>On the Process</td><td>+</td><td>On the Deliverable</td></tr>
<tr><td>Perspective of</td><td>PM and Project Team</td><td>+</td><td>Client/End-user</td></tr>
<tr><td>Measured by</td><td>Internal factors under project manager's control</td><td>+</td><td>External factors under client's control</td></tr>
<tr><td>Type of factors</td><td>Tactical factors</td><td>+</td><td>Strategic factors</td></tr>
<tr><td>Measurements</td><td>Time, Cost, Scope</td><td>+</td><td>Client satisfaction, Organization benefit</td></tr>
<tr><td>Assessed</td><td>At project completion</td><td>+</td><td>At some time in the future</td></tr>
<tr><td>Time frame</td><td>Short-term</td><td>+</td><td>Long-term</td></tr>
</table>

Figure 2-1. Summary of our evolving understanding of project success.

Studies on Project Success Measurements

Shenhar, Levy, and Dvir (1997) conducted a study about "the multi-dimensional nature of project success" (p. 7). They used an exploratory (comparative) and explanatory (correlational) research design, with structured questionnaires distributed to 182 project managers of industrial projects in Israel. The non-random, convenience sampling plan resulted in the final data producing sample of 127, and a response rate of

70%. Based on previous research by Cooper & Kleinschmidt (1987), Dvir & Shenhar (1992), Pinto & Slevin (1988), and Stuckenbruck (1986), Shenhar et al. (1997) developed a multi-dimensional framework which indentified 13 variables to measure three dimensions of project success. *Meeting operational specifications*, *meeting technical specifications*, *meeting time goals*, and *meeting budget goals* were used to measure the dimension of "design goals". *Fulfilling customer needs*, *solving a major operational problem*, *actually used by the customer*, and *customer satisfaction* were used to measure the dimension of "impact to the customer". *Level of commercial success*, *generated a large market share*, *opened a new market*, *opened a new line of products*, and *developed a new technology* were used to measure the dimension of "benefit to the organization". From this a structured questionnaire was developed. Shenhar et al. (1997) used a 7 point rating scale of 1 (very low) to 7 (very high) to collect data on the 13 measures of success. The hypothesis was tested using factor analysis. The relative importance of each dimension was determined by using Pearson's r correlation between the overall success score and the dimension's success score (averaging the scores of the measures in each of the dimensions). Analysis of variance (ANOVA) was used to compare scores of completed versus ongoing projects to determine if the relative importance of the dimensions changed over time. Factor analysis revealed that project success had four underlying dimensions (design goals, impact to customer, benefit to organization, and preparing for the future) rather than three as initially hypothesized. "Fulfilling customer needs", "customer satisfaction", "meeting operational specifications", "meeting technical specifications", "solving a major operational problem", and "actually used by the customer" loaded into Dimension 1 – *Impact to the customer*. "Meeting time" and "budget goals" loaded into Dimension 2 – *Design goals.* "Level of commercial success" and "generated a large market share" loaded into Dimension 3 – *Benefit to the organization.* "Developed a new technology", "opened a new line of products", and "opened a new market" loaded into Dimension 4 – *Preparing for the future.* These findings contradict the traditional dimensions of time, budget, and performance and supported studies by Baker, Fisher and Murphy (1988) establishing the importance of customer satisfaction as a measure of project success. Findings of a distinction between short-term and long-term impacts supported earlier studies of Dvir and Shenhar (1992) on the multi-dimensional nature of success in strategic business units. Shenhar et al. (1997) concluded that project managers need to develop a new way of examining project success. Project success is time dependent. The design goals and impact to customer dimensions are short-term and the benefit to organization and preparing for the future dimensions are long-term. Specifically, *design goals* (project efficiency) can be assessed during project execution and immediately after project completion. *Impact to customer* can be assessed after the project is delivered. *Benefits to the organization* are assessed after sales (or some financial measure) have been achieved; usually within one to two years. *Preparing for the future* can be assessed three to five years after project completion. The authors' implications for practice are to have project managers accountable for the longer-term success of their projects and to make project managers "mindful of the business aspects" (Shenhar et al., 1997, p. 10).

Studies have been conducted with this methodology and data, and it is a predominant theory used to examine the multi-dimensionality of project success. Dvir, Lipovetsky, Shenhar, and Tishler (2003) used the data and methodology to conduct a study about assessing project success and identifying common managerial factors affecting success. Lipovetski et al. (1997) applied this methodology to defense industry projects and concluded that benefit to the customer was the most important dimension. The notion that project success is time dependent, and that design goals and impact to customer dimensions are short-term, whereas benefit to the organization and preparing for the future dimensions are long-term, makes this a useful tool for measuring the time aspect of project success. In 2007, Shenhar et al. expanded the Multi-Dimensional Project Success Questionnaire to include a fifth project success dimension: *Impact on team.* The impact on team dimension looks at how the project affects the team and its members. It assesses the cumulative impact of team satisfaction, morale, loyalty, and team retention. It also measures the extent of team learning and growth. This new Project Success Assessment Questionnaire uses 27 items to measure the five dimensions.

Willard (2005) used Baccarini's (1999) framework, along with the Standish Report's (1994) definitions of project resolution types (successful, challenged, and failed) to show how a project can achieve project success and product failure at the time same. Conversely, a project can be a product success and fail the triple constraint test. In his paper about non-traditional project metrics, Willard (2005) asked, "What is the benefit to the organization to continue to implement a "challenged" project?" The Standish Group (1994) categorizes projects into: *successful* (the project is completed on time and on budget, with all features and functions originally specified); *challenged* (the project is completed and operational, but over-budget, over the time estimate, and with fewer features and functions than initially specified); and *failed* (the project is cancelled before completion or never implemented). By examining several case studies, Willard (2005) concluded that many "challenged" projects (over time, over budget, or with fewer specifications) are actually successes to the organization. They may have failed by the project managers' definition of success, but succeeded in meeting the sponsor's success criteria. An example is the Sydney Opera House. Original schedule and budget estimates, in 1959, were 4 years and $7 million. It was finally completed in 1973 at a total cost of $100 million, clearly a failure by project management measures, but a success by project success criteria. The author proposed measuring project success from three dimensions: project management success; project success; and business success. *Project management success metrics* include: time; cost; specifications met; limited change request; quality; and safety. *Project success metrics* include: benefit to the organization; stakeholder satisfaction; user satisfaction; solved a problem; and improvement to processes. *Business success metrics* include: cost savings; return on investment (ROI); competitive advantage; improved efficiencies; opportunities in the future; improving core competency; enhanced productivity; reduced paperwork or manual processes; real time processing; increase accuracy; customer service and/or resource management improvements; support business growth; build external linkages; increase flexibility; and empowerment.

Ojiako, Johansen, and Greenwood (2007) conducted a qualitative study to identify project measurement criteria. Ojiako et al. (2007) used a grounded theory, qualitative research design. The authors obtained a non-random purposive sample of participants based on professional contacts. The participants were project management professionals working for UK companies in the construction and IT industries. Ojiako et al. (2007) conducted 15 semi-structured interviews over a six-month period. The authors closed the sample when "data saturation – the sample reaches a point of no new insight" was established. Ojiako et al. (2007) categorized the data to discover patterns and concepts related to project success. Findings show that success criteria may differ from project to project, depending on a number of factors, but can be categorized as *project progress* benefits and *project performance* benefits. Project managers need to meet strategy objectives (macro measures of project performance) as well as the traditional measures of time, cost, and quality (micro measures of project progress). These measures cannot be "autonomous of each other" (Ojiaki et al. 2007, p. 413). This study advances knowledge about the inter-dependency of the macro and micro measure of project success.

Factors Affecting Project Success

Morris and Hough (1987) were pioneers in developing a comprehensive framework on the preconditions of project success. This framework depicted the elements of project success as: attitudes; project definition; external factors; finance; organization and contract strategy; schedule; communications and control; human qualities; and resources management.

Kerzner (1987) defined Critical Success Factors (CSFs) as the few elements where "things must go right" (Kerzner, 1987, p. 32). Using a modified definition of project success, the author conducted a qualitative study to identify "critical success factors present in companies that have a continuous stream of successful projects" (Kerzner, 1987, p. 31). Using a grounded theory, qualitative research design, Kerzner (1987) obtained a purposive sample of participants from 88 U.S. companies in 11 different industries. Kerzner's (1987) definition of project success included: within time;

on budget; within scope; with the desired quality level; without disturbing the corporate culture; and with well-documented post audit analysis. Through a combination of observation, interviews, and review of company literature and surveys, Kerzner (1987) content analyzed and triangulated data from the various sources to form categories of information about factors present during project success. These would become his list of critical success factors: *corporate understanding of project management; executive commitment; organizational adaptability; project manager selection criteria; project leadership style;* and *commitment to planning and control.* Many of those interviewed consistently listed four criteria for selecting project managers: results-oriented; committed to corporate values; strong interpersonal skills; and understands the organization. They preferred driven self-starters with good communication skills. "Those interviewed agreed that an understanding of technology rather than a command of technology was best" (Kerzner, 1987, p. 38). This study is significant in advancing foundational knowledge of project success. It was one of the first to offer a CSF list and to highlight the importance of project manager selection and leadership.

The Standish Group's (1994) *The Chaos Report* has an ambiguous title, but the study is well known in the project management discipline. The group conducted a mixed method (qualitative and quantitative) study, using an exploratory (comparative) and descriptive research design. The study is repeated every two years. The group seeks to identify the scope of software project failures, the major factors that cause failure, and the key ingredients to reduce failure. Projects are classified into three resolution types. Type 1 is a *project success.* This project is completed on-time and within-budget, with all features and functionality specified. Type 2 is a *project challenged.* The project is completed and operational, but over-budget, over-schedule, with few features and functionality. Type 3 is a *project impaired.* The project is cancelled at some point in the development cycle. In the 1994 study, the survey design used a purposive mass mailing of over 8,000 surveys to Information Technology (IT) executive managers. The final sample size of 365 respondents, reflect a 4.57% response rate. The survey measured the respondents' perceptions with regard to causes of the project measures (success, challenged, or impaired). Findings showed that the top reasons project succeeded were: user involvement (15.9%); executive management support (13.9%); and clearly stated requirements (13.0%). The top reasons projects were challenged were: lack of user input (12.8%); and incomplete and/or changing requirements (24.1%). The top reasons projects became impaired were: incomplete requirements (13.1%); lack of user involvement (12.4%); and lack of resources (10.6%).

In 2001, projects were succeeding more, but for different reasons. The 2001 success factors were: *executive support; user involvement; experienced project manager; clear business objectives; minimized scope; standard software infrastructure; firm basic requirements; formal methodology;* and *reliable estimates.* In 2001, projects failed, not from lack of money or technology, but from lack of skilled project management and executive support. This study is often quoted and referenced in literature concerning success and failure in IT project execution. Because of its wide-reaching audience base, this study creates a general perception of project management success (and failure).

In 2004, Turner listed the conditions necessary for project success (all of which center on the project manager): the project manager and stakeholder have a common understanding of the success criteria; they have high levels of collaboration and communication, including frequent performance reports; and the project manager is empowered.

Project Leadership and Project Success

Many state of the art studies on project leadership have been on the transformational model of leadership. That being said, there are other leadership theories that can add value to our understanding of project management. Contingency theories contend that optimum results are achieved when the leader matches the situation. The better the fit (between the behavior or style of the leader and the needs of the situation), the better the results. The most common of these are the Situational Leadership Theory and the Path Goal Theory. Universal leadership behavior theories argue that "certain behaviors enhance leadership in all situations" (Pinto, Thomas, Trailer, Palmer & Govekar, 1998, p. 22). This approach is good for developing project leaders because it provides a standard for comparison. Universal trait leadership theories state that certain traits are "associated with strong leadership". This includes the Charismatic Leadership Theory and Transformational Leadership Theory.

Barber and Warn (2005) introduced their framework for linking transactional (reactive) and transformational (proactive) leadership qualities with project management attributes. The firefighter-firelighter model has its foundations in the Bass and Avolio (1990) transformational/transactional leadership model. However, it separates the transactional segment into avoidance, reactive, and maintenance behaviors. The *Avoidant*, also called laissez-faire by Bass (1999), behavior occurs when project managers are overextended and, as problems escalate, they resort to ignoring problems and avoiding decision-making. The *Firefighters* (reactive) manage by exception. They take action when a problem becomes chronic (passive) or when deviations present themselves (active). *Maintenance* behaviors "clarify tasks, delegate responsibility, and attend to the personal needs of the team members" (Barber & Warn, 2005, p. 1035). These behaviors form the bridge to transformational leadership because they "establish a foundation of credibility in the leader's competency" (Barber & Warn, 2005, p. 1035) and build trust. The *firelighter* exhibits the behaviors of the transformational leader – idealized influence, inspirational motivation, individualized consideration, and intellectual stimulation. This model is socially significant in advancing issues about project leadership, and is useful in describing the behaviors of reactive and proactive project managers, and how these behaviors affect project success. Prabhakar's (2005) study verified the link between transformational leadership aspects and project success, providing empirical validity to this model.

Studies in project leadership. Zimmerer and Yasin (1998) conducted a mixed method study about the leadership profile of American project managers. They used a descriptive research design with 100 senior-level project managers (76% response rate). The researcher-developed open-ended and forced-answer questionnaire applied a five-point scale ranging from high (5) to low (1) to ask about: factors contributing to project management effectiveness; tools most often used; and the most and least effective project manager characteristics and behaviors. Findings are as follows. The most significant characteristics of effective project managers were: leadership by example; visionary; and technical competence. Ineffective project managers set bad examples, were not self-assured, lacked technical skills, and were both poor communicators and poor motivators.

The primary reasons projects came in over time and cost were: failure to use tools to manage the project; poor project manager leadership; slow responses from the client; lack of timely decisions and corrective action; and lack of effective communication. The top reasons projects succeeded were: timely decisions by the client; and timely responses by the project manager to changing client requests. The tools that contributed most to project success were: a project execution plan; a project schedule; and an organization chart. Project manager top characteristics and behaviors include: team builder; communicator; high self-esteem; focus on results; and demonstration of trust. Technical competency was not ranked, but it was listed as the most critical criteria for promotion to project manager. The lowest ranked characteristics and behaviors were: desirous of power; detail-oriented; strategic thinker; highly structured behavior; and charismatic personality. Zimmerer and Yasin (1998) note that "the profession has moved beyond the mind-set that the best qualified individual is the best technical person or a flashy politically savvy character with the right contacts" (Zimmerer & Yasin, 1998, p. 39). Project management effectiveness requires "project managers to combine technical competency with the application of proven project management tools that support project planning and control, and to practice leadership skills that are compatible with the internal motivations of the team and the external strategies of the client" (Zimmerer & Yasin, 1998, p. 40).

Smith (2001) conducted a qualitative study using the Meyers Briggs Type Indicator (MBTI) instrument to review the psychology and personality of project managers. He used a case study research design. The MBTI measures across four dichotomies: *introvert* (I) versus *extravert* (E); *sensing* (S) versus *intuition* (N); *thinking*

(T) versus *feeling* (F); and *judgment* (J) versus *perception* (P). Smith (2001) reviewed the MBTI results of 250 project managers in two large organizations. Results indicate that, while project managers have an introvert-intuition-thinking-judgment (INTJ) preference, there seems to be a trend towards hiring more project managers with extravert-intuition-feeling-perception (ENFP) preferences; as measured by reviewing the preferences of the experienced versus newly hired project managers. These organizations are starting to hire more managers "with a natural inclination towards innovation and people-oriented communication" (Smith, 2001, p. 7). Smith (2001) surmised that ENFP preferences make good project managers because of their "ability to work on multiple projects, their adaptability, and their people, rather than process, orientation" (Smith, 2001, p. 8). ENFPs empower others and posses the ability to generate options. Smith (2001) recommended that results from this can be used as a selection tool for those hiring project managers. It can also be used as a training tool, with the goal of helping project managers understand their differences and similarities to "reduce conflicts, build teams, make effective change strategies, and increase success" (Smith, 2001, p. 1).

Prabhakar (2005) conducted a two-phased mixed method (qualitative and quantitative) study of the relationship among project leadership approaches, team factors, and project success. The author, using an exploratory and explanatory (correlational) research design, sought to answer: which leadership approach leads to a higher level of project success and how do leaders switch between different leadership approaches to be more successful (Prabhakar, 2005, p. 53). In phase I, Prabhakar (2005) hypothesized that a switch in leadership style produces more overall project success, that time has an impact on the choice of leadership style, and that the autocratic project leadership style tends to be successful (Prabhakar, 2005, p. 54). Surveys were distributed to 225 contacts in 28 countries across a dozen different industries. Forty-six responded (20% response rate). Prabhakar (2005) found support for two of his hypotheses: switch leadership attributes to project success; and time impacts the project managers' leadership style. Findings did not support his hypothesis that "projects with autocratic project leadership tend to more successful" (Prabhakar, 2005, p. 55).

In phase II, Prabhakar hypothesized that there is a link between transformational leadership and project success, and the more experienced a project manager, the higher the project success (Prabhakar, 2005, p. 54). Prabhakar's (2005) findings supported his hypothesis that the more experienced a project manager is, the higher the level of project success. Finding supported some aspects of the hypothesis that there is a link between transformational leadership and project success. Individual consideration and ideal influence approach could be linked to project success, but the other aspects of transformational leadership could not. Results of regression analysis indicated that 51.7% (R^2 = .517) of variance in project success is explained by nine variables: *number of years experience; relationship orientation; idealized influence; individual consideration; inspirational motivation; intellectual stimulation; team understanding and expertise to accomplish technical steps; project manager not reminding team of incentive program;* and *project manager not exercising managerial authority to improve performance.* The author concluded that project managers should exercise "switch leadership" to produce more successful outcomes, "project managers who employ transformational leadership and, more specifically, idealized influence, in conjunction with a relationship-oriented approach enjoy more project success" (Prabhakar, 2005, p.

57). Prabhakar (2005) reported that future research is required to further define switches in leadership approaches and their link to project success. He states that "the challenge is to fit the theory, skills, and knowledge of the leader to the situation" (Prabhakar, 2005, p. 57).

Sumner, Bock, and Giamartino (2006) conducted a quantitative study about the link between the managerial and leadership skill of project managers and project success in the IT environment. They used an explanatory (correlational) and predictive research design. The authors' review found that empirical studies about IT professionals, using the Myers-Briggs framework, indicated that IT professionals traditionally lack "soft skills" necessary for effective project leadership. A purposive sampling plan of IT project managers in the PMI chapters of St. Louis, Indianapolis, Bloomington, and Kansas City resulted in 1024 surveys being distributed, and the final data producing sample of 112 or 10%. Of the 112 responses, only 57 were usable. The authors originally operationalized project success as the variance in planned and actual project duration, and the variance in planned and actual project cost. However, they dropped the project cost measure because of lack of variance.

No significant results were found linking positive leadership behaviors to project success from those using the self-assessment instrument. But the explanatory model of the relationship between project duration variation and Leadership Practices Inventory (LPI) leadership practices, as reported by the observers, produced a significant explanatory model ($F = 3.187, p = 0.017$). The interpretations of Sumner et al. (2006) were as follows: managers of successful projects exhibit leadership behaviors as measured by observers; IT project managers underestimate their own leadership skills;

project management skills are different from project leadership skills; and external perceptions of effective leadership are good predictors of project success.

Jacques, Garger and Thomas (2008) conducted a quantitative study on the leadership style of graduate project management students versus other Masters of Business Administration (MBA) students at a regional university in the U.S. The authors proposed that concern for task will be the same for project management and MBA students, but concern for people will be higher for project management students and project management students will have a better balance of concern for people and task. A conceptual model was developed to test whether the leadership styles of project management students differ from other management students. The Leadership Behavior Description Questionnaire (LBDQ) was used to measure leadership and ANOVA was used to analyze the differences between the two groups; 151 graduate project management and MBA student from one university.

Findings support the propositions. Concern for task was not significantly different between project management and MBA students, but concern for people was significantly higher in project management students, and the project management students had a better balance for the two styles. The interpretations by Jacques et al. are that "effective project management represents a form of leadership that fundamentally differs from the leadership related to organizational success" (2008, p. 9). They conclude that these finding are consistent with Mintzberg's (2004) argument that differences exist between the skills of MBA graduates and the behaviors needed to effectively management subordinates. Limitations, reported by the authors, include that the sample was from students at one university; and that many of the MBA students lacked professional experience and thus could be basing the leader behaviors on future events, rather than reflecting present behaviors.

Knowledge, Skills, and Other Characteristics of Effective Project Managers

According to the Project Management Book of Knowledge (PMBOK), effective project management requires that the project management team understand and use knowledge and skills from: the project management body of knowledge; the application area; standards and regulations; an understanding of the project environment; and general management (which includes interpersonal skills) (PMBOK, 2004, p. 12). Effective project managers are created through a combination of experience, time, talent, and training (Murch, 2001).

While conducting a market research study on the needs of project management skill development training in the marketplace, Schlick (1988) developed a model which organized project managers' basic knowledge and skills into three areas: project specific; project management; and people management. *Project specific knowledge and skills* include a fundamental technical knowledge of project subject matter and knowledge of resources needed for the project implementation. *Project management knowledge and skills* include ability to: clarify project goals; develop objectives and schedules (work breakdown structures); establish resource requirements; develop project plans; analyze and audit project plans; develop monitoring and control systems; develop evaluation mechanisms; monitor project progress; and determine actions to take. *People management knowledge and skills* include communication, clarifying, negotiation, group facilitation, team building, and performance management. This model is socially significant and useful because it calls attention to the need for "people skills" and provides a framework for developing an instrument to rank these different skill sets.

Posner (1987) conducted a mixed method (qualitative and quantitative) study about the attributes and skills of successful project managers. He used a descriptive research design with project managers attending a nationwide series of project management seminars. Questionnaires were randomly distributed at the seminars, and the final data producing sample was n=287. The researcher-designed survey asked two open ended questions. The first question accessed the problems project managers encountered, and the other asked to list personal characteristics, traits, or skills that make for an "above average" project manager. The responses were content analyzed, resulting in both "qualitative assessments and quantitative information" (Posner, 1987, p. 51). Each comment was coded and re-coded until patterns emerged. The 900 comments about project management problems clustered into eight categories: *inadequate resources* (69%); *meeting unrealistic deadlines* (67%); *unclear goals/direction* (63%); *team member uncommitted* (59%); *insufficient planning* (56%); *breakdowns in communications* (54%); *changes in goals and resources* (42%); and *conflicts between departments or functions* (35%). These findings align with The Standish Group's (1994) list of reasons for challenged and failed projects. The 1,400 skills set summarized into six areas: communication skills (84%); organizational skills (75%); team building skills (72%); leadership skills (68%); coping skills (59%); and technological skills (46%). Posner (1987) admits that this "obviously oversimplifies the dynamic nature of project management" (p. 53), but it also "underscores the claim that the primary problems of project managers are not technical, but human" (p. 53).

Pettersen (1991) conducted a meta-analysis about project manager predictors. He asserted that because of the very nature of the project management environment – "disorder, ambiguity, and disjunction between formal authority and responsibility", project managers need to develop skills different from functional managers (p. 21). The author aimed to provide "an integrated requirements profile designed specifically for selecting project managers" (Pettersen, 1991, p. 21). Sixty specialized publications were analyzed and summarized around main themes. From his findings, Pettersen (1991) proposed a framework of 21 predictors, grouped into five areas: *problems solving* (problem analysis, judgment and practical sense, and decisiveness); *administration* (planning and organization, control, strategy and organizational know-how, and specialized knowledge); *supervision and project team management* (delegation of responsibilities, team structuring, consideration towards team members, development of team members, teamwork flexibility and cooperation, and resolving conflicts); *interpersonal relationships* (oral communication, interpersonal influence persuasion and negotiation, and ascendancy); and *other personal qualities* (need to achieve and proactivity; self-confidence, maturity, and emotional stability; loyalty, honesty, and integrity; tolerance towards ambiguity; openness to change; and interest in the job). This framework is socially significant. Its strength lies in the fact that its formulation is based on a "large body of project management literature" (Pettersen, 1991, p. 24). Limitations noted by Pettersen (1991) are that the list is not exhaustive, and many predictors are interdependent. Empirically testing this framework and determining if differences exist between functional and project managers is an area for future study.

Similarly, El-Sabaa (2000) conducted a mixed methods (qualitative and quantitative) study about how project and functional managers differ with respect to attributes, skills, and experiences. He used a descriptive and exploratory research design, with project and functional managers "from a variety of public and private sector organizations" in Egypt (El-Sabaa, 2000, p. 3). To develop a conceptual framework, El-Sabaa (2000) asked 85 project managers open-ended questions about personality, traits, and skills of the "best" project managers they knew. The results were clustered into three categories which correspond to Katz's (1991) assertion that "effective administration rests on three basic developable skills – human, conceptual, and technical" (El-Sabaa, 2000, p. 1). The *human skills* (the ability to work effective in the team and build a cooperative effort) contained 7 items. The *conceptual and organizational skills* (the ability to envision the project as a whole) contained 6 items. The *technical skills* (an understanding or a proficiency in a specific activity) contained 5 items. A questionnaire was developed based on the 18 items, using a scale ranging from 1 (least important) to 7 (most important). In phase two, the questionnaire was distributed to a non-random sample, resulted in a final data producing sample from 126 project managers and 94 functional managers. Findings were that the human skills are the most important project manager skills (85.3%). The conceptual and organizational skills (79.6%) were second; and the technical skills (50.5%) were the least important. Project manager key competencies include collaborative and self-governance (93%), communication (91.5%), skill diversity (84%), and teamwork (92%). Functional manager key competencies include: efficiency and accuracy (87.5%); stability orientation (88%); and leadership (90%).

Goldstein (2001) examined research on project success and failure. His meta-analysis examined trends identified from project management research conducted in the US, Canada, and Europe. It should be noted that the author's research was based on studies and surveys, and did not include a review of statistical significance or methodologies used in the studies. The author reviewed the 1994 Standish Group study, the 1999 Gartner Institute study, and the 1997 Business Roundtable study. Goldstein's study included the following surveys as well: TechRepublic (2000); British Computer Society (2000); and KPMG (1998). Findings indicate that to increase the chance of project success, the project manager must take the time to develop a complete and thorough requirements analysis that is tied to a critical business need, work to obtain and retain executive and client support, and possess leadership, motivation, and team-building skills. To be an effective leader, the project manager must possess more than technical competency. The project manager must know how to coach and mentor, and possess a "persona that instills confidence about the project among stakeholders and the project team" (Goldstein, 2001, p. 4). The project manager should provide "clear and continuous communication with executives, clients, and stakeholders" (Goldstein, 2001, p. 4) and the organization should create a project management career path. The project management career path is critical to helping project managers develop the leadership and organization skills (soft skills) necessary for working with all stakeholders.

Alfi (2002) conducted a mixed method (qualitative and quantitative) study to determine the attributes of successful and effective project managers at a division of a leading Southern California aerospace company. The author used a descriptive and exploratory (correlational) research design. From his review of the literature, Alfi (2002) perceived a gap about the correlation between the project managers' personal characteristics and project success. This resulted in Alfi (2002) asking what relationship exists between the independent variables (attributes) tenure, educational background, leadership and project management training, and leadership and project management experience and the dependent variable project success. The author also questioned what factors are significant to project managers' effectiveness, which factors have the biggest impact to project success, and what improvements can be made to project management training to increase project managers' effectiveness?

Alfi (2002) used a non-experimental, single-staged, cross-sectional survey. This researcher-developed survey identified gender, tenure, and education level, the extent of leadership and project management training, the extent of leadership and project management experience, and the respondents' level of perceived significance of the dependent variables on project success. The target population was 109 project managers employed at a division of a leading Southern California aerospace company. There was not a sampling plan. The survey was distributed to the entire population of project managers within the organization. Of the 109 surveys distributed, 59 responses were returned for a response rate of 54%.

The results of the correlation analysis showed no relationship of tenure, education level, leadership training, project management training, prior leadership experience, and project success. The factors that have the biggest impact on project success are sponsorship, teamwork, process knowledge, communication, subject knowledge, customer support and involvement, and project managers' personal traits. People skills, communication skills, aggressiveness, and tenacity were the most frequently cited desirable traits. Project failure factors include lack of senior management support and sponsorship, lack of well-defined processes, lack of refresher training, and poor communication. Alfi's (2002) interpretation of these findings was that project manager development should be a blend of education, project management skills training, leadership training, and experience. Alfi (2002) reported several recommendations for areas of future study. These include examining the relationship of project manager personality and project manager success, the impact of female project managers on project success, the relationship of project manager personality and leadership traits, the impact of communication on project success, and the impact of project management training on project success.

Dolfi and Andrews (2007) developed of a typology "defining a list of the most important characteristics of a project manager's personality as well as the negative work environment corollaries to those characteristics" (p. 676). The typology asserted that project managers are open, people oriented, team players, visionaries, loyal and dependable, and detailed oriented. The antithetical work environments that challenge these characteristics include poor communication, stagnation, unclear goals, chaos, changing priorities, and lack of support and resources.

Project Type, Project Manager Style, and Project Success

As a step towards building a theory of project management, Shenhar and Dvir (1996) conducted a mixed method (qualitative and quantitative) study on the variety of projects today and their accompanying management styles. They used a descriptive, exploratory (comparative) and correlational (explanatory) research design. The authors' literature review revealed a gap for a project management typology that could be subjected to quantitative modeling and empirical testing. This resulted in Shenhar and Dvir (1996) testing the proposition that a typology could be used as a baseline for identifying project variances and their affect on project success. In the typology, Shenhar and Dvir (1996) presented a two-dimension construct for classifying projects. The first dimension, *technological uncertainty*, revealed four types: A (low uncertainty and technology); B (medium uncertainty and technology); C (high uncertainty and technology); and D (super high uncertainty and technology). The second dimension, *scope*, revealed three clusters of project management styles: assembly (low complexity); system (medium complexity); and array (high complexity). They used a qualitative approach to analyze data from a field study of management styles. A sampling plan of managers in 29 projects resulted in a data producing sample from 26 projects, and a response rate of 90%. A multiple case-study approach was used to measure ideal types. Then the authors used a quantitative plan of 183 project managers, in which data was obtained from 127 project managers via structured questionnaires to demonstrate variants in the independent variables used to describe the idea types. The response rate was 63%.

Findings showed distinct project management patterns across different levels of scope and uncertainty. For the first dimension, technology and uncertainty – Project managers for Type A (low) projects are administrators. The management style is considered firm, rigid, and formal. Managers are concerned with finishing the project on time, within budget, and to scope. A good manager is considered one that can "stick to the plan and does not add any changes, improvements, or modifications" (Shenhar & Dvir, 1996, p. 616). The management style for Type B (medium) projects is moderately firm. Managers resist change and are highly aware of excessive cost. Project managers are chosen for their technical and administrative skills in Type C (high) projects. They are required to deal with managerial (budget and schedule) problems and employ their technical judgment to resolve issues. Their management style is moderately flexible. Managers of Type D (super high) projects are considered technical leaders in their organizations. They are given considerable freedom to test new concepts. Projects are managed in a very flexible manner. For the second dimension, scope – Scope 1 (assembly) projects called for an informal, unofficial, family-like atmosphere. Managers for Scope 2 (system) projects tended to be bureaucratic (instituting formal and detailed systems of procedures, documents, management tools, meetings, and reviews). Project management for Scope 3 (program) projects called for the same bureaucratic and formal management style.

Shenhar and Dvir's (1996) interpretation of these finding were as follows. Findings of idea types in multiple dimensions supported studies by Doty and Glick (1994). Findings about the applications of different management styles supported studies by Shenhar and Alkahar (1994). Findings confirm the typology theory of project management by Shenhar (1992). Finding supported studies by Leybourne (2007) about switch leadership theory. The findings also support studies by Mansfield (1968) and Freeman (1982) that there are increments of technical innovation and accompanying project management. These findings led Shenhar and Dvir (1996) to conclude that this typology exhibited the necessary conditions for a theory. An implication for practice is that this type of typology can be used to identify the project type and subsequent management style needed prior to project execution. The typology could be "subjected to quantitative modeling and empirical testing, and it met the criteria for becoming an organizational theory of project management" (Shenhar & Dvir, 1996, p. 607).

As a follow-up, Shenhar and Wideman (2000) combined this typology theory with the Myers-Brigg Type Indicator to identify four project manager styles, and when they would be most appropriate in the project life cycle. A manager in the introvert/intuition quadrant is an *explorer*. This entrepreneurial project leader has a vision of the future, is bold, imaginative, and exudes confidence and charisma. An introvert/sensing person is a *coordinator*. Coordinators are practical, willing to compromise, and thorough. An extrovert/intuition person is a *driver*. This person is action-oriented, and hard-driving. An extravert/sensing person is an *administrator*. This person is responsible, analytical and highly organized. To optimize project success, Shenhar and Wideman (2000) suggest using a matrix of project type and project phase to select the leader type. For low tech projects use a coordinator in the concept phase, a driver in the development and execution phases, and an administrator for the close-out phase. For medium tech projects employ an explorer in the concept phase, a coordinator for the development phase, and a driver for the execution and close-out phases. For high tech projects select an explorer for the concept and development phases, a coordinator for the execution phase, and driver for close-out. For super high-tech projects utilize an explorer for the concept, development, and execution phases and a coordinator for the close-out phase.

In 2005, the Project Management Institute commissioned Turner and Muller to do a mixed method (qualitative and quantitative) study to determine whether a project manager's competency, including personality and leadership style, is a project success factor, and if different competencies are appropriate for different projects. Turner and Muller (2005) used an exploratory (comparative) and explanatory (correlational) research design. They provided an extensive literature review, comparing and contrasting theories about general management leadership, project success factors, and the role of the project manager. The authors reviewed the six main schools of leadership: trait; behavioral or style; contingency; visionary or charismatic; emotional intelligence; and competency. Here are the major findings by Turner and Muller (2005) from the literature review.

1. The literature stills largely ignores the project manager, and leadership style and competency, as a project success factor.
2. Frame (1987) has suggested that four leadership styles are appropriate at different stages of the project life cycle. Laisez-faire is appropriate in the feasibility stage. Democratic is appropriate for the design stage. Autocratic is appropriate for the execution stage; and Bureaucratic is appropriate for the close-out stage.
3. Once a project manager has achieved an "entry level of knowledge", more knowledge does not make him or her more competent.
4. Project managers are primarily people-focused (transformational).
5. There is a relationship between a project manager's perception of personal knowledge, self-confidence, and experience, and the project manager's ability to deliver a successful project.

This resulted in Muller and Turner (2007) hypothesizing that "project manager competency is positively correlated to project success; and different combinations of project leadership competency are correlated with success on different types of projects" (p. 23).

A worldwide sampling plan, consisted of about 300,000 project managers, and resulted in 400 usable results for a 1.3% response rate. Muller and Turner (2007) developed a web-based questionnaire on project type, project success, and leadership style. There were 189 questions organized by 15 competency dimensions (identified by Dulewicz and Higgs, 2003) that were used to measure the independent variables of leadership competencies, on a 5 point frequency rating scale from "Never" to "Always". The competencies were grouped into three types, intellectual (IQ), managerial (MQ), and emotional (EM). IQ includes *strategic perspective*, *vision*, and *critical thinking*. MQ includes *managing resources*, *communication*, *developing*, *empowering*, and *achieving*. EQ include *motivational*, *conscientiousness*, *sensitivity*, *influence*, *self-awareness*, *emotional resilience*, and *intuitiveness*. Project success was measured by the Westerveild and Gaya-Walters (2001) criteria, using a 5 point Likert scale from "Disagree" to "Agree". Analysis was done using multivariate regression analysis.

Results show that emotional competencies (specifically conscientiousness, self-awareness, and communication) are significant contributors to project success, while managerial and intellectual competencies were not. This partially supported the hypothesis that project manager competency is positively correlated to project success. In fact, some intellectual competencies (vision and strategic perspective) were negatively correlated. This was true across the different project types as well. Muller and Turner (2007) interpreted these findings as follows: a project manager's main focus is on delivering the project results, and "as such EQ competencies allow the project manager to motivate and influence the team and to provide emotional resilience in a changing environment" (p. 29). Vision and strategic perspective are the responsibility of others (like the project sponsor) who link the project to organizational strategy.

Dvir, Sadeh, and Malach-Pines (2006) conducted a quantitative study about the fit between project managers' personality and management styles, and the types of projects they manage, and how this fit influences project success. The authors used an exploratory (correlational) research design. They used an exploratory study, with 89 interdisciplinary projects managers. Dvir et al. (2006) discovered gaps in the literature addressing the personality of the project manager and its influence on project success. The authors sought to test the following hypotheses:

> H1: Projects managed by managers whose personality characteristics match their projects' profiles will be more successful than projects managed by managers whose personality characteristics do not match their projects' profiles.
>
> H2: Project managers will be attracted to and will be more successful managing projects that fit their personality characteristics.

A three part, self-reporting instrument assessing project manager and project characteristics, and project success was designed for this study. To assess the project manager and project characteristics, the study explored the idea of personality characteristics that fit the project types outlined in the NCTP model (novelty, complexity, technological uncertainty, and pace) developed by Shenhar and Dvir (1996). Project success was measured using nine items from the four dimensions validated in previous research by Lipovetsky et al. (1997).

Factor analysis of the nine success measures revealed that three distinct factors accounted for 78% of the variance: new opportunities (34%); customer satisfaction (26%); and efficiency (18.6%). Findings showed a higher number of high correlations for the separate project groups (36 correlations at $r > .25$) than for the entire sample (5 correlations at $r > .23$), suggesting different relationships among different types of managers, and different dimensions of project success for different types of projects. Findings also show that managers who are high in perceiving and intuition prefer high-tech projects, and managers who have an avoidance attachment style prefer low-tech projects. These findings supported the two hypotheses. The author's interpretation is that, for types of projects, there are different patterns of relationships among project manager's personalities and dimensions of project success. Findings demonstrate the value of collaboration between project management and personality psychology and provide support for the person-organization fit theory. Findings also provide guidelines for organizations to create a better fit between project managers and their assigned projects to ensure greater project success.

Other Roles of the Project Manager

Robbins (2000) views the project manager as having four roles: liaison with external constituencies; trouble-shooter; conflict manager; and coach. In 2001, The Standish Group released new findings from their seven years of CHAOS research on IT project management. Research showed that projects were succeeding more than in previous years. Twenty-eight percent of projects were completed on time, on budget, and with originally specified functionality. Twenty-three percent of projects were challenged in one of these areas but were still completed and operational. In the 2001 report, the updated CHAOS ten listed experienced project manager as number three. The first year of the survey, 1994, project manager was not even on the list. "Ninety-seven percent of successful projects had an experienced project manager at the helm" (Standish Group, 2001, p. 4). "The IT community is just beginning to understand the role of the project manager, the skills required to be a good project manager, and the benefits a project manager can bring to the project" (Standish Group, 2001, p. 6).

In his article, "*What leaders really do*", Kotter (2001) proposed that leadership is different from management. "Not everyone can be good at both leading and managing" (Kotter, 2001, p. 103). Management is about coping with complexity. Good management brings order and consistency. Leadership is about coping with change. These different functions (complexity and change) "shape the characteristic activities of management and leadership" (Kotter, 2001, p. 104). Though done is different ways, both management and leadership decide what needs to be done, create networks to accomplish something, and ensure that the agenda gets done. Management decides what needs to get done by *planning and budgeting,* leadership decides by *setting direction.* Management creates the capacity to achieve by *organizing and staffing,* leadership *aligns people.* Management ensures completion by *controlling and problem solving,* leadership *motivates and inspires.* "Managers promote stability, while leaders press for change" (Kotter, 1990, p. 85). This proposition, though not empirically tested, is important because it reveals that while project managers work in ambiguous environments, full of change; they engage in more management activities than leadership activities.

Role theory. Mintzberg (1990) introduced his model of the true role of the manager in 1975, based on his review and synthesis of research, as well as his own observations. Mintzberg sought to test four strongly held beliefs about the job of the manager: the manager is a reflective, systematic planner; the effective manager has no regular duties to perform; the senior manager needs aggregated information (which a formal management information system best provides); and management is, or at least is quickly becoming, a science and a profession (Mintzberg, 1990, p. 166). These originate from Fayol's "plan, organize, coordinate, and control" model, which had been the dominant classical view of the manager's job since its introduction in 1916 (Mintzberg, 1990, p. 163). Mintzberg conducted a qualitative study about managerial work. He used structured observations on five American Chief Executive Officers (CEOs). The author's study focused on two aspects of managerial work, the *characteristics of work* (how, when, where, whom) and the *content of work* (what and why). He also cited several widely known studies on managerial work including Sayles's (1964) *Managerial Behavior* and Neustadt (1960) *Presidential Power.*

Mintzberg's (1990) findings contradicted the classical view of the role of the manager and did not support the four postulates. Results show that the managers' work pace is unrelenting, discontinued, varied, and brief, managers perform many regular duties, (including rituals, negotiations, and information processing), managers strongly favor verbal communication over documents, and managers rely on judgment and intuition. The "science" of the role is still very much in the managers' heads.

Mintzberg's (1990) findings led him to develop a typology of the manager's role. He identified 10 roles or "organized sets of behaviors identified with a position" (p. 168).

The *figurehead* role involves those ceremonial duties that the manager must perform. As *leaders*, managers are responsible for the work of their people. Managers spend considerable time with peers and others outside of their unit in the *liaison* role. "As *monitor*, the manager is perpetually scanning the environment for information, interrogating liaisons, and receiving unsolicited information." (Mintzberg, 1990, p. 169). The manager then passes some of the information internally in the *disseminator* role, and externally in the *spokesperson* role. The last four roles describe the manager as the decision-maker. They are the *entrepreneur* (seeking to improve the unit), *disturbance handler* (responding to pressure), *resource allocator* (deciding who will get what), and *negotiator*.

Mintzberg's (1990) role typology is a predominant theory used to examine the role of the manager. Mintzberg's Role Theory has been adapted to several situations and populations. Kurke and Aldrich (1983) successfully replicated Mintzberg's structured observation method with four top executives. Spoull (1981) studied managers of educational programs. Kaplan (1979) studied mental health centers and banks. Ley (1978) studied hotel managers. Martinko and Gardner (1990) replicated Mintzberg's structured observation method with 41 school principals. "Mintzberg's structured observation methodology has some limitations such as sample size, reliability checks, coding method, and external validity" (Grover, Jeong, Kettinger, & Lee, 1993, p. 113). Allan (1981) developed a questionnaire to measure managerial roles among city managers. Results led to the identification of six task dimensions: supervision of employees; harmonizing; information handling; analytical-evaluative; change-initiating; and monitoring. His findings agreed with Mintzberg's results on many fronts, such as managers' activities are characterized by brevity and variety, there is similarity in the work done at all levels of management, managers performed regular activities, and managers strongly favored verbal mediums.

Studies on IT managers and role theory. McCall and Segrist (1980) used Mintzberg's roles to develop an instrument to study how managerial roles vary by level and function. They used Mintzberg's framework on roles and descriptions to develop a 75 item questionnaire. This instrument asked managers to rate (on a 7-point scale) the importance of each activity of their own performance. The questionnaire was mailed to a 33.3% stratified random sample of managers. A total of 2,609 completed questionnaires where returned for a 68% response rate. The surveys were split into a random sample by level and a cross-validation sample. The first sample was analyzed to identify scales with high reliabilities. Scales with internal consistencies of less than .70 were eliminated. Factor analysis was used on the second sample. The results suggest that six of the ten roles (leader, liaison, monitor, spokesman, entrepreneur, and resource allocator) were operationalized. The other four roles (figurehead, disseminator, disturbance handler, and negotiator) were not operationalized because the authors found that activities in these roles correlated with activities in the other six roles, and activities in these four roles were found only in certain functions and at certain levels of management. The scales showed convergent and discriminant validity. Reliability for the instrument showed Cronbach's coefficient *alphas* of: leaders ($\alpha = .74$); spokesman ($\alpha = .62$); monitor ($\alpha = .72$); liaison ($\alpha = .79$); entrepreneur ($\alpha = .68$); and resource allocator ($\alpha = .70$). The final 46 item questionnaire (the Managerial Work Survey) contains the following: leader (14 items); liaison (9 items); monitor (9 items); spokesman (5 items); entrepreneur (3 items); and resource allocator (6 items). The development of this instrument is important because Mintzberg's structured observation is now operationalized to a questionnaire, and findings from lower levels of management concur with those of CEO's, generalizing Mintzberg's model. The instrument has been adapted in subsequent studies.

Grover, Jeong, Kettinger, and Lee (1993) conducted a quantitative study of the managerial roles of IT executives to better understand the managerial role priorities and why conflict may occur. The authors used an exploratory (comparative) and explanatory (correlational) research design. Grover et al. (1993) compared the Chief Information Officer (CIO) roles with those of managers at different functional and hierarchical levels based on Mintzberg's framework. The authors sought to examine the extent that the CIO management roles differ from other functional senior managers and lower level Informational Systems (IS) managers. They also wanted to see if the CIO management roles change as IS maturity and IS centralization levels change. Grover et al. (1993) proposed that there was indeed a significant perceptual difference in the relative importance of managerial roles between the CIO, other senior executives, and IS middle managers. They also proposed that as IS matures, the entrepreneur, monitor, and spokesman roles become more important; and as IS centralizes (its degree of responsibility and decision-making authority), the spokesperson, resource allocator, and liaison roles become more important (p. 112).

Grover et al. (1993) first obtained a random sample of 500 companies from the 1991 listing of Fortune 1000 companies. From the list of companies, they obtained a sample of CIO's and IS middle managers using the Applied Computer Research (ACR) Directory of Top Computer Executives. Based on available addresses, 477 surveys were distributed with a total data producing size of 111 respondents (23.3% response rate). The Managerial Work Survey (MWS) was adapted to an IT context to investigate the roles.

Findings partially supported Grover et al.'s (1993) propositions. A comparison of Spearman's rank correlation coefficients between rankings of CIOs and senior manufacturing and sales executives were not significant. The perceptions of managerial role importance were similar among CIOs and middle managers. These findings conflict with Mintzberg's studies which showed differences in roles importance at differing hierarchical levels. End-user maturity was not significantly related to any of the managerial roles and management maturity was only significantly related to the liaison role ($r = 0.2648, p< .05$) and the spokesman role ($r = 0.2398, p < 0.05$). The interpretation of these findings by Grover et al. is as follows. Findings indicate that CIOs rank the entrepreneur role as most important, though most CIO research today is focused on the leader role. More research emphasis should be placed on entrepreneurship of the CIO. This study only examined maturity and centralization, other contingency factors and their affect on CIO role importance, can be considered. Implications for practice include using the role approach as a method in CIO selection, training, or career planning. Limitations reported by the authors were sample size and the use of nonparametric statistics, which "inherently tend to produce weak significance" (Grover et al., 1993, p. 129). "By relying solely on a perceptual survey method, findings may be biased" (Grover et al., 1993, p. 129). This study is important because it provide empirical validity of an instrument that measures management roles. The instrument can be used in a future study to ascertain differences in role importance between functional and project managers.

Gottschalk and Karlsen (2005) conducted a quantitative study to investigate "the emphasis placed on different managerial roles by IT project managers" (p. 1137). The authors used an exploratory (comparative) research design. They investigated two types of projects: internal IT and outsourced IT projects; and how project managers in these two groups perceive their leadership roles. They asked: What leadership roles are emphasized in internal IT versus outsourced IT projects? Gottschalk and Karlsen (2005) used Mintzberg's manager roles typology. From an IT perspective, Grover et al. (1993) identified the relevance of six of the ten roles, namely: personnel leader; resource allocator; spokesman; entrepreneur; liaison; and monitor. Gottschalk and Karlsen (2005) proposed the following hypotheses: Internal roles (personnel leader and resource allocator) were more important in internal IT projects; and external roles (liaison and monitor) were more important in outsourcing projects (Gottschalk & Karlsen, 2005, p. 1140). They also hypothesized that the spokesman role was more important for internal IT projects and the entrepreneur role was more important for external IT projects (Gottschalk & Karlsen, 2005, p. 1141). The version of the Managerial Work Survey adapted by Grover to an IT context was chosen because of the high validity and reliability that others had obtained. The *internal projects* questionnaire was mailed to 673 project managers in companies from the list of members of the Norwegian Computing Society. Eighty were returned, with a response rate of 14% and a low sample size. The second questionnaire, for *outsourcing projects*, was distributed at a seminar of

PMs of outsourced IT projects. Eighty-four questionnaires were returned for a response rate of 12%.

Findings show that for internal project managers the role of personnel leader was considered the most important. Project managers of outsourced projects choose the spokesman role as their top priority. The authors were surprised to see that the liaison and monitor roles were given the lowest priority. ANOVA was used to test the hypothesis. The authors conducted a test of assumptions for ANOVA, and the criterion was met. Findings were ($F = 37.85, p = 0.00$) for the personnel leader role and ($F = 8.41$, $p = 0.00$) for the resource allocator role, to support H1. Internal project managers emphasize the leader and resource allocator roles significantly more than outsourcing project managers. Results did not support H2. Project managers of outsourced projects did not emphasize the liaison and monitor roles more than internal project managers. H3 was not supported. The spokesman role is not more important to internal project managers than project managers of outsourced projects. Results did not support H4. The entrepreneur role is not more important to outsourced project managers.

Gottschalk and Karlsen (2005) concluded that internal and outsourced projects have the goal of improving IT systems, but differ in their approach (one using internal resources and the other using external resources) and should, therefore, differ in their project leadership roles. They found that the leader and resource allocator roles were most important in internal projects, while the spokesman and entrepreneur roles were most important in outsourced projects. "Future research can consider specific cultures or industries, and can apply a knowledge management perspective from the resource-based theory" (Gottschalk & Karlsen, 2005, p. 1137). As reported by Gottschalk and Karlsen, this study is important in showing that "the contingent approach to leadership roles implies that the significance of each role is dependent on the situation" (2005, p. 1138).

Project Life Cycle and Project Success

Project managers divide project into phases to provide better management control (PMBOK, p. 19). Collectively, these phases become the project life cycle. The project life cycle connects the beginning to the end, with transfers or hand-offs from phase to phase. Project life cycles define the work done at each phase, the deliverables of each phase, who is involved at each phase, and how to control at each phase (PMBOK, p. 20). Traditionally, the greatest level of risk is at the beginning of the project, when the level of uncertainty is the highest. The beginning is also the time when the customer can have the greatest influence. As time passes, the customer's influence diminishes and risk of completion decreases, but cost to change increases.

The seminal work of Pinto (1986) is one of the most comprehensive studies of critical success factors and their relative importance across the project life cycle. For his dissertation, Pinto conducted a quantitative study using a predictive survey design with project managers and those involved in projects worldwide. The author reviewed several attempts by researchers to determine critical success factors. He noted that past studies relied on conceptual models, or single-case studies. Also, critical success factors were "assumed to have the same degree of importance throughout the life of the project" (Pinto & Prescott, 1988, p. 5). Pinto sought to empirically derive a set of critical success factors and examining their relative importance in the project life cycle. Specifically, Pinto raised the following questions; what are the critical factors that are predictive of project success or project failure, are these critical factors of equal or stable importance over the life of the project, and are there additional factors that have a moderating effect on the relationship between critical factors and project success or failure? (Pinto & Prescott, 1988, p. 6).

In his study, Pinto introduced his process model of project implementation based on his previously developed 10-factor Project Implementation Profile (PIP). The PIP is a self-assessment tool used to identify CSFs and subsequent scores over the project life cycle. The PIP requires participants to indicate their degree of agreement on a 7-point Likert scale (where 1=Strongly Disagree, and 7= Strongly Agree) to 50 questions covering the 10 CSFs. Each factor has five sub-items. Agreement indicates project success. It provides an "empirically derived set of critical success factors" developed to assist project managers in increasing project implementation success. The 10 major factors are divided between the strategic group and the tactical group. The *strategic* factors "involve early planning, policies, and general objective setting" (Finch, 2003, p. 34). The *tactical* factors "deal with resources deployment and the implementation of specific tasks" (Finch, 2003, p. 34). The three strategic factors are project mission, top management support, and project schedule/plan. The tactical factors are client consultation, personnel, technical task, monitoring, communication, troubleshooting, and client acceptance. Schultz and Slevin (1983) developed a schematic model depicting the factors' interdependence. In addition to these factors, Pinto listed a second set of variables. Theoretical and empirical literature suggests that these have a "moderating effect on the success or failure of a project" (Pinto, 1986, p. 44). They are power relationships and political activity, characteristics of the project leader, environmental effects, and sense of urgency. Pinto used the Adams and Barndt (1978) four-stage model to identify the phases of the project life cycle. *Conceptualization* is the initial project stage. *Planning* established a formal set of plans to accomplish the project. *Execution* is performance of the work or the project. *Termination* includes the final steps that must be performed when the project is completed. Pinto hypothesized the following: Each CSF will be significantly ($p < 0.05$) correlated to project success across the four stages of the life cycle; Project mission and client consultation are the dominant CSFs during the conceptualization stage; Project mission, top management support, client consultation, and client acceptance are the dominant CSFs during the planning stage; Project schedule, personnel, technical tasks, trouble shooting, client consultation, monitoring and feedback, and communication are the dominant CSFs during the execution stage; and Client acceptance, and consultation are the dominant CSFs during the termination stage of a project. The non-random, purposive sample plan came from two mailing lists. Total sample size was 605, adequate to perform the data analysis. The final data response size was 418, resulting in a 71.33% response rate. The estimated internal consistency reliability for all scales on the PIP questionnaire was Cronbach's coefficient *alphas* greater than .76, indicating satisfactory internal consistency.

Findings were as follows. The construct of "project success" is multi-dimensional. Eight of the initially hypothesized critical factors and all of the four exogenous variables were found to be significantly related to project success. Monitoring and Communication were not. Strategy and Tactics remain useful sub-dimensions for critical factor classification. Urgency has a moderating influence on the relationship between Strategy and project success. Leadership has a moderating influence on the relationship between and Tactics and project success. Strategy declines and tactics (project management leadership) increases in relative importance over the life of the project. A stepwise regression was done on the CSF in each stage of the project life cycles. In the *conceptual stage*, project mission and client consultation were the two key factors related to project success. In the *planning stage*, project mission, top management support, and client acceptance explained 63% of the variance in success. In the *execution stage*, project mission, trouble shooting, project schedule, technical task, and client consultation explained 60% of project success. In the *termination stage*, technical task, project mission, and client consultation explained 60% of the variance. Personnel was the only factor found to be not significant in predicting project success in any of the life cycle stages.

The author's interpretations show that the project manager can have a strong influence during the operational phase of the project. A project leader "having high technical, administrative, and interpersonal skills, who is highly visible and has been granted sufficient authority can offset project technical activities on the part of the project team and push a project through to successful completion" (Pinto, 1986, p. 158). This supports research by Avots (1969), and Hill (1977), who argued the importance of a competent project leader for project success. A practical implication reported by the author was that the study provided not only the critical success factors, but also the project lifecycle stages that they address. Limitations reported by the author were as follows. The study only analyzed ten independent and four moderating factors (total variance explained by these was 60%, so additional predictors of project success are missing); the study was cross-sectional and analysis could have been better served through tracking the projects through each stage of the life cycle; and there may have been possible perceptual bias associated with the use of the mail survey format.

Finch (2003) evaluated the application of the PIP methodology, post-implementation, on an information systems project. The project was undertaken to improve "communications within the global company and to help break down political/cultural barriers" (Finch, 2003, p. 33). By traditional standards, the implementation was a success. The triple constraints were met, but the "main aim of the project was not fulfilled" (Finch, 2003, p. 33), because few employees used the system. Senior management expressed concerns that the "successful" project was not being utilized and sought to use the PIP tool to obtain a more accurate measure of project success. The PIP tool, applied three months after launch, was given to the project manager, a project team member, and an end-user. The results were reviewed for contrast and comparison with data from a previous post implementation company survey. The PIP tool correctly identified problems previously noted by the organization. Results show that the project was adequate on strategic factors, but low on tactical factors. This resulted in low user acceptance and usage.

Beale and Freeman (1991) sought to develop a model that explains what factors affect successful project execution. In particular, the authors aimed to develop a general project management model for the *construction* and *execution phase* of a project. They believed the more efficiently projects are executed, the more effective and profitable the project investment will be. They introduced their model of successful project execution based on a review of literature on organizational theory, management, finance, accounting and project management. The authors' review of 29 papers on project success indentified common threads of fourteen variables affecting project success. The authors grouped the variables into three categories which were either endogenous or exogenous. *Endogenous* variables can be explained within the model. *Exogenous* variables are those whose value is wholly independent from other variables in the model.

The variables in Group A are exogenous (independent) to the organization. They reflect the nature of the project and cannot be changed without affecting this nature. They are *technology*, *environment/location*, *size/duration*, and *ownership/sponsorship*. The variables in Group B are endogenous (dependent) to the organization but exogenous (independent) to the project team. They can be affected by the project sponsor or parent organization, but not by the project team. They occur early in the project life cycle. They are *clarity of objectives*, *risk*, *support by parent*, *provision of resources*, *linking mechanisms*, and *labor market/industrial climate*. The variables in Group C are endogenous variables that can be influenced by the project manager and team. They include *project structure and organization*, *project manager*, *project team*, and *systems and procedures*. The authors then proposed a model of the project execution phase emphasizing feedback loops. The major proposition is that projects are more successful when "the technology is well developed, the political climate is predictable, duration is less than a year, a single private sector sponsor exists and is committed and supportive, the communication links are clear, labor is plentiful, the project manager and team are competent and experienced, and where the project organizational structure is appropriate" (Beale & Freeman, 1991, p. 27).

The authors conducted a qualitative observational case study to observe the presence (or lack) of these variables in one particular project. For the project, they selected a "high-rise commercial building being built in the central business district of Sydney for a single private sector sponsor" (Beale & Freeman, 1991, p. 24). Results show that the variables in Group B, especially "clarity of objectives" justify project success. A practical implication reported by the authors was that having a prescription for project success would allow an organization to operate more efficiently and increase its competitive advantage. A major limitation reported by the authors was that the model does not have empirical validity, and this case study is a weak design in terms of providing internal validity. They suggest that the model be tested in all significant classes of projects, and that the conclusion of these tests would identify the most critical variables. The model is still significant in distinguishing between variables that are under the control of the project team and variables that are not, all which affect project success. It is a useful tool to show that changes in project manager (and team) behavior and dynamics may not result in significant increases in project success because of exogenous factors beyond their control.

Khang and Moe (2008) introduced their framework for success criteria and factors in the project life-cycle phases based on their review of empirical studies (Pinto & Slevin, 1987, 1989; and Diallo & Thuillier, 2004) of critical success factors of project implementation. The authors note that factors have been identified as relevant for the overall success of the project, but there was not a list of factors relevant for each stage of the project life-cycle. Baccarini (1999) and Cooke-Davies (2002) have observed the need to differentiate project success from project management success, and that an enabling environment is just as important as the project manager for successful project implementation. The authors proposed four distinct stages of the project life-cycle;

conceptualizing, planning, implementing, and closing. *Conceptualizing* involves assessing needs, developing and evaluating project alternatives, and generating interest and support from key stakeholders. Variables include a clear understanding of the project environment, effective consultations, and project designer competencies. *Planning* involves developing the project scope and plan, obtaining resources, and negotiating final approval. Variables include compatible development priorities, adequate resources, effective communication with key stakeholders, and competencies to support the project plan. *Implementing* involves kicking off the project, carrying out planned activities, monitoring and controlling budget and schedule, and managing stakeholder relationships. Variables include adequate support, high motivation and interest, adequate knowledge and skills, adequate resources and support, compatible rules and procedures, and effective consultation. *Closing* includes testing project outcomes, handing over of output, dissolving the team, and settling financial transactions. Variables include adequate provisions, competency of project manager, and effective communication to key stakeholders.

To validate the model, a survey was conducted with internal and external stakeholders of projects in various industries in Vietnam and Myanmar. Over 1000 questionnaires were distributed to project managers and team members, and 368 were usable, for a 37% response rate design. The 53-item questionnaire assessed respondents' evaluation of their project success. CSFs' were assessed on perceived importance and extent of use in each phase, and ranked with a scale from 1(low importance and use) to 4 (high importance and use). Reliability analysis yield Cronbach's coefficient *alphas* values from 0.89 to 0.95 for the CSFs' presence and importance.

Findings confirm the success factors developed in the model. "Of the 16 factors listed in the life-cycle phases, 10 had significant or moderately significant impacts to the project management success score, and no factor had a negative beta coefficient in the regression model" (Khang & Moe, 2008, p. 82). The competency factor was the most importance throughout the entire project life-cycle. In each phase, the influence of the preceding phase was significant and exceeded the other factors in the model. Implications include the need to "start right". Success in the early phases has a strong impact on later stages. The benefit of the model is that project management performance can be evaluated at each phase. Evaluation of the CSF at each phase can "forecast future status and predict project results" (Khang & Moe, 2008, p. 83). This model is socially significant in addressing essential issues about the relative importance of CSFs in the project life cycle. It is useful in explaining that the importance of success factors change as projects progress. The most useful proposition is that success factors for the preceding phase significantly determine the success of the succeeding phase. More empirical validity is needed.

Organizational Context and Project Success

Projects are part of an organization. The organization's culture, style, size, structure, and level of project management maturity can influence the project. Project-based organizations have systems in place to facilitate project management. Organizations that encourage an entrepreneurial spirit are more receptive to, and tolerant of project risk (PMBOK, 2008). Projectized organizations allow the project manager more authority and autonomy, whereas functional organizations may constrain the project manager's authority. (PMBOK, 2008)

Adams and Barndt's (1978) seminal meta-analysis on organizational variables and the project life cycle suggest that "changes occur in the organizational environment as it progresses through phases of its life cycle" (Adams & Barndt, 1978, p. 39), and these changes can have implications for the project manager. The authors synthesized and analyzed existing data from four independent studies conducted within the same organization. Data were collected from 463 project managers in 1976 and 1977. Organizational variables include: size; level of bureaucracy; climate; conflict intensity and resolution modes; and job satisfaction.

Though results cannot be generalized, Adams and Barndt's (1978) life cycle theory was supported. There were differences in the organizational environment according to the project phases, specifically:

1. The size of the project organization (as measured by project resources) was small in the conception and termination phases and much larger in the planning and execution phases.
2. Project organizations tend to be more formal in the planning and execution phases and more informal in the conceptual phase.
3. As the project progresses through the life cycle, the overall intensity of conflict decreases. Smoothing (as a conflict resolution mode) decreases while compromising and forcing increases. In phase I, conflict arises from manpower resource constraints. Program priorities are the major sources of conflict in the other phases.

The authors concluded that these changes that occur in the organizational environment as the project progresses through life cycle phases could have implications for supervisors of project managers. They proposed selecting a new project manager (best suited for the upcoming environment) for each phase of the project instead of letting one project manager lead through the entire project life cycle. Also, project managers can make adjustments to "maintain an internal environment most conducive to project goal accomplishment" (Adams & Barndt, 1978, p. 39).

Wellman (2007) conducted a study using ground theory research to better understand the senior manager's role in matrix organizations and to "provide an emergent theory of matrix-organizational management" (p. 63). A total of 47 program managers, from a division of a major Fortune 100 company, were interviewed over a 3-months period. The interviews consisted of open-ended questions intending to "encourage individuals to describe leadership and organizational culture attributes" that either facilitated or inhibited business success (Wellman, 2007, p. 64).

Organizational artifacts and 1,500 pages of interview transcripts were analyzed to identify recurrent themes. Preliminary conclusions were tested via follow-up interviews. This process led to the identification of 15 emergent concepts instrumental in matrix organizational performance: access; accountability; active listening; allow mistakes; balance; communications; customer relationships; decision-making; decisiveness; empowerment; flexibility; open relationships; support; tools/processes; and trust. These finding support previous research on matrix management. Mintzberg (1993) contends that there is a high communication cost in matrix organizations. A successful matrix organization needs to be "open, empowering, and democratic" with high levels of cooperation and teamwork. Future research can investigate the relative importance of these concepts, or the relationships between the concepts and different organizational structures. This study is significant in "building towards a foundation for better preparing managers for their roles" (Wellman, 2007, p. 63).

Kendra and Taplin (2004) conducted a qualitative study on the adoption of project management practices in an IT division of a manufacturing company. The authors used structured interviews to gather data from the IT division leaders. The authors compared and contrasted theories about critical success factors and the interrelationships among project manager, project team, and processes within an organization. This led to the authors' development of a "four-dimensional (2x2) success model based on sociotechnical system design concepts" (Kendra & Taplin, 2007, p. 30). In this model, success factors are categorized at the micro and macro levels within social and technical organizations. The *micro-social elements* are the project manager's skills and competencies. The *macro-social elements* are the project's organizational structure. *Micro-technical elements* are individual performance metrics used to monitor performance. *Macro-technical elements* are structured business processes or frameworks. These four elements are linked together by the organization's project management culture.

To test their model, the authors formed two research questions: What organizational values exist regarding project management among IT organizational members; and what linkages exist between organizational culture, project manager competencies, project management processes, performance systems, and project success? A qualitative research approach using a series of structured interviews was employed on eight IT executives from the participating company. The participants were asked about their personal experiences managing IT projects. Data collected was analyzed using a grounded theory approach and inferential coding to identify common themes.

Findings identified five common themes related to the adoption of project management in an organization.

1. Project management competencies exist at the project manager level in the organization.
2. Project success requires use of management processes from project management, systems development, supplier management, and business planning.
3. Organizational structure is a key to project success, because it determines the project manager's level of authority, the skills and competencies of the team, and the dynamics of the group.
4. Performance measurements metrics (to evaluate project success) are determined at the individual, project, and organizational level.
5. Organizational culture determines the importance of project manager competencies, performance metrics, and business processes used to perform project work that leads to project success.

These findings support studies by Shenhar et al. (1997) that project success criteria is measured at different times and by different people. Findings also support theories and research by Freeman and Beale (1992), and Pinto (1986) that there are external factors beyond the control of the project manager. It also affirms the PMBOK's (2008) assertion that the organization's culture, style, and structure can affect project success.

Synopsis of the Literature

The purpose of this review was to critically analyze the theoretical and empirical literature about the roles, and characteristics of project managers that enhance project success, to analyze the literature about changes in the effect of the project managers throughout the project life cycle, and to identify areas of future scholarly inquiry. This review analyzed theories that explained project success and analyzed reliable and valid tools to measure project success. This review examined theories and studies about the relationship between the project manager and project success. Lastly, this review critiqued the expected roles and skills of the effective project manager, and reliable and valid measures of these concepts. The following two sections present a synopsis of the state-of-the-art theoretical and empirical literature, what is known and unknown about the relationship between the roles, competencies, and characteristics of the project manager that affect the outcome variable of project success across the project life cycle.

Theoretical Literature

Project success. The theoretical literature about project success included various theories with minimal variance in definition. The traditional "Triple Constraint" theory defines project success as being on time, within budget, and to specification (Jugdev & Muller, 2005). This theory is still popular today, but successive theories have expanded from these tactical factors to include definitions of product value (Jugdev & Muller, 2005). One group of project success theories diverged from the "triple constraint" by introducing a distinction between internal factors under the control of the project manager, and external factors under the control of the client (Pinto, 1988; Rad, 2003; and

Ojiako et. al., 2007). These theories expounded on *internal/micro* (project team) factors versus *external/macro* (client) factors. Internal factors include those of the triple constraint – time, cost, and scope. External factors include client satisfaction and strategic benefit. Though not empirically tested by these authors, these theories are socially significant and useful because they introduce the notion that different stakeholders view project success differently. The client's focus is on the features of the deliverable. The project team's focus is on the processes, procedures, and tools used to create the deliverable.

Other project success theories introduce a time component in describing project success (Munns & Bjeirmi; 1996; Baccarini, 1999; and Cooke-Davies, 2002). There are short term and long term *project management success* factors occurring during project execution, concerned mainly with achieving the triple constraint. It is a subset of *project success*. Project (or product) success is the long-term indicator, occurring at some time after project completion, concerned with meeting strategic objectives, satisfying end-users' needs, and satisfying stakeholder needs related to the product. These theories provide a more holistic approach to project management, focusing not only on managing project objectives, but also on managing expectations of success. Both branches of theory development provide inter-subjectivity, creating a well-developed model of what concepts should be used as a guide when measuring project success. These theories fit present project management reality. Further investigation of the influences of time and client are areas for future research.

With their multi-dimensionality theory of project success, Shenhar et al. (1997) theorized that project success had three different dimensions. The authors identified 13 items to measure three dimensions of project success. Results of their study show that project managers distinguish among four measures of project success. These are design goals, impact to customer, benefits to the organization, and preparing for the future. Project success is time dependent. *Design goals* are assessed during project execution. *Impact to customer* is assessed when the product is delivered. *Benefit to organization* is assessed after break-even ROI is achieved, and *preparing for the future* is assessed three to five years after project completion. Similarly, Willard (2005) proposed his theory for measuring project success from three dimensions. These are project management success, project success, and business success. *Project management success* is measured by the triple constraint. *Project success* is measured by benefit to organization and client satisfaction. *Business success* is measured by ROI, competitive advantage, and improved efficiencies.

Role of the project manager. Ever since Pinto and Slevin (1988) identified the project manager as having more than a moderating effect on project success, researchers have theorized about the "right" project manager. Theories have emerged in two main areas: project leadership; and knowledge and skills models.

Researchers use classic leadership theories to enhance our understanding of project management. For instance, Contingency theories (such as Situational Leadership Theory and Path Goal Theory) contend that optimum results are achieved when the leader's skills are matched to the situation. These theories have been used to guide project management research matching project management style to project type. Universal leadership behavior theories argue that "certain behaviors enhance leadership in all situations" (Pinto et al., 1998, p. 22). The advantage of this approach is its ability to guide project leader development because it provides a standard for comparison. Universal trait leadership theories (such as Charismatic Leadership Theory and Transformational Leadership Theory) state that certain traits are "associated with strong leadership" (Pinto et al., 1998, p. 23). In the project management discipline, transformational leadership theory has empirical support, is socially significant in addressing the varying duties of the project manager, and is frequently referenced in research to explain the relationship between the project manager and project success. Barber and Warn (2005) introduced their Firelighter theory for linking transactional (reactive) and transformational (proactive) leadership qualities with project management attributes. This theory is socially significant and useful to describe the range of behaviors of reactive and proactive project managers, and how these behaviors affect project success. Effective project management is more than just project leadership (Shenhar & Dvir, 1996; Kotter, 2001; and Jacques, Garger & Thomas, 2008), but there has been no proposal of a theoretical model to explain the importance of other project management roles.

Schlick (1988) and El-Sabaa (2000) each theorized a three-pronged knowledge and skills model. Schlick (1988) emphasized *project specific knowledge and skills* (a fundamental technical knowledge of the project subject matter), *project management knowledge and skills* (the ability to use tools and techniques to successfully manage the project), and *people management knowledge and skills* (those "soft skills" needed to manage the human aspects of the project performance). Similarily, El-Sabaa's (2000) model emphasized *technical*, *organizational*, and *human* skills. For both models, there is consistency and clarity between the theoretical and operational definitions. Researchers consistently generate the same list of skills when defining the knowledge areas. Empirical studies support these theories (Posner, 1987; Standish Group, 2001; and El-Sabaa, 2000). People management knowledge is the most important competency to have (Muller & Turner, 2006; Smith, 2001; and Jacques, Garger & Thomas, 2008). These theories are socially significant and useful because they call attention to the need for "people skills" and provide a framework for developing an instrument to rank these different skill sets.

Pettersen's (1991) theory of project manager predictors asserts that, because of the very nature of the project management environment, characterized by "disorder, ambiguity, and disjunction between formal authority and responsibility", project managers need to develop skills different from functional managers. He proposed a model of 21 predictors grouped by *ability*, *motivational*, and *personality* factors. Though not empirically tested, this theory is socially significant. It is based on psychological foundations that provide a better understanding of performance determinants. Pettersen (1991) notes that his list of predictors is not exhaustive and that many predictors are interdependent. Research testing the model, and examining if the list of predictors vary between project managers and functional manager, is an area for future study.

Project type and project manager style. In 1997, Shenhar and Dvir presented a theory for classifying projects within a two-dimension construct. The first dimension, *technological uncertainty*, revealed four project types: A (low uncertainty and technology); B (medium uncertainty and technology); C (high uncertainty and technology); and D (super high uncertainty and technology). The second dimension, *scope*, revealed three clusters of project styles: assembly (low complexity); system (medium complexity); and array (high complexity). Shenhar and Wideman (2000) combined this typology theory with the Myers-Brigg Type Indicator to identify four project manager styles, and when they would be most appropriate in the project life cycle. To optimize project success, Shenhar and Wideman (2000) theorized using a matrix of project type and project phase to select the leader type.

This theory exhibits good internal criticism strengths. It builds upon a previous theory that has empirical validity, and provides propositions. It is socially significant in addressing the issue of flexibility and change in project manager style, especially as the project moves through its life cycle. The model cannot be empirically tested though, because project managers are not usually changed as the project moves through the life cycle. Project managers may be able to change their management style, but measuring this adaptation with the Myer-Briggs indicator (which measure psychological preferences that do not change) is inadequate.

Project life cycle and project success. Theoretical literature in the area of project life cycle was sparse. A few studies integrated the concept of the project life cycle with the constructs of project success. Khang and Moe (2008) introduced their framework combining success criteria and factors in the project life-cycle phases. The authors proposed four distinct stages of the project life-cycle; conceptualizing, planning, implementing, and closing. The benefit of the model is that project management performance can be evaluated at each phase. This model is socially significant in addressing essential issues about the relative importance of CSFs in the project life cycle. It is useful in explaining how the importance of success factors change as projects progress. The most useful proposition is that success factors for the preceding phase significantly determine the success of the succeeding phase. Although Khang and Moe conducted a survey to confirm the model's empirical validity, external validity of the study was weak. More empirical validity is needed.

A summary of the research themes theories and frameworks is provided in Table 2-1. It highlights theories and frameworks on: measuring project success; factors affecting project success; project leadership; project manager characteristics; project types; roles; the project life cycle; and organizational context.

Table 2-1

Summary of Theories and Frameworks

Research Theme	Theory	Author, year	Premise	Empirical Validation by Author
Measuring Project Success	Triple Constraint Theory		Project success is measured by: • On time • Within cost • To specification	Yes
	Integrated framework of project success	Pinto & Slevin, 1988	Project success is measured by internal factors: • Time, cost, performance And external factors: • Client use and satisfaction, and effectiveness	Yes
	Methodology for measuring project success	Rad, 2003	Project success is measured from the client view: • Scope, quality, client satisfaction And the team view: • Final delivery of the project	No
	Logical Framework Method (LFM)	Baccarini, 1999	Project management success is measured by: • Meeting the triple constraint • Addressing quality • Satisfying stakeholders Project success is measured by: • Meeting strategic objectives • Customer satisfaction • Satisfying stakeholder needs	No

Table 2-1 Continued

Research Theme	Theory	Author, year	Premise	Empirical Validation by Author
	"Real" success factors of projects model	Cooke-Davies, 2002	Project management success is measured by: • Time, cost, quality Project success is measured by: • Overall objectives of the project	No
Factors Affecting Project Success	Critical Success Factors (CSF)	Kerzner, 1987	There are critical factors present in companies that have a continuous stream of successful projects	Yes
Project Leadership	Firefighter-Firelighter Model	Barber & Warn, 2005	There are both transactional and transformational leadership qualities in project managers	Yes
Project Manager Characteristics	Project manager basic knowledge and skill model	Schlick, 1988	Project manager basic knowledge and skills can be organized in three areas: • Project specific • Project management specific • People management specific	No
	Project manager styles model	Shenhar & Wideman, 2000	Combine the typology theory with MBTI to identify project manager styles and when they would be most appropriate across the project life cycle	No
Roles	Fayol's POCC Model	Fayol, 1916	A manager's job consist of plan, organize, coordinate, and control duties	Yes
	Mintzberg's Role Theory	Mintzberg, 1990	There are 10 organized sets of behaviors identified with a position	Yes
Project Life Cycle	Process model of Project Implementation (PIP)	Pinto, 1986	Developed a10-factor PIP tool to identify CSF's and their impact over the project life cycle	Yes

Table 2-1 Continued

Research Theme	Theory	Author, year	Premise	Empirical Validation by Author
	Model for successful project execution	Beale & Freeman, 1991	Identified 14 variables affecting project success, grouped as: • Exogenous to the organization • Endogenous to the organization/exogenous to the project team • Endogenous to the project team	Yes
Organizational Context	Four-dimensional success model	Kendra & Taplin, 2004	Success factors are: • Micro-social – project manager skills • Macro-social – organizational structure • Micro-technical – individual performance metrics • Macro-technical – business processes or frameworks	Yes

Empirical Literature

Measures of project success. Research consistently demonstrates that project success is multidimensional. Shenhar et al.'s (1997) seminal work on the multi-dimensionality of project success provides a method for measuring project success. The authors used an exploratory (comparative) and explanatory (correlational) research design, with structured questionnaires distributed to 182 project managers of industrial projects in Israel. Factor analysis revealed that project success had four underlying dimensions (design goals, impact to customer, benefit to organization, and preparing for the future). Findings of a distinction between short-term and long-term impacts supported earlier studies of Dvir and Shenhar (1992) on the multi-dimensional nature of success in strategic business units. Shenhar et al. (1997) concluded that project managers need to develop a new, time dependent, way of examining project success. Design goals and impact to customer dimensions are short-term and benefits to the organization and preparing for the future dimensions are long-term. Though reliability of the "impact to customer" dimension was weak, this instrument has been used in subsequent studies. Dvir et al. (2003) used the multi-dimensionality instrument to identify common managerial factors affecting project success. The instrument was updated in 2007 to include a short-term impact to team dimension. External validity is weak because they were unable to generalize beyond the country and the sample size was small. The study should be replicated with a large and diverse target population and sample size. Examining not only the project manager's perceptions of project success, but also the client's and organizational stakeholder's perceptions, is an area of future research.

Willard's (2005) case study analysis revealed how a project can achieve project management success and yet be a product failure (or vice versa). Based on results of their qualitative study, Ojiako et al. (2007) suggest that project managers need to meet strategic objectives (the macro measures of project performance) as well as the traditional measures of time, cost, and quality (the micro measures of project progress). Though both of these qualitative studies support theoretical positions by Rad (2003) and Baccarini (1999), they lack data analysis rigor.

Role of the project manager. The predominant role theory about the role of the manager was developed from Mintzberg's (1994) structural observation study of CEOs. The study has been successfully replicated in various disciplines (Kurke & Aldrich, 1983; and Martinko & Gardner, 1990), and an instrument (the Managerial Work Survey) was developed from the framework. Studies using the instrument have confirmed Mintzberg's original findings (McCall and Segrist, 1980; Allan, 1981; Grover, Jeong, Kettinger, & Lee, 1993; and Gottschalk & Karlsen, 2005). Grover, Jeong, Kettinger, and Lee (1993) conducted a quantitative study of the managerial roles of IT executives to better understand the managerial role priorities and why conflict may occur.

Gottschalk and Karlsen (2005) conducted a quantitative study to investigate "the emphasis placed on different managerial roles by IT project managers" (p. 1137). They concluded that internal and outsourced projects have the goal of improving IT systems, but differ in their approach and should therefore differ in their project leadership roles. Internal validity strengths include hypothesis testing and the reliability and validity of the instrument (as implied by its use in other studies). Threats to internal validity include low level of data analysis and a sample size too small to conduct rigorous analysis. External validity strength was the broad range of companies invited to participate, however, the size of the sample was too small to generalize to the target population and the sampling plan was not well described. Future studies should seek to identify a target population and design a probability sampling plan. Multiple regression analysis is recommended.

Several quantitative exploratory (comparative) and explanatory (correlational) studies have been conducted to examine the characteristics and behaviors of project managers with the respect to project success. Authors have studied leadership styles, specifically the transformation leadership style (Turner & Muller, 2005; Prabhakar, 2005; and Jacques, Garger & Thomas, 2008). Prabhakar's (2005) study examined the relationship among project leadership approaches, team factors, and project success. Findings supported his hypothesis that there is a link between some aspects of transformational leadership and project success. Internal validity strengths of the study were reliability of measures of variables, high level of data analysis, and clearly defined procedures allowing replication. Threats to internal validity include the validity of the PIP tool as a measure for project success and the design of the sampling plan. External validity weaknesses are target population and small sample size. Measuring the project manager's leadership style, and subsequent switch in style, from the perspective of the team members, is an area for future study.

The Myers-Briggs Type Indicator (MBTI) was used in several studies (Shenhar & Wideman, 2000; Smith, 2001; and Sumner, Bock & Giamartino, 2006). Smith (2001) conducted a qualitative study using of the Meyers Briggs Type Indicator (MBTI) instrument to review the psychology and personality of project managers. He surmised that ENFP preferences make good project managers because of their "ability to work on multiple projects, their adaptability, and their people, rather than process, orientation" (Smith, 2001, p. 8). Smith (2001) recommended that results can be used as a selection tool for hiring or as a training tool. Again, there is the question of usefulness. Project managers can change their roles while executing the project, but there is a question of the ability to change a psychological preference.

Sumner, Bock, and Giamartino (2006) conducted a quantitative study about the link between the managerial and leadership skills of project managers and project success in the IT environment. The Leadership Practices Inventory (LPI) was used to measure leadership competency in five areas. An important finding of the study was that project management skills are different from project leadership skills. Strength of the study is the internal validity and psychometric qualities of the leadership measure, but a threat was the reliability and validity of the project success measure, which was planned versus actual duration of project. The sample size was small for multiple regression analysis and, coupled with a non-probability sampling plan, threats to external validity were present.

Knowledge, skills, and other characteristics of project managers. Studies by Posner (1987), El-Sabaa (2000), and Turner and Muller (2005), confirmed the importance of project manager people skills for project success. Posner's (1987) mixed method study about the attributes and skills of successful project managers, underscores the claim that the primary problems of project managers are not technical, but human. His resulting skills list, which aligns with finding by The Standish Group (2004), ranked communications skills as most important and technological skills as least important. The author admits that the study "oversimplifies the dynamic nature of project management". It also, by nature of design, exhibits low internal validity. External validity is strengthened by the randomized sampling of project managers attending the "nationwide" series of project management seminars.

El-Sabaa (2000) conducted a mixed methods study on the differences between project and functional managers with respect to attributes, skills, and experiences. He found that the human skills are the most important project manager skill. Again, results show that human skills rank highest and technical skills rank lowest. The strength of internal validity is based in the use of Katz's (1991) theory to guide the study. Threats to internal validity include the reliability and validity of the instrument, the sample size, and the level of data analysis. A threat to external validity is that findings cannot be generalized, since a non-probability plan was used. This study is weak, but useful because it shows that the project manager's key competency is communication, not leadership; and that project manager key competencies differ from functional manager key competencies.

Though both of these studies exhibit internal validity weaknesses, they lend themselves to future research in the area of project manager skill assessment and project success. Future studies can operationalize the skills list to create an instrument to examine whether project managers who consistently exhibit high communication skills achieve project success more than project managers who exhibit high technological skills. Turner and Muller's (2005) study to determine whether a project manager's competency, including personality and leadership style, are project success factors revealed three types of competency dimensions: *intellectual* (IQ); *managerial* (MQ); and *emotional* (EM). Results show that "emotional competencies (specifically conscientiousness, self-awareness, and communication) were significant contributors to project success. Managerial and intellectual competencies were not. In fact, some intellectual competencies (vision and strategic perspective) were negatively correlated. This was supported across the different project types as well.

Project type and project manager style. Dvir, Sadeh, and Malach-Pines (2006) conducted a quantitative study about the fit between project managers' personality and management styles, and the types of projects they manage, and how this fit influences project success. Findings demonstrated the value of collaboration between project management and personality psychology, and provide support for the person-organization fit theory. These findings provided guidelines for organizations to create a better fit between project managers and their assigned projects to ensure greater project success. Threats to internal validity include low level of analysis, and small sample size. An internal validity strength is reliability of measures of variables. A threat to external validity is that data, while across industries, came from only one country. Future studies should increase sample size, and enhance sampling plan to include a diverse target population, and provide psychometric evaluation of the measures.

Organizational context and project success. Kendra and Taplin (2004) conducted a qualitative study on the adoption of project management practices in an IT division of a manufacturing company. Results show that organizational structure is a key to project success, because it determines the project manager's level of authority, the skills and competencies of the team, and the dynamics of the group. These findings support theories and research by Beale & Freeman (1991) and Pinto (1986) that there are external factors beyond the control of the project manager. It also confirms the PMBOK's (2008) assertion that the organization's culture, style, and structure can affect project success. Internal validity strengths of this study are hypothesis testing and data triangulation. As with qualitative studies, statistics weren't performed. Sample size was small and the external validity was weak because the results could not be generalized. Future studies, testing the model's applicability to other organizations, are needed.

Table 2-2 provides a summary of the research themes empirical studies. It highlights studies and findings on: measuring project success; factors affecting project success; project leadership; project manager characteristics; project types; roles; the project life cycle; and organizational context.

Table 2-2

Summary of Empirical Studies

Research Theme	Author, Year	Hypothesis or Research Questions	Findings
Measuring Project Success	Shenhar, Levy, & Dvir, 1997	Project success has three dimensions: • Meeting design goals • Impact to customer • Benefit to organization	Project success had four underlying dimensions • Meeting design goals • Impact to customer • Benefit to organization • Preparing for the future Subsequent research includes: • Impact to team
	Willard, 2005	Projects can achieve project success and products failure at the same time	Validated hypothesis, using the triple constraint to measure project success, and Standish Group project categories to examine case studies
Factors Affecting Project Success	Kerzner, 1987	There are critical factors present in companies that have a continuous stream of successful projects	Using a modified triple constraint, which includes well-documented post audit analysis and maintaining corporate culture, to measure project success, created a list of CSFs
	The Standish Group, 1994	Identify the major factors for project failure	Using triple constraint and Standish Group project categories, developed top 10 success factors
Project Leadership	Zimmerer & Yasin, 1998	Identify characteristics of effective project managers	Technical competency is as critical to project success as leadership skills
	Smith, 2001	Use MBTI instrument to review the psychology and personality of project managers	There is a trend toward hiring project managers with ENFP (extrovert, thinking, feeling, perception) preferences
	Prabhakar, 2005	Determine if project managers switch leadership style and if this affects project success	Used to PIP tool to measure project success, determined that transformational leadership is not linked to project success

Table 2-2 Continued

Research Theme	Author, Year	Hypothesis or Research Questions	Findings
	Sumner, Bock & Giamartino, 2006	Examine the link between managerial and leadership skills of project managers and project success in IT.	Used project schedule variance to measure project success, found no significant results linking positive leadership behaviors to project success
Project Manager Characteristics	El-Sabaa, 2000	Project and functional managers differ with respect to attributes and skills	For project managers, human skills were more important than technical and organizational skills.
	Alfi, 2002	What is the relationship between tenure, education, training and experience and project success	Measuring respondents perceived significance of factors on project success, showed no relationship
Project Types	Shenhar & Dvir, 1996	Project typology can be used as a baseline for identifying project management variances and their effect on project success	Finds show distinct project management patterns across different levels of scope and technological uncertainty
	Muller & Turner, 2005	Is project manager competency a project success factor and are different competencies appropriate for different projects	Using the Westervield & Gaya-Walters criteria to measure project success, findings show emotional competencies are significant contributors to project success, not managerial or intellectual competencies
	Dvir, Sadeh, & Malachi-Pines, 2006	Project managers whose personality characteristics match the project profiles with be more successful	Measuring project success using the Shenhar four dimensions, findings show managers who are high in perceiving and intuition prefer high-tech projects, managers with an avoidance attachment style prefer low-tech projects
Roles	Mintzberg, 1990	Test the classical beliefs about the job of the manager	Results show managers' work to be unrelenting, discontinued, varied, and brief
	McCall & Segrist, 1980	Operationalized Mintzberg's Role Typology into Managerial Work Survey	Developed reliable and valid instrument to measure managerial roles across levels and functions
	Grover, Jeong, Kettinger & Lee, 1993	Examine the extent that CIO management roles differ from other senior management roles using Mintzberg's framework	Using the McCall & Segrist instrument, which operationalized Mintzberg's managerial roles, findings did not support hypothesis

Table 2-2 Continued

Research Theme	Author, Year	Hypothesis or Research Questions	Findings
	Gottschalk & Karlsen, 2005	Do roles differ for internal IT versus external IT projects	Using the Grover instrument, found that internal and external project managers emphasize different roles
Project Life Cycle	Pinto, 1986	What are the critical factors that predict project success and does the importance of these factors change over the life of the project	Using the Adams & Barndt 4-stage model of the project life cycle, concluded that project success is multi-dimensional
Organizational Context	Kendra & Taplin, 2004	Is there a linkage between organizational culture, project manager competencies and project success	Organizational structure is key to project success because it determines the project manager's level of authority

Conclusions

1. The Triple Constraint theory (Jugdev & Muller, 2005) of project success is an effective measure of internal, short-term project execution success, but subsequent theories by Rad (2003), Shenhar & Dvir (1996), Baccarini (1999), and Cooke-Davies (2002) have expanded the theory to include definitions of product value.
2. State of the art theories about project success include considering external (client) factors (Pinto, 1988; Rad, 2003; and Ojiako et al., 2007) and incorporating a time component (Munns & Bjeirmi, 1996; Baccarini, 1999; Cooke-Davies, 2002; and Willard, 2005). Though not empirically tested, these theories are socially significant because they introduce the notion that different stakeholders view project success differently and that time is a factor in measuring project success.
3. Theories by Rad (2003), Baccarini (1988), and Willard (2005) contend that project success is composed of project management success and product success.

These theories provide a holistic approach to project management and are empirically supported by research by Pinto and Slevin (1988), Willard (2005), The Standish Report (2001), and Beale and Freeman (1991). They also introduce the notion that a project can be a project management (internal) success and a project (external) failure (or vice versa).

4. Shenhar's et al. (2007) multi-dimensionality theory of project success provides a model for explaining project success. It identifies 27 items to measure five dimensions of project success. This theory is well-developed with empirical validity, utility, and significance.
5. Classic leadership theories have been used to enhance our understanding of the project manager. Shenhar et al. (1997) used Situational Leadership Theory to guide research matching project management style to project type. Pinto (1988) used Universal Leadership Behavior Theory to guide his research into CSF's of project management. Prabhakar (2005) used Transformational and Path Goal Theory to guide his research on switch leadership and project success.
6. Knowledge and skills models proposed by Schlick (1988) and El-Sabaa (2000) contend that successful project managers exhibit knowledge and skills in three areas: project specific/technical; project management/organizational; and people management/human knowledge and skills. Research shows that people management skills are the most important to project success and technical competency is the least important to project success (Posner, 1987; El-Sabaa, 2000; Muller & Turner, 2005; Smith, 2002; and Jacques et al., 2008).

7. Researchers have theorized that effective project management is more than just project leadership (Shenhar & Dvir, 1996; Kotter, 2001; and Jacques, Garger & Thomas, 2008). Turner and Muller (2005) and Kotter (2001) contend that project management skills are different from project leadership skills. None have proposed a theoretical model to explain the importance of other project management roles and/or skills. Sumner, Bock, and Giamartino (2006), conducted a study about the link between the managerial and leadership skills of project managers and project success using the Myers-Briggs framework, but their sample size (57) was small for multiple regression analysis.
8. Theoretical focus has expanded from the technical aspects of project management to include the "soft skills" of project management, and as such, more emphasis is being placed on the role of the project manager, and less on the tools of the project manager. (El Sabaa, 2000; and Kotter, 2001). Posner (1987) asserts that the primary problems of project managers are not technical, but human. No studies link people skills to the role of the project manager throughout the project life cycle.
9. Shenhar and Dvir (1997) presented a theory for classifying projects within the constructs of technological uncertainty and scope. Shenhar and Wideman (2000) enhanced this theory by identifying the most appropriate project manager within the project life cycle. The authors used Myers-Briggs to identify the project manager's style. A project manager's Myers-Brigg type does not change, but the project manager can choose to emphasize or de-emphasize roles within the project life cycle to increase project success. This is an area of future study.

10. Empirical research by Pinto (1986) and Kerzner (2004) demonstrate that the project manager is a factor in project success and selection of the "right" project manager is a "critical" factor to project success. Pinto's (1986) seminal work is one of the most popular and often cited works used to explain the CSF's of project success, and Kerzner's (2004) qualitative study exhibits internal and external validity; but neither study examines the impact of the project manager across the project life cycle.
11. Predictors from Pettersen's (1991) meta-analysis about integrated requirements for selecting project managers led him to assert that "because of the very nature of the project management environment – disorder, ambiguity, and disjunction between formal authority and responsibility" project managers need to develop skills different from functional managers (p. 21). Pettersen proposed a framework of 21 predictors of project managers. Empirical testing of this framework, determining if differences exist between functional and project managers, is an area for future study.
12. Research shows that project success is multi-dimensional and the project life cycle may be a moderating factor (Pinto, 1988). The importance of CSFs change as the project progresses. Success factors for the preceding phase determine the success of the succeeding phase (Khang & Moe, 2008). There are no studies that examined the behavioral changes that the project manager makes to address these CSFs as the project progresses.
13. Finding from Kendra and Taplin's (2004) qualitative study on project management adoption shows that organizational structure is key to project

success, because it determines the project manager's level of authority, the skills and competencies of the team, and the dynamics of the group.

14. Instruments used in the study of project leadership include the Managerial Work Survey (MWS), Myers-Briggs Type Indicator (MBTI), Jerrell and Slevin's leadership instrument, the Multifactor Leadership Questionnaire-6S (MLQ), Leadership Behavior Description Questionnaire (LBDQ), Costa and McCrae's Five Factors Model of Personality, and Wallach, Kogen, and Bem's Choice Dilemma Questionnaire. Many researchers developed their own instruments.
15. The Managerial Work Survey is a reliable and valid measure of manager roles across functions and levels as defined by the Mintzberg role typology (McCall & Segrist, 1980). The adapted Grover Instrument is a reliable and valid measure of managerial roles in IT, (Grover, Jeong, Kettinger, & Lee, 1993). Gottschalk & Karlsen (2005) adapted the instrument to study managerial roles with project managers.
16. The Standish Group's (2004) project resolution type is a reliable and valid instrument to measure project implementation success. A project is successful if it is completed on time, on budget, with all features and functions originally specified. A project is challenged if the project is completed and operational, but over-budget, over-schedule, with few features and functionality. A project is impaired if the project is cancelled at some point in the development cycle.
17. Empirical studies about project success have been exploratory (comparative) and explanatory (correlational). The most common method of data collection is via a survey/questionnaire. As an exception, Kerzner (1987) used grounded theory to

qualitatively obtain data about critical success factors. Several authors employed case study analysis (The Standish Group, 1994; Willard, 2005; and Beale and Freeman, 1991). While many studies have obtained data from across industries (Kerzner, 1987; Shenhar et al., 1997; and Pinto, 1986), most lack a sample size sufficient for rigorous analysis (Shenhar et al., 1997; and Dvir et al., 2003).

18. Most studies on project managers employed a survey, administered to project managers. Many studies had inadequate sample sizes (Grover, Jeong, Kettinger, & Lee, 1993; Zimmerer & Yasin, 1998; and Dvir, Sadeh & Malach-Pines, 2006) and data from samples that were not representative (El Sabaa, 2000; Shenhar & Dvir, 1996; Prabhakar, 2005; Gottschalk & Karlsen, 2005; and Sumner, Bock & Giamartino, 2006). Some studies employed a convenience sample plan, and distributed surveys at local PMI organizations or seminars (Posner, 1987). The web-based survey increased the size of and the randomness of the sample. There are concerns about reliability and validity of measures, as many surveys were researcher-developed (El Sabaa, 2000; Posner, 1987; Dolfi & Andrews, 2007; and Zimmerer & Yasin, 1998).

Recommendations

Based on analysis of the literature related to the project managers' affect on project success, there are some identified gaps in the literature. Theoretical formulations about the role of the project manager in project success have stressed the need to increase the project leadership role. State of the art theories have identified transformational leadership as a requisite of effective project management. Transformational leadership is based on idealized influence, inspirational motivation, individual consideration, and intellectual stimulation. Prabhakar's (2005) study found that individual consideration and ideal influence are not linked to project success. Turner and Muller's (2005) study shows that intellectual competencies (vision and strategic perspective) were negatively correlated to project success and emotional competencies (like communications) were significant contributes to project success. Researchers are questioning whether effective project management is more than just project leadership, but none have proposed a theoretical model to explain the importance of other project management roles and/or skills. There is a need to develop theoretical formulations about the importance of project management (not project leadership) to project success.

Theoretical formulations in the area of project life cycle and project success are few. Seminal works by Pinto (1986) have shown that the project manager is a CSF to project success, that the project life cycle is a moderating factor of project success, and that CSFs change as the project progresses. There is a need to develop theoretical formulations about the role the project manager plays throughout the project life cycle.

Future areas of scholarly inquiry using critical analysis of the theoretical and empirical literature are needed in the area of the varied and changing roles that project managers play and how these roles affect project success. Do project managers switch roles? Does the role switch precede and guide the project status, or does the project manager switch roles in response to changes in the project? There is a need to critically review both theoretical and empirical studies that examine the effect of project manager role switching within and among project phases.

Future areas of scholarly inquiry using critical analysis of the theoretical and empirical literature are needed in the area of organizational influence and project success.

Studies have shown that there are variables (external to the project team and not under the project manager's control) that affect project success. Organizational influences include type, maturity of project management systems, culture, and structure.

Methodological study is another area of future scholarly inquiry where design, sample size, populations studied, and measurement of variables are needed. There are ample studies that use the triple constraint as a measure of project success, but there is a need to develop new ways of examining project success, because project success is time dependent. Shenhar's et al. (1997) study on the multi-dimensionality of project success should be replicated with a larger, and more diverse, target population and sample size. The target population could include not only project managers, but also clients, to assess their perception of project success.

The Managerial Work Survey (McCall et al., 1980) has been used to examine managerial role priorities, and to evaluate the roles of the manager. Grover et al. (1993) adapted the Managerial Work Survey for IT executives and Gottschalk & Karlsen (2005) adapted it for project managers, but the instrument has not been used to examine changes in the role of the project manager as the project moves through the project life cycle. It has also not been used in other project management industries. Empirical studies are needed to strengthen the validity and reliability of the Managerial Work Survey as a measurement of project manager's roles.

Most studies examining the relationship between project managers and project success lack a sample size sufficient for rigorous analysis. Multiple regression analysis is recommended. Many studies obtained results from less than 100 project managers in one industry or one country, and cannot be generalized beyond that. Studies employed a convenience sample plan, distributing to personal contacts or to local PMI organizations or seminars. Data need to come from a large and diverse sample. The web-based survey increases the size of and the randomness of the sample (Dolfi & Andrews, 2007).

Many studies examine the impact of the project manager using the Myer-Briggs Type Indicator. Myer-Briggs (which measure psychological preferences that do not change), while adequate for measuring the personality of the project manager, presently lacks empirical rigor for measuring the impact of the project manager on project success, the role of the project manager through the project life cycle, and changes that the project manager makes to improve project success.

Most studies employ a cross-sectional method to assess project success over time (Prabhakar, 2005; Zimmerer & Yasin, 1998; El-Sabaa, 2000; and Pinto, 1986). Future studies should monitor the same projects from start to completion to more accurately assess impacts and changes throughout the project life cycle.

There is a need to include other stakeholders in the assessments (Pinto, 1986; Rad, 2003). Measuring the project manager's leadership style for the perspective of the team members is an area for future study. There are concerns about reliability and validity of measures, as many surveys were researcher-developed (El-Sabaa, 2000; Posner, 1987; Prabhakar, 2005; and Zimmerer & Yasin, 1998).

Emotional competencies, not intellectual competencies, contribute to project success (Dolfi & Andrews, 2007; and Turner & Muller, 2005). As such, management roles (like communication and negotiating) are more critical to project success than leadership roles (like influencing and creating vision). There is a need for empirical studies (using comparative and correlational designs) that examine the relationship between the various roles of the project manager and project success. The research should include an examination of the effect of the project life cycle, the context of the organization, the project type, and other characteristics of the project manager.

Studies have shown that people management knowledge (the soft skill) is the most important competency to have (Jacques et al., 2008; Schlick, 1988; and Pettersen, 1991). Future studies can operationalize the skills list to create an instrument to examine if project managers who consistently exhibit high communication skills achieve project success more than project managers who exhibit high technological skills.

Studies have shown that project success is multi-dimensional and that there are factors that are critical to project success (Munns & Bjeirmi, 1996, Pinto & Slevin, 1988; Rad, 2003; Baccarini, 1999; and Shenhar & Dvir, 1996). The importance of these success factors changes as the project progresses (Shenhar et al., 1997; Pinto & Slevin, 1988; Shehar & Dvir, 1996; Shenhar & Wideman, 2000; Khang & Moe, 2008; and Beale & Freeman, 1991). The project manager is a critical success factor to project success (Beale & Freeman, 1991; Kerzner, 1987; Pinto & Slevin, 1988; and The Standish Group, 2001). There are no studies to show if the importance of the project manager's skills and roles changes throughout the project life cycle and what effect this could have on project success.

Theories and empirical studies that determine the factors critical to project success have developed from the project managers' perspective (Rad, 2003; Beale & Freeman, 1991; and Pinto & Slevin, 1988). Theories now include an external perspective of project success (Rad, 2003; and Pinto, 1986). Empirical studies are needed to critically evaluate the factors of project success from the clients' perspective.

Pettersen (1991) proposed a framework of 21 predictors of the success of project managers. He asserted that project managers need to develop skills different from functional managers. Empirical testing of this framework, determining if differences exist between functional and project managers, is an area of future study. Future studies can also examine the impact of the female project manager on project success and the impact of project management training on project success. Measuring the project manager's leadership style for the perspective of the team members is also an area for future study.

To address gaps in the literature, the proposed research strategy is to conduct a non-experimental, comparative (exploratory) and correlational (explanatory) online survey research design to examine the relationship among organizational characteristics, project characteristics including project life cycle phase, project manager roles, the project manager profile, and project success. The theoretical framework to guide this study follows.

Theoretical Framework

Project Success

The Multi-Dimensionality Theory proposes that project success includes five dimensions (Shenhar, Levy, & Dvir, 2007). These dimensions vary at different times during the project. Design goals and impact to team are assessed during project execution. Impacts to the customer are assessed after the project is delivered. Benefits to the organization are assessed after financial measures have been achieved, typically in one or two years. Preparing for the future is assessed three to five years after project completion. With the Multi-Dimensionality Theory, project managers become accountable for the long-term success of the project. The Multi-Dimensionality Theory is socially significant in addressing issues about the expanding (and inclusive) constructs of project success.

Organizational Characteristics and Project Success

Kendra and Taplin's (2004) four-dimensional (2x2) success model proposes that project success factors are categorized at the micro and macro levels within social and technical organizations. The micro-social elements are the project manager's skill and competencies. The macro-social element is the project's organization structure. The micro-technical elements are the performance metrics used to monitor project performance. Macro-technical elements are structured business processes. These four elements are linked together by the organization's project management culture. The authors propose that organizational structure is a key to project success because it determines the project manager's level of authority, the skills and competencies of the team, and the dynamics of the group. The "organization's degree of project management maturity can influence the project" (PMBOK, 2004, p. 27). The characteristics of the organization determine the importance of project manager competencies, performance metrics, and business processes used to perform project work that leads to project success (Kendra & Taplin, 2004).

Project Characteristics and Project Success

Theoretical literature in the area of project characteristics is sparse. Shenhar and Dvir's (1996) Typology Theory of Project Management proposes that projects can be classified along a technological spectrum (low, medium, high, and super high uncertainty and technology) and a scope spectrum (assembly-low complexity, system-medium complexity, and array-high complexity). Management styles can be firm, moderately firm, moderately flexible, and flexible; and change based on the project technology and scope type. The authors proposed that this type of typology can be used to identify the project type and subsequent management style needed prior to project execution.

The Project Life Cycle and Project Success

Adams and Barndt (1978) proposed the four-phase model to identify the phases of the project life cycle. Conceptualization is the initial project stage. Planning establishes a formal set of plans to accomplish the project. Execution is performance of the work or the project. Termination includes the final steps that must be performed to close the project.

In 1986, Pinto introduced his Process Model of Project Implementation. It provides a set of critical success factors to assist project managers in increasing project implementation success. The strategic factors involve early planning and general objective setting. The tactical factors deal with resource deployment and implementation. The mediating factors have a moderate effect on project success or failure. The model proposes that certain factors are dominant during the four stages of the life cycle, and this contributes to overall project success.

Roles of the Manager and Project Success

Mintzberg's Role Theory is the prominent theory used to examine the role of the manager. It proposes that managers' activities are characterized by brevity and variety, there is similarity in the work done at all levels of management, managers perform regular activities, and managers strongly favor verbal mediums. This is in contrast to Fayol's (1916) "plan, organize, coordinate, and control" model, which was, previously, the dominant classical view of the managers' job. Mintzberg's typology identifies ten roles or "organized sets of behaviors identified with a position" (Mintzberg, 1990, p. 169). They are figurehead, leader, liaison, monitor, disseminator, spokesperson, entrepreneur, disturbance handler, resource allocator, and negotiator. Theoretical literature in the area of project manager roles is limited to Gottschalk and Karlsen's (2005) who proposed that internal roles are more important on internal IT projects, and external roles are more important on outsourced IT projects. No literature integrated the concepts of Role Theory and the constructs of project success.

The Project Manager Profile and Project Success

Theoretical literature in the area of project manager profile is sparse. Most theories are about the behavioral aspects of the project manager. Alfi (2002) proposed a relationship between tenure, education, training, experience, and project success.

Based upon the gaps in the literature and the theoretical framework used to guide this study, an exploratory (comparative) and explanatory (correlational) online survey research study was conducted to examine the relationships among organizational characteristics, project characteristics including project life cycle phase, project manager roles, the project manager profile, and project success. Research questions and hypotheses as well as a description of the hypothesized model tested in this study follow.

Research Questions

1. What are organizational characteristics, project characteristics, project life cycle stages, project manager roles, project manager profiles, and project success factors in this sample?
2. What are organizational characteristics, project characteristics, project life cycle stages, project manager roles, and project manager profiles that affect project success?
3. Are there differences in project manager roles according to organizational characteristics, project characteristics, project manager profiles, or the project life cycle stages?

Research Hypotheses

H1: Project manager profiles are significant explanatory variables of project success (impact to customer, impact to team, design goals, benefit to the organization, and preparing for the future).

H2: Project manager roles are significant explanatory variables of project success (impact to customer, impact to team, design goals, benefit to the organization, and preparing for the future).

H3: The stage of the project life cycle and project manager roles are significant explanatory variables of project success (impact to customer, impact to team, design goals, benefit to the organization, and preparing for the future).

H4: Project manager profiles and project manager roles are significant explanatory variables of project success (impact to customer, impact to team, design goals, benefit to the organization, and preparing for the future).

H5: Organizational characteristics, project characteristics, and project manager roles are significant explanatory variables of project success (impact to customer, impact to team, design goals, benefit to the organization, and preparing for the future).

A hypothesized model (See Figure 2-2) depicts the combined theoretical framework and hypotheses tested in the study about the explanatory relationships among organizational characteristics, project characteristics including project life cycle, project manager roles, the project manager profile, and project success. The model identifies the explanatory relationships between project manager profile (H1), project manager roles (H2), the project life cycle and project manager roles (H3), the project manager profile and project manager roles (H4), and organizational and project characteristics and project manager roles (H5) and project success.

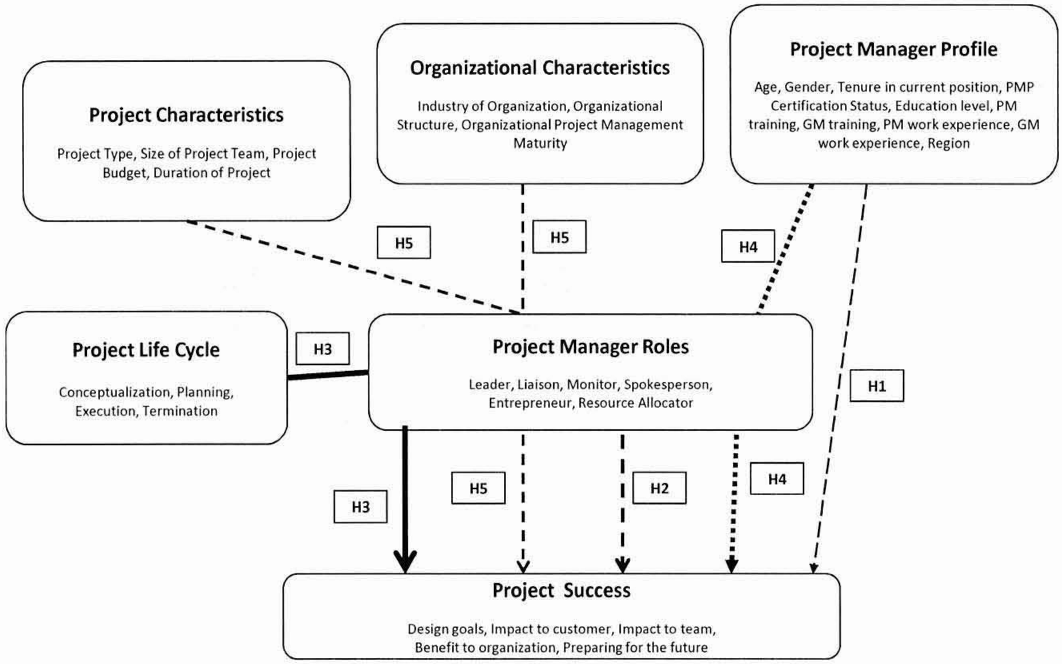

Figure 2-2. Hypothesized model for project success.

Chapter II presented a review of the literature, a theoretical framework that guides this study, research questions and hypotheses identified for the study of project manager roles, the project life cycle and project success. Critical analyses of theoretical and empirical literature led to the discovery of a literature gap that finds no integrative approach to project success, project manager roles, and project life cycle in a single study. The literature gap provides a direction and shows a need for further empirical study. Consequently, the hypotheses for this study are developed to test specific propositions. Chapter III presents the research methods used to test the hypotheses proposed in this study and to answer the research questions. The chapter presents the research design, population, sampling plan, instrumentation, procedures, methods of data analysis, and evaluation of methods for this study of the impact of project manager roles and the project life cycle on project success.

CHAPTER III

RESEARCH METHODS

Chapter III presents a description of the methods to be used in this study of the relationship among organizational characteristics, project characteristics including the project life cycle, project manager roles, the project manager profile, and project success. The research questions and hypotheses, which appear at the end of Chapter II, evolved from gaps in the literature. There are six sections to this chapter: (1) a discussion of the research design; (2) the study's population and sampling plan; (3) instrumentation; (4) data collection procedures and ethical aspects; (5) data analysis methods; and (6) evaluation of this study's research methods.

Research Design

This is a non-experimental, quantitative, exploratory (comparative) and explanatory (correlational) online survey research study. This research design was used to examine the relationships among organizational characteristics, project characteristics including project life cycle, project manager roles, the project manager profile, and project success. A web-based survey was used to collect data from the entire target population of approximately 307,000 worldwide PMI project managers that were working on a project. They were invited to participate in the survey to answer the research questions, and to test the hypotheses.

The online survey instrument consists of six parts (See Appendix A). In Part 1, *Organizational Characteristics* is measured by two nominal variables (Organizational Industry and Structure), and one scaled variable (Maturity Level). Part 1 was developed by the researcher (RQ1, RQ2, RQ3 attribute variables and explanatory variables in H5). Part 2 of the survey, *Project Characteristics,* was developed by the researcher. It is measured by the nominal variable Project Type, and three scaled variables: Size of team; Budget; and Duration (RQ1, RQ2, RQ3 attribute variables and explanatory variables in H5). Part 3 of the survey, *Project Life Cycle*, was measured by the scaled *Life Cycle Stage Model* developed by Adams and Barndt (1978) (RQ1, RQ2, RQ3 attribute variable and explanatory variable in H3). The scaled scores of Leader, Liaison, Monitor, Spokesperson, Entrepreneur, and Resource Allocator are measured by Part 4: *Project Manager Roles*. The 46-item Managerial Work Survey was developed by McCall and Segrist (1980) (RQ1, RQ2 attribute variables, RQ3 dependent variables, explanatory variables in H2, H3, H4, and H5). Part 5 of the survey, *Project Success,* is measured by Shenhar's et al. (2007) 27-item *Project Success Assessment Questionnaire* (RQ1 attribute variables, RQ2 dependent variables, and dependent variables in H1, H2, H3, H4, and H5). The scaled scores are Design Goals, Impact to Customer, Impact to Team, Benefit to the Organization, and Preparing for the Future. Part 6, *Project Manager Profile*, includes 10 items. All items were developed by the researcher. Gender, PMP certification, Education, and Region are nominal variables. Age, Tenure, Project Management and General Management courses, and Project Management and General Management experience are scaled variables (RQ1, RQ2, RQ3 attribute variables and explanatory variables in H1 and H4).

A descriptive research design was used to answer Research Question 1. This includes measures of central tendency (mean, mode, median), frequency distributions, and variability to describe the variables of organizational characteristics, project characteristics, project life cycle stages, project manager roles, project manager profiles, and project success. An explanatory (correlational) design was used to answer Research Question 2. Regression was used to examine differences in project success according to organizational characteristics, project characteristics, project life cycle stages, project manager roles, and project manager profiles. An exploratory (comparative) research design was used to answer Research Question 3. ANOVA was used to examine differences in project manager roles according to organizational characteristics, project characteristics including project life cycle stages, and the project manager profile.

Each hypothesis has five sub-hypotheses for the five measures of project success. To test Hypothesis 1, multiple regression analysis using the stepwise (forward) method was used to examine whether project manager profiles (age, gender, education, tenure, training, experience, and location) are significant explanatory variables of project success (customer, team, design goals, benefit to the organization, and preparing for the future). To test Hypothesis 2, multiple regression analysis using the stepwise (forward) method was used to examine whether project manager roles (leader, liaison, monitor, spokesman, entrepreneur, resource allocator) are significant explanatory variables of project success. To test Hypothesis 3, multiple regression analysis using the stepwise (forward) method was used to examine whether the stage of the project life cycle (conceptualization, planning, execution, and termination) and project manager roles are significant explanatory variables of project success. To test Hypothesis 4, multiple regression analysis using the stepwise (forward) method was used to examine whether the project manager profiles and project manager roles are significant explanatory variables of project success. To test Hypothesis 5, multiple regression analysis using the stepwise (forward) method was used to examine whether organizational characteristics (industry, structure, and maturity level), project characteristics (type, size, budget, and duration) and project manager roles are significant explanatory variables of project success.

Population and Sampling Plan

Target Population

In this study, the target population consisted of project managers that were members of the Project Management Institute (PMI). In May 2009, there were 307,180 members worldwide (Martin, personal communication, July 7, 2009). These PMI project managers are the appropriate target population because PMI is the leading global association for project management professionals. The association is "dedicated to advancing the state-of-the-art in effective and appropriate application of the practice and science of project management" (PMI, Inc., p. 1). Founded in 1969, PMI has 250 chapters in over 70 countries, and has been at the forefront of project management evolution and standardization regardless of industry or geography. Of the 307,180 current members, percentage of members by region include: North America (66.9%); Asia Pacific (14.8%); Europe, the Middle East, and Africa (EMEA) (13.0%); and Mexico, Latin America and Caribbean (5.3%). Ninety-six percent of the members are certified project managers. The top 10 represented industries are Information Technology, Computer Software, Financial Services, Telecommunications, Business Management Service, Aerospace, Education and Training, Defense, Engineering, and Utilities (Martin, personal communication, July 7, 2009). Project managers that were members of PMI, working on a project, that are at least 21 years of age, and able to read

English, were invited to participate in the study. They provided the basis for data collection and analysis.

Accessible Population

For this study, members of the target population of PMI project managers with Internet access, at least 21 years old, currently working on a project, and can read English were invited to participate. Members were invited to participate by two methods. A link to the survey instrument was placed on the PMI public website for 90 days. All members of the target population have access to the PMI website. Also, an invitation to participate, containing a link to the survey, was placed in the discussion forum of nine project management LinkedIn sites. The *Global Project Management* site has 12,650 members who foster knowledge exchange among project managers across cultures and nations. The *PMI – Project Management* site has 5,497 members networking project management best practices. The *PMI Certified PMPs* site has 26,019 certified project management professional members. The *PMI South Florida Chapter* site has 1,057 members promoting the acceptance and growth of project management in South Florida. The *PMI/PMBOK Self Study Group* site is a resource for professionals wanting to study the PMBOK while preparing for the PMP test. It has 974 members. The *PMP Credential Holders* site is limited to individuals who have attained PMP certification. The 3,563 members on this site network and share knowledge. The *PM Link* site has 46,020 members sharing project management best practices, methodologies, and tools. With 88,167 members, the *Project Manager Networking Group* is the largest social group for project managers on LinkedIn. The *Project Managers PMP Certified Networking*

Group site connects 5,375 PMI members in the LinkedIn network. These sites were selected by the researcher because they contained member populations matching the target population. None of these LinkedIn sites are endorsed or supported by the Project Management Institute. Filtering questions were used to obtain responses from active PMI project managers that were 21 years old or older and capable of reading English.

Sampling Plan

The sampling plan (the entire population of PMI member project managers over the age of 21 who can read English and are working on projects) was invited to participate in the survey. The final data producing sample was a self-selected and self-reported sample of those project managers that agreed to participate in this study. Multiple responses from the same computer generated a failure notice.

Sample Size. An adequate sample size is essential to establish internal and external validity. An adequate sample size is needed to conduct statistical analysis and to allow generalization of findings to the target population. In this study, multiple regression and exploratory factor analysis were conducted. Estimating the sample size needed for multiple regression analysis was based on $50 + 8m = n$ (Green, 1991), where m is equal to the number or explanatory variables and n represents the sample size. There are 24 explanatory variables in this study:

Part 1: Organizational Characteristics = 3
Part 2: Project Characteristics = 4
Part 3: Life Cycle = 1
Part 4: Project Manager Roles = 6
Part 6: Project Manager Profile = 10

Therefore, according to Green's formula, 50 + 8(24) = 242 is the minimum sample size to conduct multiple regression for this study. Additionally, the minimum sample size for exploratory factor analysis is 3 to 20 times the number of items (Green, 1991). The scale with the most number of items used in this study is the measure of *Project Success* with 46 items. This requires a sample size of 3(46) to 20(46) or 138 to 920 respondents. The required sample size of 242 participants for multiple regression is within this range.

In 2005, Turner and Mueller conducted a study on project managers utilizing the PMI membership database. Of 300,000 members, they received 400 usable responses for a 1.3% response rate. Therefore, for the purpose of this study, the intent was to have a minimum of 250 participants.

Inclusion and Exclusion Criteria

Inclusion criteria. The focus of this study is to examine the roles, characteristics, and project environment of active project managers. Respondents that met the following criteria were invited to participate:

1. The target population was restricted to project managers who were members of the PMI organization, worldwide.
2. The participants must have been active project managers currently working on a project.
3. This survey is accessed and completed via the Internet; so respondents must have had Internet access.
4. The participants had to be 21 years old or older.
5. Participants must have been able to read English.

Exclusion criteria. Project managers were not included in the study if they met any of the following exclusion criteria:

1. Project managers that did not have Internet access.
2. Project managers that were not members of the PMI organization.
3. PMI members that were not project managers.
4. PMI member project managers that were not currently working on a project.
5. PMI member project managers under the age of 21 years old.
6. PMI member project managers unable to read English.

Evaluation of sampling design. One of the strengths of the study is that the entire target project manager membership of the PMI organization (N=307,180) was asked to participate in this study (excluding those not currently working as project managers on a project, those not able to read English, and those under the age of 21 years), providing a chance for each member of the population to be represented. The final data producing sample was self-selected and self-reported, consisting of those that agreed to participate, introducing some sampling bias. However, sampling bias is minimal since the target population was invited.

Setting

The PMI Research Program provides opportunities for researchers to post links to surveys on the PMI website. A link to the survey was posted on this website for 90 days. A link to the survey was also distributed, via a discussion forum, to several PMI LinkedIn sites. The link takes the potential participant to the

SurveyMonkey site. The survey was available continuously (24 hours a day) for the 90 day duration. This allowed for respondents to complete the survey at any time, any place, and allows for adequate time to complete.

Instrumentation

Instrumentation consists of a self-reporting survey that measures variables consisting of six parts (See Appendix A). Part 1, *Organizational Characteristics*, measures organizational characteristics of the project, and was developed by the researcher. Part 2, *Project Characteristics*, developed by the researcher, measures characteristics of the project. Part 3, *Project Life Cycle*, measures the stage of the project life cycle using the four-stage life cycle model, and was developed by Adams and Bardnt (1978). Part 4, *Project Manager Roles*, measures the importance of six project manager roles using the Managerial Work Survey (MWS), and was developed by McCall and Segrist (1980). The instrument has six subscales, with a 46 item scale. Part 5, *Project Success*, measures project managers' perceptions of the project's ability to be successful and is measured using the Project Success Assessment Questionnaire (2007) updated from the Multi-dimensional Project Success Questionnaire on project success developed by Shenhar, Levy, and Dvir (1997). The instrument has five subscales, with a 27 item scale. Part 6, *Project Manager Profile*, developed by the researcher, includes socio-demographic characteristics.

Ninety-one items encompass the six-part survey, which takes approximately 10 to 15 minutes to complete. The constructs measured are summarized in Table 3-1. After the table, each of the measures is discussed in detail.

Table 3-1

Constructs in the Survey and Measurement

Part	Construct	Instrument Name and Developer (s)	Measures	Number of Items and Score Range
1	**Organizational Characteristics**	Developed by researcher	**Multiple Choice:** Industry Structure	2 items
			Ranked Choice: Maturity Level	1 item
2	**Project Characteristics**	Developed by researcher	**Multiple Choice:** Type	1 item
			Ranked Choice: Size of Team Budget Duration	3 items
3	**Project Life Cycle**	Developed by Adams and Barndt (1978)	**Ranked Choice:** Life Cycle Stage	1 item
4	**Project Manager Roles**	Managerial Work Survey developed by McCall and Segrist (1980)	**7-Point Semantic Differential** **Rating Scale:** **(Total Scale)** **Subscales:** Leader Liaison Monitor Spokesman Entrepreneur Resource Allocator	46 items 1-7 scale 46-322 Score Range 14 (1-7) 14-98 9(1-7) 9-63 9(1-7) 9-63 5(1-7) 5-35 3(1-7) 3-21 6(1-7) 6-42

Table 3-1 Continued

Part	Construct	Instrument Name and Developer (s)	Measures	Number of Items and Score Range
5	**Project Success**	*Project Success Assessment Questionnaire* developed by Shenhar, Levy, and Dvir (2007)	**5-Point Likert Rating Scale: (Total Scale)**	27 items 1-5 scale 27-135 Score Range
			Subscales:	
			Design Goals,	4 (1-5) 4-20
			Impact to Customer,	5(1-5) 5-25
			Impact to Team,	6(1-5) 6-30
			Benefit to the Organization,	6(1-5) 6-30
			Preparing for the Future	6(1-5) 6-30
6	**Project Manager Profile**	Developed by researcher	**Dichotomous:** Gender PMP Certified	2 items
			Multiple Choice: Education Region	2 items
			Ranked Choice: Age Tenure PM Courses GM Courses PM Experience GM Experience	6 items
	Total Items			**91 Items**

Eligibility Questions

Four Yes/No eligibility questions ask if the respondent is a member of PMI, if the respondent is a project manager, if the respondent is 21 years old or older, and if the respondent is presently working on a project. No = 0 and Yes = 1. To proceed to the survey, an answer of "Yes" must be given to each of the four questions.

Part 1. Organizational Characteristics

Part 1, *Organizational Characteristics,* was designed by the researcher. Questions relate to identity of the organization, including industry, structure, and maturity level. This section of the survey includes two multiple choice items (Industry and Structure) and one ranked choice (Maturity level) item, with a number assigned to each level (See Appendix A, Part 1).

In developing the survey, the researcher used the PMI specific industry groups to strengthen the study's external validity (PMI, Inc., 2009). The researcher assigned numbers to each industry type: 1 – Aerospace and Defense; 2 – Automation Systems; 3 – Consulting; 4 – Construction; 5 – E-business; 6 – Education and Training; 7 – Financial Services; 8 – Government; 9 – Healthcare; 10 – Human Resources; 11 – Information Systems; 12 – International Development; 13 – Information Technology and Telecom; 14 – Manufacturing; 15 – Marketing and Sales; 16 – New Product Development; 17 – Oil, Gas, and Petrochemicals; 18 – Pharmaceutical; 19 – Retail; 20 – Service and Outsourcing; and 21 – Utilities.

The Project Management Process Maturity $(PM)^2$ Model (Ibbs & Kwan, 1997) was used to develop the organizational project management maturity level question. This 5-level model is used to determine an organization's relative PM level. At Level 1, the Ad-hoc Stage, there are no formal procedures or plans to execute a project. The organization is trying to establish basic PM processes. At Level 2, the Planning Stage, the organization uses informal and incomplete procedures to manage projects. Project management processes become formal and projects show basic planning and controlling in Level 3, the Managed Stage. Project management processes are formal and documented in Level 4, the Integrated Stage. At this level the organization can conduct multiple project planning and control. At Level 5, the Sustained Stage, project management processes are being improved continuously. In this model, organizations evolve from less organized project management to highly project-oriented.

Organizational structure determines how much authority the project manager has. (PMI, Inc., 2009). In a functional organization the project manager has little authority or control over resources. In a projectized organization the project manager has high to total authority and control. In this study, the researcher has assigned numbers to each structure type: 1 – Functional; 2 – Matrixed; and 3 – Projectized.

Part 2. Project Characteristics

Part 2, *Project Characteristics*, was designed by the researcher, and includes questions about project type, size, budget, and duration (See Appendix A, Part 2). This section of the survey has one multiple choice question (project type) and three ranked responses (size, budget, and duration). In this study, the researcher has assigned numbers to each level. For Size, the ranked choice question requires selection from: 1 – Two (2) to Four (4) team members; 2 – Five (5) to Seven (7) team members; 3 – Eight (8) to Ten (10) team members; 4 – Eleven (11) to Thirteen (13) team members; 5 – Fourteen (14) to Sixteen (16) team members; 6 – Seventeen (17) to Nineteen (19) team members; and 7 – More than twenty (20+) team members. For Budget, the ranked choice question requires selection from: 1 – One (1) to Fifty thousand (50,000) dollars; 2 – Fifty thousand and one (50,001) to One hundred thousand (100,000) dollars; 3 – One hundred thousand and one (100,001) to Five hundred thousand (500,000) dollars; 4 – Five hundred thousand and one (500,001) to One million (1,000,000) dollars; 5 – One million and one (1,000,001) to Five million (5,000,000) dollars; and 6 – More than Five million (5,000,000+) dollars. For Duration, the ranked choice question requires selection from: 1 – One (1) to Ninety (90) days; 2 – Ninety-one (91) to One hundred eighty (180) days; 3 – One hundred eighty-one (181) to Three hundred sixty-four (364) days; 4 – One (1) to Three (3) years; 5 – Four (4) to Six (6) years; and 6 – More than six (6+) years. For Project Type: 1 – Strategic; 2 – Compliance; and 3 – Operational/Maintenance. These questions were derived from Shenhar and Dvir's (1996) study on project type and project manager style across the life cycle. It is expected that larger (and more complex) projects require a more bureaucratic and formal management style (Shenhar & Dvir, 1996).

Part 3. Project Life Cycle

Part 3, *Project Life Cycle*, was designed by the researcher using Adams and Barndt (1978) four-stage model to identify the phases of the project life cycle that the project manager was currently working in (See Appendix A, Part 3). In this study, the researcher has assigned numbers to each stage. The ranked choice question requires selection from; 1 - Conceptualization (the initial project stage), 2 - Planning (established a formal set of plans to accomplish the project), 3 - Execution (performance of the work or the project), and 4 - Termination (final steps that must be performed when the project is completed). The four-stage model was used in Pinto's (1986) seminal work to show that the importance of critical success factors change as the project proceeds through the project life cycle.

Part 4. Project Manager Roles

Part 4, *Project Manager Roles* are measured by an adaptation of the *Managerial Work Survey* developed by McCall and Segrist (1980) (See Appendix, Part 4). This part consists of 46 items that assess the six functions of leader, liaison, monitor, spokesperson, entrepreneur, and resource allocator (subscales). Respondents rate the importance of the tasks in their current project phase using a 7-point semantic differential scale with anchor ratings of 1 = "not important" to 7 = "very important". For the total scale, the score range is 46 to 322, where higher scores reflect a greater importance of the task in the respondents' current project phase. No items are reversed scored. The items for the subscales are: leader (GL1 – GL14); liaison (GI1 – GI9); monitor (GM1 – GM9); spokesperson (GS1 – GS5); entrepreneur (GE1 – GE3); and resource allocator (GR1 – GR6). With permission, the researcher adapted McCall and Segrist's (1980) survey in the following ways.

1. Changed the word from "subordinate" to "team members" in Questions 1-5, 8-9, and 11-14.
2. Changed the word from "employees" to "team members" in Question 7.
3. Changed the word from "organization" to "project" in Questions 10, 15-19, 21, 24, 27, 32, 40, and 43.
4. Changed the word from "work" to "project" in Questions 20 and 23.
5. Changed the word from "unit" to "project" in Questions 36, 39, and 44.

The McCall and Segrist (1980) survey is grounded in Mintzberg's Role Typology, which has been adapted to several situations and populations. McCall and Segrist (1980) used Mintzberg's roles to develop an instrument to study how managerial roles vary by level and function. The McCall and Segrist (1980) instrument operationalized six of Mintzberg's managerial roles: leader (14 items); liaison (9 items); monitor (9 items); spokesman (5 items); entrepreneur (3 items); and resource allocator (6 items). The other four roles (figurehead, disseminator, disturbance handler, and negotiator) were not operationalized because the authors found that activities in these roles correlated with activities in the other six roles, and activities in these four roles were found only in certain functions and at certain levels of management. Grover et al. (1993) adapted the instrument to investigate manager roles in an IT context. Gottschalk and Karlsen (2005) used the *Grover Instrument* in their study on internal and outsourcing IT project managers.

Reliability. Reliability for the instrument showed Cronbach's coefficient *alphas* of: leaders ($\alpha = .74$); spokesman ($\alpha = .62$); monitor ($\alpha = .72$); liaison ($\alpha = .79$); entrepreneur ($\alpha = .68$); and resource allocator ($\alpha = .70$) (McCall & Segrist, 1980). In this study, internal consistency reliability was also estimated using Cronbach's coefficient *alphas* for each role.

Validity. McCall and Segrist (1980) used Mintzberg's framework to develop 75 questionnaire items (content validity). This questionnaire was tested using a 33.3% stratified random sample. A total of 2,609 completed questionnaires were returned for a 68.3% response rate. Item-scale correlations were computed and scales with internal consistencies less than .70 were eliminated. This was confirmed by exploratory factor analysis, which resulted in the final 46 item questionnaire. In this study, exploratory factor analysis was also used to further establish construct validity.

Part 5. Project Success

Part 5, *Project Success* is measured by an adaptation of Shenhar's et al. (2007) *Project Success Assessment Questionnaire* (Appendix A, Part 5) which contains 27 items. The *Project Success Questionnaire* was adapted from the Multi-dimensional Project Success Questionnaire (MPSQ) developed to "examine the multi-dimensional nature of project success" (Shenhar et al., 1997, p. 7). The 27 items are organized into five subscales of design goals, impact to customer, impact to team, benefit to organization, and preparing for the future. The questionnaire uses a 5-point Likert scale with anchor ratings where 1 = "strongly disagree" and 5 = "strongly agree". For the total scale, the score range is 27 to 135, where the higher scores reflect a higher level of overall project success. The items for the subscales are: design goals (SD1 – SD4); impact to customer (SC1 – SC5); impact to team (ST1 – ST6); benefit to the organization (SO1-SO6); and preparing for the future (SF1 – SF5). The researcher adapted the instrument with permission to comment "At project completion, my current project will". The words "The project" was removed from the beginning of each statement.

Other studies have been conducted with this methodology and data, and it is a predominant theory used to examine the multi-dimensionality of project success. Dvir, Lipovetsky, Shenhar, and Tishler (2003) used the data and methodology to conduct a secondary study about assessing project success and identifying common managerial factors affecting success. Lipovetski et al. (1997) applied this methodology to defense industry projects. The notion that project success is time dependent; and that design goals, impact to customer, and impact to team dimensions are short-term, whereas benefit to the organization and preparing for the future dimensions are long-term, makes this a useful tool for measuring the time aspect of project success.

Reliability. Cronbach's coefficients *alphas* were not reported and were not available through the authors or publisher. In this study, internal consistency reliability was estimated using Cronbach's coefficient *alphas* for the total project success and its five subscales.

Validity. The relative importance of each success dimension was determined by comparing Pearson's *r* correlation between the overall success scores and scores of each success dimension. Exploratory factor analysis in the original study suggested that a successful project has four underlying dimensions. The factor loading for design goals ranged from .834 to. 872; for impact to customer loadings ranged from .499 to .694; for benefit to the organization loadings ranged from .701 to .730; and for preparing for the future loadings ranged from .650 to .825. In this study, exploratory factor analysis was also used to further establish construct validity and the multidimensionality of project success.

Part 6. Project Manager Profile

Part 6, *Project Manager Profile*, was designed by the researcher, and includes questions about age, gender, education, tenure, project management experience and training, and general management experience and training (See Appendix A, Part 6). This section of the survey allows for selection from dichotomous Yes/No responses (gender, and PMP certification status), two multiple choice items (education level and region), and several ranked responses (age, tenure, PM and GM experience in years, and

PM and GM training in number of courses). In this study, the researcher has assigned numbers to each attribute. No = 0 and Yes = 1 for PMP certification status. Male = 0 and Female = 1 for Gender. For Education Level, the categorical question requires selection from: 1 – High School; 2 – Bachelors; 3 – Masters; and 4 – Doctorate. The Region question allows for testing of external validity: 1 – North America; 2 – Asia Pacific; 3 – EMEA; 4 – Mexico, Latin America and Caribbean.

For Years in current Project Manager position, Years of total Project Management experience, and Years of General Management experience, the ranked choice questions require selection from: 1 – less than one (1) year; 2 – One (1) to Three (3) years; 3 – Fours (4) to Six (6) years; 4 – Seven (7) to Nine (9) years; 5 – Ten (10) to Twelve (12) years; and 6 – More than twelve years (12+). For Number of total Project Management courses taken, and Number of total General Management course taken, the ranked choice questions require selection from: 1 – none; 2 – One (1) to Three (3) courses; 3 – Fours (4) to Six (6) courses; 4 – Seven (7) to Nine (9) courses; 5 – Ten (10) to Twelve (12) courses; and 6 – More than twelve courses (12+). The attribute Age requires selection from ranked choices: 1 – Twenty one (21) to Twenty-five (25); 2 – Twenty-six (26) to Thirty (30); 3 – Thirty-one (31) to Thirty-five (35); 4 – Thirty-six (36) to Forty (40); 5 – Forty-one (41) to Forty-five (45); 6 – Forty-six (46) to Fifty (50); 7 – Fifty-one (51) to Fifty-five (55); 8 – Fifty-six (56) to Sixty (60); 9 – Sixty-one (61) to Sixty-five (65); and 10 – More than Sixty-five (65+).

Procedures: Ethical Considerations and Data Collection Methods

The following section describes the ethical considerations that were taken to protect subject participants. Every step of the data collection in this study followed ethical considerations and is presented in sequential order.

1. Permissions were obtained before Institutional Review Board (IRB) approval and data collection. The researcher used the Lynn University's web mail to contact the developers of scales for permission to adapt and use in this study (see Appendix B). Permissions were obtained for the *Four-stage project life cycle model* (Adams & Barndt, 1978), the *Managerial Work Survey* (McCall & Segrist, 1980), the *Project Success Assessment Questionnaire* (Shenhar et al., 2007), and the *Project Management Process Maturity $(PM)^2$ Model* (Ibbs & Kwan, 1997). Appropriate American Psychological Association (APA) notes of permission are documented on the survey (see Appendix A). These parts measure the project life cycle, project manager roles, project success, and organizational maturity.
2. An online survey (see Appendix A) was created and posted on the SurveyMonkey site (www.surveymonkey.com).
3. Policies and Procedures for SurveyMonkey (see Appendix E).
    i. A fee of $19.95 was paid for a professional monthly subscription (see Appendix E). Additional $9.95 was paid for SSL encryption.
    ii. SurveyMonkey agrees not to track or record respondents IP or e-mail addresses, or other personal identification (see Appendix E).
    iii. Multiple responses from a computer will generate a failure notice.

iv. SurveyMonkey uses SSL encryption to encrypt both the survey link and survey pages during transmission (see Appendix E).

v. SurveyMonkey stores collected data on a professionally administered server. Data are stored in encrypted format.

4. Permission was obtained from the Project Management Institute to place a link from the online survey on SurveyMonkey (see Appendix F) to the PMI survey site (http://www.pmi.org/Resources/Pages/Tell-Us-What-You-Think.aspx).
5. The dissertation proposal was successfully defended.
6. An application was submitted to the Institutional Review Board (IRB) of Lynn University after a successful defense. The following forms were submitted for approval:

   i. IRB Form 1, Application and Protocol

   ii. Authorization for Voluntary Consent (see Appendix C),

   iii. The survey (see Appendix A).

7. Upon approval from the Lynn University Institutional Review Board, the study commenced (see Appendix G).

   i. The survey link was activated.

   ii. A discussion note was posted on the PMI and Project Management LinkedIn sites. The discussion was an invitation to participate in the online survey and included a link to the authorization for voluntary consent and online survey (see Appendix D).

iii. The link took participants to the "consent form" (see Appendix C) within SurveyMonkey. The consent form contains information for consent, purpose, procedures, possible risks and benefits, assurance of anonymity, and instructions. Following authorization of their consent, the participants clicked the "I agree" button and were then directed to a secure web page to complete the survey. If the "I do not agree" button was selected, the participants were taken to a "Thank you" page.

iv. Participants completed four eligibility questions. If "no" was selected for any of the questions, the participants were taken to a "Thank you" page. If "yes" was selected, the participants continued to the next section of the survey.

v. The estimated time for completion of the survey was ten to fifteen minutes.

vi. Participation in the survey was voluntary. The researcher has no knowledge of who completed the survey and all participants are anonymous to the researcher.

vii. The respondents clicked a submit button once the survey was completed.

viii. No IP addresses or personal identifiers were tracked by the website. SurveyMonkey employs a third-party firm to conduct daily audits of their security, and the data reside behind firewall and intrusion prevention technology. Anonymity is maintained, however, no guarantee is made regarding the inception of any data sent using the Internet by any third parties. Information is held in the strictest of confidence unless required, by law or regulation, to be disclosed.

8. The data collection process was conducted for 90 days, after which time the survey link was removed from the PMI website and the Project Management LinkedIn Discussion Boards.
9. The IRB Report of Termination of Project was submitted to the IRB at completion of data collection.
10. Data were analyzed using SPSS version 18.0.
11. Researcher will submit a report (along with the number of completed questionnaires received) to PMI at the close of the study.
12. The data will be kept confidential and stored on password protected computers electronically.
13. The data will be destroyed after five years.

Methods of Data Analysis

The data collected for the study was coded so that it could be assigned values to be imported and analyzed with the Statistical Package for Social Sciences (SPSS) version 18.0. The methods of data analysis include descriptive statistics (frequency distributions, measures of central tendency, and variability), exploratory factor analysis, internal consistency reliability (coefficient *alphas*), Pearson's *r* correlations, ANOVA, and multiple regression analysis using the stepwise (forward) method. Below are the steps that were taken before actual data analysis began.

1. Data Coding: Collected data was assigned number of levels to each variable in the study.
2. Exploratory Data Analysis: Descriptive statistics was computed to examine data problems and to check the statistical assumptions for the parameters used in the study.
3. Exploratory Factor Analysis (EFA): EFA was used to explore the correlation among measurable variables and to examine the multi-dimensionality of the scales to establish construct validity.
4. Internal Consistency Reliability: Scales and subscales used in the survey containing multiple items with multiple-point ratings were examined for internal consistency reliability. Cronbach's coefficient *alphas* reliability estimates of 0.70 or higher for each scale indicated satisfactory reliability.
5. Pearson's *r* correlation was applied to the independent variables to test for bi-variable relationships and multicollinearity.

Data Analysis Planned to Answer Research Questions

To answer Research Question 1 about the characteristics of all variables (organizational characteristics, project characteristics, the project life cycle, project manager roles, the project manager profile, and project success), descriptive statistics, including frequency distributions, measures of central tendency, and variability (such as mean and standard deviation) was conducted.

For Research Question 2: What are organizational characteristics, project characteristics, project life cycle stages, project manager roles, and project manager profiles that affect project success, regression was used to test H1, H2, H3, H4, and H5.

For Research Question 3: Are there differences in project manager roles according to organizational characteristics, project characteristics, the project life cycle, or the project manager profile, ANOVA was used for a difference between two or more individual groups on the means of continuous variables.

Data Analysis Planned to Test Research Hypotheses

All hypotheses were tested using stepwise (forward) multiple regression analysis. In order to identify the order of variables to enter into the hierarchical linear regression models, Pearson's *r* and eta correlations were examined for a significant relationship between each explanatory variable and the dependent variable for each hypothesis, prior to conducting multiple regression analysis.

1. Categorical variables were converted to dummy variables.
2. Scaled (non-categorical) variables and dummy variables were correlated with each dependent variable using Pearson's *r* correlation coefficient.

The variables were entered into a forward regression model, until the model with the highest explanatory power (R^2) was produced. Goodness of fit of the model and statistical significance were confirmed using the adjusted R^2. Following are the notations for the 24 explanatory variables, 6 dependent variables, the constant, the unstandardized coefficient, and the error, which vary with each hypothesis.

Explanatory Variables varying with the Hypotheses

Project Manager Profile

X_1=Years of Project Management Experience
X_2=Years of General Management Experience
X_3=Tenure
X_4=PMP Certified
X_5=Project Management courses
X_6=General Management courses
X_7=Education Level
X_8=Gender
X_9=Age
X_{10}=Region

Organizational Characteristics

X_{11}=Industry
X_{12}=Organization Structure
X_{13}=Organization Maturity

Project Characteristics

X_{14}=Project Type
X_{15}=Project Size
X_{16}=Project Budget
X_{17}=Project Duration

Project Life Cycle

X_{18}=Phase of Project Life Cycle

Project Manager Roles

X_{19}=Leader
X_{20}=Spokesperson
X_{21}=Monitor
X_{22}=Liaison
X_{23}=Entrepreneur
X_{24}=Resource Allocator

Dependent Variables, varying with the hypotheses

Y_1=Design Goals
Y_2=Impact to Customer
Y_3=Impact to Team
Y_4=Benefit to Organization
Y_5=Prepare for the Future
Y_6=Overall Project Success

Other Notations

b=unstandardized regression coefficient
c=constant
e=error

Hypothesis 1 is designed to test the explanatory relationships among project manager profiles (PM experience, GM experience, Tenure, PMP certified, PM courses, GM courses, Education, Gender, Age, Region) and project success (design goals, impact to customer, impact to team, benefit to organization, prepare for the future). Hypothesis 1 is examined through stepwise (forward) multiple regression analysis where the regression model uses the following equations:

$$Y_1 = c + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + b_8X_8 + b_9X_9 + b_{10}Xd_{10} + e$$

$$Y_2 = c + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + b_8X_8 + b_9X_9 + b_{10}Xd_{10} + e$$

$$Y_3 = c + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + b_8X_8 + b_9X_9 + b_{10}Xd_{10} + e$$

$$Y_4 = c + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + b_8X_8 + b_9X_9 + b_{10}Xd_{10} + e$$

$$Y_5 = c + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + b_8X_8 + b_9X_9 + b_{10}Xd_{10} + e$$

$$Y_6 = c + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + b_8X_8 + b_9X_9 + b_{10}Xd_{10} + e$$

Hypothesis 2 is designed to test the explanatory relationship among project manager roles (leader, spokesperson, monitor, liaison, entrepreneur, and resource allocator) and project success (design goals, impact to customer, impact to team, benefit to organization, prepare for the future). Hypothesis 2 is examined through stepwise (forward) multiple regression analysis where the regression model uses the following equations:

$$Y_1 = c + b_{19}X_{19} + b_{20}X_{20} + b_{21}X_{21} + b_{22}X_{22} + b_{23}X_{23} + b_{24}X_{24} + e$$

$$Y_2 = c + b_{19}X_{19} + b_{20}X_{20} + b_{21}X_{21} + b_{22}X_{22} + b_{23}X_{23} + b_{24}X_{24} + e$$

$$Y_3 = c + b_{19}X_{19} + b_{20}X_{20} + b_{21}X_{21} + b_{22}X_{22} + b_{23}X_{23} + b_{24}X_{24} + e$$

$$Y_4 = c + b_{19}X_{19} + b_{20}X_{20} + b_{21}X_{21} + b_{22}X_{22} + b_{23}X_{23} + b_{24}X_{24} + e$$

$$Y_5 = c + b_{19}X_{19} + b_{20}X_{20} + b_{21}X_{21} + b_{22}X_{22} + b_{23}X_{23} + b_{24}X_{24} + e$$

$$Y_6 = c + b_{19}X_{19} + b_{20}X_{20} + b_{21}X_{21} + b_{22}X_{22} + b_{23}X_{23} + b_{24}X_{24} + e$$

Hypothesis 3 is designed to test the explanatory relationship among stage of the project cycle, project manager roles (leader, spokesperson, monitor, liaison, entrepreneur, and resource allocator) and project success (design goals, impact to customer, impact to team, benefit to organization, prepare for the future). Hypothesis 3 is examined through stepwise (forward) multiple regression analysis where the regression model uses the following equations:

$$Y_1 = c + b_{18}X_{18} + b_{19}X_{19} + b_{20}X_{20} + b_{21}X_{21} + b_{22}X_{22} + b_{23}X_{23} + b_{24}X_{24} + e$$

$$Y_2 = c + b_{18}X_{18} + b_{19}X_{19} + b_{20}X_{20} + b_{21}X_{21} + b_{22}X_{22} + b_{23}X_{23} + b_{24}X_{24} + e$$

$$Y_3 = c + b_{18}X_{18} + b_{19}X_{19} + b_{20}X_{20} + b_{21}X_{21} + b_{22}X_{22} + b_{23}X_{23} + b_{24}X_{24} + e$$

$$Y_4 = c + b_{18}X_{18} + b_{19}X_{19} + b_{20}X_{20} + b_{21}X_{21} + b_{22}X_{22} + b_{23}X_{23} + b_{24}X_{24} + e$$

$$Y_5 = c + b_{18}X_{18} + b_{19}X_{19} + b_{20}X_{20} + b_{21}X_{21} + b_{22}X_{22} + b_{23}X_{23} + b_{24}X_{24} + e$$

$$Y_6 = c + b_{18}X_{18} + b_{19}X_{19} + b_{20}X_{20} + b_{21}X_{21} + b_{22}X_{22} + b_{23}X_{23} + b_{24}X_{24} + e$$

Hypothesis 4 is designed to test the explanatory relationship among project manager profiles (PM experience, GM experience, Tenure, PMP certified, PM courses, GM courses, Education, Gender, Age, Region), project manager roles (leader, spokesperson, monitor, liaison, entrepreneur, and resource allocator) and project success (design goals, impact to customer, impact to team, benefit to organization, prepare for the future). Hypothesis 4 is examined through stepwise (forward) multiple regression analysis where the regression model uses the following equations:

$$Y_1 = c + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + b_8X_8 + b_9X_9 + b_{10}Xd_{10} + b_{19}X_{19} + b_{20}X_{20} + b_{21}X_{21} + b_{22}X_{22} + b_{23}X_{23} + b_{24}X_{24} + e$$

$$Y_2 = c + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + b_8X_8 + b_9X_9 + b_{10}Xd_{10} + b_{19}X_{19} + b_{20}X_{20} + b_{21}X_{21} + b_{22}X_{22} + b_{23}X_{23} + b_{24}X_{24} + e$$

$$Y_3 = c + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + b_8X_8 + b_9X_9 + b_{10}Xd_{10} + b_{19}X_{19} + b_{20}X_{20} + b_{21}X_{21} + b_{22}X_{22} + b_{23}X_{23} + b_{24}X_{24} + e$$

$$Y_4 = c + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + b_8X_8 + b_9X_9 + b_{10}Xd_{10} + b_{19}X_{19} + b_{20}X_{20} + b_{21}X_{21} + b_{22}X_{22} + b_{23}X_{23} + b_{24}X_{24} + e$$

$$Y_5 = c + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + b_8X_8 + b_9X_9 + b_{10}Xd_{10} + b_{19}X_{19} + b_{20}X_{20} + b_{21}X_{21} + b_{22}X_{22} + b_{23}X_{23} + b_{24}X_{24} + e$$

$$Y_6 = c + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + b_8X_8 + b_9X_9 + b_{10}Xd_{10} + b_{19}X_{19} + b_{20}X_{20} + b_{21}X_{21} + b_{22}X_{22} + b_{23}X_{23} + b_{24}X_{24} + e$$

Hypothesis 5 is designed to test the explanatory relationship among organizational characteristics, project characteristics, project manager roles (leader, spokesperson, monitor, liaison, entrepreneur, and resource allocator) and project success (design goals, impact to customer, impact to team, benefit to organization, prepare for the future). Hypothesis 5 is examined through stepwise (forward) multiple regression analysis where the regression model uses the following equations:

$$Y_1 = c + b_{11}x_{11} + b_{12}X_{12} + b_{13}X_{13} + b_{14}X_{14} + b_{15}X_{15} + b_{16}X_{16} + b_{17}X_{17} + b_{19}X_{19} + b_{20}X_{20} + b_{21}X_{21} + b_{22}X_{22} + b_{23}X_{23} + b_{24}X_{24} + e$$

$$Y_2 = c + b_{11}x_{11} + b_{12}X_{12} + b_{13}X_{13} + b_{14}X_{14} + b_{15}X_{15} + b_{16}X_{16} + b_{17}X_{17} + b_{19}X_{19} + b_{20}X_{20} + b_{21}X_{21} + b_{22}X_{22} + b_{23}X_{23} + b_{24}X_{24} + e$$

$$Y_3 = c + b_{11}x_{11} + b_{12}X_{12} + b_{13}X_{13} + b_{14}X_{14} + b_{15}X_{15} + b_{16}X_{16} + b_{17}X_{17} + b_{19}X_{19} + b_{20}X_{20} + b_{21}X_{21} + b_{22}X_{22} + b_{23}X_{23} + b_{24}X_{24} + e$$

$$Y_4 = c + b_{11}x_{11} + b_{12}X_{12} + b_{13}X_{13} + b_{14}X_{14} + b_{15}X_{15} + b_{16}X_{16} + b_{17}X_{17} + b_{19}X_{19} + b_{20}X_{20} + b_{21}X_{21} + b_{22}X_{22} + b_{23}X_{23} + b_{24}X_{24} + e$$

$$Y_5 = c + b_{11}x_{11} + b_{12}X_{12} + b_{13}X_{13} + b_{14}X_{14} + b_{15}X_{15} + b_{16}X_{16} + b_{17}X_{17} + b_{19}X_{19} + b_{20}X_{20} + b_{21}X_{21} + b_{22}X_{22} + b_{23}X_{23} + b_{24}X_{24} + e$$

$$Y_6 = c + b_{11}x_{11} + b_{12}X_{12} + b_{13}X_{13} + b_{14}X_{14} + b_{15}X_{15} + b_{16}X_{16} + b_{17}X_{17} + b_{19}X_{19} + b_{20}X_{20} + b_{21}X_{21} + b_{22}X_{22} + b_{23}X_{23} + b_{24}X_{24} + e$$

Evaluation of Research Methods

Both internal and external validity was examined to discuss the strengths and weaknesses of this research design. Internal validity considers the appropriateness of the study from theory to hypothesis testing, research design, instruments, procedures, and data analysis that affects relationships between independent variables and dependent variables. On the other hand, external validity is the approximate truth of conclusions that researchers draw for generalizations (Trochim & Donnelly, 2007). The research methodology was evaluated, and strengths and weaknesses are presented.

Internal validity: Strengths

1. Use of an explanatory (correlational) research design, which is stronger than an exploratory or descriptive research design.
2. Use of multiple regression analysis to examine the relationships among attribute and dependent variables.
3. Instruments used in the survey are reliable and validated through previous empirical research using Cronbach's coefficient *alphas* and exploratory factor analysis.

Internal validity: Weaknesses

1. This study is not an experimental design.
2. Survey inquires about the respondent's perception of project success. It does not review project metrics such as actual versus budgeted schedules or cost figures.
3. Project success is assessed from the project manager's viewpoint only. In this study, other stakeholders are not considered.
4. Final data producing sample is self-selected and self-reported.

External validity: Strengths

1. Large international sample is sought to strengthen external validity (generalizing findings of the study).
2. Survey is completed in natural environment

External validity: Weaknesses

1. Final data producing sample is self-selected and self-reported, introducing a possibility of selection bias.

Chapter III describes the research methodology that test the hypotheses regarding the impact of organizational characteristics, project characteristics, the project life cycle, project manager roles, and the project manager profile on project success. The chapter describes the research design, population, sampling, instrumentation, data collection procedures (including ethical considerations), data analysis methods, and evaluation of research methods. Chapter IV presents the findings of this study. Chapter V discusses the findings.

CHAPTER IV

RESULTS

Chapter IV presents the findings of the study about the relationship between organizational characteristics, project characteristics, project manager roles, the project life cycle, project manager characteristics, and project success. The data collected from online surveys were analyzed using the Statistical Program for Social Sciences (SPSS) version 18.0. The reliability and validity of the subscales and total scales used in this study were examined and reported. Descriptive and inferential statistics were used to answer the research questions and conduct hypotheses testing.

Final Data Producing Sample

The target population for the study consists of project managers that are members of PMI. Information available from PMI states there are 307,180 current members. Percentage of members by region include: North America (66.9%); Asia Pacific (14.8%); Europe, the Middle East, and Africa (EMEA) (13.0%); and Mexico, Latin America and Caribbean (5.3%). Ninety-six percent of the members are certified project managers. The top 10 represented industries are Information Technology, Computer Software, Financial Services, Telecommunications, Business Management Service, Aerospace, Education and Training, Defense, Engineering, and Utilities (Martin, personal communication, July 7, 2009). The survey was made available online to all PMI members and those meeting the selection criteria were invited to participate. The total number of project managers starting the survey was 343. The total number of project managers completing the survey was 261. The usable response rate was 76.1%. Of the 261 completing the survey, 46.0% were in North America, 34.1% in Asia Pacific, 16.1% in Europe, the Middle East, and Africa, and 3.8% in Mexico, Latin America and Caribbean. Of those completing the survey, 76.6% were certified. The sample for Europe, the Middle East and Africa provides a good representation. The sample for Asia Pacific is overrepresented and the sample for North America is under-representative of the target population. A comparative analysis of the sample with the target population is presented in Table 4-1.

Table 4-1

Comparative Analysis of the Sample with the Target Population on Region and PMP Certification

Project Manager Characteristic	Target Population	Sample	Percentage Differences (+ , -)
Region	N = 307,180	N = 261	
North America	66.9%	46.0%	+20.9%
Asia Pacific	14.8%	34.1%	-19.3%
Europe, the Middle East and Africa	13.0%	16.1%	-3.1%
Mexico, Latin America and Caribbean	5.3%	3.8%	+1.5%
PMP certification	N = 307,180	N = 261	
Yes	96.0%	76.6%	+19.4%
No	4.0%	32.4%	-28.4%

+ Sample is under represented. – Sample is over represented

Table 4-2 provides a comparison of the Top 10 Industries. The sample population provides a good representation, as the Top 10 industries align with the target population. Information Technology is the top industry represented in both the target and sample populations. Education and Training (#7 in the target population) was #11 in the sample population; and Utilities (#10 in the target population) was #13 in the sample population.

Table 4-2

Comparative Analysis of the Sample with the Target Population on Organizational Industries

Top 10 Organization Industries	Target Population	Sample
1	Information Technology	IT & Telecom
2	Computer Software	Information Systems
3	Financial Services	Consulting
4	Telecommunications	Financial Services
5	Business Management Services	Government
6	Aerospace	Healthcare
7	Education & Training	Manufacturing
8	Defense	Aerospace
9	Engineering	Services & Outsourcing
10	Utilities	Construction

Validity and Reliability of Scales

The survey was comprised of six parts including two scales. The *Project Manager Roles* scale measures the importance of project manager roles. This scale is comprised of six subscales: *Leader; Liaison; Monitor; Spokesperson; Entrepreneur;* and *Resource Allocator.* The *Project Success* scales measures the multi-dimensional nature of project success. This scale is comprised of five subscales: *Design goals; Impact to customer; Impact to team; Benefit to organization;* and *Preparing for the future.* Reliability and validity analyses for the *Project Manager Roles* and *Project Success* scales were conducted before answering the research questions and testing the hypotheses to ensure the adequacy of their psychometric qualities.

Exploratory Factor Analysis and Coefficient Alpha Analysis of Part 4: Project Manager Roles

For *Part 4: Project Manager Roles,* participants responded to a 46-item multidimensional scale comprised of six subscales. The subscales: *Leader, Liaison, Monitor, Spokesperson, Entrepreneur,* and *Resource Allocator* have anchors of 1 = "not important" and 7 = "very important". The scale reflects the importance of the task in the respondent's current project phase. Fourteen items were used to represent *Leader* (GL1 – GL14), *Liaison* consisted of nine items (GI1 – GI9), *Monitor* consisted of nine items (GM1 – GM9), *Spokesperson* consisted of 5 items (GS1 – GS5), *Entrepreneur* consisted of three items (GE1 – GE3), and *Resource Allocator* consisted of six items (GR1 – GR6). For the total scale, the score range is 46 to 322, where higher scores are reflective of greater importance for the tasks in the respondent's current project phase. No items were reversed scored.

Before factor analysis was conducted on the *Project Manager Roles* scale, the Kaiser-Meyer-Olkin Measure of Sampling Adequacy was conducted resulting in an outcome of .884. This outcome indicates that factor analysis is appropriate. Additionally, Bartletts Test of Sphericity was conducted resulting in a significant value of .000, which is highly significant, indicating that factor analysis is appropriate (Field, 2005).

To further establish construct validity of the *Project Manager Roles* scale, principal components analysis with varimax rotation was conducted. Six factors, leader (GL), liaison (GI), monitor (GM), spokesperson (GS), entrepreneur (GE), and resource allocator (GR) were expected to emerge from the analysis. Items with eigenvalues greater than 1.0 were used to extract factors. Exploratory factor analysis resulted in 10 factors being extracted. The eigenvalue totals range from 1.004 to 13.046 and the total variance explained was 68.476%. The factor loadings were as follows: factor 1 consisted of nine items with factor loadings ranging from .583 to .838; factor 2 consisted of six items with factor loadings ranging from .583 to .812; factor 3 consisted of eight items with factor loadings ranging from .535 to .766; factor 4 consisted of six items with factor loadings ranging from .611 to .792; factor 5 consisted of five items with factor loadings ranging from .629 to .743; factor 6 consisted of five items with factor loadings ranging from .464 to .690; factor 7 consisted of three items with factor loadings ranging from .609 to .737; factor 8 consisted of two items with factor loadings ranging from .482 to .696; factor 9 consisted of one item with a factor loading of .774; and factor 10 consisted of one item with a factor loading of .657. Table 4-3 shows the factor item loadings for *Part 4: Project Manager Roles Scale.*

Table 4-3

Initial Factor Item Loadings for Part 4: 46-Item Project Manager Roles Scale before Extraction

Item # and Part 4: Project Manager Roles Scale[a]	**Loadings for Factor 1**	**Loadings for Factor 2**	**Loadings for Factor 3**	**Loadings for Factor 4**	**Loadings for Factor 5**	**Loadings for Factor 6**	**Loadings for Factor 7**	**Loadings for Factor 8**	**Loadings for Factor 9**	**Loadings for Factor 10**
GI3	**.838**	.013	.173	.026	.097	.002	.102	.024	.051	.011
GI2	**.818**	-.041	.127	.021	.191	.039	.075	-.009	.178	.075
GI8	**.777**	.078	.225	.164	.107	-.001	-.136	-.079	.031	.157
GI9	**.772**	.101	.240	.176	.128	-.034	-.104	-.071	.066	.153
GI5	**.726**	.088	.322	.076	.182	.032	.129	.175	-.035	-.106
GI1	**.716**	.069	.142	.158	-.026	.094	-.019	-.033	.087	.321

Table 4-3 Continued

Item # and Part 4: Project Manager Roles Scale[a]	Loadings for Factor 1	Loadings for Factor 2	Loadings for Factor 3	Loadings for Factor 4	Loadings for Factor 5	Loadings for Factor 6	Loadings for Factor 7	Loadings for Factor 8	Loadings for Factor 9	Loadings for Factor 10
GI7	**.680**	.024	.348	.173	.189	.159	.098	.077	-.014	-.102
GI4	**.659**	.036	.226	.095	.262	.075	.242	.044	.126	-.186
GI6	**.557**	.021	.190	.247	-.001	-.005	.049	.373	.057	.007
GE3	.037	**.812**	.110	.153	.046	.280	.083	.093	-.012	-.142
GR2	-.037	**.792**	.090	.231	.059	-.028	**.067**	.022	.064	.288
GE2	-.007	**.772**	.122	.237	.045	.285	.038	.125	.004	-.153
GE1	.184	**.688**	.126	.159	.063	.277	.094	.087	.059	-.192
GR1	.017	**.683**	.123	.049	.171	.169	**.378**	-.049	-.092	.159
GR3	.130	**.583**	.035	.190	.176	-.111	**.222**	-.074	.178	.271
GM5	.341	-.017	**.766**	.020	.108	.042	.032	-.060	-.056	.092
GM8	.319	.094	**.760**	.057	.182	-.015	.002	.057	.005	-.016
GM4	.190	.238	**.693**	.154	.031	.222	.166	-.094	.020	-.094
GM6	.337	.126	**.664**	.032	.203	.142	.006	-.035	-.005	.129
GM3	.188	.091	**.646**	.299	.028	-.034	-.036	.010	.315	.046
GM9	.367	.161	**.619**	-.020	.087	.051	-.090	-.011	.165	.257
GM7	.180	-.003	**.605**	.042	.299	-.214	.189	.269	.133	.106
GM2	.214	.063	**.535**	.094	.120	.200	.240	-.027	.533	-.096
GS4	.118	.133	.116	**.792**	.011	.081	-.022	.178	.017	.005
GS5	.098	.229	.074	**.725**	-.043	.046	-.141	.161	.200	.064
GS3	.119	.153	.208	**.715**	-.147	-.041	.135	.166	-.033	-.005
GS1	.248	.162	-.072	**.650**	.114	.163	.084	-.107	.014	-.061
GS2	.208	-.133	.126	**.634**	-.013	.210	.357	-.205	-.088	.169
GL14	.099	.340	.060	**.611**	.087	.135	-.141	.121	.198	.047
GL3	.205	-.041	.147	.020	**.743**	-.027	.027	.012	.057	.092
GL1	.125	.156	.046	.044	**.714**	-.049	.066	.178	-.076	.198
GL2	.092	.188	.219	-.118	**.685**	.161	.061	-.036	.108	-.093
GL4	.174	.169	.076	.110	**.670**	.311	.055	.121	.050	-.055
GL5	.313	.021	.253	-.024	**.629**	.270	.146	-.122	.100	.130
GL10	-.014	.315	-.070	.208	.000	**.690**	-.002	.298	.005	.039
GL7	.072	.137	.255	-.008	.362	**.622**	.217	-.034	-.012	.088
GL6	.066	.351	.017	.134	.194	**.601**	.213	.067	.005	.064

Table 4-3 Continued

Item # and Part 4: Project Manager Roles Scale	Loadings for Factor 1	Loadings for Factor 2	Loadings for Factor 3	Loadings for Factor 4	Loadings for Factor 5	Loadings for Factor 6	Loadings for Factor 7	Loadings for Factor 8	Loadings for Factor 9	Loadings for Factor 10
GL8	.006	.302	.016	.378	.107	**.534**	.060	.264	.112	-.019
GL11	.202	.089	.285	.093	.079	**.464**	-.005	-.029	.110	.451
GR6	.068	.300	.073	.023	.137	.136	**.737**	.080	.166	.062
GR4	.074	.525	.173	.010	.132	.116	**.627**	.007	-.039	.103
GR5	.085	.487	-.039	.083	.111	.146	**.609**	.222	.256	.013
GL9	.058	.086	-.033	.192	.044	.282	.054	**.696**	.088	.145
GL13	.024	.159	-.035	.405	.246	.090	.134	**.482**	-.115	.060
GM1	.277	.085	**.190**	.151	.109	.016	.156	.058	**.774**	.053
GL12	.160	.026	.128	.043	.200	.104	.153	.227	-.026	**.657**

Note. GI = Liaison, GE = Entrepreneur, GR = Resource Allocator, GM = Monitor, GS = Spokesperson, GL = Leadership. Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. Rotation converged in 13 iterations.

To reduce the number of factors in the analysis and to evaluate the factor loadings in terms of theory and comprehensibility, the researcher extracted three factors (Garson, 2008). The three factors extracted for the factor analysis accounted for 4.072% of the total variance explained. Eigenvalues ranged from 1.004 to 2.664. For the factor loadings a cutoff of 0.4 was established (Garson, 2008). The factor loadings and names of the factors are: factor 1 (liaison) consisted of 9 items ranging from .552 to .837, factor 2 (monitor) consisted of 8 items ranging from .604 to .764, factor 3 (entrepreneur) consisted 6 items ranging from .574 to .802 and included 3 resource allocator items, factor 4 (spokesperson) consisted of 6 items ranging from .551 to .824 and included 1 leadership item, factor 5 (transformational leader) consisted of 5 items ranging from .590 to .771, factor 6 (transactional leader) consisted of 5 items ranging from .436 to .701, and factor 7 (resource allocator) consisted of 3 items ranging from .617 to .763. Two leadership items that loaded to factor 8, one monitor item that loaded on factor 9 and one leadership item that loaded on factor 10 were not considered in further analysis due to the fact that they did not fit the theoretical construct of the factor loadings. This resulted in a 42-item scale comprising 9 liaison items, 6 entrepreneur items, 8 monitor items, 6 spokesperson items, 5 transformational leader items, 5 transactional leader items, and 3 resource allocator items. Table 4-4 shows the factor item loadings for *Part 4: 42-Item Project Manager Roles Scale* after a three factor extraction.

Table 4-4

Factor Item Loadings for Part 4: 42-Item Project Manager Roles Scales after Extraction

Item # and Part 4: Project Manager Roles Scale	Loadings for Factor 1	Loadings for Factor 2	Loadings for Factor 3	Loadings for Factor 4	Loadings for Factor 5	Loadings for Factor 6	Loadings for Factor 7
GI3	**.837**	.180	.011	.025	.090	.012	.104
GI2	**.824**	.167	-.040	.020	.185	.026	.102
GI8	**.783**	.242	.083	.148	.110	-.009	-.138
GI9	**.779**	.263	.108	.162	.131	-.045	-.101
GI1	**.729**	.177	.071	.167	.001	.065	.005
GI5	**.720**	.304	.090	.078	.164	.066	.117
GI7	**.675**	.334	.015	.160	.156	.195	.081
GI4	**.653**	.233	.022	.086	.221	.115	.247
GI6	**.552**	.159	.023	.331	.039	.042	.055
GM5	.341	**.764**	-.011	-.011	.090	.035	-.001
GM8	.312	**.745**	.095	.065	.176	.004	-.016
GM4	.183	**.694**	.221	.113	-.016	.236	.150
GM3	.191	**.690**	.089	.326	.026	-.045	.011
GM6	.335	**.660**	.124	.025	.205	.152	-.021
GM9	.371	**.647**	.166	.011	.122	.031	-.074
GM2	.218	**.615**	.053	.105	.076	.195	.298
GM7	.185	**.604**	.018	.094	.334	-.184	.187
GR2	-.022	.116	**.802**	.242	.090	-.027	.091
GE3	.032	.092	**.802**	.147	.010	.338	.074

Table 4-4 Continued

Item # and Part 4: Project Manager Roles Scale[a]	Loadings for Factor 1	Loadings for Factor 2	Loadings for Factor 3	Loadings for Factor 4	Loadings for Factor 5	Loadings for Factor 6	Loadings for Factor 7
GE2	-.010	.109	**.760**	.231	.005	.344	.039
GR1	.024	.130	**.681**	.008	.161	.180	.365
GE1	.177	.116	**.669**	.160	.025	.335	.101
GR3	.139	.080	**.574**	.213	.217	-.124	.274
GS4	.117	.100	.123	**.824**	.041	.095	.001
GS5	.100	.085	.221	**.786**	.004	.050	-.088
GS3	.114	.175	.146	**.745**	-.118	-.017	.130
GL14	.115	.090	.334	**.619**	.071	.176	-.098
GS1	.261	-.053	.152	**.570**	.060	.188	.081
GS2	.221	.140	-.153	**.551**	-.035	.204	.333
GL1	.127	.028	.157	.084	**.771**	-.014	.071
GL3	.213	.164	-.043	.010	**.746**	.007	.036
GL2	.091	.242	.177	-.142	**.651**	.192	.078
GL4	.177	.080	.154	.101	**.644**	.373	.063
GL5	.326	.298	.006	-.073	**.590**	.290	.160
GL10	-.016	-.082	.304	.258	.012	**.701**	.019
GL7	.071	.264	.110	-.024	.337	**.632**	.217
GL6	.069	.024	.336	.123	.175	**.618**	.213
GL8	.004	.016	.286	.429	.118	**.552**	.097
GL11	.220	.328	.080	.112	.110	**.436**	.021
GR6	.074	.104	.288	.030	.135	.150	**.763**
GR5	.085	-.012	.472	.144	.135	.165	**.667**
GR4	.075	.175	.517	-.006	.131	.130	**.617**

Note. GI = Liaison, GE = Entrepreneur, GR = Resource Allocator, GM = Monitor, GS = Spokesperson, GL = Leadership. Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. Rotation converged in 8 iterations.

For the 46-item: *Part 4: Project Manager Roles Scale*, the internal consistency reliability was calculated using Cronbach's alpha. For the total scale the overall Cronbach's Alpha reported was .942. The scale had an internal consistency well above the recommended cutoff point of 0.7 (Field, 2005). By eliminating items GL9, GL12, GL13 and GM1, the alpha would decrease to .940, still well above the recommended cutoff point. The Cronbach's alpha if item deleted for the total revised scale is reported in Table 4-5. Based on exploratory factor analysis, there were a total of 7 subscales (42 items) for the *Project Manager Roles* scale. The coefficient alphas and the corrected item total correlations for the revised 42 item *Project Manager Roles subscales* is reported in Table 4-6.

Table 4-5

Corrected Item-total Correlations and Cronbach's Alpha if Item Deleted for Revised Part 4: 42-Item Project Manager Roles Scale (Total Scale Coefficient Alpha = .940)

Item	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
GL1	.404	.940
GL2	.442	.940
GL3	.408	.940
GL4	.525	.939
GL5	.585	.938
GL6	.461	.939
GL7	.507	.939
GL8	.432	.939
GL10	.319	.940
GL11	.476	.939
GL14	.438	.939
GS1	.408	.940
GS2	.392	.940
GS3	.383	.940
GS4	.420	.940
GS5	.379	.940
GM2	.580	.938
GM3	.534	.939
GM4	.613	.938
GM5	.553	.939
GM6	.628	.938
GM7	.498	.939
GM8	.606	.938

Table 4-5 Continued

Item	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
GM9	.581	.938
GI1	.545	.939
GI2	.581	.938
GI3	.577	.938
GI4	.633	.938
GI5	.663	.938
GI6	.489	.939
GI7	.678	.937
GI8	.586	.938
GI9	.615	.938
GE1	.541	.939
GE2	.471	.939
GE3	.484	.939
GR1	.485	.939
GR2	.425	.939
GR3	.459	.939
GR4	.505	.939
GR5	.477	.939
GR6	.437	.940

Table 4-6

Coefficient Alphas and Corrected Item-total Correlations for Revised Part 4: 42-Item Project Manager Roles Subscales (Total Scale Coefficient Alpha = .940)

Panel A: Liaison

9 items

Coefficient Alpha = .925

Item	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
GI3	.794	.913
GI2	.787	.914
GI8	.770	.915
GI9	.779	.914
GI1	.674	.921
GI5	.761	.915
GI7	.750	.916
GI4	.692	.920
GI6	.563	.927

Table 4-6 Continued

Panel B: Monitor

8 items

Coefficient Alpha = .895

Item	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
GM5	.741	.872
GM8	.767	.869
GM4	.672	.879
GM3	.641	.882
GM6	.702	.876
GM9	.670	.880
GM2	.615	.885
GM7	.585	.889

Panel C: Entrepreneur

6 items

Coefficient Alpha = .884

Item	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
GE1	.678	.860
GE2	.770	.846
GE3	.801	.841
GR2	.731	.852
GR1	.663	.866
GR3	.526	.885

Panel D: Spokesperson

6 items

Coefficient Alpha = .838

Item	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
GS4	.732	.777
GS5	.656	.792
GS3	.658	.790
GL14	.572	.810
GS1	.563	.811
GS2	.488	.836

Table 4-6 Continued

Panel E: Transformational Leader

5 items

Coefficient Alpha = .820

Item	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
GL1	.569	.796
GL3	.608	.784
GL2	.592	.789
GL4	.630	.778
GL5	.656	.770

Panel F: Transactional Leader

5 items

Coefficient Alpha = .770

Item	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
GL10	.577	.704
GL7	.577	.701
GL6	.621	.681
GL8	.543	.711
GL11	.375	.770

Panel G: Resource Allocator

3 items

Coefficient Alpha = .835

Item	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
GR6	.698	.742
GR5	.730	.737
GR4	.648	.800

Exploratory Factor Analysis and Coefficient Alpha Analysis of Part 4: Project Manager Roles

For *Part 5: Project Success,* participants responded to a 27-item multidimensional scale comprised of five subscales. The subscales: *Design Goals, Impact to Customer, Impact to Team, Benefit to Organization,* and *Preparing for the Future* have anchors of 1

= “strongly disagree” and 5 = “strongly agree”. The scale reflects the project manager’s perception of the project’s ability to be successful. For the total scale, the score range is 27 to 135, where the higher scores reflect a higher level of overall project success. No items were reversed scored. Four items were used to represent *Design Goals* (SD1 – SD4), *Impact to Customer* consisted of five items (SC1 – SC5), *Impact to Team* consisted of six items (ST1 – ST6), *Benefit to Organization* consisted of six items (SO1-SO6), and *Preparing for the Future* consisted of five items (SF1 – SF5).

Before factor analysis was conducted on the *Project Success* scale, the Kaiser-Meyer-Olkin Measure of Sampling Adequacy was conducted resulting in an outcome of .889. This outcome indicates that factor analysis is appropriate. Additionally, Bartletts Test of Sphericity was conducted resulting in a significant value of .000, which is highly significant, indicating that factor analysis is appropriate (Field, 2005).

To further establish construct validity of the *Project Success* scale, principal components analysis with varimax rotation was conducted. Five factors, design goals (SD), impact to customer (SC), impact to team (ST), benefit to organization (SO), and preparing for the future (SF) were expected to emerge from the analysis. Items with eigenvalues greater than 1.0 were used to extract factors. Exploratory factor analysis resulted in 5 factors being extracted. The eigenvalue totals range from 1.357 to 9.805 and the total variance explained was 65.336%. The factor loadings were as follows: factor 1 consisted of seven items with factor loadings ranging from .511 to .800; factor 2 consisted of six items with factor loadings ranging from .653 to .788; factor 3 consisted of seven items with factor loadings ranging from .433 to .713; factor 4 consisted of four items with factor loadings ranging from .614 to .816; and factor 5 consisted of three items with factor loadings ranging from .671 to .833. Table 4-7 shows the factor item loadings for *Part 5: Project Success Scale*.

Table 4-7

Initial Factor Item Loadings for Part 5: 27-Item Project Success Scale

Item # and Part 5: Project Success Scale	Loadings for Factor 1	Loadings for Factor 2	Loadings for Factor 3	Loadings for Factor 4	Loadings for Factor 5
SO2	**.800**	.195	.152	.167	.097
SO5	**.750**	.122	.296	.090	.055
SO3	**.744**	.227	.144	.189	.202
SO6	**.733**	.167	.278	.199	-.036
SO1	**.727**	.179	.157	.210	.230
SO4	**.658**	.099	.432	.156	.124
SD4	**.511**	.239	.026	.183	.293
ST2	.110	**.788**	.087	.212	.192
ST3	.140	**.787**	.080	.233	.266
ST6	.382	**.773**	.044	-.024	.017
ST5	.165	**.747**	.244	.088	-.092
ST4	.203	**.729**	.252	.036	.156
ST1	.081	**.653**	.180	.396	.266
SF3	.349	-.044	**.713**	.016	.115
SF2	.447	.032	**.708**	.023	.065
SF5	.066	.241	**.670**	.181	-.156
SF4	.199	.234	**.660**	.040	.041
SF6	.145	.401	**.582**	.144	-.089
SF1	.158	.095	**.533**	.374	.080
SC5	.008	.132	**.433**	**.404**	.297
SC3	.154	.144	.143	**.816**	.268
SC4	.187	.115	.157	**.815**	.015
SC2	.246	.128	.087	**.764**	.236

Table 4-7 Continued

Item # and Part 5: Project Success Scale	Loadings for Factor 1	Loadings for Factor 2	Loadings for Factor 3	Loadings for Factor 4	Loadings for Factor 5
SC1	.379	.240	.084	**.614**	-.092
SD1	.120	.087	-.032	.113	**.833**
SD2	.193	.049	.092	.099	**.803**
SD3	.143	.301	-.009	.142	**.671**

Note. SO = Organizational Success, ST = Team Success, SF = Future Success, SC = Customer Success, SD = Design Success. Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. Rotation converged in 7 iterations.

For the 27-item: *Part 5: Project Success Scale*, the internal consistency reliability was calculated using Cronbach's alpha. For the total scale the overall Cronbach's Alpha reported was .927. The scale had an internal consistency well above the recommend cutoff point of 0.7 (Field, 2005). The Cronbach's alpha if item deleted for the total scale is reported in Table 4-8.

Table 4-8

Corrected Item-total Correlations and Cronbach's Alpha if Item Deleted for Part 5: 27-Item Project Success Scale (Total Scale Coefficient Alpha = .927)

Item	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
SD1	.342	.928
SD2	.411	.927
SD3	.431	.927
SD4	.540	.925
SC1	.539	.925
SC2	.569	.925
SC3	.584	.924
SC4	.513	.925
SC5	.468	.926
ST1	.638	.924
ST2	.578	.924

Table 4-8 Continued

Item	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
ST3	.626	.924
ST4	.598	.924
ST5	.528	.925
ST6	.562	.924
SO1	.678	.923
SO2	.666	.923
SO3	.688	.923
SO4	.671	.923
SO5	.621	.923
SO6	.646	.923
SF1	.505	.925
SF2	.574	.924
SF3	.491	.926
SF4	.509	.925
SF5	.439	.926
SF6	.527	.925

Based on exploratory factor analysis there were 5 subscales of the *Project Success* scale. The coefficient alphas and the corrected item total correlations for the 27 item *Project Success subscales* is reported in Table 4-9.

Table 4-9

Coefficient Alphas and Corrected Item-total Correlations for Part 5: 27-Item Project Success Subscales (Total Scale Coefficient Alpha = .927)

Panel A: Organizational Success
7 items
Coefficient Alpha = .901

Item	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
SO1	.742	.882
SO2	.788	.877
SO3	.768	.879
SO4	.702	.887
SO5	.737	.882

Table 4-9 Continued

Panel A: Organizational Success

7 items

Coefficient Alpha = .901

Item	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
SO6	.736	.883
SD4	.493	.908

Panel B: Team Success

6 items

Coefficient Alpha = .898

Item	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
ST1	.692	.886
ST2	.765	.874
ST3	.802	.868
ST4	.725	.881
ST5	.672	.888
ST6	.699	.884

Panel C: Future Success

7 items

Coefficient Alpha = .818

Item	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
SF1	.507	.805
SF2	.681	.772
SF3	.591	.789
SF4	.584	.790
SF5	.574	.792
SF6	.576	.791
SC5	.411	.817

Panel D: Customer Success

4 items

Coefficient Alpha = .855

Item	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
SC1	.588	.860
SC2	.715	.800
SC3	.786	.772
SC4	.693	.809

Table 4-9 Continued

Panel E: Design Success

3 items

Coefficient Alpha = .770

Item	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
SD1	.643	.638
SD2	.652	.632
SD3	.514	.786

Bi-Variable Test among Independent Variables

After items were grouped according to factor analysis to reflect the best possible psychometric qualities for the study, a Pearson correlation coefficient was performed for the independent variables to test for bi-variable relationships and multicollinearity. The results are show in Table 4-10. No findings exceed .800, indicating acceptable levels of correlation. The next steps were to answer the research questions and test the hypotheses.

Table 4-10

Pearson Correlation Coefficient for Predictor Variables

	Org Industry	Org Structure	Org Maturity	Project Type	Project Size	Project Budget	Project Duration	Phase	Liaison	Monitor	Entrepreneur	Spokesperson	Transformational	Transactional	Resource Allocator
Organization Industry	1.000														
Organization Structure	-.143**	1.000													
Org Maturity	-.049	.135**	1.000												
Project Type	.064	-.038	-.097	1.000											
Project Size	.008	.052	.240*	-.022	1.000										
Project Budget	-.060	.091	.161*	-.134**	.556*	1.000									
Project Duration	-.104	.047	.062	-.160*	.357*	.617*	1.000								
Life Cycle Phase	.128	-.031	.035	.070	-.001	.055	.051	1.000							
Liaison Role	-.068	-.001	.103	-.113	.081	.006	.095	-.019	1.000						
Monitor Role	-.052	.049	.184**	-.048	.008	-.042	.048	-.088	.644*	1.000					
Entrepreneur Role	.041	.104	.210*	-.120	.162*	.178*	.115	.024	.230*	.325*	1.000				
Spokesperson	-.054	-.028	-.051	-.063	-.116	.005	.023	-.017	.395*	.328*	.429*	1.000			
Transformational Leader	-.063	.124**	.214*	-.046	.187*	.097	.124**	.064	.449*	.466*	.329*	.141**	1.000		
Transactional Leader	-.013	.072	.135**	-.092	.164*	.102	.162*	.028	.303*	.365*	.567*	.421*	.469*	1.000	
Resource Allocator	-.043	.101	.209*	-.154**	.122**	.123**	.037	-.013	.237*	.311*	.659*	.264*	.361*	.491*	1.000

* and ** indicate 2-tailed significances of <0.01 and <0.05 (difference) levels, respectively.

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Research Questions

Research Question 1

What are organizational characteristics, project characteristics, project life cycle stages, project manager roles, project manager profiles, and project success factors in this sample?

Organizational characteristics. The frequency distribution of project organizations' industry type, project management structure, and project management maturity level are shown in Table 4-11. The majority of organizations were in the IT and Telecom industry (60 or 23.0%). Most organizations operated in a matrix project management structure (131 or 50.2%) and achieved a project management maturity level of 3 – Managed Stage (87 or 33.3%).

Table 4-11

Organizational Characteristics

Organizational Characteristic Variables	Frequency	Valid Percent
Industry of Organization		
Aerospace & Defense		3.8%
Automation Systems		2.3%
Consulting		11.5%
Construction		3.4%
E-business		1.1%
Education & Training		2.3%
Financial Services		8.4%
Government		7.3%
Healthcare		6.1%
Human Resources		0.0%
Information Systems		12.6%
International Development		0.4%
IT & Telecom		23.0%
Manufacturing		5.0%
Marketing & Sales		0.8%
New Product Development		1.1%

Table 4-11 Continued

Organizational Characteristic Variables	Frequency	Valid Percent
Oil, Gas & Petrochemicals	3	1.1%
Pharmaceutical	4	1.5%
Retail	4	1.5%
Service & Outsourcing	10	3.8%
Utilities	7	2.7%
Total	261	100.0%
Project Management Structure		
Functional	72	27.6%
Matrixed	131	50.2%
Projectized	58	22.2%
Total	261	100.0%
Project Management Maturity		
Level 1 – Adhoc Stage	37	14.2%
Level 2 – Planned Stage	63	24.1%
Level 3 – Managed Stage	87	33.3%
Level 4 – Integrated Stage	35	13.4%
Level 5 – Sustained Stage	39	14.9%
Total	261	100.0%

Project characteristics. The frequency distribution of project type, size of project team, project budget, and project duration are shown in Table 4-12. The majority of projects is strategic (136 or 52.1%) and has 5 to 7 members (69 or 26.4%). Most projects have a $100,001-$500,000 budget (55 or 21.1%) and last 1 to 3 years (88 or 33.7%).

Table 4-12

Project Characteristics

Project Characteristic Variables	Frequency	Valid Percent
Project Type		
Strategic	136	52.1%
Compliance	20	7.7%
Operational/Maintenance	105	40.2%
Total	261	100.0%

Table 4-12 Continued

Project Characteristic Variables		Frequency	Valid Percent
Size of Project Team			
2 – 4 Members		45	17.2%
5 – 7 Members		69	26.4%
8 – 10 Members		56	21.5%
11 – 13 Members		19	7.3%
14 – 16 Members		7	2.7%
17 – 19 Members		5	1.9%
20+ Members		60	23.0%
	Total	261	100.0%
Project Budget			
\$1 - \$50,000		42	16.1%
\$50,001 - \$100,000		33	12.6%
\$100,001 - \$500,000		55	21.1%
\$500,001 - \$1,000,000		36	13.8%
\$1,000,001 - \$5,000,000		50	19.2%
\$5,000,001+		45	17.2%
	Total	261	100.0%
Project Duration			
1 day – 90 days		24	9.2%
91 days – 180 days		69	26.4%
181 days – 364 days		56	21.5%
1 year – 3 years		88	33.7%
4 years – 6 years		13	5.0%
6+ years		11	4.2%
	Total	261	100.0%

Project Life Cycle Stages. The frequency distribution of the project life cycles phases is shown in Table 4-13. Most projects are in execution phase (170 or 65.1%).

Table 4-13

Project Life Cycle Stages

Project Life Cycle Variables		Frequency	Valid Percent
Project Phase			
Conceptualization		15	5.7%
Planning		58	22.2%
Execution		170	65.1%
Termination		18	6.9%
	Total	261	100.0%

Project Manager Roles. The mean scale and average item scores for the revised *42-Item Project Manager Roles* scale resulted from exploratory factor analysis. The scale is a 42-item multidimensional, 7-point semantic differential scale, with anchors of not important (1) and very important (7). All items were given points that correspond to the importance of the tasks in their current project phase. For the total scale, the score range is 46 to 322, where higher scores are reflective of greater importance of the task in the respondents' current project phase. The scale consists of nine Liaison items with a score range from 9 to 63, eight Monitor items with a score range from 8 to 56, six Entrepreneur items with a score range from 6 to 42, six Spokesperson items with a score range from 6 to 42, five Transformational Leader items with a score range from 5 to 35, five Transactional Leader items with a score range from 5 to 35, and three Resource Allocator items with a score range from 3 to 21.

The lowest average *Liaison* item score was item #GI4, "Attending social functions as a representative of your project" at 3.78. The highest average *Liaison* item score was item #GI1, "Maintaining your personal network of contacts" at 4.79. The lowest average *Monitor* item score was item #GM7, "Touring facilities for observational purposes" at 3.66. The highest average *Monitor* item score was item #GM4, "Keeping up with technological developments related to your project" at 5.18. The lowest average *Entrepreneur* item score was item #GR1, "Distributing budgeted resources at 5.34. The highest average *Entrepreneur* item score was item #GE1, "Planning and implementing change" at 5.98. The lowest average *Spokesperson* item score was item #GS2, "Serving as an expert to people outside of your project" at 5.10. The highest average *Spokesperson* item score was item #GL14, "Forwarding important information to your team members" at 6.09. The lowest average *Transformational Leader* item score was item #GL3, "Keeping in touch with and helping team members with personal problems" at 4.08. The highest average *Transformational Leader* item score was item #GL4, "Resolving conflict between team members" at 5.16. The lowest average *Transactional Leader* item scores were item #GL11, "Providing guidance to your team members on organizational issues" at 5.07 and item #GL7, "Providing new team members with adequate training" at 5.08. The highest average *Transactional Leader* item score was item #GL10, "Maintaining supervision over changes on the project" at 6.15. The lowest average *Resource Allocator* item score was item #GR6, "Allocating equipment or materials" at 5.05. The highest average *Resource Allocator* item score was item #GR5, "Deciding for which task to provide resources" at 5.71. Average item scores for the *42-Item Project Manager Roles* scale ranged from item #GM7, "Touring facilities for observational purposes" at 3.66 to item #GL10, "Maintaining supervision over changes on the project" at 6.15. This is presented in table 4-14.

Table 4-14

Mean Scale and Average Item Scores for the 42-Item Project Manager Roles Scale

42 Item Project Manager Roles Scale	N	1 Not Important	2	3	4	5	6	7 Very Important	Average Item Score
GI3 Attending conferences or meetings to maintain your contacts	261	8.4%	11.1%	9.2%	36.8%	18.4%	11.5%	4.6%	3.98
GI2 Attending social functions which allow you to keep up your contacts	261	8.8%	11.1%	14.2%	34.9%	16.9%	10.7%	3.4%	3.86
GI8 Developing personal relationships with people outside your project	261	6.9%	8.8%	10.7%	32.6%	18.4%	19.2%	3.4%	4.18
GI9 Developing contacts with important people outside your project	261	5.0%	7.3%	9.6%	13.8%	34.5%	22.2%	7.7%	4.63
GI1 Maintaining your personal network of contacts	261	3.4%	6.9%	6.1%	14.2%	39.5%	20.3%	9.6%	4.79
GI5 Joining associations which might provide work-related contacts	261	9.2%	10.0%	7.3%	35.2%	17.2%	14.6%	6.5%	4.11
GI7 Developing new contacts by answering request for information	261	6.1%	9.6%	7.3%	34.1%	22.2%	17.2%	3.4%	4.22
GI4 Attending social functions as a representative of your project	261	11.1%	13.0%	12.6%	31.0%	16.9%	12.6%	2.7%	3.78

Table 4-14 Continued

42 Item Project Manager Roles Scale	N	1 Not Important	2	3	4	5	6	7 Very Important	Average Item Score
GI6 Staying attune to the grapevine	261	4.2%	6.9%	8.4%	36.4%	22.2%	15.7%	6.1%	4.37
Liaison Total Score									**37.92**
GM5 Gathering information about trends outside of your project	261	5.7%	6.9%	14.6%	34.1%	20.7%	13.4%	4.6%	4.16
GM8 Learning about new ideas originating outside your project	261	3.4%	9.2%	8.4%	14.6%	35.6%	20.7%	8.0%	4.64
GM4 Keeping up with technological developments related to your project	261	1.1%	4.2%	3.8%	13.4%	34.5%	29.1%	13.8%	5.18
GM3 Keeping up with information on the progress of operations in the company	261	1.9%	6.9%	6.1%	17.6%	37.5%	24.1%	5.7%	4.77
GM6 Gathering information about customers and competitors	261	5.0%	9.6%	11.9%	30.7%	16.5%	16.9%	9.6%	4.33
GM9 Reading reports on activities in your own organization or other company	261	3.1%	8.4%	9.2%	39.5%	23.4%	13.8%	2.7%	4.24
GM2 Keeping up with market changes and trends that impact your project	261	5.0%	7.7%	8.4%	11.9%	36.8%	19.2%	11.1%	4.70
GM7 Touring facilities for observational purposes	261	17.2%	9.6%	8.4%	36.0%	15.3%	10.7%	2.7%	3.66
Monitor Total Score									**35.67**

Table 4-14 Continued

42 Item Project Manager Roles Scale	N	1 Not Important	2	3	4	5	6	7 Very Important	Average Item Score
GR2 Making decisions about time parameters on the project	261	0.8%	1.9%	1.9%	3.1%	15.3%	48.3%	28.7%	5.90
GE3 Solving problems by instituting needed changes on your project	261	0.4%	2.3%	0.8%	4.6%	15.3%	48.3%	28.4%	5.90
GE2 Initiating controlled change on your project	261	0.8%	1.5%	1.5%	4.2%	13.0%	48.3%	30.7%	5.95
GR1 Distributing budgeted resources	261	3.1%	2.7%	3.4%	8.0%	33.3%	29.1%	20.3%	5.34
GE1 Planning and implementing change	261	1.5%	1.1%	2.3%	2.7%	10.3%	48.7%	33.3%	5.98
GR3 Preventing the loss of resources valued by your project	261	0.8%	1.5%	2.7%	8.4%	13.4%	45.2%	28.0%	5.80
Entrepreneur Total Score									**34.88**
GS4 Answering inquires on behalf of your project	261	0.8%	0.8%	1.1%	6.9%	16.5%	50.6%	23.4%	5.83
GS5 Keeping other people informed about your project's activities	261	0.4%	0.8%	3.8%	4.2%	16.9%	47.9%	26.1%	5.84
GS3 Informing others of your project's future plans	261	0.4%	2.3%	3.8%	8.0%	18.0%	44.4%	23.0%	5.66

Table 4-14 Continued

42 Item Project Manager Roles Scale	N	1 Not Important	2	3	4	5	6	7 Very Important	Average Item Score
GL14 Forwarding important information to your team members	261	0.0%	1.5%	0.8%	3.1%	10.7%	49.4%	34.5%	6.09
GS1 Presiding at meetings as a representative of your project	261	0.4%	1.1%	0.8%	5.4%	18.4%	49.0%	24.9%	5.87
GS2 Serving as an expert to people outside of your project	261	2.3%	3.1%	6.9%	12.3%	35.6%	25.7%	14.2%	5.10
Spokesperson Total Score									**34.39**
GL1 Evaluating the quality of team members' job performance	261	3.1%	5.7%	9.6%	7.3%	33.3%	20.7%	20.3%	5.05
GL3 Keeping in touch with and helping team members with personal problems	261	7.3%	9.2%	12.6%	36.0%	15.7%	12.6%	6.5%	4.08
GL2 Integrating team members' goals with the project work requirements	261	5.0%	6.1%	8.4%	7.7%	35.2%	22.2%	15.3%	4.90
GL4 Resolving conflict between team members	261	3.1%	5.4%	4.2%	10.0%	34.1%	23.8%	19.5%	5.16
GL5 Keeping track of team members' special skills to facilitate personal growth	261	5.0%	9.2%	10.3%	33.3%	19.9%	16.5%	5.75	4.26
Transformational Leader Total Score									**23.46**

Table 4-14 Continued

42 Item Project Manager Roles Scale	N	1 Not Important	2	3	4	5	6	7 Very Important	Average Item Score
GL10 Maintaining supervision over changes on the project	261	0.0%	0.8%	2.3%	2.7%	9.2%	46.0%	39.1%	6.15
GL7 Providing new team members with adequate training	261	3.8%	3.4%	5.4%	11.9%	34.5%	25.7%	15.3%	5.08
GL6 Allocating manpower to specific jobs or tasks	261	1.1%	1.9%	0.4%	5.0%	16.9%	47.5%	27.2%	5.86
GL8 Seeing to that team members are alerted to problems that need attention	261	0.8%	0.4%	1.5%	4.6%	14.2%	46.4%	32.2%	5.99
GL11 Providing guidance to your team members on organizational issues	261	1.5%	3.1%	5.0%	14.6%	39.8%	25.7%	10.3%	5.07
Transactional Leader Total Score									**28.14**
GR6 Allocating equipment or materials	261	3.8%	6.1%	4.6%	10.7%	31.4%	28.4%	14.9%	5.05
GR5 Deciding for which task to provide resources	261	1.5%	1.5%	2.7%	6.9%	14.6%	51.7%	21.1%	5.71
GR4 Allocating money within your project	261	3.4%	6.1%	5.7%	9.6%	31.8%	22.6%	20.7%	5.11
Resource Allocator Total Score									**15.86**

The lowest average item mean score was 4.2137 for the Liaison subscale. The highest average item mean score was 5.8129 for the Entrepreneur subscale. The average item mean score for the total scale was 5.0077. The subscale mean scores were: Liaison 37.92, Monitor 35.67, Entrepreneur 34.88, Spokesperson 34.39, Transformational Leader 23.46, Transactional Leader 28.14, and Resource Allocator 15.86. The total scale mean score was 210.32. The average item mean, subscale, total scale scores, and standard deviations for the *42-Item Project Manager Roles Scale* are presented in Table 4-15.

Table 4-15

Mean Item, Subscale, Total Scale Scores, and Standard Deviations for the 42-Item Project Manager Roles Scale

42 Item Project Manager Roles Scale	N	Item Mean	Subscale and Total Scale Mean Score	Standard Deviation
Liaison Subscale (9 items, Score Range 9-61)	261	4.2137	37.9234	10.84
Monitor Subscale (8 items, Score Range 10-56)	261	4.4593	35.6743	8.88
Entrepreneur Subscale (6 items, Score Range 9-42)	261	5.8129	34.8774	5.55
Spokesperson Subscale (6 items, Score Range 12-42)	261	5.7318	34.4908	4.89
Transformational Leader Subscale (5 items, Score Range 7-35)	261	4.6912	23.4559	5.89
Transactional Leader Subscale (5 items, Score Range 10-35)	261	5.6276	28.1379	4.18
Resource Allocator Subscale (3 items, Score Range 3-21)	261	5.2874	15.8621	3.72
Total 42-Item Scale (42 items, Score Range 82-281)	261	5.0077	210.3218	30.96

Project Manager Profiles. The frequency distribution of project managers' PMP certification status, tenure, project management experience and training, general management experience and training, education level, gender, age, and region are shown in Table 4-16. The majority of project managers were certified (200 or 76.6%), had been working in their present job only 1 to 3 years (86 or 33.0%), but had more than 12 years of project management experience (95 or 36.4%) and general management experience (90 or 34.5%). The majority of project managers had taken only 1 to 3 courses in project management (100 or 38.3%) or general management (81 or 31.0%). Most project managers had a Masters degree (138 or 59.2%), and managed in the North American region (120 or 46.0%). There were 187 (71.6%) males and 74 (28.4%) females. Most project managers were between 31 and 40 years old (103 or 39.1%).

Table 4-16

Project Manager Profiles

Project Manager Profile Demographic Variables		Frequency	Valid Percent
PMP Certification			
Yes		200	76.6%
No		61	23.4%
	Total	261	100.0%
Tenure			
Less than 1 year		38	14.6%
1 – 3 years		86	33.0%
4 – 6 years		71	27.2%
7 – 9 years		28	10.7%
10 – 12 years		10	3.8%
More than 12 years		28	10.7%
	Total	261	100.0%

Table 4-16 Continued

Project Manager Profile Demographic Variables		Frequency	Valid Percent
PM Experience			
Less than 1 year		1	0.4%
1 – 3 years		21	8.0%
4 – 6 years		66	25.3%
7 – 9 years		32	12.3%
10 – 12 years		46	17.6%
More than 12 years		95	36.4%
	Total	261	100.0%
GM Experience			
Less than 1 year		26	10.0%
1 – 3 years		37	14.2%
4 – 6 years		40	15.3%
7 – 9 years		33	12.6%
10 – 12 years		35	13.4%
More than 12 years		90	34.5%
	Total	261	100.0%
PM Training			
None		3	1.1%
1 – 3 courses		100	38.3%
4 – 6 courses		59	22.6%
7 – 9 courses		23	8.8%
10 – 12 courses		21	8.0%
More than 12 courses		55	21.1%
	Total	261	100.0%
GM Training			
None		29	11.1%
1 – 3 courses		81	31.0%
4 – 6 courses		51	19.5%
7 – 9 courses		24	9.2%
10 – 12 courses		16	6.1%
More than 12 courses		60	23.0%
	Total	261	100.0%
Education Level			
High School		16	6.1%
Bachelors		96	36.8%
Masters		138	52.9%
Doctorate		11	4.2%
	Total	261	100.0%
Gender			
Male		187	71.6%
Female		74	28.4%
	Total	261	100.0%

Table 4-16 Continued

Project Manager Profile Demographic Variables	Frequency	Valid Percent
Age		
21-25	2	0.8%
26-30	17	6.5%
31-35	52	19.9%
36-40	50	19.2%
41-45	42	16.1%
46-50	31	11.9%
51-55	37	14.2%
56-60	21	8.0%
61-65	5	1.9%
66+	4	1.5%
Total	261	100.0%
Region		
North America	120	46.0%
Asia Pacific	89	34.1%
Europe, the Middle East and Africa	42	16.1%
Mexico, Latin America and Caribbean	10	3.8%
Total	261	100.0%

Project Success. The mean scale and average item scores for the *27-Item Project Success* scale resulted from exploratory factor analysis. The scale is a 27-item multidimensional, 5-point Likert rating scale, with anchor ratings where 1 = "strongly disagree" and 5 = "strongly agree". All items were given points that correspond to the perception of the project's ability to be successful. For the total scale, the score range is 26 to 135, where the higher scores reflect a higher level of overall project success. The scale consists of seven Organization items with a score range from 7 to 35, six Team items with a score range from 6 to 30, seven Future items with a score range from 7 to 35, four Customer items with a score range from 4 to 20, and three Design items with a score range from 3 to 15.

The lowest average *Organizational* item score was item #SO4, "Increase the organization's market share" at 3.39. The highest average *Organizational* item scores were item #SO3, "Create a positive return on investment" at 3.97 and item #SO6, "Contribute to the organization's direct performance" at 3.96. The lowest average *Team* item scores were item #ST6, "Encourage team members to stay with the organization" at 3.67 and item #ST4, "Create a fun working environment for the project team" at 3.65. The highest average *Team* item score was item #ST1, "Satisfy and motivate the project team" at 4.04. The lowest average *Future* item score was item #SF4, "Create new technologies for future use" at 3.16. The highest average *Future* item scores were item #SF1, "Contribute to future projects" and item #SC5, "Cause customers to come back for future work", both at 4.10. The lowest average *Customer* item score was item #SC1, "Create a product that improves customer's performance" at 4.15. The highest average *Customer* item score was item #SC3, "Meet customer requirements" at 4.38. The lowest average *Design* item score was item #SD3, "Complete with minor changes" at 3.25. The highest average *Design* item scores were item #SD2, "Complete within or below budget" at 3.94 and item #SD1, "Complete on time or earlier" at 3.93. Average item scores for the 27-Item Project Success scale ranged from item #SF4, "Create new technologies for future use" at 3.16 to item #SC3, "Meet customer's requirements" at 4.38. This is present in table 4-17.

Table 4-17

Mean Scale and Item Scores for the 27-Item Project Success Scale

27 Item Project Success Scale	N	1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree	Average Item Score
SO2 Increase the organization's profitability	261	3.1%	3.8%	12.6%	57.1%	23.4%	3.94
SO5 Contribute to shareholder's value	261	5.4%	6.1%	16.1%	55.6%	16.9%	3.72
SO3 Create a positive return on investment	261	3.1%	4.6%	11.1%	54.4%	26.8%	3.97
SO6 Contribute to the organization's direct performance	261	2.3%	3.1%	14.2%	57.5%	23.0%	3.96
SO1 Achieve economic business success	261	3.1%	3.8%	14.6%	54.4%	24.1%	3.93
SO4 Increase the organization's market share	261	5.7%	9.2%	41.4%	28.0%	15.7%	3.39
SD4 Achieve other efficiency measures	261	2.3%	4.6%	19.2%	57.5%	16.5%	3.81
Organizational Success Total Score							**26.72**
ST2 Create a highly loyal project team	261	1.5%	5.7%	18.8%	51.0%	23.0%	3.88
ST3 Provide high energy and morale for the project team	261	2.7%	4.6%	16.1%	56.7%	19.9%	3.87

Table 4-17 Continued

27 Item Project Success Scale	N	1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree	Average Item Score
ST6 Encourage team members to stay with the organization	261	2.7%	7.3%	22.2%	56.3%	11.5%	3.67
ST5 Provide personal growth for the project team	261	1.1%	6.9%	18.4%	57.9%	15.7%	3.80
ST4 Create a fun working environment for the project team	261	4.2%	6.9%	23.0%	51.3%	14.6%	3.65
ST1 Satisfy and motivate the project team	261	1.1%	3.1%	13.4%	55.6%	26.8%	4.04
Team Success Total Score							**22.90**
SF3 Help create new markets	261	10.3%	10.0%	42.9%	24.1%	12.6%	3.19
SF2 Lead to additional new products	261	5.4%	9.6%	13.8%	52.5%	18.8%	3.70
SF5 Contribute to new business processes	261	5.0%	6.1%	13.8%	55.2%	19.9%	3.79
SF4 Create new technologies for future use	261	8.8%	14.6%	39.8%	24.9%	11.9%	3.16
SF6 Develop better managerial capabilities	261	4.6%	5.4%	14.6%	53.3%	22.2%	3.83
SF1 Contribute to future projects	261	0.4%	3.4%	10.0%	58.2%	28.0%	4.10
SC5 Cause customers to come back for future work	261	3.8%	2.7%	7.3%	51.7%	34.5%	4.10
Future Success Total Score							**25.87**

Table 4-17 Continued

27 Item Project Success Scale	N	1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree	Average Item Score
SC3 Meet customer's requirements	261	1.1%	0.8%	5.0%	45.2%	47.9%	4.38
SC4 Create a product that will be used by the customer	261	1.1%	1.9%	4.6%	46.4%	46.0%	4.34
SC2 Satisfy the customer	261	1.1%	1.1%	8.4%	48.3%	41.0%	4.27
SC1 Create a product that improves customer's performance	261	2.3%	3.1%	6.9%	52.9%	34.9%	4.15
Customer Success Total Score							**17.14**
SD1 Complete on time or earlier	261	5.4%	5.7%	11.9%	44.8%	32.2%	3.93
SD2 Complete within or below budget	261	3.8%	6.1%	14.2%	43.7%	32.2%	3.94
SD3 Complete with only minor changes	261	8.4%	12.6%	40.2%	23.4%	15.3%	3.25
Design Success Total Score							**11.11**

The lowest average item mean score was 3.7050 for the Design subscale. The highest average item mean score was 4.2845 for the Customer subscale. The average item mean score for the total scale was 3.8426. The subscale mean scores were: Organization 26.72, Team 22.90, Future 25.87, Customer 17.14, and Design 11.11. The total scale mean score was 103.75. The average item mean, subscale, total scale scores, and standard deviations for the *27-Item Project Success Scale* are presented in Table 4-18.

Table 4-18

Mean Item, Subscale, Total Scale Scores, and Standard Deviations for the 27-Item Project Success Scale

27 Item Project Success Scale	N	Average Item Mean	Subscale and Total Scale Mean Score	Standard Deviation
Organization Subscale (7 items, Score Range 7-35)	261	3.8172	26.7203	5.10
Team Subscale (6 items, Score Range 6-30)	261	3.8174	22.9042	4.25
Future Subscale (7 items, Score Range 7-35)	261	3.6962	25.8736	4.81
Customer Subscale (4 items, Score Range 4-20)	261	4.2845	17.1379	2.57
Design Subscale (3 items, Score Range 3-15)	261	3.7050	11.1149	2.66
Total 27-Item Scale (27 items, Score Range 27-135)	261	3.8426	103.7510	14.72

Research Question 2

What are organizational characteristics, project characteristics, project life cycle stages, project manager roles, and project manager profiles that affect project success?

Research Question 2 is answered by Hypotheses 1 through 5. Multiple regression was used to determine the explanatory relationships among project manager profiles, project manager roles, the project life cycle, organizational characteristics, project characteristics and project success (total scale). Organizational characteristic that affect project success (total scale) are organizational maturity level, organizational industry, and organizational structure. Project manager roles that affect project success (total scale) include the Monitor role and the Resource Allocator role. Project manager attributes that affect project success (total scale) include gender and region. There were no project characteristics that affected project success (total scale). The project life cycle stages do not affect project success (total scale). Table 4-19 shows the independent variables that were significant explanatory variables of *Project Success* (total scale) and the corresponding adjusted R^2.

Table 4-19

Summary of Hierarchical Multiple Regression of Project Manager Profiles, Project Manager Roles, Organizational Characteristics, Project Characteristics, the Project Life Cycle and Project Success (Total Scale)

Hypotheses	Independent Variables	Adjusted R^2
H_1		
Project Manager Profiles	Mexico, Latin America & Caribbean Region Male Gender	.023
H_2		
Project Manager Roles	Monitor Role Resource Allocator Role	.180
H_3		
Project Life Cycle **Project Manager Roles**	Monitor Role Resource Allocator Role	.180
H_4		
Project Manager Profiles **Project Manager Roles**	Monitor Roles Resource Allocator Role	.180
H_5		
Organizational Characteristics **Project Characteristics** **Project Manager Roles**	Monitor Role Resource Allocator Role Education & Training Industry (inverse) Functional Organization Structure Organizational Maturity	.232

Research Question 3

Are there differences in project manager roles according to organizational characteristics, project characteristics, project manager profiles, or the project life cycle stages?

ANOVA was performed to test for differences in project manager roles according to organizational characteristics. There were significant differences in the importance of the transformational leader role according to organizational industry, $F\ (19, 241) = 1.818$, $p = .022$. The mean scores range from 3.50 (Marketing and Sales) to 5.40 (Oil, Gas and Petrochemicals). There were no significant differences in the other project manager roles. The mean scores for the project manager roles according to organizational industry are presented in Table 4-20. The results of the ANOVA comparisons for project manager roles for organizational industry are presented in Table 4-21.

Table 4-20

Comparison on Project Manager Roles Means according to Organizational Industry

	N	Liaison	Monitor	Entrepreneur	Spokesperson	Transformational Leader	Transactional Leader	Resource Allocator
Organizational Industry								
Aerospace & Defense	10	4.21	4.75	5.83	6.03	5.00	5.66	5.07
Automation Systems	6	4.67	4.77	5.86	5.97	5.27	5.73	5.11
Consulting	30	4.44	4.66	5.64	5.73	4.75	5.65	5.38
Construction	9	4.89	5.08	5.94	5.74	5.22	5.49	6.15
E-business	3	3.67	3.67	4.89	5.61	3.67	4.73	5.11
Education & Training	6	4.43	4.19	5.33	5.81	4.57	5.73	4.94
Financial Services	22	4.13	4.36	5.80	5.75	4.49	5.58	5.41
Government	19	4.40	4.69	5.97	5.79	4.38	5.68	5.51
Healthcare	16	4.19	4.12	5.90	5.88	4.24	5.59	4.73
Information Systems	33	3.74	4.31	5.78	5.75	4.69	5.68	5.22
International Development	1	4.22	4.50	5.83	5.83	4.60	5.60	5.33

Table 4-20 Continued

	N	Liaison	Monitor	Entrepreneur	Spokesperson	Transformational Leader	Transactional Leader	Resource Allocator
IT & Telecom	60	4.15	4.27	5.99	5.56	5.10	5.73	5.35
Manufacturing	13	4.15	4.49	5.64	5.46	4.35	5.52	5.46
Marketing & Sales	2	5.44	5.63	6.00	6.50	3.50	6.30	5.17
New Product Development	3	3.81	4.29	5.28	5.94	4.13	5.40	4.78
Oil, Gas & Petrochemicals	3	4.37	4.71	5.78	5.72	5.40	5.60	6.00
Pharmaceutical	4	5.36	5.28	5.67	6.21	5.30	5.40	4.92
Retail	4	3.28	3.84	5.71	6.21	3.15	4.55	4.08
Services & Outsourcing	10	4.22	4.40	5.82	5.53	4.36	5.72	5.20
Utilities	7	4.38	5.02	5.83	5.81	4.26	5.60	5.33
Total	261	4.21	4.46	5.81	5.73	4.69	5.63	5.29

Table 4-21

Comparison of Project Manager Roles according to Organizational Industry

Variable and Group	Sum of the Squares	Diff	Mean Square	*F*	Sig
Liaison					
Between Group	29.065	19	1.530	1.060	.394
Within Group	347.929	241	1.444		
Total	376.993	260			
Monitor					
Between Group	23.938	19	1.260	1.025	.432
Within Group	296.145	241	1.229		
Total	320.083	260			
Entrepreneur					
Between Group	8.969	19	.472	.534	.946
Within Group	213.144	241	.884		
Total	222.113	260			
Spokesperson					
Between Group	7.960	19	.419	.613	.895
Within Group	164.710	241	.683		
Total	172.670	260			
Transformation Leader					
Between Group	45.222	19	2.380	**1.818**	**.022**
Within Group	315.528	241	1.309		
Total	360.750	260			
Transactional Leader					
Between Group	9.683	19	.510	.716	.802
Within Group	171.638	241	.712		
Total	181.321	260			

Table 4-21 Continued

Variable and Group	**Sum of the Squares**	**Diff**	**Mean Square**	**F**	**Sig**
Resource Allocator					
Between Group	24.172	19	1.272	.814	.689
Within Group	376.610	241	1.563		
Total	400.782	260			

ANOVA was performed to test for differences in project manager roles according to organizational maturity. There were significant differences in the importance of the monitor role according to organizational maturity, F (4, 256) = 2.846, p = .025. The mean scores range from 4.18 (Level 2 – Planned Stage) to 4.80 (Level 4 – Integrated Stage). There were significant differences in the importance of the entrepreneur role according to organizational maturity, F (4, 256) = 3.548, p = .008. The mean scores range from 5.38 (Level 1 – Adhoc Stage) to 6.09 (Level 4 – Integrated Stage). There were significant differences in the importance of the transformational leader role according to organizational maturity, F (4, 256) = 4.756, p = .001. The mean scores range from 4.16 (Level 1 – Adhoc Stage) to 5.13 (Level 5 – Sustained Stage). There were significant differences in the importance of the transactional leader role according to organizational maturity, F (4, 256) = 2.438, p = .048. The mean scores range from 5.27 (Level 1 – Adhoc Stage) to 5.85 (Level 4 – Integrated Stage). There were significant differences in the importance of the resource allocator role according to organizational maturity, F (4, 256) = 3.852, p = .005. The mean scores range from 4.68 (Level 1 – Adhoc Stage) to 5.68 (Level 4 – Integrated Stage). There were no significant differences in the other project manager roles. The mean scores for the project manager roles according to organizational maturity are presented in Table 4-22. The results of the

ANOVA comparisons for project manager roles for organizational maturity are presented in Table 4-23.

Table 4-22

Comparison on Project Manager Roles Means according to Organizational Maturity

	N	Liaison	Monitor	Entrepreneur	Spokesperson	Transformational Leader	Transactional Leader	Resource Allocator
Organizational Maturity								
Level 1 – Adhoc Stage	37	4.02	4.22	5.38	5.61	4.16	5.27	4.68
Level 2 – Planned Stage	63	4.08	4.18	5.74	5.85	4.77	5.65	5.27
Level 3 – Managed Stage	87	4.21	4.52	5.84	5.76	4.53	5.65	5.27
Level 4 – Integrated Stage	35	4.62	4.80	6.09	5.80	5.03	5.85	5.68
Level 5 – Sustained Stage	39	4.25	4.70	6.03	5.51	5.13	5.68	5.58
Total	261	4.21	4.46	5.81	5.73	4.69	5.63	5.29

Table 4-23

Comparison of Project Manager Roles according to Organizational Maturity

Variable and Group	Sum of the Squares	Diff	Mean Square	*F*	Sig
Liaison					
Between Group	8.373	4	2.093	1.454	.217
Within Group	368.621	256	1.440		
Total	376.993	260			
Monitor					
Between Group	13.626	4	3.406	**2.846**	**.025**
Within Group	306.457	256	1.197		
Total	320.083	260			
Entrepreneur					
Between Group	11.668	4	2.917	**3.548**	**.008**
Within Group	210.446	256	.822		
Total	222.113	260			
Spokesperson					
Between Group	3.582	4	.896	1.356	.250
Within Group	169.088	256	.661		
Total	172.670	260			

Table 4-23 Continued

Variable and Group	Sum of the Squares	Diff	Mean Square	F	Sig
Transformation Leader					
Between Group	24.952	4	6.238	**4.756**	**.001**
Within Group	335.798	256	1.312		
Total	360.750	260			
Transactional Leader					
Between Group	6.654	4	1.663	**2.438**	**.048**
Within Group	174.668	256	.682		
Total	181.321	260			
Resource Allocator					
Between Group	22.753	4	5.688	**3.852**	**.005**
Within Group	378.029	256	1.477		
Total	400.782	260			

ANOVA was performed to test for differences in project manager roles according to organizational structure. There were no significant differences in the project manager roles. The mean scores for the project manager roles according to organizational structure are presented in Table 4-24. The results of the ANOVA comparisons for project manager roles for organizational structure are presented in Table 4-25.

Table 4-24

Comparison on Project Manager Roles Means according to Organizational Structure

	N	Liaison	Monitor	Entrepreneur	Spokesperson	Transformational Leader	Transactional Leader	Resource Allocator
Organizational Structure								
Functional	72	4.16	4.38	5.63	5.79	4.51	5.62	5.15
Matrixed	131	4.27	4.47	5.88	5.70	4.69	5.55	5.26
Projectized	58	4.15	4.53	5.89	5.73	4.93	5.81	5.52
Total	261	4.21	4.46	5.81	5.73	4.69	5.63	5.29

Table 4-25

Comparison of Project Manager Roles according to Organizational Structure

Variable and Group	Sum of the Squares	Diff	Mean Square	*F*	Sig
Liaison					
Between Group	.883	2	.441	.303	.739
Within Group	376.111	258	1.458		
Total	376.993	260			
Monitor					
Between Group	.794	2	.397	.321	.726
Within Group	319.289	258	1.238		
Total	320.083	260			
Entrepreneur					
Between Group	3.342	2	1.671	1.971	.141
Within Group	218.771	258	.848		
Total	222.113	260			
Spokesperson					
Between Group	.325	2	.163	.244	.784
Within Group	172.345	258	.668		
Total	172.670	260			
Transformation Leader					
Between Group	5.651	2	2.825	2.053	.130
Within Group	355.099	258	1.376		
Total	360.750	260			
Transactional Leader					
Between Group	2.736	2	1.368	1.976	.141
Within Group	178.586	258	.692		
Total	181.321	260			
Resource Allocator					
Between Group	4.471	2	2.235	1.455	.235
Within Group	396.311	258	1.536		
Total	400.782	260			

ANOVA was performed to test for differences in project manager roles according to project type. There were significant differences in the importance of the resource allocator role according to project type, F (2, 258) = 3.321, p = .038. The mean scores range from 5.08 (Operational/Maintenance) to 5.48 (Strategic). There were no significant differences in the other project manager roles. The mean scores for the project manager roles according to project type are presented in Table 4-26. The results of the ANOVA comparisons for project manager roles for project type are presented in Table 4-27.

Table 4-26

Comparison on Project Manager Roles Means according to Project Type

	N	Liaison	Monitor	Entrepreneur	Spokesperson	Transformational Leader	Transactional Leader	Resource Allocator
Project Type								
Strategic	136	4.34	4.55	5.93	5.77	4.75	5.70	5.48
Compliance	20	4.16	3.96	5.67	5.79	4.53	5.58	5.10
Operational/Maintenance	105	4.06	4.44	5.70	5.67	4.64	5.54	5.08
Total	261	4.21	4.46	5.81	5.73	4.69	5.63	5.29

Table 4-27

Comparison of Project Manager Roles according to Project Type

Variable and Group	Sum of the Squares	Diff	Mean Square	*F*	Sig
Liaison					
Between Group	4.879	2	2.439	1.691	.186
Within Group	372.115	258	1.442		
Total	376.993	260			
Monitor					
Between Group	6.085	2	3.043	2.500	.084
Within Group	313.998	258	1.217		
Total	320.083	260			
Entrepreneur					
Between Group	3.598	2	1.799	2.124	.122
Within Group	218.515	258	.847		
Total	222.113	260			
Spokesperson					
Between Group	.787	2	.394	.591	.555
Within Group	171.883	258	.666		
Total	172.670	260			
Transformation Leader					
Between Group	1.293	2	.647	.464	.629
Within Group	359.456	258	1.393		
Total	360.750	260			
Transactional Leader					
Between Group	1.576	2	.788	1.131	.324
Within Group	179.746	258	.697		
Total	181.321	260			

Table 4-27 Continued

Variable and Group	Sum of the Squares	Diff	Mean Square	F	Sig
Resource Allocator					
Between Group	10.058	2	5.029	**3.321**	**.038**
Within Group	390.724	258	1.514		
Total	400.782	260			

ANOVA was performed to test for differences in project manager roles according to project size. There were significant differences in the importance of the transformational leader role according to project size, F (6, 254) = 2.279, p = .037. The mean scores range from 4.24 (2 to 4 members) to 5.26 (14 to 16 members). There were no significant differences in the other project manager roles. The mean scores for the project manager roles according to project size are presented in Table 4-28. The results of the ANOVA comparisons for project manager roles for project size are presented in Table 4-29.

Table 4-28

Comparison on Project Manager Roles Means according to Project Size

	N	Liaison	Monitor	Entrepreneur	Spokesperson	Transformational Leader	Transactional Leader	Resource Allocator
Project Size								
2-4 Members	45	4.12	4.28	5.58	5.99	4.24	5.43	5.10
5-7 Members	69	4.15	4.47	5.72	5.70	4.60	5.51	5.20
8-10 Members	56	4.14	4.58	5.83	5.68	4.80	5.64	5.31
11-13 Members	19	4.25	4.51	5.90	5.82	4.65	5.71	5.11
14-16 Members	7	4.73	5.05	6.19	5.90	5.26	6.09	5.33
17-19 Members	5	4.29	4.48	5.57	5.70	4.48	6.00	5.27
20+ Members	60	4.35	4.38	6.04	5.58	5.00	5.79	5.56
Total	261	4.21	4.46	5.81	5.73	4.69	5.63	5.29

Table 4-29

Comparison of Project Manager Roles according to Project Size

Variable and Group	Sum of the Squares	Diff	Mean Square	*F*	Sig
Liaison					
Between Group	4.118	6	.686	.468	.832
Within Group	372.875	254	1.468		
Total	376.993	260			
Monitor					
Between Group	5.072	6	.845	.682	.665
Within Group	315.011	254	1.240		
Total	320.083	260			
Entrepreneur					
Between Group	7.608	6	1.268	1.501	.178
Within Group	214.506	254	.845		
Total	222.113	260			
Spokesperson					
Between Group	5.013	6	.836	1.266	.274
Within Group	167.657	254	.660		
Total	172.670	260			
Transformation Leader					
Between Group	18.427	6	3.071	**2.279**	**.037**
Within Group	342.322	254	1.348		
Total	360.750	260			
Transactional Leader					
Between Group	6.498	6	1.083	1.573	.155
Within Group	174.824	254	.688		
Total	181.321	260			
Resource Allocator					
Between Group	7.306	6	1.218	.786	.582
Within Group	393.476	254	1.549		
Total	400.782	260			

ANOVA was performed to test for differences in project manager roles according to project budget. There were significant differences in the importance of the resource allocator role according project budget, F (5, 255) = 2.365, p = .040. The mean scores range from 4.94 ($500,001 to $1,000,000) to 5.66 ($1,000,001 to $5,000,000). There were no significant differences in the other project manager roles. The mean scores for the project manager roles according to project budget are presented in Table 4-30. The results of the ANOVA comparisons for project manager roles for project budget are presented in Table 4-31.

Table 4-30

Comparison on Project Manager Roles Means according to Project Budget

	N	Liaison	Monitor	Entrepreneur	Spokesperson	Transformational Leader	Transactional Leader	Resource Allocator
Project Budget								
$1-$50,000	42	4.41	4.64	5.60	5.88	4.59	5.52	5.19
$50,001-$100,000	33	4.13	4.52	5.58	5.63	4.66	5.53	5.28
$100,001-$500,000	55	3.97	4.35	5.80	5.57	4.55	5.62	5.04
$500,001-$1,000,000	36	4.31	4.43	5.76	5.75	4.62	5.51	4.94
$1,000,001-$5,000,000	50	4.20	4.37	6.00	5.88	4.75	5.75	5.66
$5,000,000+	45	4.32	4.51	6.04	5.70	4.97	5.76	5.54
$1-$50,000	42	4.41	4.64	5.60	5.88	4.59	5.52	5.19
Total	261	4.21	4.46	5.81	5.73	4.69	5.63	5.29

Table 4-31

Comparison of Project Manager Roles according to Project Budget

Variable and Group	Sum of the Squares	Diff	Mean Square	*F*	Sig
Liaison					
Between Group	5.925	5	1.185	.814	.540
Within Group	371.068	255	1.455		
Total	376.993	260			
Monitor					
Between Group	2.752	5	.550	.442	.819
Within Group	317.331	255	1.244		
Total	320.083	260			
Entrepreneur					
Between Group	7.838	5	1.568	1.865	.101
Within Group	214.276	255	.840		
Total	222.113	260			
Spokesperson					
Between Group	3.820	5	.764	1.154	.333
Within Group	168.851	255	.662		
Total	172.670	260			
Transformation Leader					
Between Group	5.394	5	1.079	.774	.569
Within Group	355.356	255	1.394		
Total	360.750	260			

Table 4-31 Continued

Variable and Group	Sum of the Squares	Diff	Mean Square	F	Sig
Transactional Leader					
Between Group	2.846	5	.569	.813	.541
Within Group	178.475	255	.700		
Total	181.321	260			
Resource Allocator					
Between Group	17.760	5	3.552	**2.365**	**.040**
Within Group	383.022	255	1.502		
Total	400.782	260			

ANOVA was performed to test for differences in project manager roles according to project duration. There were no significant differences in the project manager roles. The mean scores for the project manager roles according to project duration are presented in Table 4-32. The results of the ANOVA comparisons for project manager roles for project duration are presented in Table 4-33.

Table 4-32

Comparison on Project Manager Roles Means according to Project Duration

	N	Liaison	Monitor	Entrepreneur	Spokesperson	Transformational Leader	Transactional Leader	Resource Allocator
Project Duration								
1 day – 90 days	24	4.34	4.45	5.83	5.90	4.58	5.40	5.24
91 days – 180 days	69	4.00	4.42	5.61	5.68	4.54	5.52	5.23
181 days – 364 days	56	4.04	4.40	5.73	5.60	4.61	5.50	5.26
1 year – 3 years	88	4.41	4.48	5.99	5.79	4.77	5.79	5.34
4 years – 6 years	13	4.25	4.60	6.08	5.69	5.28	5.95	5.54
6 + years	11	4.52	4.73	5.79	5.94	4.96	5.71	5.18
Total	261	4.21	4.46	5.81	5.73	4.69	5.63	5.29

Table 4-33

Comparison of Project Manager Roles according to Project Duration

Variable and Group	Sum of the Squares	Diff	Mean Square	*F*	Sig
Liaison					
Between Group	9.713	5	1.943	1.349	.244
Within Group	367.280	255	1.440		
Total	376.993	260			
Monitor					
Between Group	1.370	5	.274	.219	.954
Within Group	318.713	255	1.250		
Total	320.083	260			
Entrepreneur					
Between Group	6.881	5	1.376	1.630	.152
Within Group	215.232	255	.844		
Total	222.113	260			
Spokesperson					
Between Group	2.697	5	.539	.809	.544
Within Group	169.974	255	.667		
Total	172.670	260			
Transformation Leader					
Between Group	8.132	5	1.626	1.176	.321
Within Group	352.618	255	1.383		
Total	360.750	260			
Transactional Leader					
Between Group	6.640	5	1.328	1.939	.088
Within Group	174.682	255	.685		
Total	181.321	260			
Resource Allocator					
Between Group	1.601	5	.320	.205	.960
Within Group	399.181	255	1.565		
Total	400.782	260			

ANOVA was performed to test for differences in project manager roles according to PMP certification. There were no significant differences in the project manager roles. The mean scores for the project manager roles according to PMP certification are presented in Table 4-34. The results of the ANOVA comparisons for project manager roles for PMP certification are presented in Table 4-35.

Table 4-34

Comparison on Project Manager Roles Means according to PMP Certified

		N	Liaison	Monitor	Entrepreneur	Spokesperson	Transformational Leader	Transactional Leader	Resource Allocator
PMP Certified									
Yes		200	4.33	4.57	5.83	5.82	4.76	5.71	5.31
No		61	4.18	4.43	5.81	5.70	4.67	5.60	5.28
	Total	261	4.21	4.46	5.81	5.73	4.69	5.63	5.29

Table 4-35

Comparison of Project Manager Roles according to PMP Certified

Variable and Group	Sum of the Squares	Diff	Mean Square	*F*	Sig
Liaison					
Between Group	1.005	1	1.005	.692	.406
Within Group	375.989	259	1.452		
Total	376.993	260			
Monitor					
Between Group	.934	1	.934	.758	.385
Within Group	319.149	259	1.232		
Total	320.083	260			
Entrepreneur					
Between Group	.025	1	.025	.029	.865
Within Group	222.088	259	.857		
Total	222.113	260			
Spokesperson					
Between Group	.653	1	.653	.984	.322
Within Group	172.017	259	.664		
Total	172.670	260			
Transformation Leader					
Between Group	.349	1	.349	.251	.617
Within Group	360.401	259	1.392		
Total	360.750	260			
Transactional Leader					
Between Group	.605	1	.605	.867	.353
Within Group	180.717	259	.698		
Total	181.321	260			
Resource Allocator					
Between Group	.028	1	.028	.018	.894
Within Group	400.754	259	1.547		
Total	400.782	260			

ANOVA was performed to test for differences in project manager roles according to tenure. There were no significant differences in the project manager roles. The mean scores for the project manager roles according to tenure are presented in Table 4-36. The results of the ANOVA comparisons for project manager roles for tenure are presented in Table 4-37.

Table 4-36

Comparison on Project Manager Roles Means according to Tenure

		N	Liaison	Monitor	Entrepreneur	Spokesperson	Transformational Leader	Transactional Leader	Resource Allocator
Tenure									
Less than 1 year		38	4.18	4.18	5.69	5.65	4.46	5.59	5.35
1-3 years		86	4.09	4.37	5.72	5.62	4.55	5.49	5.08
4-6 years		71	4.27	4.51	5.83	5.82	4.86	5.66	5.24
7-9 years		28	4.07	4.46	5.90	5.91	4.64	5.71	5.31
10-12 years		10	4.27	4.69	6.05	5.97	4.92	5.94	5.37
12+ years		28	4.61	4.92	6.03	5.71	4.99	5.82	5.90
	Total	261	4.21	4.46	5.81	5.73	4.69	5.63	5.29

Table 4-37

Comparison of Project Manager Roles according to Tenure

Variable and Group	Sum of the Squares	Diff	Mean Square	*F*	Sig
Liaison					
Between Group	6.509	5	1.302	.896	.484
Within Group	370.485	255	1.453		
Total	376.993	260			
Monitor					
Between Group	10.274	5	2.055	1.691	.137
Within Group	309.810	255	1.215		
Total	320.083	260			

Table 4-37 Continued

Variable and Group	Sum of the Squares	Diff	Mean Square	F	Sig
Entrepreneur					
Between Group	3.429	5	.686	.800	.551
Within Group	218.684	255	.858		
Total	222.113	260			
Spokesperson					
Between Group	3.351	5	.670	1.009	.413
Within Group	169.319	255	.664		
Total	172.670	260			
Transformation Leader					
Between Group	8.673	5	1.735	1.256	.283
Within Group	352.077	255	1.381		
Total	360.750	260			
Transactional Leader					
Between Group	3.862	5	.772	1.110	.355
Within Group	177.459	255	.696		
Total	181.321	260			
Resource Allocator					
Between Group	14.823	5	2.965	1.959	.085
Within Group	385.959	255	1.514		
Total	400.782	260			

ANOVA was performed to test for differences in project manager roles according to PM experience. There were significant differences in the importance of the monitor role according to PM experience, $F\ (5, 255) = 4.415$, $p = .001$. The mean scores range from 3.78 (7 to 9 years) to 6.88 (less than 1 year). There were significant differences in the importance of the spokesperson role according to PM experience, $F\ (5, 255) = 2.540$, $p = .029$. The mean scores range from 5.38 (1 to 3 years) to 6.00 (less than 1 year). There were no significant differences in the other project manager roles. The mean scores for the project manager roles according to PM experience are presented in Table 4-38. The results of the ANOVA comparisons for project manager roles for PM experience are presented in Table 4-39.

Table 4-38

Comparison on Project Manager Roles Means according to PM Experience

	N	Liaison	Monitor	Entrepreneur	Spokesperson	Transformational Leader	Transactional Leader	Resource Allocator
PM Experience								
Less than 1 year	1	5.89	6.88	5.00	6.00	5.80	6.20	6.33
1-3 years	21	4.31	4.39	5.72	5.38	5.02	5.43	5.30
4-6 years	66	4.12	4.39	5.61	5.56	4.91	5.57	5.07
7-9 years	32	3.78	3.78	5.97	5.66	4.50	5.68	5.08
10-12 years	46	4.32	4.67	5.97	5.96	4.33	5.75	5.25
12+ years	95	4.34	4.62	5.91	5.84	4.69	5.63	5.51
Total	261	4.21	4.46	5.81	5.73	4.69	5.63	5.29

Table 4-39

Comparison of Project Manager Roles according to PM Experience

Variable and Group	Sum of the Squares	Diff	Mean Square	*F*	Sig
Liaison					
Between Group	11.571	5	2.314	1.615	.156
Within Group	365.423	255	1.433		
Total	376.993	260			
Monitor					
Between Group	25.504	5	5.101	**4.415**	**.001**
Within Group	294.579	255	1.155		
Total	320.083	260			
Entrepreneur					
Between Group	5.644	5	1.129	1.330	.252
Within Group	216.469	255	.849		
Total	222.113	260			
Spokesperson					
Between Group	8.192	5	1.638	**2.540**	**.029**
Within Group	164.479	255	.645		
Total	172.670	260			
Transformation Leader					
Between Group	13.721	5	2.744	2.016	.077
Within Group	347.029	255	1.361		
Total	360.750	260			
Transactional Leader					
Between Group	2.211	5	.442	.630	.677
Within Group	179.111	255	.702		
Total	181.321	260			

Table 4-39 Continued

Variable and Group	Sum of the Squares	Diff	Mean Square	*F*	Sig
Between Group	10.412	5	2.082	1.360	.240
Within Group	390.370	255	1.531		
Total	400.782	260			

ANOVA was performed to test for differences in project manager roles according to GM experience. There were significant differences in the importance of the monitor role according to GM experience, $F\,(5, 255) = 2.696, p = .021$. The mean scores range from 4.01 (10 to 12 years) to 4.67 (4 to 6 years). There were no significant differences in the other project manager roles. The mean scores for the project manager roles according to GM experience are presented in Table 4-40. The results of the ANOVA comparisons for project manager roles for GM experience are presented in Table 4-41.

Table 4-40

Comparison on Project Manager Roles Means according to GM Experience

	N	Liaison	Monitor	Entrepreneur	Spokesperson	Transformational Leader	Transactional Leader	Resource Allocator
GM Experience								
Less than 1 year	26	3.99	4.04	5.73	5.65	4.35	5.58	4.97
1-3 years	37	4.30	4.47	5.67	5.73	4.71	5.48	5.31
4-6 years	40	4.35	4.67	5.90	5.66	4.74	5.63	5.38
7-9 years	33	4.17	4.55	5.75	5.84	5.12	5.81	5.27
10-12 years	35	3.94	4.01	5.75	5.68	4.51	5.57	5.00
12+ years	90	4.30	4.62	5.91	5.77	4.68	5.66	5.45
Total	261	4.21	4.46	5.81	5.73	4.69	5.63	5.29

Table 4-41

Comparison of Project Manager Roles according to GM Experience

Variable and Group	Sum of the Squares	Diff	Mean Square	*F*	Sig
Liaison					
Between Group	5.750	5	1.150	.790	.558
Within Group	371.244	255	1.456		
Total	376.993	260			
Monitor					
Between Group	16.068	5	3.214	**2.696**	**.021**
Within Group	304.015	255	1.192		
Total	320.083	260			
Entrepreneur					
Between Group	2.312	5	.462	.536	.749
Within Group	219.801	255	.862		
Total	222.113	260			
Spokesperson					
Between Group	1.029	5	.206	.306	.909
Within Group	171.642	255	.673		
Total	172.670	260			
Transformation Leader					
Between Group	10.293	5	2.059	1.498	.191
Within Group	350.457	255	1.374		
Total	360.750	260			
Transactional Leader					
Between Group	2.147	5	.429	.611	.691
Within Group	179.174	255	.703		
Total	181.321	260			
Resource Allocator					
Between Group	8.092	5	1.618	1.051	.388
Within Group	392.690	255	1.540		
Total	400.782	260			

ANOVA was performed to test for differences in project manager roles according to PM training. There were significant differences in the importance of the spokesperson role according to PM training, F (5, 255) = 3.031, p = .011. The mean scores range from 5.51 (1 to 3 courses) to 6.05 (10 to 12 courses). There were no significant differences in the other project manager roles. The mean scores for the project manager roles according to PM training are presented in Table 4-42. The results of the ANOVA comparisons for project manager roles for PM training are presented in Table 4-43.

Table 4-42

Comparison on Project Manager Roles Means according to PM Training

	N	Liaison	Monitor	Entrepreneur	Spokesperson	Transformational Leader	Transactional Leader	Resource Allocator
PM Training								
None	3	4.11	4.54	5.50	5.61	5.40	5.89	4.56
1-3 courses	100	4.12	4.42	5.67	5.51	4.82	5.51	5.27
4-6 courses	59	4.28	4.54	5.93	5.82	4.43	5.58	5.15
7-9 courses	23	4.14	4.32	5.85	5.76	4.59	5.91	5.46
10-12 courses	21	4.60	4.64	6.06	6.05	4.94	5.95	5.57
12+ courses	55	4.21	4.44	5.88	5.92	4.64	5.64	5.33
None	3	4.11	4.54	5.50	5.61	5.40	5.89	4.56
Total	261	4.21	4.46	5.81	5.73	4.69	5.63	5.29

Table 4-43

Comparison of Project Manager Roles according to PM Training

Variable and Group	Sum of the Squares	Diff	Mean Square	*F*	Sig
Liaison					
Between Group	4.447	5	.889	.609	.693
Within Group	372.546	255	1.461		
Total	376.993	260			
Monitor					
Between Group	1.695	5	.339	.272	.928
Within Group	318.388	255	1.249		
Total	320.083	260			
Entrepreneur					
Between Group	4.971	5	.994	1.167	.326
Within Group	217.143	255	.852		
Total	222.113	260			
Spokesperson					
Between Group	9.685	5	1.937	**3.031**	**.011**
Within Group	162.985	255	.639		
Total	172.670	260			
Transformation Leader					
Between Group	8.931	5	1.786	1.295	.267
Within Group	351.818	255	1.380		
Total	360.750	260			

Table 4-43 Continued

Variable and Group	Sum of the Squares	Diff	Mean Square	F	Sig
Transactional Leader					
Between Group	5.865	5	1.173	1.705	.134
Within Group	175.457	255	.688		
Total	181.321	260			
Resource Allocator					
Between Group	5.299	5	1.060	.683	.636
Within Group	395.483	255	1.551		
Total	400.782	260			

ANOVA was performed to test for differences in project manager roles according to GM training. There were no significant differences in the project manager roles. The mean scores for the project manager roles according to GM training are presented in Table 4-44. The results of the ANOVA comparisons for project manager roles for GM training are presented in Table 4-45.

Table 4-44

Comparison on Project Manager Roles Means according to GM Training

	N	Liaison	Monitor	Entrepreneur	Spokesperson	Transformational Leader	Transactional Leader	Resource Allocator
GM Training								
None	29	3.79	4.40	5.80	5.49	4.74	5.54	5.37
1-3 courses	81	4.33	4.55	5.83	5.71	4.83	5.61	5.39
4-6 courses	51	4.33	4.58	5.94	5.74	4.73	5.77	5.41
7-9 courses	24	4.12	4.39	5.66	5.83	4.57	5.34	4.74
10-12 courses	16	4.06	3.99	5.40	5.42	4.21	5.40	4.94
12+ courses	60	4.24	4.41	5.46	5.92	4.62	5.75	5.32
High School	16	4.17	4.48	6.02	5.77	4.66	5.83	5.33
Total	261	4.21	4.46	5.81	5.73	4.69	5.63	5.29

Table 4-45

Comparison of Project Manager Roles according to GM Training

Variable and Group	Sum of the Squares	Diff	Mean Square	*F*	Sig
Liaison					
Between Group	7.709	5	1.542	1.065	.380
Within Group	369.284	255	1.448		
Total	376.993	260			
Monitor					
Between Group	5.262	5	1.052	.852	.514
Within Group	314.821	255	1.235		
Total	320.083	260			
Entrepreneur					
Between Group	4.333	5	.867	1.015	.409
Within Group	217.780	255	.854		
Total	222.113	260			
Spokesperson					
Between Group	5.745	5	1.149	1.755	.123
Within Group	166.926	255	.655		
Total	172.670	260			
Transformation Leader					
Between Group	6.021	5	1.204	.866	.505
Within Group	354.729	255	1.391		
Total	360.750	260			
Transactional Leader					
Between Group	4.936	5	.987	1.427	.215
Within Group	176.385	255	.692		
Total	181.321	260			
Resource Allocator					
Between Group	11.103	5	2.221	1.453	.206
Within Group	389.679	255	1.528		
Total	400.782	260			

ANOVA was performed to test for differences in project manager roles according to education. There were no significant differences in the project manager roles. The mean scores for the project manager roles according to education are presented in Table 4-46. The results of the ANOVA comparisons for project manager roles for education are presented in Table 4-47.

Table 4-46

Comparison on Project Manager Roles Means according to Education

		N	Liaison	Monitor	Entrepreneur	Spokesperson	Transformational Leader	Transactional Leader	Resource Allocator
Education									
High School		16	4.17	4.48	6.02	5.77	4.66	5.83	5.33
Bachelors		96	4.05	4.23	5.87	5.69	4.51	5.55	5.21
Masters		138	4.29	4.60	5.74	5.74	4.81	5.62	5.29
Doctorate		11	4.73	4.67	5.97	6.00	4.82	6.07	5.82
	Total	261	4.21	4.46	5.81	5.73	4.69	5.63	5.29

Table 4-47

Comparison of Project Manager Roles according to Education

Variable and Group	Sum of the Squares	Diff	Mean Square	*F*	Sig
Liaison					
Between Group	6.560	3	2.187	1.517	.211
Within Group	370.434	257	1.441		
Total	376.993	260			
Monitor					
Between Group	8.519	3	2.840	2.342	.074
Within Group	311.564	257	1.212		
Total	320.083	260			
Entrepreneur					
Between Group	2.119	3	.706	.825	.481
Within Group	219.994	257	.856		
Total	222.113	260			
Spokesperson					
Between Group	1.024	3	.341	.511	.675
Within Group	171.646	257	.668		
Total	172.670	260			
Transformation Leader					
Between Group	5.161	3	1.720	1.243	.294
Within Group	355.588	257	1.384		
Total	360.750	260			
Transactional Leader					
Between Group	3.328	3	1.109	1.602	.189
Within Group	177.993	257	.693		
Total	181.321	260			

Table 4-47 Continued

Variable and Group	Sum of the Squares	Diff	Mean Square	F	Sig
Resource Allocator					
Between Group	3.740	3	1.247	.807	.491
Within Group	397.041	257	1.545		
Total	400.782	260			

ANOVA was performed to test for differences in project manager roles according to gender. There were significant differences in the importance of the spokesperson role according to gender, F (1, 259) = 5.540, p = .019. The mean scores range from 5.66 (male) to 5.92 (female). There were significant differences in the importance of the transformational leader role according to gender, F (1, 259) = 9.602, p = .002. The mean scores range from 4.34 (female) to 4.83 (male). There were no significant differences in the other project manager roles. The mean scores for the project manager roles according to gender are presented in Table 4-48. The results of the ANOVA comparisons for project manager roles for gender are presented in Table 4-49.

Table 4-48

Comparison on Project Manager Roles Means according to Gender

		N	Liaison	Monitor	Entrepreneur	Spokesperson	Transformational Leader	Transactional Leader	Resource Allocator
Gender									
Male		187	4.23	4.52	5.78	5.66	4.83	5.62	5.33
Female		74	4.16	4.29	5.90	5.92	4.34	5.64	5.17
	Total	261	4.21	4.46	5.81	5.73	4.69	5.63	5.29

Table 4-49

Comparison of Project Manager Roles according to Gender

Variable and Group	Sum of the Squares	Diff	Mean Square	*F*	Sig
Liaison					
Between Group	.291	1	.291	.200	.655
Within Group	376.703	259	1.454		
Total	376.993	260			
Monitor					
Between Group	2.825	1	2.825	2.306	.130
Within Group	317.259	259	1.225		
Total	320.083	260			
Entrepreneur					
Between Group	.800	1	.800	.936	.334
Within Group	221.313	259	.854		
Total	222.113	260			
Spokesperson					
Between Group	3.616	1	3.616	**5.540**	**.019**
Within Group	169.054	259	.653		
Total	172.670	260			
Transformation Leader					
Between Group	12.896	1	12.896	**9.602**	**.002**
Within Group	347.854	259	1.343		
Total	360.750	260			
Transactional Leader					
Between Group	.017	1	.017	.025	.875
Within Group	181.304	259	.700		
Total	181.321	260			
Resource Allocator					
Between Group	1.394	1	1.394	.904	.343
Within Group	399.387	259	1.542		
Total	400.782	260			

ANOVA was performed to test for differences in project manager roles according to age. There were significant differences in the importance of the spokesperson role according to age, F (9, 251) = 1.919, p = .050. The mean scores range from 5.39 (26 to 30) to 6.27 (61 to 65). There were no significant differences in the other project manager roles. The mean scores for the project manager roles according to age are presented in Table 4-50. The results of the ANOVA comparisons for project manager roles for age are presented in Table 4-51.

Table 4-50

Comparison on Project Manager Roles Means according to Age

	N	Liaison	Monitor	Entrepreneur	Spokesperson	Transformational Leader	Transactional Leader	Resource Allocator
Age								
21-25	2	3.83	4.13	6.08	6.17	4.50	5.50	5.83
26-30	17	4.07	4.28	5.71	5.39	4.82	5.45	4.94
31-35	52	4.39	4.51	5.81	5.65	4.94	5.64	5.32
36-40	50	4.07	4.36	5.74	5.54	4.51	5.42	5.25
41-45	42	3.99	4.21	5.56	5.65	4.54	5.66	5.21
45-50	31	4.16	4.42	5.80	5.84	4.66	5.68	5.08
51-55	37	4.55	4.79	6.04	6.00	4.71	5.74	5.48
56-60	21	4.17	4.47	5.91	6.02	4.64	5.76	5.32
61-65	5	4.56	5.25	6.63	6.27	5.24	6.08	6.60
66+	4	4.00	4.88	6.17	5.67	4.55	5.80	5.50
Total	261	4.21	4.46	5.81	5.73	4.69	5.63	5.29

Table 4-51

Comparison of Project Manager Roles according to Age

Variable and Group	Sum of the Squares	Diff	Mean Square	*F*	Sig
Liaison					
Between Group	10.371	9	1.152	.789	.627
Within Group	366.623	251	1.461		
Total	376.993	260			
Monitor					
Between Group	11.901	9	1.322	1.077	.380
Within Group	308.182	251	1.228		
Total	320.083	260			
Entrepreneur					
Between Group	9.141	9	1.016	1.197	.297
Within Group	212.972	251	.848		
Total	222.113	260			
Spokesperson					
Between Group	11.114	9	1.235	**1.919**	**.050**
Within Group	161.556	251	.644		
Total	172.670	260			
Transformation Leader					
Between Group	7.890	9	.877	.624	.777
Within Group	352.869	251	1.406		
Total	360.750	260			

Table 4-51 Continued

Variable and Group	Sum of the Squares	Diff	Mean Square	F	Sig
Transactional Leader					
Between Group	4.849	9	.539	.766	.648
Within Group	176.472	251	.703		
Total	181.321	260			
Resource Allocator					
Between Group	14.596	9	1.622	1.054	.398
Within Group	386.186	251	1.539		
Total	400.782	260			

ANOVA was performed to test for differences in project manager roles according to region. There were significant differences in the importance of the entrepreneur role according to region, F (3, 257) = 3.426, p = .018. The mean scores range from 5.60 (EMEA) to 6.13 (Mexico, Latin America and Caribbean). There were significant differences in the importance of the spokesperson role according to region, F (3, 257) = 7.557, p = .000. The mean scores range from 5.45 (Asia Pacific) to 5.96 (North America). There were significant differences in the importance of the transformational leader role according region, F (3, 257) = 4.164, p = .007. The mean scores range from 4.31 (EMEA) to 5.24 (Mexico, Latin America and Caribbean). There were significant differences in the importance of the transactional leader role according to age, F (3, 257) = 3.787, p = .011. The mean scores range from 5.26 (EMEA) to 5.76 (North America). There were no significant differences in the other project manager roles. The mean scores for the project manager roles according to region are presented in Table 4-52. The results of the ANOVA comparisons for project manager roles for region are presented in Table 4-53.

Table 4-52

Comparison on Project Manager Roles Means according to Region

	N	Liaison	Monitor	Entrepreneur	Spokesperson	Transformational Leader	Transactional Leader	Resource Allocator
Region								
North America	120	4.23	4.45	5.98	5.96	4.58	5.76	5.38
Asia Pacific	89	4.31	4.55	5.66	5.45	4.96	5.63	5.28
EMEA	42	3.83	4.15	5.60	5.64	4.31	5.26	4.90
Mexico, Latin America and Caribbean	10	4.79	5.11	6.13	5.88	5.24	5.60	5.83
Total	261	4.21	4.46	5.81	5.73	4.69	5.63	5.29

Table 4-53

Comparison of Project Manager Roles according to Region

Variable and Group	Sum of the Squares	Diff	Mean Square	*F*	Sig
Liaison					
Between Group	10.387	3	3.462	2.427	.066
Within Group	366.607	257	1.426		
Total	376.993	260			
Monitor					
Between Group	8.953	3	2.984	2.465	.063
Within Group	311.130	257	1.211		
Total	320.083	260			
Entrepreneur					
Between Group	8.541	3	2.847	**3.426**	**.018**
Within Group	213.572	257	.831		
Total	222.113	260			
Spokesperson					
Between Group	13.998	3	4.666	**7.557**	**.000**
Within Group	158.672	257	.617		
Total	172.670	260			
Transformation Leader					
Between Group	16.723	3	5.574	**4.164**	**.007**
Within Group	344.027	257	1.339		
Total	360.750	260			

Table 4-53 Continued

Variable and Group	**Sum of the Squares**	**Diff**	**Mean Square**	**F**	**Sig**
Transactional Leader					
Between Group	7.675	3	2.558	**3.787**	**.011**
Within Group	173.646	257	.676		
Total	181.321	260			
Resource Allocator					
Between Group	10.243	3	3.414	2.247	.083
Within Group	390.538	257	1.520		
Total	400.782	260			

ANOVA was performed to test for differences in project manager roles according to life cycle stage. There were significant differences in the importance of the entrepreneur role according to life cycle stage, $F\ (3, 257) = 3.349, p = .020$. The mean scores range from 5.31 (Termination) to 5.93 (Execution). There were significant differences in the importance of the transformational leader role according to life cycle stage, $F\ (3, 257) = 2.719, p = .045$. The mean scores range from 5.22 (Termination) to 5.71 (Execution). There were no significant differences in the other project manager roles. The mean scores for the project manager roles according to life cycle stage are presented in Table 4-54. The results of the ANOVA comparisons for project manager roles for life cycle stage are presented in Table 4-55.

Table 4-54

Comparison on Project Manager Roles Means according to Life Cycle Stage

	N	Liaison	Monitor	Entrepreneur	Spokesperson	Transformational Leader	Transactional Leader	Resource Allocator
Life Cycle Stage								
Conceptualization	15	4.35	4.64	5.63	5.71	4.39	5.33	5.29
Planning	58	4.29	4.64	5.68	5.82	4.64	5.58	5.19
Execution	170	4.15	4.39	5.93	5.69	4.73	5.71	5.37
Termination	18	4.46	4.38	5.31	5.84	4.76	5.22	4.81
Total	261	4.21	4.46	5.81	5.73	4.69	5.63	5.29

Table 4-55

Comparison of Project Manager Roles according to Life Cycle Stage

Variable and Group	Sum of the Squares	Diff	Mean Square	*F*	Sig
Liaison					
Between Group	2.449	3	.816	.560	.642
Within Group	374.544	257	1.457		
Total	376.993	260			
Monitor					
Between Group	3.202	3	1.067	.866	.459
Within Group	316.881	257	1.233		
Total	320.083	260			
Entrepreneur					
Between Group	8.356	3	2.785	**3.349**	**.020**
Within Group	213.757	257	.832		
Total	222.113	260			
Spokesperson					
Between Group	.935	3	.312	.467	.706
Within Group	171.735	257	.668		
Total	172.670	260			
Transformation Leader					
Between Group	1.843	3	.614	.440	.725
Within Group	358.907	257	1.397		
Total	360.750	260			

Table 4-55 Continued

Variable and Group	Sum of the Squares	Diff	Mean Square	F	Sig
Transactional Leader					
Between Group	5.578	3	1.859	**2.719**	**.045**
Within Group	175.744	257	.684		
Total	181.321	260			
Resource Allocator					
Between Group	5.751	3	1.917	1.247	.293
Within Group	395.031	257	1.537		
Total	400.782	260			

Research Hypotheses

Hypothesis 1

Project manager profiles are significant explanatory variables of project success (impact to customer, impact to team, design goals, benefit to the organization, and preparing for the future).

In order to test Hypothesis 1, ETA correlation analysis, Pearson *r* correlations, and multiple regression were used to determine the explanatory relationships among project manager profiles and project success. Research Hypothesis 1 has six separate hypotheses. Each hypothesis tests a different explanatory relationship among project manager profiles and variations of the dependent variable of project success. The dependent variable changed as follows: $H1_a$ *Design Goals* subscale; $H1_b$ *Impact to Customer* subscale; $H1_c$ *Impact to Team* subscale; $H1_d$ *Benefit to the Organization* subscale; $H1_e$ *Preparing for the Future* subscale; and $H1_f$ total score for *Project Success*.

In Research Hypothesis 1, explanatory categorical variables included the project manager profile variables of PMP Certified, Gender, and Region. The explanatory variables that were scaled included the project manager profile variables of Education, Age, Tenure, PM Courses, GM Courses, PM Experience, and GM Experience. For the correlational analysis of Project Success and its five subscales, ETA was used for categorical variables, which were dummy coded, and Pearson *r* was used for scaled variables.

ETA correlation analysis indicated that region ($p = .047$) was significantly related to *Design Goals*. All other categorical variables had non-significant correlations to *Design Goals*. ETA correlation analysis indicated the all categorical variables had non-significant correlations to *Impact to Customer*. ETA correlation analysis indicated that gender ($p = .020$) was significantly related to *Impact to Team*. All other categorical variables had non-significant correlations to *Impact to Team*. ETA correlation analysis indicated that gender ($p = .030$) was significantly related to *Benefit to Organization*. All other categorical variables had non-significant correlations to *Benefit to Organization*. ETA correlation analysis indicated the all categorical variables had non-significant correlations to *Preparing for the Future*. ETA correlation analysis indicated that all categorical variables had non-significant correlations to *Project Success*. The results of the ETA correlation analysis, ETA Squared, F and p values are presented in Table 4-56.

Table 4-56

ETA Correlations for Categorical Variables of Project Manager Profiles and Project Success (Subscales and Total Scale)

	ETA	ETA Squared	*F*	*P*
Correlations with Design Goals				
Project Manager Profiles				
PMP Certified	.017	.000	.076	.784
Gender	.002	.000	.001	.979
Region	.175	.030	2.692	**.047**
Correlations with Impact to Customer				
Project Manager Profiles				
PMP Certified	.080	.006	1.655	.199
Gender	.074	.005	1.409	.236
Region	.065	.004	.362	.780
Correlations with Impact to Team				
Project Manager Profiles				
PMP Certified	.012	.000	.040	.841
Gender	.144	.021	5.502	**.020**
Region	.166	.028	2.442	.065
Correlations with Benefit to the Organization				
Project Manager Profiles				
PMP Certified	.087	.008	1.990	.160
Gender	.134	.018	4.749	**.030**
Region	.101	.010	.888	.448
Correlations with Preparing for the Future				
Project Manager Profiles				
PMP Certified	.077	.006	1.537	.216
Gender	.042	.002	.455	.501
Region	.082	.007	.583	.626
Correlations with Project Success				
Project Manager Profiles				
PMP Certified	.070	.005	1.265	.262
Gender	.115	.013	3.463	.064
Region	.127	.016	1.394	.245

Categorical variables resulting from ETA correlation with *Project Success* and its subscales were dummy coded with 1's and 0's in order to determine their association using Pearson *r*. Pearson *r* correlations were used to analyze the relationship among the categorical (PMP certified, Gender, and Region) and scaled (Education, Age, Tenure, PM Courses, GM Courses, PM Experience, and GM Experience) variables of project manager profiles with *Project Success* (total scale and subscales). Pearson r correlation analysis resulted in non-significant relationships to *Design Goals, Impact to Customer,* and *Preparing for the Future.* Pearson r correlations resulted in three variables that were significantly related to *Impact to Team*: the gender descriptions of Female ($r = -.144$, $p = .020$), and Male ($r = .144$, $p = 020$); and the region description of Mexico, Latin America and the Caribbean ($r = .146$, $p = .018$). Pearson r correlations resulted in two variables that were significantly related to *Benefit to Organization*: Female ($r = -.134$, $p = .030$); and Male ($r = .134$. $p = .030$). Pearson r correlations resulted in one variable that was significantly related to Project Success, the region description of Mexico, Latin America and the Caribbean ($r = .122$, $p = .050$). The results of the Pearson r correlations for the categorical and scaled variables of project manager profiles with *Project Success* (total and subscales) are presented in Table 4-57.

Table 4-57

Pearson r Correlations of Project Manager Profiles and Project Success (Subscales and Total Scale)

	Design Goals		Impact to Customer		Impact to Team		Benefit to Organization		Preparing for the Future		Project Success	
	r	*p*	*r*	*p*	*r*	*p*	*r*	*p*	*r*	*p*	*r*	*p*
PMP Certified - Yes	.017	.784	-.080	.199	-.012	.841	-.087	.160	-.077	.216	-.070	.262
PMP Certified - No	-.017	.784	.080	.199	.012	.841	.087	.160	.077	.216	.070	.262
Male	.002	.979	.074	.236	**.144**	**.020**	**.134**	**.030**	.042	.501	.115	.064
Female	-.002	.979	-.074	.236	**-.144**	**.020**	**-.134**	**.030**	-.042	.501	-.115	.064
North America	.119	.054	.037	.549	-.077	.214	-.016	.800	.026	.677	.009	.887
Asia Pacific	-.083	.182	-.064	.304	.058	.349	-.018	.777	-.042	.503	-.029	.640
EMEA	-.105	.090	.021	.734	-.047	.453	-.009	.889	-.019	.761	-.038	.541
Mexico, LA, and Caribbean	.097	.120	.020	.743	**.146**	**.018**	.101	.103	.072	.248	**.122**	**.050**
Education	.014	.824	-.013	.835	.040	.520	.064	.303	.091	.141	.064	.305
Age	.005	.938	.068	.274	.014	.826	.053	.392	.019	.765	.041	.508
Tenure	.003	.956	.027	.667	.026	.674	.095	.126	.047	.453	.061	.327
PM Training	-.008	.892	.019	.763	-.054	.388	.002	.978	.033	.600	-.002	.968
GM Training	.014	.822	.063	.309	-.008	.902	.064	.302	.086	.166	.062	.321
PM Experience	.010	.875	-.029	.645	-.078	.207	-.022	.726	-.010	.869	-.037	.555
GM Experience	.066	.291	.041	.507	-.011	.858	.038	.540	.044	.477	.043	.484

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To test research hypothesis 1_a, the forward method for hierarchical multiple regression was used to find the best explanatory model of the relationships among project manager profiles as significant explanatory variables of *Design Goals*, until a significant F model with the highest R^2 and adjusted R^2 was produced. Collinearity statistics of variance inflation factor (VIF) and tolerance were used to test for multicollinearity. The resulted of the hierarchical multiple regression analysis showed that no project manager profile variables were significant explanatory variables of *Design Goals*. According to the results, Hypothesis 1_a was not supported.

To test research hypothesis 1_b, the forward method for hierarchical multiple regression was used to find the best explanatory model of the relationships among project manager profiles as significant explanatory variables of *Impact to Customer*, until a significant F model with the highest R^2 and adjusted R^2 was produced. Collinearity statistics of variance inflation factor (VIF) and tolerance were used to test for multicollinearity. The resulted of the hierarchical multiple regression analysis showed that no project manager profile variables were significant explanatory variables of *Impact to Customer*. According to the results, Hypothesis 1_b was not supported.

To test research hypothesis 1_c, the enter method for hierarchical multiple regression was used to find the best explanatory model of the relationships among project manager profiles as significant explanatory variables of *Impact to Team*, until a significant F model with the highest R^2 and adjusted R^2 was produced. Collinearity statistics of variance inflation factor (VIF) and tolerance were used to test for multicollinearity. For $H1_c$, the VIF were not more than 10 (1.009) and the tolerance was more than .10 (.991) indicating that multicollinearity was not an issue.

The multiple regression resulted in two models which had a significant *F* value which tests for the significance of R^2, or the model as a whole. Model 2 had two explanatory variables: region of Mexico; and gender of Male. It was the best explanatory model to explain *Impact to Team* ($F = 6.294$, $p = .002$) and resulted in an R^2 of (.047) and an adjusted R^2 of (.039). The overall variance explained by the two variables ranged between 3.9% and 4.7%. To analyze the individual predictors in Model 2, the *t*-statistic was significant for Mexico (2.638, $p = .009$) and Male (2.615, $p = .009$).

The effect size of the explanatory variables explaining *Impact to Team* based on the standardized Beta coefficients (β) were: region of Mexico, Latin America, and the Caribbean ($\beta = .161$, $p = .009$), and Male ($\beta = .160$, $p = .009$). According to the results, Hypothesis 1_c was partially supported because only the region of Mexico, Latin America, and the Caribbean, and the gender of Male were explanatory variables of *Impact to Team*. The other project manager profile variables were not. The best explanatory model was:

Impact to Team = 3.615(Constant) + Region(+.593 Mexico, Latin America, and the Caribbean) + Gender(.250 Male) + e

The results of the hierarchical multiple regression analysis of the explanatory variables and *Impact to Team* are shown in Table 4-58.

Table 4-58

Hierarchical Multiple Regression of Project Manager Profiles and Impact to Team

Model	B	SE	*β*	*T*	*p-value*	*F*	*P*	R_2	R_2 *Adjusted*
Constant	3.615	.082		44.054	.000				
Mexico	.593	.225	.161	2.638	.009				
Male	.250	.096	.160	2.615	.009				
						6.294	.002	.047	.039

To test research hypothesis 1_d, the enter method for hierarchical multiple regression was used to find the best explanatory model of the relationships among project manager profiles as significant explanatory variables of *Benefit to Organization*, until a significant *F* model with the highest R^2 and adjusted R^2 was produced. Collinearity statistics of variance inflation factor (VIF) and tolerance were used to test for multicollinearity. For $H1_c$, the VIF were not more than 10 (1.000) and the tolerance was more than .10 (1.000) indicating that multicollinearity was not an issue.

The multiple regression resulted in one model which had a significant *F* value which tests for the significance of R2, or the model as a whole. Model 1 had one explanatory variable: gender of female. It was the best explanatory model to explain *Benefit to Organization* ($F = 4.749$, $p = .030$) and resulted in an R^2 of (.018) and an adjusted R^2 of (.014). The overall variance explained by the variable ranged between 1.4% and 1.8%. To analyze the individual predictor in Model 1, the *t*-statistic was significant for Female (-2.179, p = .030).

The effect size of the explanatory variable explaining *Benefit to Organization* based on the standardized Beta coefficient (β) was: Female ($\beta = -.134$, $p = .030$). According to the results, Hypothesis 1_d was partially supported because only the gender of Male was an explanatory variable of *Benefit to Organization*. The other project manager profile variables were not. The best explanatory model was:

Benefit to Organization = 3.879(Constant) + Gender(-.216 Female) + e

The results of the hierarchical multiple regression analysis of the explanatory variables and *Benefit to Organization* are shown in Table 4-59.

Table 4-59

Hierarchical Multiple Regression of Project Manager Profiles and Benefit to Organization

Model	B	SE	*β*	*t*	*p-value*	*F*	*P*	R_2	R_2 *Adjusted*
Constant	3.879	.053		73.364	.000				
Female	-.216	.099	-.134	-2.179	.030				
						4.749	.030	.018	.014

To test research hypothesis 1_e, the forward method for hierarchical multiple regression was used to find the best explanatory model of the relationships among project manager profiles as significant explanatory variables of *Preparing for the Future*, until a significant *F* model with the highest R^2 and adjusted R^2 was produced. Collinearity statistics of variance inflation factor (VIF) and tolerance were used to test for multicollinearity. The resulted of the hierarchical multiple regression analysis showed that no project manager profile variables were significant explanatory variables of *Preparing for the Future.* According to the results, Hypothesis 1_e was not supported.

To test research hypothesis 1_f, the enter method for hierarchical multiple regression was used to find the best explanatory model of the relationships among project manager profiles as significant explanatory variables of *Project Success*, until a significant *F* model with the highest R^2 and adjusted R^2 was produced. Collinearity statistics of variance inflation factor (VIF) and tolerance were used to test for multicollinearity. For $H1_f$, the VIF were not more than 10 (1.009) and the tolerance was more than .10 (.991) indicating that multicollinearity was not an issue.

The multiple regression resulted in two models which had a significant *F* value which tests for the significance of R2, or the model as a whole. Model 2 had two explanatory variables: region of Mexico, Latin America, and the Caribbean; and gender of Male. It was the best explanatory model to explain *Project Success* ($F = 4.117, p = .017$) and resulted in an R^2 of (.031) and an adjusted R^2 of (.023). The overall variance explained by the two variables ranged between 2.3% and 3.1%. To analyze the individual predictors in Model 2, the *t*-statistic was significant for Mexico (2.173, p = .031) and Male (2.074, p = .039).

The effect size of the explanatory variables explaining *Project Success* based on the standardized Beta coefficients (β) were: region of Mexico, Latin America, and the Caribbean ($\beta = .134, p = .031$), and Male ($\beta = .128, p = .039$). According to the results, Hypothesis 1_f was partially supported because only the region of Mexico, Latin America, and the Caribbean, and the gender of Male were explanatory variables of *Project Success*. The other project manager profile variables were not. The best explanatory model was:

Project Success = 3.718(Constant) + Region(+.379 Mexico, Latin America, and the Caribbean) + Gender(.154 Male) + e

The results of the hierarchical multiple regression analysis of the explanatory variables and *Impact to Team* are shown in Table 4-60.

Table 4-60

Hierarchical Multiple Regression of Project Manager Profiles and Project Success

Model	B	SE	β	*t*	*p-value*	*F*	*p*	R_2	R_2 *Adjusted*
Constant	3.718	.064		58.314	.000				
Mexico	.379	.175	.134	2.173	.031				
Male	.154	.074	.128	2.074	.039				
						4.117	.017	.031	.023

Hypothesis 2

Project manager roles are significant explanatory variables of project success (impact to customer, impact to team, design goals, benefit to the organization, and preparing for the future).

In order to test Hypothesis 2, Pearson *r* correlations and multiple regression were used to determine the explanatory relationships among project manager roles and project success. Research Hypothesis 2 has six separate hypotheses. Each hypothesis tests a different explanatory relationship among project manager roles and variations of the dependent variable of project success. The dependent variable changed as follows: $H2_a$ *Design Goals* subscale; $H2_b$ *Impact to Customer* subscale; $H2_c$ *Impact to Team* subscale; $H2_d$ *Benefit to the Organization* subscale; $H2_e$ *Preparing for the Future* subscale; and $H2_f$ total score for *Project Success.*

In Research Hypothesis 2, there are no explanatory categorical variables. The explanatory variables that were scaled included the project manager roles variables of Liaison, Monitor, Entrepreneur, Spokesperson, Transformational Leader, Transactional

Leader, and Resource Allocator. Pearson r correlations were used to analyze the relationship among the scaled variables with *Project Success* and its five subscales.

Pearson r correlations resulted in four variables that were significantly related to *Design Goals*: Liaison ($r = .127, p = .040$); Monitor ($r = .147, p = .018$); Entrepreneur ($r = .171, p = .006$); and Resource Allocator ($r = .219, p = .000$). Pearson r correlations resulted in five variables that were significantly related to *Impact to Customer*: Monitor ($r = .148, p = .017$); Entrepreneur ($r = .274, p = .000$); Transformational Leader ($r = .157, p = .011$); Transactional Leader ($r = .135, p = .029$); and Resource Allocator ($r = .177, p = .004$). Pearson r correlations resulted in six variables that were significantly related to *Impact to Team*: Liaison ($r = .302, p = .000$); Monitor ($r = .371, p = .000$); Entrepreneur ($r = .169, p = .006$); Transformational Leader ($r = .317, p = .000$); Transactional Leader ($r = .153, p = .014$); and Resource Allocator ($r = .249, p = .000$). Pearson r correlations resulted in six variables that were significantly related to *Benefit to the Organization*: Liaison ($r = .216, p = .000$); Monitor ($r = .343, p = .000$); Entrepreneur ($r = .258, p = .000$); Transformational Leader ($r = .220, p = .000$); Transactional Leader ($r = .187, p = .002$); and Resource Allocator ($r = .280, p = .000$). Pearson r correlations resulted in seven variables that were significantly related to *Preparing for the Future*: Liaison ($r = .264, p = .000$); Monitor ($r = .365, p = .000$); Entrepreneur ($r = .164, p = .008$); Spokesperson ($r = .142, p = .021$); Transformational Leader ($r = .236, p = .000$); Transactional Leader ($r = .187, p = .002$); and Resource Allocator ($r = .141, p = .023$). Pearson r correlations resulted in seven variables that were significantly related to *Project Success*: Liaison ($r = .277, p = .000$); Monitor ($r = .397, p = .000$); Entrepreneur ($r = .270, p = .000$); Spokesperson ($r = .150, p = .015$); Transformational Leader ($r = .276, p$

= .000); Transactional Leader (r = .198, p = .001); and Resource Allocator (r = .285, p = .000). The results of the Pearson r correlations for the scaled variables of project manager roles with *Project Success* (total and subscales) are presented in Table 4-61.

Table 4-61

Pearson r Correlations of Project Manager Roles and Project Success (Subscales and Total Scale)

	Design Goals		Impact to Customer		Impact to Team		Benefit to Organization		Preparing for the Future		Project Success	
	r	*p*	*r*	*p*	*r*	*p*	*r*	*p*	*r*	*p*	*r*	*p*
Liaison Role	**.127**	**.040**	.032	.602	**.302**	**.000**	**.216**	**.000**	**.264**	**.000**	**.277**	**.000**
Monitor Role	**.147**	**.018**	**.148**	**.017**	**.371**	**.000**	**.343**	**.000**	**.365**	**.000**	**.397**	**.000**
Entrepreneur Role	**.171**	**.006**	**.274**	**.000**	**.169**	**.006**	**.258**	**.000**	**.164**	**.008**	**.270**	**.000**
Spokesperson Role	.089	.153	.112	.071	.092	.137	.121	.052	**.142**	**.021**	**.150**	**.015**
Transformational Leader Role	.022	.725	**.157**	**.011**	**.317**	**.000**	**.220**	**.000**	**.236**	**.000**	**.276**	**.000**
Transactional Leader Role	.028	.649	**.135**	**.029**	**.153**	**.014**	**.187**	**.002**	**.187**	**.002**	**.198**	**.001**
Resource Allocator Role	**.219**	**.000**	**.177**	**.004**	**.249**	**.000**	**.280**	**.000**	**.141**	**.023**	**.285**	**.000**

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To test research hypothesis 2_a, the forward method for hierarchical multiple regression was used to find the best explanatory model of the relationships among project manager roles as significant explanatory variables of *Design Goals*, until a significant F model with the highest R^2 and adjusted R^2 was produced. Collinearity statistics of variance inflation factor (VIF) and tolerance were used to test for multicollinearity. For $H2_a$, the VIF was not more than 10 (1.000) and the tolerance was more than .10 (1.000) indicating that multicollinearity was not an issue.

The multiple regression resulted in one model which had a significant F value which tests for the significance of R^2, or the model as a whole. Model 1 had one explanatory variable: Resource Allocator. It was the best explanatory model to explain *Design Goals* ($F = 13.026$, $p = .000$) and resulted in an R^2 of (.048) and an adjusted R^2 of (.044). The overall variance explained by the variable ranged between 4.4% and 4.8%. To analyze the individual predictor in Model 1, the t-statistic was significant for Resource Allocator (3.609, $p = .000$).

The effect size of the explanatory variable explaining *Design Goals* based on the standardized Beta coefficients (β) was: Resource Allocator ($\beta = .219$, $p = .000$). According to the results, Hypothesis 2_a was partially supported because only the Resource Allocator role was an explanatory variable to *Design Goals*. The other project manager role variables were not. The best explanatory model was:

Design Goals = 2.878(Constant) + Project Manager Roles(+.156 Resource Allocator) + e

The results of the hierarchical multiple regression analysis of the explanatory variable and *Design Goals* are shown in Table 4-62.

Table 4-62

Hierarchical Multiple Regression of Project Manager Roles and Design Goals

Model	B	SE	*β*	*T*	*p-value*	*F*	*p*	*R₂*	*R₂ Adjusted*
Constant	2.878	.235		12.230	.000				
Resource Allocator	.156	.043	.219	3.609	.000				
						13.026	.000	.048	.044

To test research hypothesis 2_b, the forward method for hierarchical multiple regression was used to find the best explanatory model of the relationships among project manager roles as significant explanatory variables of *Impact to Customer*, until a significant *F* model with the highest R^2 and adjusted R^2 was produced. Collinearity statistics of variance inflation factor (VIF) and tolerance were used to test for multicollinearity. For $H2_b$, the VIF was not more than 10 (1.000) and the tolerance was more than .10 (1.000) indicating that multicollinearity was not an issue.

The multiple regression resulted in one model which had a significant *F* value which tests for the significance of R^2, or the model as a whole. Model 1 had one explanatory variable: Entrepreneur. It was the best explanatory model to explain *Impact to Customer* ($F = 21.093, p = .000$) and resulted in an R^2 of (.075) and an adjusted R^2 of (.072). The overall variance explained by the variable ranged between 7.2% and 7.5%. To analyze the individual predictor in Model 1, the *t*-statistic was significant for Entrepreneur ($4.593, p = .000$).

The effect size of the explanatory variable explaining *Impact to Customer* based on the standardized Beta coefficients (β) was: Entrepreneur ($\beta = .274, p = .000$). According to the results, Hypothesis 2_b was partially supported because only the

Entrepreneur role was an explanatory variable to *Impact to Customer*. The other project manager role variables were not. The best explanatory model was:

Impact to Customer = 3.175(Constant) + Project Manager Roles(+.191 Entrepreneur) + e

The results of the hierarchical multiple regression analysis of the explanatory variable and *Impact to Customer* are shown in Table 4-63.

Table 4-63

Hierarchical Multiple Regression of Project Manager Roles and Impact to Customer

Model	B	SE	β	t	*p-value*	F	p	R_2	R_2 *Adjusted*
Constant	3.175	.245		12.981	.000				
Entrepreneur	.191	.042	.274	4.593	.000				
						21.093	.000	.075	.072

To test research hypothesis 2_c, the forward method for hierarchical multiple regression was used to find the best explanatory model of the relationships among project manager roles as significant explanatory variables of *Impact to Team*, until a significant F model with the highest R^2 and adjusted R^2 was produced. Collinearity statistics of variance inflation factor (VIF) and tolerance were used to test for multicollinearity. For $H2_c$, the VIF was not more than 10 (1.277) and the tolerance was more than .10 (.783) indicating that multicollinearity was not an issue.

The multiple regression resulted in two models which had a significant F value which tests for the significance of R^2, or the model as a whole. Model 2 had two explanatory variables: Monitor and Transformational Leader. It was the best explanatory model to explain *Impact to Team* ($F = 25.278$, $p = .000$) and resulted in an R^2 of (.164) and an adjusted R^2 of (.157). The overall variance explained by the variable ranged between 15.7% and 16.4%. To analyze the individual predictors in Model 2, the *t*-statistic was significant for Monitor (4.432, p = .000), and Transformational Leader (2.856, p = .005).

The effect size of the explanatory variable explaining *Impact to Team* based on the standardized Beta coefficients (β) were: Monitor (β = .285, p = .000) and Transformational Leader (β = .184, p = .005). According to the results, Hypothesis 2_c was partially supported because only the Monitor and Transformational Leader roles were explanatory variables to *Impact to Team*. The other project manager role variables were not. The best explanatory model was:

Impact to Team = 2.488(Constant) + Project Manager Roles(+.182 Monitor + .110 Transformational Leader) + e

The results of the hierarchical multiple regression analysis of the explanatory variables and *Impact to Team* are shown in Table 4-64.

Table 4-64

Hierarchical Multiple Regression of Project Manager Roles and Impact to Team

Model	B	SE	β	T	p-value	F	p	R_2	R_2 Adjusted
Constant	2.488	.193		12.924	.000				
Monitor	.182	.041	.285	4.432	.000				
Transformational Leader	.110	.039	.184	2.856	.005				
						25.278	.000	.164	.157

To test research hypothesis 2_d, the forward method for hierarchical multiple regression was used to find the best explanatory model of the relationships among project manager roles as significant explanatory variables of *Benefit to Organization*, until a significant F model with the highest R^2 and adjusted R^2 was produced. Collinearity statistics of variance inflation factor (VIF) and tolerance were used to test for multicollinearity. For $H2_d$, the VIF was not more than 10 (1.107) and the tolerance was more than .10 (.903) indicating that multicollinearity was not an issue.

The multiple regression resulted in two models which had a significant *F* value which tests for the significance of R^2, or the model as a whole. Model 2 had two explanatory variables: Monitor and Resource Allocator. It was the best explanatory model to explain *Benefit to Organization* ($F = 22.932, p = .000$) and resulted in an R^2 of (.151) and an adjusted R^2 of (.144). The overall variance explained by the variable ranged between 14.4% and 15.1%. To analyze the individual predictors in Model 2, the *t*-statistic was significant for Monitor (4.703, $p = .000$), and Resource Allocator (3.168, $p = .002$).

The effect size of the explanatory variables explaining *Benefit to Organization* based on the standardized Beta coefficients (β) were: Monitor ($\beta = .284, p = .000$) and Resource Allocator ($\beta = .191, p = .002$). According to the results, Hypothesis 2_d was partially supported because only the Monitor and Resource Allocator roles were explanatory variables to *Benefit to Organization.* The other project manager role variables were not. The best explanatory model was:

Benefit to Organization = 2.394(Constant) + Project Manager Roles(+.186 Monitor + .112 Resource Allocator) + e

The results of the hierarchical multiple regression analysis of the explanatory variables and *Benefit to Organization* are shown in Table 4-65.

Table 4-65

Hierarchical Multiple Regression of Project Manager Roles and Benefit to Organization

Model	B	SE	β	*t*	*p-value*	*F*	*p*	R_2	R_2 *Adjusted*
Constant	2.394	.218		10.994	.000				
Monitor	.186	.040	.284	4.703	.000				
Resource Allocator	.112	.035	.191	3.168	.002				
						22.932	.000	.151	.144

To test research hypothesis 2_e, the forward method for hierarchical multiple regression was used to find the best explanatory model of the relationships among project manager roles as significant explanatory variables of *Preparing for the Future*, until a significant *F* model with the highest R^2 and adjusted R^2 was produced. Collinearity statistics of variance inflation factor (VIF) and tolerance were used to test for multicollinearity. For $H2_e$, the VIF was not more than 10 (1.000) and the tolerance was more than .10 (1.000) indicating that multicollinearity was not an issue.

The multiple regression resulted in one model which had a significant *F* value which tests for the significance of R^2, or the model as a whole. Model 1 had one explanatory variable: Monitor. It was the best explanatory model to explain *Preparing for the Future* ($F = 39.922, p = .000$) and resulted in an R^2 of (.134) and an adjusted R^2 of (.130). The overall variance explained by the variable ranged between 13.0% and 13.4%. To analyze the individual predictor in Model 1, the *t*-statistic was significant for Monitor ($6.318, p = .000$).

The effect size of the explanatory variable explaining *Preparing for the Future* based on the standardized Beta coefficients (β) was: Monitor ($\beta = .365, p = .000$).

According to the results, Hypothesis 2_e was partially supported because only the Monitor role was an explanatory variable to *Preparing for the Future*. The other project manager role variables were not. The best explanatory model was:

Preparing for the Future = 2.687(Constant) + Project Manager Roles(+.226 Monitor) + e

The results of the hierarchical multiple regression analysis of the explanatory variables and *Preparing for the Future* are shown in Table 4-66.

Table 4-66

Hierarchical Multiple Regression of Project Manager Roles and Preparing for the Future

Model	B	SE	β	t	*p-value*	F	p	R_2	R_2 *Adjusted*
Constant	2.687	.165		16.335	.000				
Monitor	.226	.036	.365	6.318	.000				
						39.922	.000	.134	.130

To test research hypothesis 2_f, the forward method for hierarchical multiple regression was used to find the best explanatory model of the relationships among project manager roles as significant explanatory variables of *Project Success*, until a significant F model with the highest R^2 and adjusted R^2 was produced. Collinearity statistics of variance inflation factor (VIF) and tolerance were used to test for multicollinearity. For $H2_f$, the VIF was not more than 10 (1.107) and the tolerance was more than .10 (.903) indicating that multicollinearity was not an issue.

The multiple regression resulted in two models which had a significant F value which tests for the significance of R^2, or the model as a whole. Model 2 had two explanatory variables: Monitor and Resource Allocator. It was the best explanatory model to explain *Project Success* (F = 29.621, p = .000) and resulted in an R^2 of (.187) and an adjusted R^2 of (.180). The overall variance explained by the variable ranged between 18.0% and 18.7%. To analyze the individual predictors in Model 2, the *t*-statistic was significant for Monitor (5.787, p = .000), and Resource Allocator (3.022, p = .003).

The effect size of the explanatory variables explaining *Project Success* based on the standardized Beta coefficients (β) were: Monitor (β = .342, p = .000) and Resource Allocator (β = .179, p = .003). According to the results, Hypothesis 2_f was partially supported because only the Monitor and Resource Allocator roles were explanatory variables to *Project Success*. The other project manager role variables were not. The best explanatory model was:

Project Success = 2.679(Constant) + Project Manager Roles(+.168 Monitor + .078 Resource Allocator) + e

The results of the hierarchical multiple regression analysis of the explanatory variables and *Project Success* are shown in Table 4-67.

Table 4-67

Hierarchical Multiple Regression of Project Manager Roles and Project Success

Model	B	SE	β	*t*	*p-value*	*F*	*p*	R_2	R_2 Adjusted
Constant	2.679	.160		16.785	.000				
Monitor	.168	.029	.342	5.787	.000				
Resource Allocator	.078	.026	.179	3.022	.003				
						29.621	.000	.187	.180

Hypothesis 3

The stage of the project life cycle and project manager roles are significant explanatory variables of project success (impact to customer, impact to team, design goals, benefit to the organization, and preparing for the future).

In order to test Hypothesis 3, Pearson r correlations and multiple regression were used to determine the explanatory relationships among project manager roles, the project life cycle, and project success. Research Hypothesis 3 has six separate hypotheses. Each hypothesis tests a different explanatory relationship among project manager roles, the project life cycle, and variations of the dependent variable of project success. The dependent variable changed as follows: $H3_a$ *Design Goals* subscale; $H3_b$ *Impact to Customer* subscale; $H3_c$ *Impact to Team* subscale; $H3_d$ *Benefit to the Organization* subscale; $H3_e$ *Preparing for the Future* subscale; and $H3_f$ total score for *Project Success*.

In Research Hypothesis 3, there are no explanatory categorical variables. The explanatory variables that were scaled included the project manager roles variables of Liaison, Monitor, Entrepreneur, Spokesperson, Transformational Leader, Transactional Leader, and Resource Allocator, and the project life cycle variable of Life Cycle Stage. Pearson r correlations were used to analyze the relationship among the scaled variables with *Project Success* and its five subscales.

Pearson r correlations resulted in four variables that were significantly related to *Design Goals*: Liaison ($r = .127, p = .040$); Monitor ($r = .147, p = .018$); Entrepreneur ($r = .171, p = .006$); and Resource Allocator ($r = .219, p = .000$). Pearson r correlations resulted in five variables that were significantly related to *Impact to Customer*: Monitor ($r = .148, p = .017$); Entrepreneur ($r = .274, p = .000$);

Transformational Leader ($r = .157, p = .011$); Transactional Leader ($r = .135, p = .029$); and Resource Allocator ($r = .177, p = .004$). Pearson r correlations resulted in six variables that were significantly related to *Impact to Team*: Liaison ($r = .302, p = .000$), Monitor ($r = .371, p = .000$), Entrepreneur ($r = .169, p = .006$), Transformational Leader ($r = .317, p = .000$), Transactional Leader ($r = .153, p = .014$), and Resource Allocator ($r = .249, p = .000$). Pearson r correlations resulted in six variables that were significantly related to *Benefit to the Organization*: Liaison ($r = .216, p = .000$); Monitor ($r = .343, p = .000$); Entrepreneur ($r = .258, p = .000$); Transformational Leader ($r = .220, p = .000$); Transactional Leader ($r = .187, p = .002$); and Resource Allocator ($r = .280, p = .000$). Pearson r correlations resulted in seven variables that were significantly related to *Preparing for the Future*: Liaison ($r = .264, p = .000$); Monitor ($r = .365, p = .000$); Entrepreneur ($r = .164, p = .008$); Spokesperson ($r = .142, p = .021$); Transformational Leader ($r = .236, p = .000$); Transactional Leader ($r = .187, p = .002$); and Resource Allocator ($r = .141, p = .023$). Pearson r correlations resulted in seven variables that were significantly related to *Project Success*: Liaison ($r = .277, p = .000$); Monitor ($r = .397, p = .000$); Entrepreneur ($r = .270, p = .000$); Spokesperson ($r = .150, p = .015$); Transformational Leader ($r = .276, p = .000$); Transactional Leader ($r = .198, p = .001$); and Resource Allocator ($r = .285, p = .000$). The results of the Pearson r correlations for the scaled variables of project manager roles and the project life cycle with *Project Success* (total and subscales) are presented in Table 4-68.

Table 4-68

Pearson r Correlations of Project Manager Roles, the Project Life Cycle, and Project Success (Subscales and Total Scale)

	Design Goals		Impact to Customer		Impact to Team		Benefit to Organization		Preparing for the Future		Project Success	
	r	*p*	*r*	*p*	*r*	*p*	*r*	*p*	*r*	*p*	*r*	*p*
Liaison Role	**.127**	**.040**	.032	.602	**.302**	**.000**	**.216**	**.000**	**.264**	**.000**	**.277**	**.000**
Monitor Role	**.147**	**.018**	**.148**	**.017**	**.371**	**.000**	**.343**	**.000**	**.365**	**.000**	**.397**	**.000**
Entrepreneur Role	**.171**	**.006**	**.274**	**.000**	**.169**	**.006**	**.258**	**.000**	**.164**	**.008**	**.270**	**.000**
Spokesperson Role	.089	.153	.112	.071	.092	.137	.121	.052	**.142**	**.021**	**.150**	**.015**
Transformational Leader Role	.022	.725	**.157**	**.011**	**.317**	**.000**	**.220**	**.000**	**.236**	**.000**	**.276**	**.000**
Transactional Leader Role	.028	.649	**.135**	**.029**	**.153**	**.014**	**.187**	**.002**	**.187**	**.002**	**.198**	**.001**
Resource Allocator Role	**.219**	**.000**	**.177**	**.004**	**.249**	**.000**	**.280**	**.000**	**.141**	**.023**	**.285**	**.000**
Life Cycle Stage	-.118	.056	.062	.321	-.016	.800	-.004	.948	-.039	.529	-.029	.637

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To test research hypothesis 3_a, the forward method for hierarchical multiple regression was used to find the best explanatory model of the relationships among project manager roles and the project life cycle as significant explanatory variables of *Design Goals*, until a significant F model with the highest R^2 and adjusted R^2 was produced. Collinearity statistics of variance inflation factor (VIF) and tolerance were used to test for multicollinearity. For $H3_a$, the VIF was not more than 10 (1.000) and the tolerance was more than .10 (1.000) indicating that multicollinearity was not an issue.

The multiple regression resulted in one model which had a significant F value which tests for the significance of R^2, or the model as a whole. Model 1 had one explanatory variable: Resource Allocator. It was the best explanatory model to explain *Design Goals* ($F = 13.026$, $p = .000$) and resulted in an R^2 of (.048) and an adjusted R^2 of (.044). The overall variance explained by the variable ranged between 4.4% and 4.8%. To analyze the individual predictor in Model 1, the t-statistic was significant for Resource Allocator (3.609, $p = .000$).

The effect size of the explanatory variable explaining *Design Goals* based on the standardized Beta coefficients (β) was: Resource Allocator ($\beta = .219$, $p = .000$). According to the results, Hypothesis 3_a was partially supported because only the Resource Allocator role was an explanatory variable to *Design Goals*. The other project manager role variables and the project life cycle were not. The best explanatory model was:

Design Goals = 2.878(Constant) + Project Manager Roles(+.156 Resource Allocator) + e

The results of the hierarchical multiple regression analysis of the explanatory variable and *Design Goals* are shown in Table 4-69.

Table 4-69

Hierarchical Multiple Regression of Project Manager Roles, the Project Life Cycle, and Design Goals

Model	B	SE	*β*	*t*	*p-value*	*F*	*p*	R_2	R_2 *Adjusted*
Constant	2.878	.235		12.230	.000				
Resource Allocator	.156	.043	.219	3.609	.000				
						13.026	.000	.048	.044

To test research hypothesis 3_b, the forward method for hierarchical multiple regression was used to find the best explanatory model of the relationships among project manager roles and the project life cycle as significant explanatory variables of *Impact to Customer*, until a significant *F* model with the highest R^2 and adjusted R^2 was produced. Collinearity statistics of variance inflation factor (VIF) and tolerance were used to test for multicollinearity. For $H3_b$, the VIF was not more than 10 (1.000) and the tolerance was more than .10 (1.000) indicating that multicollinearity was not an issue.

The multiple regression resulted in one model which had a significant *F* value which tests for the significance of R^2, or the model as a whole. Model 1 had one explanatory variable: Entrepreneur. It was the best explanatory model to explain *Impact to Customer* ($F = 21.093$, $p = .000$) and resulted in an R^2 of (.075) and an adjusted R^2 of (.072). The overall variance explained by the variable ranged between 7.2% and 7.5%. To analyze the individual predictor in Model 1, the *t*-statistic was significant for Entrepreneur (4.593, $p = .000$).

The effect size of the explanatory variable explaining *Impact to Customer* based on the standardized Beta coefficients (β) was: Entrepreneur ($\beta = .274, p = .000$). According to the results, Hypothesis 3_b was partially supported because only the Entrepreneur role was an explanatory variable to *Impact to Customer.* The other project manager role variables and the project life cycle were not. The best explanatory model was:

Impact to Customer = 3.175(Constant) + Project Manager Roles(+.191 Entrepreneur) + e

The results of the hierarchical multiple regression analysis of the explanatory variable and *Impact to Customer* are shown in Table 4-70.

Table 4-70

Hierarchical Multiple Regression of Project Manager Roles, the Project Life Cycle, and Impact to Customer

Model	B	SE	β	t	*p-value*	F	p	R_2	R_2 *Adjusted*
Constant	3.175	.245		12.981	.000				
Entrepreneur	.191	.042	.274	4.593	.000				
						21.093	.000	.075	.072

To test research hypothesis 3_c, the forward method for hierarchical multiple regression was used to find the best explanatory model of the relationships among project manager roles and the project life cycle as significant explanatory variables of *Impact to Team*, until a significant F model with the highest R^2 and adjusted R^2 was produced. Collinearity statistics of variance inflation factor (VIF) and tolerance were used to test for multicollinearity. For $H3_c$, the VIF was not more than 10 (1.277) and the tolerance was more than .10 (.783) indicating that multicollinearity was not an issue.

The multiple regression resulted in two models which had a significant *F* value which tests for the significance of R^2, or the model as a whole. Model 2 had two explanatory variables: Monitor and Transformational Leader. It was the best explanatory model to explain *Impact to Team* ($F = 25.278$, $p = .000$) and resulted in an R^2 of (.164) and an adjusted R^2 of (.157). The overall variance explained by the variable ranged between 15.7% and 16.4%. To analyze the individual predictors in Model 2, the *t*-statistic was significant for Monitor (4.432, $p = .000$), and Transformational Leader (2.856, $p = .005$).

The effect size of the explanatory variable explaining *Impact to Team* based on the standardized Beta coefficients (β) were: Monitor ($\beta = .285$, $p = .000$) and Transformational Leader ($\beta = .184$, $p = .005$). According to the results, Hypothesis 3_c was partially supported because only the Monitor and Transformational Leader roles were explanatory variables to *Impact to Team*. The other project manager role variables and the project life cycle were not. The best explanatory model was:

Impact to Team = 2.488(Constant) + Project Manager Roles(+.182 Monitor + .110 Transformational Leader) + e

The results of the hierarchical multiple regression analysis of the explanatory variables and *Impact to Team* are shown in Table 4-71.

Table 4-71

Hierarchical Multiple Regression of Project Manager Roles, the Project Life Cycle, and Impact to Team

Model	B	SE	β	*t*	*p-value*	*F*	*p*	R_2	R_2 Adjusted
Constant	2.488	.193		12.924	.000				
Monitor	.182	.041	.285	4.432	.000				
Transformational Leader	.110	.039	.184	2.856	.005				
						25.278	.000	.164	.157

To test research hypothesis 3_d, the forward method for hierarchical multiple regression was used to find the best explanatory model of the relationships among project manager roles and the project life cycle as significant explanatory variables of *Benefit to Organization*, until a significant *F* model with the highest R^2 and adjusted R^2 was produced. Collinearity statistics of variance inflation factor (VIF) and tolerance were used to test for multicollinearity. For $H3_d$, the VIF was not more than 10 (1.107) and the tolerance was more than .10 (.903) indicating that multicollinearity was not an issue.

The multiple regression resulted in two models which had a significant *F* value which tests for the significance of R^2, or the model as a whole. Model 2 had two explanatory variables: Monitor and Resource Allocator. It was the best explanatory model to explain *Benefit to Organization* ($F = 22.932, p = .000$) and resulted in an R^2 of (.151) and an adjusted R^2 of (.144). The overall variance explained by the variable ranged between 14.4% and 15.1%. To analyze the individual predictors in Model 2, the *t*-statistic was significant for Monitor (4.703, $p = .000$), and Resource Allocator (3.168, $p = .002$).

The effect size of the explanatory variables explaining *Benefit to Organization* based on the standardized Beta coefficients (β) were: Monitor ($\beta = .284, p = .000$) and

Resource Allocator ($\beta = .191, p = .002$). According to the results, Hypothesis 3_d was partially supported because only the Monitor and Resource Allocator roles were explanatory variables to *Benefit to Organization.* The other project manager role variables and the project life cycle were not. The best explanatory model was:

Benefit to Organization = 2.394(Constant) + Project Manager Roles(+.186 Monitor + .112Resource Allocator) + e

The results of the hierarchical multiple regression analysis of the explanatory variables and *Benefit to Organization* are shown in Table 4-72.

Table 4-72

Hierarchical Multiple Regression of Project Manager Roles, the Project Life Cycle, and Benefit to Organization

Model	**B**	**SE**	***β***	***t***	***p-value***	***F***	***p***	***R₂***	***R₂ Adjusted***
Constant	2.394	.218		10.994	.000				
Monitor	.186	.040	.284	4.703	.000				
Resource Allocator	.112	.035	.191	3.168	.002				
						22.932	.000	.151	.144

To test research hypothesis 3_e, the forward method for hierarchical multiple regression was used to find the best explanatory model of the relationships among project manager roles and the project life cycle as significant explanatory variables of *Preparing for the Future*, until a significant *F* model with the highest R^2 and adjusted R^2 was produced. Collinearity statistics of variance inflation factor (VIF) and tolerance were used to test for multicollinearity. For $H3_e$, the VIF was not more than 10 (1.000) and the tolerance was more than .10 (1.000) indicating that multicollinearity was not an issue.

The multiple regression resulted in one model which had a significant *F* value which tests for the significance of R^2, or the model as a whole. Model 1 had one explanatory variable: Monitor. It was the best explanatory model to explain *Preparing for the Future* ($F = 39.922, p = .000$) and resulted in an R^2 of (.134) and an adjusted R^2 of (.130). The overall variance explained by the variable ranged between 13.0% and 13.4%. To analyze the individual predictor in Model 1, the *t*-statistic was significant for Monitor (6.318, $p = .000$).

The effect size of the explanatory variable explaining *Preparing for the Future* based on the standardized Beta coefficients (β) was: Monitor ($\beta = .365, p = .000$). According to the results, Hypothesis 3_e was partially supported because only the Monitor role was an explanatory variable to *Preparing for the Future.* The other project manager role variables and the project life cycle were not. The best explanatory model was:

Preparing for the Future = 2.687(Constant) + Project Manager Roles(+.226 Monitor) + e

The results of the hierarchical multiple regression analysis of the explanatory variables and *Preparing for the Future* are shown in Table 4-73.

Table 4-73

Hierarchical Multiple Regression of Project Manager Roles, the Project Life Cycle, and Preparing for the Future

Model	**B**	**SE**	***β***	***t***	***p-value***	***F***	***p***	***R₂***	***R₂ Adjusted***
Constant	2.687	.165		16.335	.000				
Monitor	.226	.036	.365	6.318	.000				
						39.922	.000	.134	.130

To test research hypothesis 3_f, the forward method for hierarchical multiple regression was used to find the best explanatory model of the relationships among project manager roles and the project life cycle as significant explanatory variables of *Project*

Success, until a significant *F* model with the highest R^2 and adjusted R^2 was produced. Collinearity statistics of variance inflation factor (VIF) and tolerance were used to test for multicollinearity. For $H3_f$, the VIF was not more than 10 (1.107) and the tolerance was more than .10 (.903) indicating that multicollinearity was not an issue.

The multiple regression resulted in two models which had a significant *F* value which tests for the significance of R^2, or the model as a whole. Model 2 had two explanatory variables: Monitor and Resource Allocator. It was the best explanatory model to explain *Project Success* ($F = 29.621, p = .000$) and resulted in an R^2 of (.187) and an adjusted R^2 of (.180). The overall variance explained by the variable ranged between 18.0% and 18.7%. To analyze the individual predictors in Model 2, the *t*-statistic was significant for Monitor (5.787, $p = .000$), and Resource Allocator (3.022, $p = .003$).

The effect size of the explanatory variables explaining *Project Success* based on the standardized Beta coefficients (β) were: Monitor ($\beta = .342, p = .000$) and Resource Allocator ($\beta = .179, p = .003$). According to the results, Hypothesis 3_f was partially supported because only the Monitor and Resource Allocator roles were explanatory variables to *Project Success*. The other project manager role variables and the project life cycle were not. The best explanatory model was:

Project Success = 2.679(Constant) + Project Manager Roles(+.168 Monitor + .078 Resource Allocator) + e

The results of the hierarchical multiple regression analysis of the explanatory variables and *Project Success* are shown in Table 4-74.

Table 4-74

Hierarchical Multiple Regression of Project Manager Roles, the Project Life Cycle, and Project Success

Model	B	SE	*β*	*t*	*p-value*	*F*	*p*	R_2	R_2 *Adjusted*
Constant	2.679	.160		16.785	.000				
Monitor	.168	.029	.342	5.787	.000				
Resource Allocator	.078	.026	.179	3.022	.003				
						29.621	.000	.187	.180

Hypothesis 4

Project manager profiles and project manager roles are significant explanatory variables of project success (impact to customer, impact to team, design goals, benefit to the organization, and preparing for the future).

In order to test Hypothesis 4, ETA correlation analysis, Pearson *r* correlations, and multiple regression were used to determine the explanatory relationships among project manager profiles, project manager roles, and project success. Research Hypothesis 4 has six separate hypotheses. Each hypothesis tests a different explanatory relationship among project manager profiles, project manager roles, and variations of the dependent variable of project success. The dependent variable changed as follows: $H4_a$ *Design Goals* subscale; $H4_b$ *Impact to Customer* subscale; $H4_c$ *Impact to Team* subscale; $H4_d$ *Benefit to the Organization* subscale; $H4_e$ *Preparing for the Future* subscale; and $H4_f$ total score for *Project Success*.

In Research Hypothesis 4, explanatory categorical variables included the project manager profile variables of PMP Certified, Gender, and Region. The explanatory variables that were scaled included the project manager profile variables of Tenure, PM

Experience, GM Experience, PM Courses, GM Courses, Education, and Age and the project manager roles variables of Liaison, Monitor, Entrepreneur, Spokesperson, Transformational Leader, Transactional Leader, and Resource Allocator. For the correlational analysis of Project Success and its five subscales, ETA was used for categorical variables, which were dummy coded, and Pearson *r* was used for scaled variables.

ETA correlational analysis indicated that region ($p = .047$) was significantly related to *Design Goals*. All other categorical variables had non-significant correlations with *Design Goals*. ETA correlation analysis indicated that all categorical variables had non-significant correlations with the project success subscale *Impact to Customer*. ETA correlational analysis indicated that gender ($p = .020$) was significantly related to *Impact to Team*. All other categorical variables had non-significant correlations with *Impact to Team*. ETA correlational analysis indicated that gender ($p = .030$) was significantly related to *Benefit to Organization*. All other categorical variables had non-significant correlations with *Benefit to Organization*. ETA correlation analysis indicated that all categorical variables had non-significant correlations with the project success subscale *Preparing for the Future*. ETA correlational analysis indicated that all categorical variables had non-significant correlations with *Project Success*. The results of the ETA correlation analysis, ETA Squared, *F* and *p* values are presented in Table 4-75.

Table 4-75

ETA Correlations for Categorical Variables of Project Manager Profiles and Project Success (Subscales and Total Scale)

	ETA	ETA Squared	*F*	*P*
Correlations with Design Goals				
Project Manager Profiles				
PMP Certified	.017	.000	.076	.784
Gender	.002	.000	.001	.979
Region	.175	.030	2.692	**.047**
Correlations with Impact to Customer				
Project Manager Profiles				
PMP Certified	.080	.006	1.655	.199
Gender	.074	.005	1.409	.236
Region	.065	.004	.362	.780
Correlations with Impact to Team				
Project Manager Profiles				
PMP Certified	.012	.000	.040	.841
Gender	.144	.021	5.502	**.020**
Region	.166	.028	2.442	.065
Correlations with Benefit to the Organization				
Project Manager Profiles				
PMP Certified	.087	.008	1.990	.160
Gender	.134	.018	4.749	**.030**
Region	.101	.010	.888	.448
Correlations with Preparing for the Future				
Project Manager Profiles				
PMP Certified	.077	.006	1.537	.216
Gender	.042	.002	.455	.501
Region	.082	.007	.583	.626
Correlations with Project Success				
Project Manager Profiles				
PMP Certified	.070	.005	1.265	.262
Gender	.115	.013	3.463	.064
Region	.127	.016	1.394	.245

Categorical variables resulting from ETA correlation with *Project Success* and its subscales were dummy coded with 1's and 0's in order to determine their association using Pearson *r*. Pearson *r* correlations were used to analyze the relationship among the categorical (PMP certified, Gender, and Region) and scaled (Education, Age, Tenure, PM

Courses, GM Courses, PM Experience, GM Experience, Liaison, Monitor, Entrepreneur, Spokesperson, Transformational Leader, Transactional Leader, and Resource Allocator. Pearson r correlations resulted in four variables that were significantly related to *Design Goals*: Liaison (r = .127, p = .040); Monitor (r = .147, p = .018); Entrepreneur (r = .171, p = .006); and Resource Allocator (r = .219, p = .000). Pearson r correlations resulted in five variables that were significantly related to *Impact to Customer*: Monitor (r = .148, p = .017); Entrepreneur (r = .274, p = .000); Transformational Leader (r = .157, p = .011); Transactional Leader (r = .135, p = .029); and Resource Allocator (r = .177, p = .004). Pearson r correlations resulted in nine variables that were significantly related to *Impact to Team*: the gender descriptions of Female (r = -.144, p = .020), and Male (r = .144, p = 020); the region description of Mexico, Latin American and the Caribbean (r = .146, p = .018); Liaison (r = .302, p = .000); Monitor (r = .371, p = .000); Entrepreneur (r = .169, p = .006); Transformational Leader (r = .317, p = .000); Transactional Leader (r = .153, p = .014); and Resource Allocator (r = .249, p = .000). Pearson r correlations resulted in eight variables that were significantly related to *Benefit to the Organization*: Female (r = -.134, p = .030); and Male (r = .134. p = .030); Liaison (r = .216, p = .000); Monitor (r = .343, p = .000); Entrepreneur (r = .258, p = .000); Transformational Leader (r = .220, p = .000); Transactional Leader (r = .187, p = .002); and Resource Allocator (r = .280, p = .000). Pearson r correlations resulted in seven variables that were significantly related to *Preparing for the Future*: Liaison (r = .264, p = .000); Monitor (r = .365, p = .000); Entrepreneur (r = .164, p = .008); Spokesperson (r = .142, p = .021); Transformational Leader (r = .236, p = .000); Transactional Leader (r = .187, p = .002); and Resource Allocator (r = .141, p = .023). Pearson r correlations resulted in eight variables that were significantly related to *Project Success*: Mexico, Latin American and Caribbean (r = .122, p = .050); Liaison (r = .277, p = .000); Monitor (r = .397, p = .000); Entrepreneur (r = .270, p = .000); Spokesperson (r = .150, p = .015); Transformational Leader (r = .276, p = .000); Transactional Leader (r = .198, p = .001); and Resource Allocator (r = .285, p = .000). The results of the Pearson r correlations for the categorical and scaled variables of project manager profiles and project manager roles with *Project Success* (total and subscales) are presented in Table 4-76.

Table 4-76

Pearson r Correlations of Project Manager Profiles, Project Manager Roles, and Project Success (Subscales and Total Scale)

	Design Goals		Impact to Customer		Impact to Team		Benefit to Organization		Preparing for the Future		Project Success	
	r	*p*	*r*	*p*	*r*	*p*	*r*	*p*	*r*	*p*	*r*	*p*
PMP Certified - Yes	.017	.784	-.080	.199	-.012	.841	-.087	.160	-.077	.216	-.070	.262
PMP Certified - No	-.017	.784	.080	.199	.012	.841	.087	.160	.077	.216	.070	.262
Male	.002	.979	.074	.236	**.144**	**.020**	**.134**	**.030**	.042	.501	.115	.064
Female	-.002	.979	-.074	.236	**-.144**	**.020**	**-.134**	**.030**	-.042	.501	-.115	.064
North America	.119	.054	.037	.549	-.077	.214	-.016	.800	.026	.677	.009	.887
Asia Pacific	-.083	.182	-.064	.304	.058	.349	-.018	.777	-.042	.503	-.029	.640
EMEA	-.105	.090	.021	.734	-.047	.453	-.009	.889	-.019	.761	-.038	.541
Mexico, LA, and Caribbean	.097	.120	.020	.743	**.146**	**.018**	.101	.103	.072	.248	**.122**	**.050**
Education	.014	.824	-.013	.835	.040	.520	.064	.303	.091	.141	.064	.305
Age	.005	.938	.068	.274	.014	.826	.053	.392	.019	.765	.041	.508
Tenure	.003	.956	.027	.667	.026	.674	.095	.126	.047	.453	.061	.327
PM Training	-.008	.892	.019	.763	-.054	.388	.002	.978	.033	.600	-.002	.968
GM Training	.014	.822	.063	.309	-.008	.902	.064	.302	.086	.166	.062	.321
PM Experience	.010	.875	-.029	.645	-.078	.207	-.022	.726	-.010	.869	-.037	.555
GM Experience	.066	.291	.041	.507	-.011	.858	.038	.540	.044	.477	.043	.484
Liaison	**.127**	**.040**	.032	.602	**.302**	**.000**	**.216**	**.000**	**.264**	**.000**	**.277**	**.000**
Monitor	**.147**	**.018**	**.148**	**.017**	**.371**	**.000**	**.343**	**.000**	**.365**	**.000**	**.397**	**.000**
Entrepreneur	**.171**	**.006**	**.274**	**.000**	**.169**	**.006**	**.258**	**.000**	**.164**	**.008**	**.270**	**.000**
Spokesperson	.089	.153	.112	.071	.092	.137	.121	.052	**.142**	**.021**	**.150**	**.015**
Transformational Leader	.022	.725	**.157**	**.011**	**.317**	**.000**	**.220**	**.000**	**.236**	**.000**	**.276**	**.000**
Transactional Leader	.028	.649	**.135**	**.029**	**.153**	**.014**	**.187**	**.002**	**.187**	**.002**	**.198**	**.001**
Resource Allocator	**.219**	**.000**	**.177**	**.004**	**.249**	**.000**	**.280**	**.000**	**.141**	**.023**	**.285**	**.000**

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To test research hypothesis 4_a, the forward method for hierarchical multiple regression was used to find the best explanatory model of the relationship among project manager profiles and project manager roles as significant explanatory variables of *Design Goals*, until a significant F model with the highest R^2 and adjusted R^2 was produced. Collinearity statistics of variance inflation factor (VIF) and tolerance were used to test for multicollinearity. For $H4_a$, the VIF was not more than 10 (1.000) and the tolerance was more than .10 (1.000) indicating that multicollinearity was not an issue.

The multiple regression resulted in one model which had a significant F value which tests for the significance of R^2, or the model as a whole. Model 1 had one explanatory variable: Resource Allocator. It was the best explanatory model to explain *Design Goals* ($F = 13.026, p = .000$) and resulted in an R^2 of (.048) and an adjusted R^2 of (.044). The overall variance explained by the variable ranged between 4.4% and 4.8%. To analyze the individual predictor in Model 1, the t-statistic was significant for Resource Allocator ($3.609, p = .000$).

The effect size of the explanatory variable explaining *Design Goals* based on the standardized Beta coefficients (β) was: Resource Allocator ($\beta = .219, p = .000$). According to the results, Hypothesis 4_a was partially supported because only the Resource Allocator role was an explanatory variable to *Design Goals*. The other project manager profile and project manager roles variables were not. The best explanatory model was:

Design Goals = 2.878(Constant) + Project Manager Roles(+.156 Resource Allocator) + e

The results of the hierarchical multiple regression analysis of the explanatory variable and *Design Goals* are shown in Table 4-77.

Table 4-77

Hierarchical Multiple Regression of Project Manager Roles and Design Goals

Model	B	SE	β	*t*	*p-value*	*F*	*p*	R_2	R_2 *Adjusted*
Constant	2.878	.235		12.230	.000				
Resource Allocator	.156	.043	.219	3.609	.000				
						13.026	.000	.048	.044

To test research hypothesis 4_b, the forward method for hierarchical multiple regression was used to find the best explanatory model of the relationships among project manager profiles and project manager roles as significant explanatory variables of *Impact to Customer*, until a significant *F* model with the highest R^2 and adjusted R^2 was produced. Collinearity statistics of variance inflation factor (VIF) and tolerance were used to test for multicollinearity. For $H4_b$, the VIF was not more than 10 (1.000) and the tolerance was more than .10 (1.000) indicating that multicollinearity was not an issue.

The multiple regression resulted in one model which had a significant *F* value which tests for the significance of R^2, or the model as a whole. Model 1 had one explanatory variable: Entrepreneur. It was the best explanatory model to explain *Impact to Customer* ($F = 21.093$, $p = .000$) and resulted in an R^2 of (.075) and an adjusted R^2 of (.072). The overall variance explained by the variable ranged between 7.2% and 7.5%. To analyze the individual predictor in Model 1, the *t*-statistic was significant for Entrepreneur (4.593, $p = .000$).

The effect size of the explanatory variable explaining *Impact to Customer* based on the standardized Beta coefficients (β) was: Entrepreneur ($\beta = .274, p = .000$). According to the results, Hypothesis 4_b was partially supported because only the Entrepreneur role was an explanatory variable to *Impact to Customer*. The other project manager profile and project manager role variables were not. The best explanatory model was:

Impact to Customer = 3.175(Constant) + Project Manager Roles(+.191 Entrepreneur) + e

The results of the hierarchical multiple regression analysis of the explanatory variable and *Impact to Customer* are shown in Table 4-78.

Table 4-78

Hierarchical Multiple Regression of Project Manager Roles and Impact to Customer

Model	B	SE	β	t	*p-value*	F	p	R_2	R_2 Adjusted
Constant	3.175	.245		12.981	.000				
Entrepreneur	.191	.042	.274	4.593	.000				
						21.093	.000	.075	.072

To test research hypothesis 4_c, the forward method for hierarchical multiple regression was used to find the best explanatory model of the relationships among project manager profiles and project manager roles as significant explanatory variables of *Impact to Team*, until a significant F model with the highest R^2 and adjusted R^2 was produced. Collinearity statistics of variance inflation factor (VIF) and tolerance were used to test for multicollinearity. For $H4_c$, the VIF was not more than 10 (1.277) and the tolerance was more than .10 (.783) indicating that multicollinearity was not an issue.

The multiple regression resulted in two models which had a significant *F* value which tests for the significance of R^2, or the model as a whole. Model 2 had two explanatory variables: Monitor and Transformational Leader. It was the best explanatory model to explain *Impact to Team* ($F = 25.278$, $p = .000$) and resulted in an R^2 of (.164) and an adjusted R^2 of (.157). The overall variance explained by the variable ranged between 15.7% and 16.4%. To analyze the individual predictors in Model 2, the *t*-statistic was significant for Monitor (4.432, $p = .000$), and Transformational Leader (2.856, $p = .005$).

The effect size of the explanatory variable explaining *Impact to Team* based on the standardized Beta coefficients (β) were: Monitor ($\beta = .285$, $p = .000$) and Transformational Leader ($\beta = .184$, $p = .005$). According to the results, Hypothesis 4_c was partially supported because only the Monitor and Transformational Leader roles were explanatory variables to *Impact to Team.* The other project manager profiles and project manager role variables were not. The best explanatory model was:

Impact to Team = 2.488(Constant) + Project Manager Roles(+.182 Monitor + .110 Transformational Leader) + e

The results of the hierarchical multiple regression analysis of the explanatory variables and *Impact to Team* are shown in Table 4-79.

Table 4-79

Hierarchical Multiple Regression of Project Manager Roles and Impact to Team

Model	B	SE	β	*t*	*p-value*	*F*	*p*	R_2	R_2 *Adjusted*
Constant	2.488	.193		12.924	.000				
Monitor	.182	.041	.285	4.432	.000				
Transformational Leader	.110	.039	.184	2.856	.005				
						25.278	.000	.164	.157

To test research hypothesis 4_d, the forward method for hierarchical multiple regression was used to find the best explanatory model of the relationships among project manager profiles and project manager roles as significant explanatory variables of *Benefit to Organization*, until a significant F model with the highest R^2 and adjusted R^2 was produced. Collinearity statistics of variance inflation factor (VIF) and tolerance were used to test for multicollinearity. For $H4_d$, the VIF was not more than 10 (1.107) and the tolerance was more than .10 (.903) indicating that multicollinearity was not an issue.

The multiple regression resulted in two models which had a significant F value which tests for the significance of R^2, or the model as a whole. Model 2 had two explanatory variables: Monitor and Resource Allocator. It was the best explanatory model to explain *Benefit to Organization* ($F = 22.932, p = .000$) and resulted in an R^2 of (.151) and an adjusted R^2 of (.144). The overall variance explained by the variable ranged between 14.4% and 15.1%. To analyze the individual predictors in Model 2, the t-statistic was significant for Monitor (4.703, $p = .000$), and Resource Allocator (3.168, $p = .002$).

The effect size of the explanatory variables explaining *Benefit to Organization* based on the standardized Beta coefficients (β) were: Monitor ($\beta = .284, p = .000$) and Resource Allocator ($\beta = .191, p = .002$). According to the results, Hypothesis 4_d was partially supported because only the Monitor and Resource Allocator roles were explanatory variables to *Benefit to Organization*. The other project manager profiles and project manager role variables were not. The best explanatory model was:

Benefit to Organization = 2.394(Constant) + Project Manager Roles(+.186 Monitor + .112 Resource Allocator) + e

The results of the hierarchical multiple regression analysis of the explanatory variables and *Benefit to Organization* are shown in Table 4-80.

Table 4-80

Hierarchical Multiple Regression of Project Manager Roles and Benefit to Organization

Model	B	SE	*β*	*t*	*p-value*	*F*	*p*	R_2	R_2 *Adjusted*
Constant	2.394	.218		10.994	.000				
Monitor	.186	.040	.284	4.703	.000				
Resource Allocator	.112	.035	.191	3.168	.002				
						22.932	.000	.151	.144

To test research hypothesis 4_e, the forward method for hierarchical multiple regression was used to find the best explanatory model of the relationships among project manager profiles and project manager roles as significant explanatory variables of *Preparing for the Future*, until a significant *F* model with the highest R^2 and adjusted R^2 was produced. Collinearity statistics of variance inflation factor (VIF) and tolerance were used to test for multicollinearity. For $H4_e$, the VIF was not more than 10 (1.000) and the tolerance was more than .10 (1.000) indicating that multicollinearity was not an issue.

The multiple regression resulted in one model which had a significant *F* value which tests for the significance of R^2, or the model as a whole. Model 1 had one explanatory variable: Monitor. It was the best explanatory model to explain *Preparing for the Future* ($F = 39.922, p = .000$) and resulted in an R^2 of (.134) and an adjusted R^2 of

(.130). The overall variance explained by the variable ranged between 13.0% and 13.4%. To analyze the individual predictor in Model 1, the *t*-statistic was significant for Monitor (6.318, $p = .000$).

The effect size of the explanatory variable explaining *Preparing for the Future* based on the standardized Beta coefficients (β) was: Monitor ($\beta = .365, p = .000$). According to the results, Hypothesis 4_e was partially supported because only the Monitor role was an explanatory variable to *Preparing for the Future*. The other project manager profiles and project manager role variables were not. The best explanatory model was:

Preparing for the Future = 2.687(Constant) + Project Manager Roles(+.226 Monitor) + e

The results of the hierarchical multiple regression analysis of the explanatory variables and *Preparing for the Future* are shown in Table 4-81.

Table 4-81

Hierarchical Multiple Regression of Project Manager Roles and Preparing for the Future

Model	B	SE	β	t	*p-value*	F	p	R_2	R_2 *Adjusted*
Constant	2.687	.165		16.335	.000				
Monitor	.226	.036	.365	6.318	.000				
						39.922	.000	.134	.130

To test research hypothesis 4_f, the forward method for hierarchical multiple regression was used to find the best explanatory model of the relationships among project manager profiles and project manager roles as significant explanatory variables of *Project Success*, until a significant F model with the highest R^2 and adjusted R^2 was produced. Collinearity statistics of variance inflation factor (VIF) and tolerance were used to test for multicollinearity. For $H4_f$, the VIF was not more than 10 (1.107) and the tolerance was more than .10 (.903) indicating that multicollinearity was not an issue.

The multiple regression resulted in two models which had a significant F value which tests for the significance of R^2, or the model as a whole. Model 2 had two explanatory variables: Monitor and Resource Allocator. It was the best explanatory model to explain *Project Success* ($F = 29.621, p = .000$) and resulted in an R^2 of (.187) and an adjusted R^2 of (.180). The overall variance explained by the variable ranged between 18.0% and 18.7%. To analyze the individual predictors in Model 2, the t-statistic was significant for Monitor (5.787, $p = .000$), and Resource Allocator (3.022, $p = .003$).

The effect size of the explanatory variables explaining *Project Success* based on the standardized Beta coefficients (β) were: Monitor ($\beta = .342, p = .000$) and Resource Allocator ($\beta = .179, p = .003$). According to the results, Hypothesis 4_f was partially supported because only the Monitor and Resource Allocator roles were explanatory variables to *Project Success*. The other project manager profiles and project manager role variables were not. The best explanatory model was:

Project Success = 2.679(Constant) + Project Manager Roles(+.168 Monitor + .078 Resource Allocator) + e

The results of the hierarchical multiple regression analysis of the explanatory variables and *Project Success* are shown in Table 4-82.

Table 4-82

Hierarchical Multiple Regression of Project Manager Roles and Project Success

Model	B	SE	*β*	*T*	*p-value*	*F*	*p*	R_2	R_2 *Adjusted*
Constant	2.679	.160		16.785	.000				
Monitor	.168	.029	.342	5.787	.000				
Resource Allocator	.078	.026	.179	3.022	.003				
						29.621	.000	.187	.180

Hypothesis 5

Organizational characteristics, project characteristics, and project manager roles are significant explanatory variables of project success (impact to customer, impact to team, design goals, benefit to the organization, and preparing for the future).

In order to test Hypothesis 5, ETA correlation analysis, Pearson *r* correlations, and multiple regression were used to determine the explanatory relationships among organizational characteristics, project characteristics, project manager roles, and project success. Research Hypothesis 5 has six separate hypotheses. Each hypothesis tests a different explanatory relationship among organizational characteristics, project characteristics, project manager roles, and variations of the dependent variable of project success. The dependent variable changed as follows: $H5_a$ *Design Goals* subscale; $H5_b$ *Impact to Customer* subscale; $H5_c$ *Impact to Team* subscale; $H5_d$ *Benefit to the Organization* subscale; $H5_e$ *Preparing for the Future* subscale; and $H5_f$ total score for *Project Success*.

In Research Hypothesis 5, explanatory categorical variables included the organizational characteristics variables of Industry and Structure, and the project characteristics variable of Type. The explanatory variables that were scaled included the organizational characteristic variable of Maturity, the project characteristics variables of Size of Team, Budget, and Duration, and the project manager roles variables of Liaison, Monitor, Entrepreneur, Spokesperson, Transformational Leader, Transactional Leader, and Resource Allocator. For the correlational analysis of Project Success and its five subscales, ETA was used for categorical variables and Pearson *r* was used for scaled variables.

ETA correlational analysis indicated that all categorical variables had non-significant correlations with the project success subscale *Design Goals.* ETA correlational analysis indicated that all categorical variables had non-significant correlations with the project success subscale *Impact to Customer.* ETA correlational analysis indicated that all categorical variables had non-significant correlations with the project success subscale *Impact to Team.* ETA correlational analysis indicated that type (p = .009) was significantly correlated with the project success subscale *Benefit to Organization.* All other categorical variables had non-significant correlations with *Benefit to Organization.* ETA correlational analysis indicated that type (p = .010) was significantly correlated with the project success subscale *Preparing for the Future.* All other categorical variables had non-significant correlations with *Preparing for the Future.* ETA correlational analysis indicated that type (p = .023) was significantly correlated with *Project Success.* All other categorical variables had non-significant correlations with *Project Success.* The results of the ETA correlation analysis, ETA Squared, F and p values are presented in Table 4-83.

Table 4-83

ETA Correlations for Categorical Variables of Organizational Characteristics, Project Characteristics, and Project Success (Subscales and Total Scale)

	ETA	ETA Squared	*F*	*P*
Correlations with Design Goals				
Organizational Characteristics				
Industry	.267	.071	.973	.494
Structure	.099	.010	1.283	.279
Project Characteristics				
Type	.025	.001	.079	.924
Correlations with Impact to Customer				
Organizational Characteristics				
Industry	.311	.097	1.360	.148
Structure	.024	.001	.071	.931
Project Characteristics				
Type	.057	.003	.424	.655
Correlations with Impact to Team				
Organizational Characteristics				
Industry	.306	.094	1.313	.175
Structure	.056	.003	.410	.664
Project Characteristics				
Type	.108	.012	1.516	.222
Correlations with Benefit to the Organization				
Organizational Characteristics				
Industry	.316	.100	1.408	.124
Structure	.118	.014	1.814	.165
Project Characteristics				
Type	.190	.036	4.828	**.009**
Correlations with Preparing for the Future				
Organizational Characteristics				
Industry	.308	.095	1.331	.164
Structure	.067	.004	.574	.564
Project Characteristics				
Type	.187	.035	4.689	**.010**
Correlations with Project Success				
Organizational Characteristics				
Industry	.328	.108	1.532	.075
Structure	.084	.007	.913	.402
Project Characteristics				
Type	.170	.029	3.844	**.023**

Categorical variables resulting from ETA correlation with *Project Success* and its subscales were dummy coded with 1's and 0's in order to determine their association using Pearson *r*. Pearson r correlations were used to analyze the relationships among the categorical variables of organizational characteristics (Industry, Structure) and project characteristics (Type) and scaled variables of organizational characteristics (Maturity), project characteristics (Size of Team, Budget, and Duration) and project manager roles (Liaison, Monitor, Entrepreneur, Spokesperson, Transformational Leader, Transactional Leader, and Resource Allocator) with *Project Success* (total scale and subscales). Pearson *r* correlations resulted in eight variables that were significantly related to *Design Goals*: Information Systems ($r = -.147, p = .018$ inverse); Maturity ($r = .152, p = .014$); Size of Project Team ($r = -.161, p = .009$ inverse); Project Duration ($r = -.127, p = .040$ inverse); Liaison ($r = .127, p = .040$); Monitor ($r = .147, p = .018$); Entrepreneur ($r = .171, p = .006$); and Resource Allocator ($r = .219, p = .000$). Pearson *r* correlations resulted in seven variables that were significantly related to *Impact to Customer*: Education & Training ($r = -.247, p = .000$ inverse); Maturity ($r = .160, p = .010$); Monitor ($r = .148, p = .017$); Entrepreneur ($r = .274, p = .000$); Transformational Leader ($r = .157, p = .011$); Transactional Leader ($r = .135, p = .029$); and Resource Allocator ($r = .177, p = .004$). Pearson *r* correlations resulted in eight variables that were significantly related to *Impact to Team*: Education & Training ($r = -.159, p = .010$ inverse); Maturity ($r = .180, p = .003$); Liaison ($r = .302, p = .000$); Monitor ($r = .371, p = .000$); Entrepreneur ($r = .169, p = .006$); Transformational Leader ($r = .317, p = .000$); Transactional Leader ($r = .153, p = .014$); and Resource Allocator ($r = .249, p = .000$). Pearson *r* correlations resulted in thirteen variables that were significantly related to *Benefit to the Organization*:

Construction ($r = .130, p = .036$); Education & Training ($r = -.183, p = .003$ inverse); Strategic ($r = .125, p = .043$); Compliance ($r = -.174, p = .005$ inverse); Maturity ($r = .214, p = .000$); Project Budget ($r = .142, p = .022$); Project Duration ($r = .125, p = .043$); Liaison ($r = .216, p = .000$); Monitor ($r = .343, p = .000$); Entrepreneur ($r = .258, p = .000$); Transformational Leader ($r = .220, p = .000$); Transactional Leader ($r = .187, p = .002$); and Resource Allocator ($r = .280, p = .000$). Pearson r correlations resulted in twelve variables that were significantly related to *Preparing for the Future*: Construction ($r = .141, p = .023$); Retail ($r = -.159, p = .010$ inverse); Strategic ($r = .163, p = .008$); Compliance ($r = -.136, p = .027$ inverse); Maturity ($r = .174, p = .005$); Liaison ($r = .264, p = .000$); Monitor ($r = .365, p = .000$); Entrepreneur ($r = .164, p = .008$); Spokesperson ($r = .142, p = .021$); Transformational Leader ($r = .236, p = .000$); Transactional Leader ($r = .187, p = .002$); and Resource Allocator ($r = .141, p = .023$). Pearson r correlations resulted in twelve variables that were significantly related to *Project Success*: Construction ($r = .142, p = .022$); Education & Training ($r = -.178, p = .004$ inverse); Strategic ($r = .134, p = .030$); Compliance ($r = -.140, p = .024$ inverse); Maturity ($r = .238, p = .000$); Liaison ($r = .277, p = .000$); Monitor ($r = .397, p = .000$); Entrepreneur ($r = .270, p = .000$); Spokesperson ($r = .150, p = .015$); Transformational Leader ($r = .276, p = .000$); Transactional Leader ($r = .198, p = .001$); and Resource Allocator ($r = .285, p = .000$). The results of the Pearson r correlations for the categorical and scaled variables of organizational characteristics, project characteristics, and project manager roles with *Project Success* (total and subscales) are presented in Table 4-84.

Table 4-84

Pearson r Correlations of Organizational Characteristics, Project Characteristics, Project Manager Roles, and Project Success (Subscales and Total Scale)

	Design Goals		Impact to Customer		Impact to Team		Benefit to Organization		Preparing for the Future		Project Success	
	r	*p*	*r*	*p*	*r*	*p*	*r*	*p*	*r*	*p*	*r*	*p*
Aerospace & Defense	.021	.731	.067	.280	.070	.257	.093	.132	.084	.175	.096	.123
Automation Systems	-.026	.677	.002	.978	.003	.956	.059	.345	.073	.238	.041	.511
Consulting	.012	.853	-.024	.699	-.068	.271	-.004	.951	-.003	.961	-.024	.698
Construction	.102	.099	.039	.531	.088	.154	**.130**	**.036**	**.141**	**.023**	**.142**	**.022**
E-business	-.099	.109	-.062	.320	-.082	.185	-.072	.248	-.110	.077	-.113	.068
Education & Training	.022	.721	**-.247**	**.000**	**-.159**	**.010**	**-.183**	**.003**	-.092	.139	**-.178**	**.004**
Financial Services	.023	.709	-.038	.543	.065	.292	-.043	.490	.011	.861	.005	.934
Government	-.012	.845	.019	.775	-.088	.158	-.051	.409	-.005	.937	-.043	.485
Healthcare	.097	.117	-.001	.983	-.039	.526	-.058	.349	-.090	.148	-.043	.484
HR	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Information Systems	**-.147**	**.018**	-.016	.798	-.021	.732	-.049	.427	-.007	.913	-.055	.378
International Development	-.063	.966	-.027	.658	.016	.797	.003	.956	.002	.979	.001	.987
IT & Telecom	-.051	.411	.038	.541	-.046	.463	.005	.936	.011	.865	-.011	.865
Manufacturing	.070	.262	.118	.057	.105	.091	.110	.077	.039	.530	.114	.066
Marketing & Sales	.013	.838	.064	.305	.075	.230	.108	.080	.066	.285	.094	.129
New Product Development	-.032	.610	-.006	.926	.002	.969	.034	.582	.048	.442	.021	.731
Oil, Gas, & Petrochemicals	-.005	.940	-.048	.442	.019	.755	-.001	.985	-.027	.663	-.013	.836
Pharmaceutical	.077	.216	.018	.777	.076	.219	-.012	.853	.003	.958	.036	.562
Retail	.042	.504	.018	.777	.010	.870	-.005	.931	**-.159**	**.010**	-.040	.517
Service & Outsourcing	-.046	.457	-.042	.501	.037	.547	.015	.811	-.045	.473	-.014	.818

Table 4-84 Continued

	Design Goals		Impact to Customer		Impact to Team		Benefit to Organization		Preparing for the Future		Project Success	
	r	*p*	*r*	*p*	*r*	*p*	*r*	*p*	*r*	*p*	*r*	*p*
Utilities	.064	.301	.037	.549	.088	.158	.009	.883	.014	.819	.051	.410
Functional Structure	.099	.110	.020	.744	.028	.651	.110	.077	.047	.453	.083	.182
Matrixed Structure	-.058	.352	-.003	.959	.021	.737	-.101	.102	-.066	.287	-.062	.321
Projectized Structure	-.037	.552	-.018	.773	-.055	.373	.004	.948	.029	.636	-.015	.821
Strategic Type	.024	.698	.049	.435	.085	.170	**.125**	**.043**	**.163**	**.008**	**.134**	**.030**
Compliance Type	-.012	.841	-.044	.484	-.089	.153	**-.174**	**.005**	**-.136**	**.027**	**-.140**	**.024**
Operational/Maint Type	-.018	.774	-.026	.678	-.039	.535	-.033	.593	-.092	.137	-.061	.330
Organizational Maturity	**.152**	**.014**	**.160**	**.010**	**.180**	**.003**	**.214**	**.000**	**.174**	**.005**	**.238**	**.000**
Size of Project Team	-.161	.009	-.046	.455	.005	.940	.052	.407	.012	.844	-.014	.822
Project Budget	-.069	.269	.092	.137	.020	.753	**.142**	**.022**	.097	.119	.090	.147
Project Duration	**-.127**	**.040**	.065	.296	.014	.825	**.125**	**.043**	.113	.069	.072	.243
Liaison Role	**.127**	**.040**	.032	.602	**.302**	**.000**	**.216**	**.000**	**.264**	**.000**	**.277**	**.000**
Monitor Role	**.147**	**.018**	**.148**	**.017**	**.371**	**.000**	**.343**	**.000**	**.365**	**.000**	**.397**	**.000**
Entrepreneur Role	**.171**	**.006**	**.274**	**.000**	**.169**	**.006**	**.258**	**.000**	**.164**	**.008**	**.270**	**.000**
Spokesperson Role	.089	.153	.112	.071	.092	.137	.121	.052	**.142**	**.021**	**.150**	**.015**
Transformational Leader Role	.022	.725	**.157**	**.011**	**.317**	**.000**	**.220**	**.000**	**.236**	**.000**	**.276**	**.000**
Transactional Leader Role	.028	.649	**.135**	**.029**	**.153**	**.014**	**.187**	**.002**	**.187**	**.002**	**.198**	**.001**
Resource Allocator Role	**.219**	**.000**	**.177**	**.004**	**.249**	**.000**	**.280**	**.000**	**.141**	**.023**	**.285**	**.000**

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To test research hypothesis 5_a, the forward method for hierarchical multiple regression was used to find the best explanatory model of the relationships among organizational characteristics, project characteristics and project manager roles as significant explanatory variables of *Design Goals*, until a significant F model with the highest R^2 and adjusted R^2 was produced. Collinearity statistics of variance inflation factor (VIF) and tolerance were used to test for multicollinearity. For $H5_a$, the VIF was not more than 10 (range 1.001 to 1.100) and the tolerance was more than .10 (range .909 to .999) indicating that multicollinearity was not an issue.

The multiple regression resulted in four models which had a significant F value which tests for the significance of R^2, or the model as a whole. Model 4 had four explanatory variables: Resource Allocator; Project Size, Organizational Maturity; and Information Systems. It was the best explanatory model to explain *Design Goals* (F = 9.203, p = .000) and resulted in an R^2 of (.126) and an adjusted R^2 of (.112). The overall variance explained by the variable ranged between 11.2% and 12.6%. To analyze the individual predictor in Model 4, the t-statistic was significant for Resource Allocator (3.501, p = .001), Project Size (-3.675, p = .000), Organizational Maturity (2.600, p = .010), and Information Systems (-2.312, p = .022). Project Size and Information Systems were inversely related to *Design Goals*.

The effect size of the explanatory variables explaining *Design Goals* based on the standardized Beta coefficients (β) were: Resource Allocator (β = .210, p = .001); Project Size (β = -.222, p = .000); Organizational Maturity (β = .159, p = .010); and Information Systems (β = -.135, p = .022). According to the results, Hypothesis 5_a was partially supported because only the Resource Allocator role, the Project Size, Organizational

Maturity, and the Information Systems industry were explanatory variables to *Design Goals*. The other organizational characteristics, project characteristics, and project manager role variables were not. The best explanatory model was:

Design Goals = 2.941(Constant) + Project Manager Roles(+.150 Resource Allocator) + Project Characteristics(-.090 Project Size) + Organizational Characteristics(.114 Organizational Maturity) + Organizational Industry (-.360 Information Systems) + e

The results of the hierarchical multiple regression analysis of the explanatory variable and *Design Goals* are shown in Table 4-85.

Table 4-85

Hierarchical Multiple Regression of Organizational Characteristics, Project Characteristics, Project Manager Roles, and Design Goals

Model	B	SE	β	t	p-value	F	p	R_2	R_2 Adjusted
Constant	2.941	.244		12.044	.000				
Resource Allocator	.150	.043	.210	3.501	.001				
Project Size	-.090	.025	-.222	-3.675	.000				
Org Maturity	.114	.044	.159	2.600	.010				
Info Systems	-.360	.156	-.135	-2.312	.022				
						9.203	.000	.126	.112

To test research hypothesis 5_b, the forward method for hierarchical multiple regression was used to find the best explanatory model of the relationships among organizational characteristics, project characteristics and project manager roles as significant explanatory variables of *Impact to Customer*, until a significant *F* model with the highest R^2 and adjusted R^2 was produced. Collinearity statistics of variance inflation factor (VIF) and tolerance were used to test for multicollinearity. For $H5_b$, the VIF was not more than 10 (range 1.007 to 1.037) and the tolerance was more than .10 (range .964 to .993) indicating that multicollinearity was not an issue.

The multiple regression resulted in four models which had a significant *F* value which tests for the significance of R^2, or the model as a whole. Model 4 had four explanatory variables: Entrepreneur; Education and Training; Manufacturing; and Project Size. It was the best explanatory model to explain *Impact to Customer* ($F = 11.752$, $p = .000$) and resulted in an R^2 of (.155) and an adjusted R^2 of (.142). The overall variance explained by the variable ranged between 14.2% and 15.5%. To analyze the individual predictors in Model 4, the *t*-statistic was significant for Entrepreneur (4.808, $p = .000$), Education & Training (-4.004, $p = .000$), Manufacturing (2.226, $p = .027$), and Project Size (-2.058, $p = .041$). Project Size and Education and Training were inversely related to *Impact to Customer.*

The effect size of the explanatory variables explaining *Impact to Customer* based on the standardized Beta coefficients (β) were: Entrepreneur ($\beta = .281$, $p = .000$); Education & Training ($\beta = -.232$, $p = .000$); Manufacturing ($\beta = .128$, $p = .027$); and Project Size ($\beta = -.120$, $p = .041$). According to the results, Hypothesis 5_b was partially supported because only the Entrepreneur role, the Project Size, and the Manufacturing and Education & Training industries were explanatory variables to *Impact to Customer.* The other organizational characteristics, project characteristics, and project manager role variables were not. The best explanatory model was:

Impact to Customer = 3.277(Constant) + Project Manager Roles(+.195 Entrepreneur) + Project Characteristics(-.035 Project Size) + Organizational Industry(.378 Manufacturing + -.992 Education and Training) + e

The results of the hierarchical multiple regression analysis of the explanatory variable and *Impact to Customer* are shown in Table 4-86.

Table 4-86

Hierarchical Multiple Regression of Organizational Characteristics, Project Characteristics, Project Manager Roles, and Impact to Customer

Model	**B**	**SE**	***β***	***t***	***p-value***	***F***	***p***	***R_2***	***R_2 Adjusted***
Constant	3.277	.238		13.751	.000				
Entrepreneur	.195	.041	.281	4.808	.000				
Edu & Training	-.992	.248	-.232	-4.004					
Manufacturing	.378	.170	.128	2.226					
Project Size	-.035	.017	-.120	-2.058					
						11.752	.000	.155	.142

To test research hypothesis 5_c, the forward method for hierarchical multiple regression was used to find the best explanatory model of the relationships among organizational characteristics, project characteristics, and project manager roles as significant explanatory variables of *Impact to Team*, until a significant *F* model with the highest R^2 and adjusted R^2 was produced. Collinearity statistics of variance inflation factor (VIF) and tolerance were used to test for multicollinearity. For $H5_c$, the VIF was not more than 10 (range 1.003 to 1.285) and the tolerance was more than .10 (range .778 to .997) indicating that multicollinearity was not an issue.

The multiple regression resulted in four models which had a significant *F* value which tests for the significance of R^2, or the model as a whole. Model 4 had four explanatory variables: Monitor; Transformational Leader; Education and Training; and Manufactuing. It was the best explanatory model to explain *Impact to Team* ($F = 15.731$, $p = .000$) and resulted in an R^2 of (.197) and an adjusted R^2 of (.185). The overall variance explained by the variable ranged between 18.5% and 19.7%. To analyze the individual predictors in Model 4, the *t*-statistic was significant for Monitor (4.330, $p = .000$), Transformational Leader (3.052, $p = .003$), Education and Training (-2.533, $p = .012$), and Manufacturing (1.973, $p = .050$). Education and Training was inversely related to *Impact to Team.*

The effect size of the explanatory variable explaining *Impact to Team* based on the standardized Beta coefficients (β) were: Monitor ($\beta = .175$, $p = .000$); Transformational Leader ($\beta = .116$, $p = .003$); Education and Training ($\beta = -.669$, $p = .012$); and Manufacturing($\beta = .360$, $p = .050$). According to the results, Hypothesis 5_c was partially supported because only the Monitor and Transformational Leader roles, and Education and Training and Manufacturing industries were explanatory variables to *Impact to Team.* The other organizational characteristics, project characteristics, and project manager role variables were not. The best explanatory model was:

Impact to Team = 2.488(Constant) + Project Manager Roles(+.175 Monitor + .116 Transformational Leader) + Organizational Industry(.360 Manufacturing + -.669 Education and Training) + e

The results of the hierarchical multiple regression analysis of the explanatory variables and *Impact to Team* are shown in Table 4-87.

Table 4-87

Hierarchical Multiple Regression of Organizational Characteristics, Project Characteristics, Project Manager Roles, and Impact to Team

Model	B	SE	*β*	*t*	*p-value*	*F*	*p*	*R₂*	*R₂ Adjusted*
Constant	2.488	.190		13.067	.000				
Monitor	.175	.040	.274	4.330	.000				
Transformational Leader	.116	.038	.194	3.052	.003				
Edu & Training	-.669	.264	-.142	-2.533	.012				
Manufacturing	.360	.182	.111	1.973	.050				
						15.731	.000	.197	.185

To test research hypothesis 5_d, the forward method for hierarchical multiple regression was used to find the best explanatory model of the relationships among organizational characteristics, project characteristics, and project manager roles as significant explanatory variables of *Benefit to Organization*, until a significant *F* model with the highest R^2 and adjusted R^2 was produced. Collinearity statistics of variance inflation factor (VIF) and tolerance were used to test for multicollinearity. For $H5_d$, the VIF was not more than 10 (range 1.010 to 1.129) and the tolerance was more than .10 (range .886 to .990) indicating that multicollinearity was not an issue.

The multiple regression resulted in six models which had a significant *F* value which tests for the significance of R^2, or the model as a whole. Model 6 had six explanatory variables: Monitor; Resource Allocator; Education and Training; Functional; Compliance; and Project Duration. It was the best explanatory model to explain *Benefit to Organization* (F = 13.028, p = .000) and resulted in an R^2 of (.235) and an adjusted R^2 of (.217). The overall variance explained by the variable ranged between 21.7% and 23.5%. To analyze the individual predictors in Model 6, the *t*-statistic was significant for

Monitor (4.445, p = .000), Resource Allocator (3.293, p = .001), Education and Training (-3.481, p = .001), Functional (2.850, p = .005), Compliance (-2.640, p = .009), and Project Duration (2.158, p = .032). Education and Training and Compliance were inversely related to *Benefit to Organization.*

The effect size of the explanatory variables explaining *Benefit to Organization* based on the standardized Beta coefficients (β) were: Monitor (β = .259, p = .000); Resource Allocator (β = .191, p = .001); Education and Training (β = -.193, p = .001); Functional (β = .158, p = .005); Compliance (β = -.147, p = .009); and Project Duration (β = .119, p = .032). According to the results, Hypothesis 5_d was partially supported because only the Monitor and Resource Allocator roles, the Education and Training industry, the Functional organizational structure, the Compliance project type, and the Project Duration were explanatory variables to *Benefit to Organization*. The other organizational characteristics, project characteristics, and project manager role variables were not. The best explanatory model was:

Benefit to Organization = 2.232(Constant) + Project Manager Roles(.170 Monitor + .112 Resource Allocator) + Organizational Industry(-.937 Education and Training) + Organizational Structure(.257 Functional) + Project Type(-.401 Compliance) + Project Characteristic(.070 Duration) + e

The results of the hierarchical multiple regression analysis of the explanatory variables and *Benefit to Organization* are shown in Table 4-88.

Table 4-88

Hierarchical Multiple Regression of Organizational Characteristics, Project Characteristics, Project Manager Roles, and Benefit to Organization

Model	B	SE	*β*	*t*	*p-value*	*F*	*p*	R_2	R_2 *Adjusted*
Constant	2.232	.232		9.624	.000				
Monitor	.170	.038	.259	4.445	.000				
Resource Allocator	.112	.034	.191	3.293	.001				
Edu & Training	-.937	.269	-.193	-3.481	.001				
Functional	.257	.090	.158	2.850	.005				
Compliance	-.401	.152	-.147	-2.640	.009				
Project Duration	.070	.032	.119	2.158	.032				
						13.028	.000	.235	.217

To test research hypothesis 5_e, the forward method for hierarchical multiple regression was used to find the best explanatory model of the relationships among organizational characteristics, project characteristics, and project manager roles as significant explanatory variables of *Preparing for the Future*, until a significant *F* model with the highest R^2 and adjusted R^2 was produced. Collinearity statistics of variance inflation factor (VIF) and tolerance were used to test for multicollinearity. For $H5_e$, the VIF was not more than 10 (range 1.005 to 1.011) and the tolerance was more than .10 (range .989 to .995) indicating that multicollinearity was not an issue.

The multiple regression resulted in three models which had a significant *F* value which tests for the significance of R^2, or the model as a whole. Model 3 had three explanatory variables: Monitor; Strategic; and Retail. It was the best explanatory model to explain *Preparing for the Future* ($F = 17.496, p = .000$) and resulted in an R^2 of (.170) and an adjusted R^2 of (.160). The overall variance explained by the variable ranged between 16.0% and 17.4%. To analyze the individual predictor in Model 3, the *t*-statistic was significant for Monitor (6.039, $p = .000$), Strategic (2.363, $p = .019$), and Retail (-2.361, $p = .019$). Retail was inversely related to *Preparing for the Future*.

The effect size of the explanatory variable explaining *Preparing for the Future* based on the standardized Beta coefficients (β) was: Monitor ($\beta = .345, p = .000$); Strategic ($\beta = .135, p = .019$); and Retail ($\beta = -.135, p = .019$). According to the results, Hypothesis 5_e was partially supported because only the Monitor role, the Strategic project type, and the Retail organizational industry were explanatory variables to *Preparing for the Future*. The other organizational characteristics, project characteristics, and project manager role variables were not. The best explanatory model was:

Preparing for the Future = 2.658(Constant) + Project Manager Roles(+.214 Monitor) + Project Type(.185 Strategic) + Organizational Industry(-.751 Retail) + e

The results of the hierarchical multiple regression analysis of the explanatory variables and *Preparing for the Future* are shown in Table 4-89.

Table 4-89

Hierarchical Multiple Regression of Organizational Characteristics, Project Characteristics, Project Manager Roles, and Preparing for the Future

Model	B	SE	β	*t*	*p-value*	*F*	*p*	R_2	R_2 *Adjusted*
Constant	2.658	.165		16.124	.000				
Monitor	.214	.035	.345	6.039	.000				
Strategic	.185	.078	.135	2.363	.019				
Retail	-.751	.318	-.135	-2.361	.019				
						17.496	.000	.170	.160

To test research hypothesis 5_f, the forward method for hierarchical multiple regression was used to find the best explanatory model of the relationships among organizational characteristics, project characteristics, and project manager roles as significant explanatory variables of *Project Success*, until a significant F model with the highest R^2 and adjusted R^2 was produced. Collinearity statistics of variance inflation factor (VIF) and tolerance were used to test for multicollinearity. For $H5_f$, the VIF was not more than 10 (range 1.030 to 1.139) and the tolerance was more than .10 (range .878 to .971) indicating that multicollinearity was not an issue.

The multiple regression resulted in five models which had a significant F value which tests for the significance of R^2, or the model as a whole. Model 5 had five explanatory variables: Monitor; Resource Allocator; Education and Training; Functional; and Organizational Maturity. It was the best explanatory model to explain *Project Success* ($F = 16.699, p = .000$) and resulted in an R^2 of (.247) and an adjusted R^2 of (.232). The overall variance explained by the variable ranged between 23.2% and 24.7%. To analyze the individual predictors in Model 5, the t-statistic was significant for Monitor ($5.608, p = .000$), Resource Allocator ($2.733, p = .007$), Education and Training (-2.846, $p = .005$), Functional ($2.630, p = .009$), and Organizational Maturity ($2.424, p = .016$). Education & Training was inversely related to *Project Success*.

The effect size of the explanatory variables explaining *Project Success* based on the standardized Beta coefficients (β) were: Monitor ($\beta = .323, p = .000$); Resource Allocator ($\beta = .159, p = .007$); Education and Training ($\beta = -.158, p = .005$); Functional ($\beta = .145, p = .009$); and Organizational Maturity ($\beta = .138, p = .016$). According to the results, Hypothesis 5_f was partially supported because only the Monitor and Resource Allocator roles, the Education and Training industry, the Functional organizational structure, and Organizational Maturity were explanatory variables to *Project Success*.

The other organizational characteristics, project characteristics, and project manager role variables were not. The best explanatory model was:

Project Success = 2.554(Constant) + Project Manager Roles(+.159 Monitor + .070 Resource Allocator) + Organizational Industry(-.573 Education and Training) + Organizational Characteristics(.177 Functional + .061 Organizational Maturity) + e

The results of the hierarchical multiple regression analysis of the explanatory variables and *Project Success* are shown in Table 4-90.

Table 4-90

Hierarchical Multiple Regression of Organizational Characteristics, Project Characteristics, Project Manager Roles, and Project Success

Model	**B**	**SE**	***β***	***t***	***p-value***	***F***	***p***	***R_2***	***R_2 Adjusted***
Constant	2.554	.162		15.765	.000				
Monitor	.159	.028	.323	5.608	.000				
Resource Allocator	.070	.025	.159	2.733	.007				
Edu & Training	-.573	.201	-.158	-2.846	.005				
Functional	.177	.067	.145	2.630	.009				
Org Maturity	.061	.025	.138	2.424	.016				
						16.699	.000	.247	.232

Summary of Findings

Psychometric Evaluation of Measures

In this study, *Project Manager Roles* was measured by an adaptation of the *Managerial Work Survey* developed by McCall and Segrist (1980). The original scale was a 46-item multidimensional, 7-point semantic differential scale with six subscales: *Leader, Liaison, Monitor, Entrepreneur, Spokesperson*, and *Resource Allocator.* McCall and Segrist (1980) established content validity by using Mintzberg's framework to develop the questionnaire items. Item-scale correlations were computed and scales with internal consistencies less than .70 were eliminated. Construct validity was confirmed by exploratory factor analysis. In this study, construct validity was established with exploratory factor analysis, which resulted in a multidimensional, *42-Item Project Manager Roles* scale with seven subscales; *Liaison; Entrepreneur; Monitor; Spokesperson; Transformational Leader; Transactional Leader;* and *Resource Allocator.* Three resource allocator items loaded to factor 3 (Entrepreneur subscale): GR1 "Distributing budgeted resources"; GR2 "Making decisions about time parameters on the project"; and GR3 "Preventing the loss of resources valued by your project". One leadership item loaded to factor 4 (Spokesperson subscale), GL14 "Forwarding important information to your team members". Five leadership items loaded to factor 5 and five leadership items loaded to factor 6. Analysis revealed that factor 5 items contained leadership tasks that targeted the team members and their well-being. Factor 6 items contained leadership tasks that targeted project execution. This is consistent with research that successful project managers exhibit people, as well as, technical knowledge (Schlick, 1988; El-Sabaa, 2000). Prabhakar's (2005) findings emphasize a relationship-oriented approach to project management. Barber and Warn's (2005) framework of transactional (reactive) and transformational (proactive) leadership qualities aligns with the factor loadings. The separate leadership factors also support Shenhar et al.'s Multi-Dimensional Model outlining project efficiency success factors and team morale, loyalty, and retention success factors. Table 4-91 provides a comparison of the transformational leader and transactional leader tasks.

Table 4-91

Comparison of Factor 5 (Transformational Leader) items and Factor 6 (Transactional Leader) items

Transformational Leader	Transactional Leader
GL1 – Evaluating the quality of team members' job performance	GL6 – Allocating manpower to specific jobs or tasks
GL2 – Integrating team members' goals with the project work requirements	GL7 – Providing new team members with adequate training
GL3 – Keeping in touch with and helping team members with personal problems	GL8 – Seeing to that team members are alerted to problems that need attention
GL4 – Resolving conflicts between team members	GL10 - Maintaining supervision over changes on the project
GL5 – Keeping track of team members' special skills to facilitate personal growth	GL11 – Providing guidance to your team members on organizational issues

Two leadership items that loaded to factor 8, one monitor item that loaded to factor 9, and one leadership item that loaded to factor 10 were not considered in further analysis due to the fact that they did not fit the theoretical construct of the factor loadings. The result is a 42-item scale comprising 9 liaison items, 6 entrepreneur items, 8 monitor items, 6 spokesperson items, 5 transformational leader items, 5 transactional leader items, and 3 resource allocator items.

McCall and Segrist (1980) reported internal consistency reliability using Cronbach's coefficient *alphas*: leader ($\alpha = .74$); liaison ($\alpha = .79$); monitor ($\alpha = .72$); entrepreneur ($\alpha = .68$); spokesperson ($\alpha = .62$); and resource allocator ($\alpha = .70$). In this study, the coefficient alpha for the *42-Item Project Manager Roles* total scale was .940 and subscales were *Liaison* .925, *Monitor* .895, *Entrepreneur* .884, *Spokesperson* .838, *Transformational Leader* .820, *Transactional Leader* .770, and *Resource Allocator* .835.

In 1980, McCall and Segrist operationalized Mintzberg's Role Typology and developed the *Managerial Work Survey*, a reliable and valid instrument to measure managerial roles across levels and functions. Grover et al. (1993) used the instrument to examine the extent that CIO management roles differ from other senior management roles. Using the instrument, Gottschalk and Karlsen (2005) found that internal and external project managers emphasize different roles. In this study, the adapted *Managerial Work Survey* met the criteria of a good scale and was found to be acceptable. The scale was used to answer the research questions and hypotheses for this study.

In this study, *Project Success* was measured by an adaptation of Shenhar et al.'s (2007) *Project Success Assessment Questionnaire* which contains 27 items. The *Project Success Assessment Questionnaire* was adapted from the original scale, the *Multi-dimensional Project Success Questionnaire* (MPSQ), developed by Shenhar et al. in 1997 to examine the multi-dimensionality of project success. The original scale identified 13 variables to measure three dimensions of project success: design goals; impact to customer; and benefit to organization. Shenhar et al.'s (1997) subsequent study revealed a fourth dimension, preparing for the future. In 2007, Shenhar et al. expanded the *Multi-dimensional Project Success Questionnaire* to include a fifth project success dimension: impact to team. It was then renamed the *Project Success Assessment Questionnaire.* This questionnaire, a 27-item multi-dimensional, 5-point Likert rating scale, is organized into five subscales: design goals; impact to customer; impact to team; benefit to organization; and preparing for the future. Construct validity was confirmed by exploratory factor analysis. In this study, construct validity was established with exploratory factor analysis. The result is a 27-item scale comprising 7 organizational success items, 6 team success items, 7 future success items, 4 customer success items, and 3 design success items. One design success item loaded to factor 1 (Organizational Success subscale), SD4 "Achieve other efficiency measures". One customer success item loaded to factor 3 (Future Success subscale), SC5 "Cause customers to come back for future work". These moves fit the theoretical construct of the factor loadings. "Achieve other efficiency measures" are not contained within the "triple constraint" (as the other factor 5 items) and imply project success outcomes beyond project execution. "Cause customers to come back for future work" loaded to factor 3 (Future Success .433) and factor 4 (Customer Success .404).

Shenhar et al. (1997) did not report Cronbach's coefficients *alphas*. In this study, the coefficient alpha for the *27-Item Project Success Assessment Questionnaire* total scale was .927 and subscales were *Organizational Success* .901, *Team Success* .898, *Future Success* .818, *Customer Success* .855, and *Design Success* .770.

In 1997, Shenhar et al. developed the *Multi-dimensional Project Success Questionnaire* (MPSQ) to examine the multi-dimensions of project success. Lipovetski et al. (1997) applied the instrument while examining defense industry projects. Shenhar et al. (2003) used the instrument to conduct a secondary study about project success and managerial factors. Shenhar et al. (2007) adapted the instrument and developed the *Project Success Assessment Questionnaire*. In this study, the adapted *Project Success Assessment Questionnaire* met the criteria of a good scale and was found to be acceptable. The instrument incorporated the theoretical constructs of internal versus external project success measurements, supporting studies by Jugdev & Muller (2005), Pinto & Slevin (1998), and Rad (2003); and the time dependency of project success measurements, supporting studies by Munns & Bjeirmi (1996), Baccarini (1999), and Cooke-Davies (2002). Short-term internal project success is measured by the *Design Goals* and *Impact to Team* dimensions. Short-term external project success is measured by the *Impact to Customer* dimension. Long-term project success is measured by the *Benefit to Organization* and *Preparing for the Future* dimensions, which support studies by Willard (2005) and Ojiako et al. (2007). The scale was used to answer the research questions and hypotheses for this study. The psychometric analysis of the scales used in this study is presented in Table 4-92. The exploratory factor analysis resulted in the variance explained as 64.404% for the *Project Manager Roles* scale and 65.336% for the *Project Success Assessment Questionnaire* scale.

Table 4-92

Summary of Psychometric Evaluation of Measures using Exploratory Factor Analysis and Coefficient Alpha

		Validity Exploratory Factor Analysis			
Scale	**Reliability α**	**Factors**	**Loadings**	**Variance Explained**	**Analysis**
42 Item Project Manager Roles Scale (Total score range 42-294)	.940	7		64.404%	Adequate reliability. Validity confirmed multidimensional scale. Total scale and subscales used in comparative and regression analysis.
Factor 1: Liaison 9 items (score range 9-63)	.925		.552 to .837		
Factor 2: Monitor 8 items (score range 8-56)	.895		.604 to .764		
Factor 3: Entrepreneur 6 items (score range from 6-42)	.884		.574 to .802		
Factor 4: Spokesperson 6 items (score range from 6-42)	.838		.551 to .824		
Factor 5: Transformational Leader 5 items (score range from 5-35)	.820		.590 to .771		
Factor 6: Transactional Leader 5 items (score range from 5-35)	.770		.436 to .701		
Factor 7: Resource Allocator 3 items (score range from 3-21)	.835		.617 to .763		

Table 4-92 Continued

Scale	Reliability α	Validity Exploratory Factor Analysis Factors	Loadings	Variance Explained	Analysis
27 Item Project Success Scale (Total score range 27-135)	.927	5		65.336%	Adequate reliability. Validity confirmed multidimensional scale. Total scale and subscales used in comparative and regression analysis.
Factor 1: Organizational Success 7 items (score range 7-35)	.901		.511 to .800		
Factor 2: Team Success 6 items (score range 6-30)	.898		.653 to .788		
Factor 3: Future Success 7 items (score range from 7-35)	.818		.433 to .713		
Factor 4: Customer Success 4 items (score range from 4-20)	.855		.614 to .816		
Factor 5: Design Success 3 items (score range from 3-15)	.770		.671 to .833		

Summary of Answers to Research Questions

Research Question 1 – Descriptive Analysis. Research question 1 examined the organizational characteristics, project characteristics, project life cycle stages, project manager roles, project manager profiles, and project success factors. Results are from two hundred and sixty-one (261) respondents.

Descriptive analysis of Organizational Characteristics. Of the survey respondents, the majority managed projects in the Information Technology and Telecom Industry (23.0%). In this study, the top five organizational industries were: Information

Technology and Telecom (23.0%); Information Systems (12.6%); Consulting (11.5%); Financial Services (8.4%); and Government (7.3%). The majority of respondents managed in a Matrix organizational structure (50.2%), followed by a Functional organizational structure (27.6%), then a Projectized organizational structure (22.2%). The majority of respondents classified their organization's project management maturity level as Level 3 – Managed Stage (33.3%), noting that their organization's project management processes were formal and documented. Many rated their organization's project management maturity level lower than Level 3 (38.3%). Level 1 – Adhoc Stage, where there are no formal procedures or plans to execute projects was 14.2%. Level 2 – Planned Stage was 24.1%. Results show 28.3% rated their organization's project management maturity level higher than Level 3: Level 4 – Integrated Stage was 13.4%; and Level 5 – Sustained Stage was 14.9%. This is supportive of Ibbs and Kwak (1997) findings that the average PM maturity rating is 3.26 (Level 3 – Managed Stage).

Descriptive analysis of Project Characteristics. Of the survey respondents, the majority managed Strategic Projects (52.1%). In this study, 40.2% managed Operational/Maintenance projects, and 7.7% managed Compliance Projects. The majority of survey respondents managed projects with 5 to 10 team members (47.9%); 26.4% managed 5-7 members; and 21.5% managed 8-10 members. Many respondents were managing large projects with more than 20 members (23.0%). The majority of respondents were operating with project budgets between $100,001 and $500,000 (21.1%), while 17.2% managed projects budgets in excess of $5,000,000. The majority of projects lasted less than one year (57.1%).

Descriptive analysis of Project Life Cycle Stage. Of the survey respondents, the majority were in the execution phase of their projects (65.1%). Of the respondents, five point seven percent (5.7%) were in the conceptualization stage; 22.2% were in the planning stage; and 6.9% were in the termination stage. These findings align with Pinto's (1986) study on project life cycle and project success, which extrapolated across project phases, sampling cross-sectional data rather than longitudinal data. In Pinto's study, conceptualization stage (8.6%), planning stage (17.5%), execution stage (65.1%), and termination stage (25.6%).

Descriptive analysis of 42-Item Project Management Roles scale. The scale is a 42-item multidimensional, 7-point semantic differential scale with anchors of not important (1) to very important (7). Respondents rate the importance of the tasks in their current project phase. The scale consisted of nine Liaison items with a score range from 9 to 63, eight Monitor items with a score range from 8 to 56, six Entrepreneur items with a score range from 6 to 42, six Spokesperson items with a score range from 6 to 42, five Transformational Leader items with a score range from 5 to 35, five Transactional Leader items with a score range from 5 to 35, and three Resource Allocator items with a score range from 3 to 21. Average item score for the 42-Item Project Manager Roles scale ranged from item #GM7, "Touring facilities for observational purposes" at 3.66 to item #GL10, "Maintaining supervision over changes on the project" at 6.15. The highest average *Liaison* item score was items #GI1 "Maintaining your personal network of contacts" at 4.79. The highest average *Monitor* item score was item #GM4, "Keeping up with technological developments related to your project" at 5.18. The highest average *Entrepreneur* item score was item #GE1, "Planning and implementing change" at 5.98.

The highest average *Spokesperson* item score was item #GL14, "Forwarding important information to your team members" at 6.09. The highest average *Transformational Leader* item score was item #GL4, "Resolving conflict between team members" at 5.16. The highest average *Transactional Leader* item score was item #GL10, Maintaining supervision over changes on the project" at 6.15. The highest average *Resource Allocator* item score was item #GR5, "Deciding for which task to provide resources" at 5.71. The top 10 tasks for the 42-Item *Project Manager Roles* scale ranked by average item score is presented in Table 4-93.

Table 4-93

Item Scores Ranking of Top 10 Project Manager Roles Tasks

Subscale	Task	Average Item Score
Transactional Leader	Maintaining supervision over changes on the project (GL10)	6.15
Spokesperson	Forwarding important information to team members (GL14)	6.09
Transactional Leader	Seeing to that team members are alerted to problems that need attention (GL8)	5.99
Entrepreneur	Planning and implementing change (GE1)	5.98
Entrepreneur	Initiating controlled change on project (GE2)	5.95
Entrepreneur	Making decisions about time parameters on the project (GR2)	5.90
Entrepreneur	Solving problems by instituting needed changes on project (GE3)	5.90

Table 4-93 Continued

Subscale	Task	Average Item Score
Spokesperson	Presiding at meetings as a representative of project (GS1)	5.87
Transactional Leader	Allocating manpower to specific jobs or tasks (GL6)	5.86
Spokesperson	Keeping other people informed about project's activities (GS5)	5.84

Conversely, the lowest average *Liaison* item score was item #GI4, "Attending social functions as a representative of your project" at 3.78. The lowest average *Monitor* item score was item #GM7, "Touring facilities for observational purposes" at 3.66. The lowest average *Entrepreneur* item score was item #GR1, "Distributing budgeted resources at 5.34. The lowest average *Spokesperson* item score was item #GS2, "Serving as an expert to people outside of your project" at 5.10. The lowest average *Transformational Leader* item score was item #GL3, "Keeping in touch with and helping team members with personal problems" at 4.08. The lowest average *Transactional Leader* item scores were item #GL11, "Providing guidance to your team members on organizational issues" at 5.07 and item #GL7, "Providing new team members with adequate training" at 5.08. The lowest average *Resource Allocator* item score was item #GR6, "Allocating equipment or materials" at 5.05. The bottom 10 tasks for the 42-Item *Project Manager Roles* scale ranked by average item score is presented in Table 4-94.

Table 4-94

Item Scores Ranking of Bottom 10 Project Manager Roles Tasks

Subscale	Task	Average Item Score
Monitor	Touring facilities for observational purposes (GM7)	3.66
Liaison	Attending social functions as a representative of project (GI4)	3.78
Liaison	Attending social functions which allow you to keep up contacts (GI2)	3.86
Liaison	Attending conferences or meetings to maintain contacts (GI3)	3.98
Transformational Leader	Keeping in touch with and helping team members with personal problems (GL3)	4.08
Liaison	Joining associations with might provide work-related contacts (GI5)	4.11
Monitor	Gathering information about trends outside of project (GM5)	4.16
Liaison	Developing personal relationships with people outside project (GI8)	4.18
Liaison	Developing new contacts by answering request for information (GI7)	4.22
Monitor	Reading reports on activities in own organization or other company	4.24

The lowest average item mean score was 4.2137 for the Liaison subscale. The highest average item mean score was 5.8129 for the Entrepreneur subscale. The average item mean score for the total scale was 5.0077. The subscale mean scores were: *Liaison* 37.92 (score range 9 to 63), *Monitor* 35.67 (score range 8 to 56), *Entrepreneur* 34.88 (score range 6 to 42), *Spokesperson* 34.39 (score range 6 to 42), *Transformational Leader* 23.46 (score range 5 to 35), *Transactional Leader* 28.14 (score range 5 to 35), and *Resource Allocator* 15.86 (score range 3 to 21). The total scale mean score was 210.32 score range (42 to 294).

These reported scores indicate that project managers perceive the entrepreneur (seeking to improve the unit), the spokesperson (passing information externally), and the transactional leader (responsible for the work of their people) tasks most important in completing their projects. The project managers perceive the liaison (spending time outside of the unit) and the monitoring (scanning for information) tasks to be the least important tasks to project completion. These perceptions align with Barber and Warn's (2005) model that proactive (seeking to make change) project management behaviors are more successful than reactive (maintaining) project management behaviors. Prabhakar's (2005) study verified the link between transformational leadership and project success. These reported scores also support Zimmerer and Yasin (1998) findings that the top reasons projects succeed include the project manager's timely response to changes initiated by the client.

Descriptive analysis of Project Manager Attributes. Of the survey respondents, the majority were PMP certified (76.6%). Most had been in their current position less than 7 years: less than 1 year (14.6%); 1 to 3 years (33.0%); and 4 to 6 years (27.2%), but had more than 10 years of project management experience: 10 to 12 years (17.6%); more than 12 years (36.4%). A majority of the project managers also had more than 7 years of

General Management Experience: 34.5% had more than 12 years; 13.4% had 10 to 12 years; and 12.6% had 7 to 9 years. Few project managers have taken courses in either project management or general management (39.4% have taken 3 or fewer courses in each area). The majority of survey respondents have attained a Master Degree or higher (57.1%). There were 187 males (71.6%) and 74 females (28.4%). Of the survey respondents, the majority was between the ages of 31 and 45 years old (55.2%): 19.9% were between 31 and 35 years old; 19.2% were between 36 and 40 years old; and 16.1% were between 41 and 45 years old. In this study, 46.0% managed projects in North America, 34.1% managed projects in Asia Pacific, 16.1% managed projects in Europe, the Middle East and Africa, and 3.8% managed projects in Mexico, Latin America and the Caribbean.

Descriptive analysis of 27-Item Project Success scale. The scale is a 27-item multidimensional, 5-point Likert rating scale with anchor ranting where 1 = "strongly disagree" and 5 = "strongly agree". All items were given points that correspond to the perception of the project's ability to be successful at completion. For the total scale, the score range is 26 to 135, where the higher scores reflect a higher level of overall project success. The scale consists of seven Organization Success items with a score range from 7 to 35, six Team Success items with a score range from 6 to 30, seven Future Success items with a score range from 7 to 35, four Customer Success items with a score range from 4 to 20, and three Design Success items with a score range from 3 to 15. Average item score for the 27-item Project Success scale ranged from item #SF4, "Create new technologies for future use" at 3.16 to item #SC3, "Meet customer requirements" at 4.38. The highest average *Organization Success* item score was item #SO3, "Create a positive return on investment" at 3.97. The highest average *Team Success* item score was item #ST1, "Satisfy and motivate the project team" at 4.04. The highest average *Future Success* item score were item #SF1, "Contribute to future projects", and item #SC5, "Cause customers to come back for future work", both at 4.10. The highest average *Customer Success* item score was item #SC3, "Meet customer requirements" at 4.38. The highest average *Design Success* item score was item #SD2, "Complete within or below budget" at 3.94.

The lowest average item mean score was 3.6962 for the Future Success subscale. The highest average item mean score was 4.2845 for the Customer Success subscale. The average item mean score for the total scale was 3.8426. The subscale mean scores were: *Organization Success* 26.72 (score range 7 to 35), *Team Success* 22.90 (score range 6 to 30), *Future Success* 25.87 (score range 7 to 35), *Customer Success* 17.14 (score range 4 to 20), and *Design Success* 11.11 (score range 3 to 15). The total scale mean score was 103.75 score range (27 to 135). Most thought at completion, their project would fulfill customer's needs. The top 5 project success factors for the 27-Item *Project Success* scale ranked by average item score is presented in Table 4-95.

Table 4-95

Item Scores Ranking of Top 5 Project Success Factors

Subscale	Task	Average Item Score
Customer Success	Meet customer's requirements (SC3)	4.38
Customer Success	Create a product that will be used by the customer (SC4)	4.34
Customer Success	Satisfy the customer (SC2)	4.27
Customer Success	Create a product that improves customer's performance (GE1)	4.15
Future Success	Contribute to future projects (SF1)	4.10
Future Success	Cause customers to come back for future work (SC5)	4.10

Research Question 2 – Explanatory Relationship. Research Question 2 is answered by Hypotheses 1 through 5. Multiple regression was used to determine the explanatory relationships among project manager profiles, project manager roles, the project life cycle, organizational characteristics, project characteristics and project success (subscales and total scale). Organizational characteristics, project characteristics, and project manager roles explain 11.2% to 12.6% of *Design Goals* success. Organizational characteristics, project characteristics, and project manager roles explain 14.2% to 15.5% of *Impact to Customer* success. Organizational characteristics, project characteristics, and project manager roles explain 18.5% to 19.7% of *Impact to Team* success. Organizational characteristics, project characteristics, and project manager roles explain 21.7% to 23.5% of *Benefit to Organization* success. Organizational characteristics, project characteristics, and project manager roles explain 16.0% to 17.0% of *Preparing for the Future* success. Organizational characteristics, project characteristics, and project manager roles explain 23.2% to 24.7% of *Project Success*. Organizational characteristic that affect project success (total scale) are organizational maturity level, organizational industry, and organizational structure. Project manager roles that affect project success (total scale) include the Monitor role and the Resource Allocator role. Project manager attributes that affect project success (total scale) include gender and region. There were no project characteristics that affected project success (total scale). The project life cycle stages do not affect project success (total scale). Table 4-96 presents a summary of the explanatory variables in the best models to explain *Project Success* and the subscales *Design Goals*, *Impact to Customer*, *Impact to Team*, *Benefit to Organization*, and *Preparing for the Future*. Each explanatory relationship is reported as an inverse (-) or positive (+) relationship.

Table 4-96

Summary of Explanatory Variables of Organization Characteristics, Project Characteristics, Project Manager Profiles, and Project Manager Roles for Hypothesis H1 through H5

	Design Goals	**Impact to Customer**	**Impact to Team**	**Benefit to Organization**	**Preparing for the Future**	**Project Success**
Male			$H_1(+)$			$H_1(+)$
Female				$H_1(-)$		
Mexico, LA, and Caribbean			$H_1(+)$			$H_1(+)$
Monitor Role			$H_{2,3,4,5}(+)$	$H_{2,3,4,5}(+)$	$H_{2,3,4,5}(+)$	$H_{2,3,4,5}(+)$
Entrepreneur Role		$H_{2,3,4,5}(+)$				
Transformational Leader Role			$H_{2,3,4,5}(+)$			
Resource Allocator Role	$H_{2,3,4,5}(+)$			$H_{2,3,4,5}(+)$		$H_{2,3,4,5}(+)$

Table 4-96 Continued

	Design Goals	Impact to Customer	Impact to Team	Benefit to Organization	Preparing for the Future	Project Success
Education & Training		H_5(-)	H_5(-)	H_5(-)		H_5(-)
Information Systems	H_5(-)					
Manufacturing		H_5(+)	H_5(+)			
Retail					H_5(-)	
Strategic Type					H_5(+)	
Compliance Type				H_5(-)		
Organizational Maturity	H_5(+)					H_5(+)
Functional Structure				H_5(+)		H_5(+)
Project Duration				H_5(+)		
Project Size	H_5(-)	H_5(-)				

Research Question 3 – Analysis Comparing Project Manager Roles.

Research question 3 examined the differences in Project Manager Roles according to organizational characteristics, project characteristics, project manager profiles, and the project life cycle stages. In this study, there were no significant differences in the importance of the *Liaison* role according to organizational characteristics, project characteristics, project manager profiles, and the project life cycle. There were significant differences in the importance of the *Monitor* role according to organizational maturity F (4, 256) = 2.846, p = .025; PM experience F (5, 255) = 4.415, p = .001; and GM experience F (5, 255) = 2.696, p = .021. There were significant differences in the importance of the *Entrepreneur* role according to organizational maturity F (4, 256) = 3.548, p = .008; region F (3, 257) = 3.426, p = .018; and life cycle stage F (3, 257) = 3.349, p = .020. There were significant differences in the importance of the *Spokesperson* role according to PM experience F (5, 255) = 2.540, p = .029; PM training

F (5, 255) = 3.031, p = .011; gender F (1, 259) = 5.540, p = .019; age F (9, 251) = 1.919, p = .050; and region F (3, 257) = 7.557, p = .000. There were significant differences in the importance of the *Transformational Leader* role according to organizational industry F (19, 241) = 1.818, p = .022; organizational maturity F (4, 256) = 4.756, p = .001; project size F (6, 254) = 2.279, p = .037; gender F (1, 259) = 9.602, p = .002; and region F (3, 257) = 4.164, p = .007. There were significant differences in the importance of the *Transactional Leader* role according to organizational maturity F (4, 256) = 2.438, p = .048; region F (3, 257) = 3.787, p = .011; and life cycle stage F (3, 257) = 2.719, p = .045. There were significant differences in the importance of the *Resource Allocator* role according to organizational maturity F (4, 256) = 3.852, p = .005; project type F (2, 258) = 3.321, p = .038; and project budget F (5, 255) = 2.365, p = .040. There were no significant differences in project manager roles according to organizational structure, project duration, PMP certification, tenure, GM training, and education. Table 4-97 presents a summary of significant differences in Project Manager Roles according to organizational characteristics, project characteristics, project manager profiles, and the project life cycle stages.

Table 4-97

Summary of significant differences in Project Manager Roles according to organizational characteristics, project characteristics, project manager profiles, and the project life cycle

Comparative variables	Liaison	Monitor	Entrepreneur	Spokesperson	Transformational Leader	Transactional Leader	Resource Allocator
Organizational Industry					√		
Organizational Maturity		√	√		√	√	√
Organizational Structure							
Project Type							√
Project Size					√		
Project Budget							√
Project Duration							
PMP Certification							
Tenure							
PM Experience		√		√			
GM Experience		√					
PM Training				√			
GM Training							
Education							
Gender				√	√		
Age				√			
Region			√	√	√	√	
Life Cycle Stage			√			√	

Summary of the Results of Hypotheses Testing

To test the hypotheses in this study, the forward method for hierarchical multiple regression was used in SPSS to find the best explanatory model of the relationships among organizational characteristics, project characteristics, project manager roles, the project life cycle, project manager roles and variations of the dependent variable project success.

Research Hypothesis 1: Explanatory Relationship among Project Manager Profile Variables. Hypothesis 1 used multiple regression to find the best explanatory model of the relationships among project manager profiles as significant explanatory variables of project success (design goals, impact to customer, impact to team, benefit to organization, and preparing for the future).

Hypothesis 1_a tested the relationship among project manager profile variables as significant explanatory variables of *Design Goals*. The results of the regression analysis showed that no project manager profile variables were significant explanatory variables of *Design Goals*. According to the results, Hypothesis 1_a was not supported.

Hypothesis 1_b tested the relationship among project manager profile variables as significant explanatory variables of *Impact to Customer*. The results of the regression analysis showed that no project manager profile variables were significant explanatory variables of *Impact to Customer*. According to the results, Hypothesis 1_b was not supported.

Hypothesis 1_c tested the relationship among project manager profile variables as significant explanatory variables of *Impact to Team*. The results of the regression analysis partially supported Hypothesis 1_c because only the region of Mexico, Latin America, and the Caribbean, and gender of Male were explanatory variables; the other project manager profile variables were not.

Hypothesis 1_d tested the relationship among project manager profile variables as significant explanatory variables of *Benefit to Organization*. The results of the regression analysis partially supported Hypothesis 1_d because only gender of Female was an explanatory variable; the other project manager profile variables were not.

Hypothesis 1_e tested the relationship among project manager profile variables as significant explanatory variables of *Preparing for the Future*. The results of the regression analysis showed that no project manager profile variables were significant explanatory variables of *Preparing for the Future*. According to the results, Hypothesis 1_e was not supported.

Hypothesis 1_f tested the relationship among project manager profile variables as significant explanatory variables of *Project Success*. The results of the regression analysis partially supported Hypothesis 1_f because only the region of Mexico, Latin America, and the Caribbean, and gender of Male were explanatory variables; the other project manager profile variables were not.

Results of the analysis showed no project manager profile variables were significant explanatory variables to Design Goals, Impact to Customer, and Impact to Team. Results partially supported $H1_c$, $H1_d$, and $H1_f$, where project manager profiles variables explained less than 5% of project success and the subscales. This is supportive of Alfi's (2002) findings that project manager attributes do not affect project success. This study does not support Prabhakar (2005) findings that the more experienced the project manager, the higher the level of project success. These findings do align with Turner and Muller (2005) findings that once a project manager achieves an "entry level of knowledge", more knowledge does not make him/her more competent.

Table 4-98 presents a summary of the results of the research hypothesis testing, and the percent of variance explained by the model.

Table 4-98

Summary of Research Hypotheses and Results: Hypotheses 1

Hypothesis	Results	Percent of Variance Explained (Adj $R^2 - R^2$)	Significant Explanatory Variable (I) Inverse	Literature
$H1_a$: Project manager profiles are significant explanatory variables of design goals	Not supported			Supportive of Alfi's (2002) findings that project manager attributes do not affect project success
$H1_b$: Project manager profiles are significant explanatory variables of impact to customer	Not supported			Not supportive of the Standish Group's (2001) findings which say an experienced project manager is an important
$H1_c$: Project manager profiles are significant explanatory variables of impact to team	Partially supported	3.9% - 4.7%	Mexico Region Male	reason projects succeed; "97% of successful projects had an experienced project manager at the helm"
$H1_d$: Project manager profiles are significant explanatory variables of benefit to organization	Partially supported	1.4% - 1.8%	Female	Does not support Prabhakar (2005) findings that the more experienced the project manager, the higher the level of project success
$H1_e$: Project manager profiles are significant explanatory variables of preparing for the future	Not supported			Not supportive of Murch's (2001) assertion that effective project managers are created through a
$H1_f$: Project manager profiles are significant explanatory variables of project success	Partially supported	2.3% - 3.1%	Mexico Region Male	combination of experience, time, talent, and training Supports Turner and Muller (2005) findings that once a project manager achieves an "entry level of knowledge", more knowledge does not make him/her more competent

Research Hypothesis 2: Explanatory Relationship among Project Manager Role Variables. Hypothesis 2 used multiple regression to find the best explanatory model of the relationships among project manager roles as significant explanatory variables of project success (design goals, impact to customer, impact to team, benefit to organization, and preparing for the future).

Hypothesis 2_a tested the relationship among project manager role variables as significant explanatory variables of *Design Goals.* The results of the regression analysis partially supported Hypothesis 2_a because only Resource Allocator was an explanatory variable; the other project manager role variables were not.

Hypothesis 2_b tested the relationship among project manager role variables as significant explanatory variables of *Impact to Customer.* The results of the regression analysis partially supported Hypothesis 2_b because only Entrepreneur was an explanatory variable; the other project manager role variables were not.

Hypothesis 2_c tested the relationship among project manager role variables as significant explanatory variables of *Impact to Team.* The results of the regression analysis partially supported Hypothesis 2_c because only Monitor and Transformational Leader were explanatory variables; the other project manager role variables were not.

Hypothesis 2_d tested the relationship among project manager role variables as significant explanatory variables of *Benefit to Organization.* The results of the regression analysis partially supported Hypothesis 2_d because only Monitor and Resource Allocator were explanatory variables; the other project manager role variables were not.

Hypothesis 2_e tested the relationship among project manager role variables as significant explanatory variables of *Preparing for the Future.* The results of the regression analysis partially supported Hypothesis 2_e because only Monitor was an explanatory variable; the other project manager role variables were not.

Hypothesis 2_f tested the relationship among project manager profile variables as significant explanatory variables of *Project Success*. The results of the regression analysis partially supported Hypothesis 2_f because only Monitor and Resource Allocator were explanatory variables; the other project manager role variables were not.

These findings support Kerzner's (1987) study which lists a project manager as a critical factor to project success. Findings partially support Pinto's (1986) study which revealed that approximately 28% of project success is attributable to the project manager. This study found that approximately 18% of project success was attributable to the project manager roles. These findings also support studies by Schlick (1988), Posner (1987), and Goldstein (2001) that project managers must be multi-faceted. They should possess human, organizational, and technical skills. The *Resource Allocator* role tasks address allocating resources, the *Entrepreneur* role tasks address managing change, the *Monitor* role tasks address filtering information, and the *Transformational Leader* role tasks address team cohesiveness. This does not support Pinto's (1986) findings that the Monitoring variable was not a CSF. Table 4-99 presents a summary of the results of the research hypothesis testing, and the percent of variance explained by the model.

Table 4-99

Summary of Research Hypotheses and Results: Hypotheses 2

Hypothesis	**Results**	**Percent of Variance Explained (Adj $R^2 - R^2$)**	**Significant Explanatory Variable (I) Inverse**	**Literature**
H2$_a$: Project manager roles are significant explanatory variables of design goals	Partially supported	4.4% - 4.8%	Resource Allocator	Supports Kerzner's (1987) study which list a project manager as a CSF to project success
H2$_b$: Project manager roles are significant explanatory variables of impact to customer	Partially supported	7.2% - 7.5%	Entrepreneur	Also supports Schlick (1988), Posner (1987), and El-Sabaa (2000) assertion that project managers must be multi-faceted, possessing human, organizational, and technical skills
H2$_c$: Project manager roles are significant explanatory variables of impact to team	Partially supported	15.7% - 16.4%	Monitor Transformational Leader	
H2$_d$: Project manager roles are significant explanatory variables of benefit to organization	Partially supported	14.4% - 15.1%	Monitor Resource Allocator	Supports Zimmerer and Yasin (1998) statement that ineffective project managers lack technical skills
H2$_e$: Project manager roles are significant explanatory variables of preparing for the future	Partially supported	13.0% - 13.4%	Monitor	Pinto's (1986) study revealed that approximately 28% of project success was attributable to the project manager
H2$_f$: Project manager roles are significant explanatory variables of project success	Partially supported	18.0% - 18.7%	Monitor Resource Allocator	This study found that approximately 18% of project success was attributable to project manager roles This study does not support Pinto's (1986) findings that the Monitoring variables was not a CSF

Research Hypothesis 3: Explanatory Relationship among Project Manager Role and Project Life Cycle Variables. Hypothesis 3 used multiple regression to find the best explanatory model of the relationships among project manager roles and the project life cycle as significant explanatory variables of project success (design goals, impact to customer, impact to team, benefit to organization, and preparing for the future). Results of hypothesis testing on Hypothesis 3_a through 3f resulted in findings identical to Hypothesis 2a through 2f (Table 4-99). In this regression model, project life cycle was not an explanatory variable of project success and did not influence the percent of variance explained. This does not support Pinto's (1986) findings that the project life cycle significantly affects project implementation success.

Research Hypothesis 4: Explanatory Relationship among Project Manager Profile and Project Manager Role Variables. Hypothesis 4 used multiple regression to find the best explanatory model of the relationships among project manager profiles and project manager roles as significant explanatory variables of project success (design goals, impact to customer, impact to team, benefit to organization, and preparing for the future). Results of hypothesis testing on Hypothesis 4_a through 4f resulted in findings identical to Hypothesis 2a through 2f (Table 4-99). In this regression model, project manager profile was not an explanatory variable of project success and did not influence the percent of variance explained, supporting Alfi's (2002) findings.

Research Hypothesis 5: Explanatory Relationship among Organizational Characteristics, Project Characteristics, and Project Manager Role Variables. Hypothesis 5 used multiple regression to find the best explanatory model of the relationships among organizational characteristics, project characteristics and project manager roles as significant explanatory variables of project success (design goals, impact to customer, impact to team, benefit to organization, and preparing for the future).

Hypothesis 5_a tested the relationship among organizational characteristics, project characteristics, and project manager role variables as significant explanatory variables of *Design Goals*. The results of the regression analysis partially supported Hypothesis 5_a because only Resource Allocator, Project Size, Organizational Maturity, and Information Systems industry were explanatory variables; the other organizational characteristics, project characteristics, and project manager role variables were not.

Hypothesis 5_b tested the relationship among organizational characteristics, project characteristics, and project manager role variables as significant explanatory variables of *Impact to Customer*. The results of the regression analysis partially supported Hypothesis 5_b because only Entrepreneur, Project Size, Education and Training Industry, and Manufacturing Industry were explanatory variables; the other organizational characteristics, project characteristics, and project manager role variables were not.

Hypothesis 5_c tested the relationship among organizational characteristics, project characteristics, and project manager role variables as significant explanatory variables of *Impact to Team*. The results of the regression analysis partially supported Hypothesis 5_c because only Monitor, Transformational Leader, Education and Training Industry, and

Manufacturing Industry were explanatory variables; the other organizational characteristics, project characteristics, and project manager role variables were not.

Hypothesis 5_d tested the relationship among organizational characteristics, project characteristics, and project manager role variables as significant explanatory variables of *Benefit to Organization*. The results of the regression analysis partially supported Hypothesis 5_d because only Monitor, Resource Allocator, Education and Training, Functional Structure, Compliance Type, and Project Duration were explanatory variables; the other organizational characteristics, project characteristics, and project manager role variables were not.

Hypothesis 5_e tested the relationship among organizational characteristics, project characteristics, and project manager role variables as significant explanatory variables of *Preparing for the Future*. The results of the regression analysis partially supported Hypothesis 5_e because only Monitor, Strategic Type, and Retail Industry were explanatory variables; the other organizational characteristics, project characteristics, and project manager role variables were not.

Hypothesis 5_f tested the relationship among organizational characteristics, project characteristics, and project manager profile variables as significant explanatory variables of *Project Success*. The results of the regression analysis partially supported Hypothesis 5_f because only Monitor, Resource Allocator, Education and Training, Functional Structure, and Organizational Maturity were explanatory variables; the other organizational characteristics, project characteristics, and project manager role variables were not. Findings that Organization Maturity positively affects project success support Ibbs and Kwak (1997). Findings also partially support Kendra and Taplins's (2004) study which states there is a link between organizational structure and project success. This study found that only the functional organizational structure is an explanatory variable to project success. Findings that project duration is inversely related to *Design Goals* support Richard's (2006) findings that "projects are more likely to be successfully if they are kept to no more than nine months duration" (p. 28). Table 4-100 presents a summary of the results of the research hypothesis testing, and the percent of variance explained by the model.

Table 4-100

Summary of Research Hypotheses and Results: Hypotheses 5

Hypothesis	Results	Percent of Variance Explained (Adj $R^2 - R^2$)	Significant Explanatory Variable (I) Inverse	Literature
$H5_a$: Organizational and project characteristics and project manager roles are significant explanatory variables of design goals	Partially supported	11.2% - 12.6%	Resource Allocator Project Size (I) Org. Maturity Info Systems (I)	Supports Ibbs and Kwak's (1997) research that organizational maturity positively affects project success
$H5_b$: Organizational and project characteristics and project manager roles are significant explanatory variables of impact to customer	Partially supported	14.2% - 15.5%	Entrepreneur Ed and Training (I) Manufacturing Project Size (I)	This study's findings that the functional organizational structure is an explanatory variable to project success partially aligns with Kendra and Taplin's (2004) study which states that there is a link between organizational structure and project success
$H5_c$: Organizational and project characteristics and project manager roles are significant explanatory variables of impact to team	Partially supported	18.5% - 19.7%	Monitor Transformational Leader Ed and Training (I) Manufacturing	

Table 4-100 Continued

Hypothesis	Results	Percent of Variance Explained (Adj R^2 – R^2)	Significant Explanatory Variable (I) Inverse	Literature
$H5_d$: Organizational and project characteristics and project manager roles are significant explanatory variables of benefit to organization	Partially supported	21.7% - 23.5%	Monitor Resource Allocator Ed and Training (I) Function Structure Compliance Project Type (I) Project Duration	Findings that project duration is inversely related to Design Goals supports Richards (2006), and Beale and Freeman (1991) that projects with durations of no more than 9 months/1 year are more successful
$H5_e$: Organizational and project characteristics and project manager roles are significant explanatory variables of preparing for the future	Partially supported	16.0% - 17.4%	Monitor Strategic Project Type Retail (I)	
$H5_f$: Organizational and project characteristics and project manager roles are significant explanatory variables of project success	Partially supported	23.2% - 24.7%	Monitor Resource Allocator Edu and Training (I) Function Structure Org. Maturity	

This concludes the presentation of results. Chapter IV presented a description of the final data producing sample, psychometric analysis of the *Project Manager Roles* and *Project Success* scales, and results of answering the research questions and hypotheses testing. Chapter V presents the discussion and interpretation of findings, limitations, practical implications, and recommendations for future study.

CHAPTER V

DISCUSSION

Studies have been conducted to examine the factors critical to project success (Pinto, 1998; and Kerzner, 1987). Studies have been conducted to examine the leadership aspects of project managers (Shenhar & Dvir, 1996; Barber & Warner, 2005; and Jacques et al., 2008). This is the first study conducted to explain a relationship among project manager roles (as measured by Mintzburg's Role Typology) and project success. Chapter V presents a discussion of the results of this research.

A quantitative, non-experimental exploratory (comparative) and explanatory (correlational) online survey was the research design for this study. The design aimed to explain the relationship among organizational characteristics, project characteristics, project manager profiles, project manager roles, the project life cycle and project success (Research Question 2, Hypotheses 1, 2, 3, 4, and 5). Each hypothesis has five sub hypotheses: *Design Goals; Impact to Customer; Impact to Team*; *Benefit to Organization*; and *Preparing for the Future*. The exploratory (comparative) research design compared group differences in project manager roles (Research Question 3). Additionally, the scales used as part of this study were evaluated for their psychometric qualities. Chapter V presents the discussion and interpretation of findings of the study followed by the limitations, practical implications, and recommendations for future study.

Discussion and Interpretations

There are eight broad conclusions from the results of Chapter IV.

Project Success. Over time, the definition of project success has evolved from factors associated with attaining the triple constraint to a comprehensive measure of project success that combines the project management measures of time, cost, and scope, with the product measures of client satisfaction, utilization, and benefit to the organization. The time frame for the project success measure is both short-term (taken during the project life cycle and at the completion of the project) and long-term (assessed at some point in the future when organizational benefits can be measured). As asserted by the literature, project success is multi-dimensional (Pinto & Slevin, 1988; Shenhar et al., 1997 and 2007; Baccarini, 1999; Cooke-Davies, 2002; and Rad, 2003). Shenhar et al.'s *Multi-dimensionality Theory of Project Success* (1997) and subsequent *Project Success Assessment Questionnaire* (2007) measures five distinct aspects of project success: design goals, impact to team, impact to customer, benefit to organization, and preparing for the future. Results from this study validate the instrument and support the theory.

Project Manager and Project Success. The literature asserts that the project manager plays a part in project success (Kerzner, 1987; Pinto, 1988; and Standish Group, 1994 and 2001). Empirical research demonstrates that the project manager is a factor in project success and selection of the "right" project manager is a "critical" factor to project success (Pinto, 1988). Findings show that the role of the project manager is an explanatory variable to project success (Pinto, 1988). In this study, project manager roles explained 18% of project success. This study validates that the project manager is a success factor, but we now have more information about specific tasks that the project manager performs which contributes to project success. The entrepreneur, monitor, resource allocator, and transformational leader roles are significant explanatory variables to project success. These roles address: allocating resources, managing change, filtering information, and maintaining/increasing team cohesiveness. These are the skills that project managers need to develop to increase project success.

Project Manager Attributes and Project Success. Theoretical assertions in the literature state that project manager attributes affect project success (El-Sabaa, 2000; and Sumner et al., 2006). This study does not support these assertions. Project manager attributes have a minimal to no effect on project success. Project manager attributes explain less than 5% of *impact to team* success and less than 2% of *benefit to organization* success. No project manager attributes explained *design goals*, *impact to customer*, or *preparing for the future* success. There was no relationship established between education, tenure, age, project management experience and coursework, general management experience and coursework, or PMP certification, and Project Success.

Transformational Leadership and Project Success. The literature asserts that a project manager that exhibits transformational leadership will be successful (Smith, 2001). In the project management discipline, transformational leadership theory has empirical support, is socially significant in addressing the varying duties or the project manager, and is frequently referenced in research to explain the relationship between the project manager and project success. Empirical research has established a link between some aspects of transformational leadership and project success (Prabhakar, 2005). This study supports that Transformational Leadership is a component of successful project management. Transformation Leadership is a significant explanatory variable to *Impact* *to Team* success, which addresses the satisfaction, motivation, loyalty, energy, morale, and personal growth of project team members.

The Project Life Cycle and Project Success. The literature asserts that the project life cycle dictate how project managers act (Adams & Barndt, 1978). Seminal research shows that project success is multi-dimensional and the project life cycle is a moderating factor (Pinto, 1986). This study does not support that research. Project life cycle was not an explanatory variable to project success. This can be explained by differences in time frames for the two concepts. Shenhar et al.'s Project Success Model (1997) states that design goals and impact to team are assessed during project execution, impact to customer is assessed when the product is delivered, benefit to organization is assessed after break-even ROI is achieved (one to three years after project implementation), and preparing for the future is assessed three to five years after project completion. The time frame for this model is from project initiation, through project implementation, to project benefit realization. The project life cycle model has four stages: Conceptualization, Planning, Executing, and Termination. Pinto (1988) used this model to determine factors critical to project *implementation* success. This time frame aligns with the tradition project execution (triple constraint) framework. As such, we would expect to see project life cycle as an explanatory variable to design goals, but not to the other dimensions of project success. This was not the case; the life cycle was not an explanatory variable to any project success dimension.

Technical knowledge and Project Success. The literature asserts that technical knowledge is not as important as people skills for project success (Schlick, 1988). Researchers have stated that people management knowledge is the most important competency to have; and that the primary problem of project managers is not technical, but human (Katz, 1991; El-Sabaa, 2000; and Smith, 2001). More emphasis is being placed on the "soft skills" of the project manager, and less on the "hard skills" of the project manager. In this aspect, findings from this study do not support the literature. Project managers who master the "soft skills" will achieve some aspects of project success. Specifically, the skills associated with Transformational Leader (targeting the team members and their well-being) are significant explanatory variables to *Impact to Team* project success. The technical skills (those required to address the triple constraint) are needed to achieve *Design Goals* and *Benefit to Organization* project success. Technical knowledge is just as important as people management knowledge to successfully address all dimensions of project success.

Instrumentation. Based on scale Cronbach alphas and factor analysis, this study further validates the reliability and validity of the *Managerial Work Survey* (1980) instrument and its applicability to project managers. It provides empirical evidence that Mintzberg's Role Typology adapts to project managers. Based on total scale Cronbach alphas and factor analysis, this study further validates the reliability and validity of the *Project Success Assessment Questionnaire* (2007) instrument and its applicability to project success.

Organizational and Project characteristics. The literature asserts that there is a linkage between organizational and project characteristics, project manager competencies, and project success (Kendra & Taplin, 2007). Organizational characteristics are keys to project success because they determine the project manager's level of authority, the competencies and dynamics of the team, and the maturity level of project management tool and processes. Project characteristics are keys to project success. Research has shown that differences in project type, duration, and team size required different project manager competencies (Shenhar & Dvir, 1996; Shenhar & Wideman, 2000; and Dvir et al., 2006). Project managers that can adapt to these requirements are more successful.

This study found that organizational and project characteristics have an effect on project success. Strategic projects are explanatory variables of *preparing for the future* success. They contribute to future projects/products and create new markets and technologies. In this study, compliance projects have an inverse effect on *benefit to the organization* success. Externally regulated projects do not benefit the organization (as measured by increase in profitability, ROI, market share, or shareholder value). Increased organizational maturity positively effects *design goals* success. The more formal the procedures and plan to execute, the more likely the project will be delivered on time, within specification, and to budget. Duration was inversely related to *design goals* success. The longer the project duration, the harder it becomes to successfully execute on time, within cost, and to specification.

Limitations

1. This is a non-experimental design, which is weaker than an experimental research design.
2. The target population was limited to project managers who are members of the PMI organization.

3. The study was restricted to active project managers with Internet access.
4. The study was restricted to those able to read English.
5. The survey inquires about the respondent's perception of project success. It does not review project metrics.
6. This study asks project managers to predict the results of the project while they are in the midst of executing the project. This introduces self-serving bias.
7. This study analyzed project life cycle stages using a cross-sectional method, not longitudinal method.

Practical Implications

1. Kotter (2001) proposed that leadership is different from management. Management is about coping with complexity. Leadership is about coping with change. Both management and leadership decide what needs to been done and ensures the agenda is successfully completed, but they go about it in different ways. Table 5-1 presents a comparison of the differences between management and leadership. This study shows that effective project managers need to be good managers AND good leaders. They need to be able to manage change (the entrepreneur role), plan and budget work (the resource allocator role), inspire and motivate the team to action (the transformational leader role), and constantly scan, filter out, and disseminate information (the monitor role).

Table 5-1

Summary of Comparison of Management and Leadership

Management	Leadership
Coping with complexity	Coping with change
Decides what needs to get done by planning and budgeting	Decides what needs to get done by setting direction
Creates ability to achieve by organizing and staffing	Creates ability to achieve by aligning people
Ensures completion by controlling and problem solving	Ensures completion by motivating and inspiring
Promotes stability	Presses for change

Note: From "What leader really do" Harvard Business Review, by Kotter (2001).

2. Project managers need to have professional development in project roles to increase project success. *Design Goals* success is positively affected by the Resource Allocator Role. This role allocates resources for the project and decides for which tasks to provide the resources and is suited for achieving the design goals (the triple constraint). *Impact to Customer* success is positively affected by the Entrepreneur Role. This role plans, implements, and controls change and is suited for managing and meeting the customer's requirements. *Impact to Team* success is positively affected by the Transformational Leader role. This role is suited for building team cohesiveness, integrating team members, and resolving conflict. *Benefit to organization* success is positively affected by the Monitoring and Resource Allocator Roles. Organizational benefits include commercial success and increased market share. The Monitoring Role tasks gathers external information for decision-making and the Resource Allocator tasks aligns

resources to important initiatives within the organization. The Monitoring Role also positively affects *Preparing for the Future* success. This project success goal includes opening new products or markets, and this role constantly scans the environment for trends and/or technological developments. A Project Manager Role Typology of project manager roles and the dimensions of project success they significantly affect is presented in researcher developed Figure 5-1. Table 5-2 aligns Kotter's proposition on management and leadership skills of the project manager, with project manager roles, and their influence on the multiple project success factors. Table 5-2 is researcher developed and serves as a guideline for developing curriculum that targets project management roles and project success.

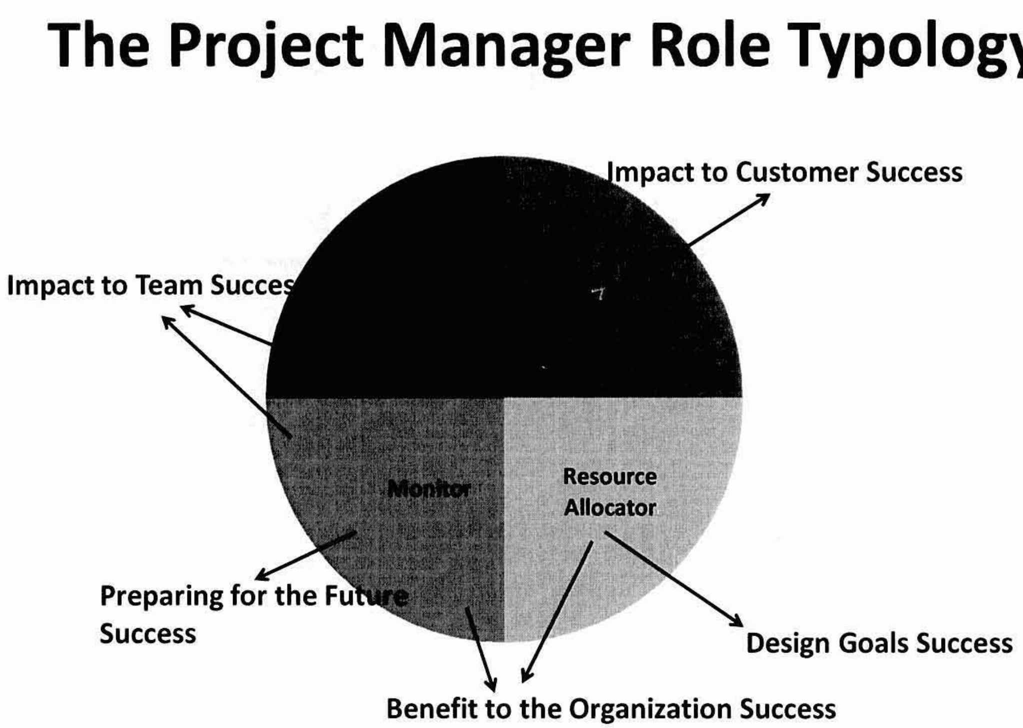

Figure 5-1. Project Manager Role Typology

Table 5-2

Role of the Successful Project Manager

Type	Project Manager Role	Roles Task	Success Factors	Success Outcomes
Leader (change)	Entrepreneur	-Making decisions about time and budget parameters on the project -Distributing and preventing loss of resources -Planning, instituting, and controlling change	Impact to Customer	-Product that satisfies the customer and meets requirements
Leader/ Manager (change and complexity)	Transformational Leader	-Resolving conflicts between team members -Evaluating quality of team members' performance -Integrating team members' goals and facilitating personal growth	Impact to Team	-Motivated team and opportunities for team member personal growth
Leader/ Manager (change and complexity)	Monitor	-Gathering information on things affecting the project -Keeping up with developments/trends related to the project	Impact to Team	-Motivated team
			Benefit to Organization	-Increased ROI, market share, and shareholder value
			Preparing for the Future	-Creation of future projects/markets
Manager (complexity)	Resource Allocator	-Deciding for which tasks to provide resources -Allocating resources within the project	Design Goals	-Project completed on time, within budget, and to specification
			Benefit to Organization	-Increased ROI, market share, and shareholder value

Recommendations for Future Study

1. Empirical validation of the Project Manager Role Typology introduced in this study. Case study or direct observation analysis of the roles in project success.
2. This study sampled cross-sectional, rather than longitudinal data. Future studies can monitor the same project(s) from initiation to a prescribed time after project completion to assess impacts and changes throughout the project life cycle.
3. Multiple regression analysis revealed some inverse relationships to project success (total and subscales). Further research is needed on the impact of female project managers, the education and training, information systems, and retail industries, compliance projects, and project duration on project success.
4. This study can be replicated to include team members, and other stakeholders.
5. Conduct further construct validity studies to further establish construct validity of the *Project Manager Roles* scale and subscale.
6. Conduct further construct validity studies to further establish construct validity of the *Project Success* scale and subscale.
7. In this study, 23.2% to 24.7% of the variance of project success was explained, leaving 75.3% to 76.8% of unexplained variance. Additional variables to incorporate into the present model and test in additional studies to further explain project success include management support, clear requirements, team skill level, and scheduling and planning tools.

The goal of this study was to contribute to the literature on organizational and project characteristics, project manager roles and attributes, and project success. The findings of the study explained 23.3% to 24.7% of the variance in project success and provided a contribution to the body of knowledge. This study also presents a Project Manager Role Typology to address the skills project managers need to successfully execute the multi-dimensions of project success. Chapter V discussed the interpretation of findings, limitations, practical implications, and recommendations for future study.

REFERENCES

Adams, J. and Barndt, S. (1978). Organizational life cycle implications for major projects. *Project Management Quarterly, Vol. IX. 4,* 32-39.

Alfi, S. (2002). *A study of the relationship between project managers' tenure, education, training, experience, and project manager success*. Pepperdine University. 131 pages; AAT 3066078.

Allan, P. (1981). Managers at work: a large-scale study of the management job in New York City government. *Academy of Management Journal (pre-1986), 24*, 613-619.

Avots, I. (1969). Why does project management fail? *California Management Review, 12,* 77-82.

Baccarini, D. (1999). The logical framework method for defining project success. *Project Management Journal, 30*(4), 25-32.

Baker, B. N., Murphy, D. C., & Fisher, D. (1988). Factors affecting project success. In Cleland, D. I. & King, W. R. (eds.) *Project Management Handbook*. New York: Van Nostrand Reinhold.

Barber, E. & Warn, J. (2005). Leadership in project management: from firefighter to firelighter. *Management Decision 43*(7), 1032-1039.

Bass, B. (1999). Two decades of research and development in transformational leadership. *European Journal of Work and Organizational Psychology, 8*(1), 9-32.

Bass, B. & Avolio, B. (1990). *Transformational leadership development: Manual for the multifactor leadership questionnaire*, Consulting Psychologists, Palo Alto, CA.

Beale, P. & Freeman, M. (1991). Successful project execution: a model. *Project Management Journal, 12*(4), 23-30.

Chan, A. (2001). *Framework of measuring success of construction projects.* Report 2001-003-C-01. School of Construction Management and Property, Queensland University of Technology.

Cooke-Davies, T. (2002). The "real" success factors on projects. *International Journal of Project Management, 20*, 185-190.

Cooper, R. G., & Kleinschmidt, E. J. (1987). Success factors in product innovation. *Industrial Marketing Management, 16* (3), 215-224.

Diallo, A. & Thuillier, D. (2004). The success dimensions of international development projects: the perceptions of African project coordinators. *International Journal of Project Management, 22*, 19-31.

Dolfi, J. & Andrews, E. (2007). The subliminal characteristics of project managers: an explanatory study of optimism overcoming challenge in the project management work environment. *International Journal of Project Management*, *25*(2007), 674-682.

Doty, H. & Glick, W. (1994). Typologies as a unique form of theory building: toward improved understanding and modeling, *Academy of Management Review 19*(2), 230-251.

Dulewicz, V. & Higgs, M. (2003). *Design of a new instrument to assess leadership dimensions and styles.* Henley Working Paper Series HWP 0311. Henley-on-Thames, UK: Henley Management College, 2003.

Dvir, D., Lipovetsky, S., Shenhar, A., & Tishler, A. (2003) What is really important for project success? A refined, multivariate, comprehensive analysis. *International Journal of Management and Decision Making, 4*(4), 382-404.

Dvir, D., Sadeh, A., & Malach-Pines, A. (2006). Projects and project managers: the relationship between project manager's personality, project types, and project success. *Project Management Journal, 37*(5), 36-48.

Dvir, D., & Shenhar, A. J. (1992). Measuring the success of technology-based strategic business units. *Engineering Management Journal, 4* (4), 33-38.

El-Sabaa, S. (2000). The skills and career path of an effective project manager. *International Journal of Project Management 19*(2001), 1-7.

Field, A. (2005). *Discovering statistics using SPSS (2nd edition).* London, England: Sage Publications Ltd.

Finch, P. (2003). Applying the Slevin-Pinto project implementation profile to an information systems project. *Project Management Journal, 34*(3), 32-39.

Frame, J. (1987). *Managing projects in organizations.* San Francisco: Jossey Bass.

Freeman, C. (1982). *The Economics of Industrial Innovation, 2nd edition.* MIT Press, Cambridge, MA.

Freeman, M. & Beale, P. (1992). Measuring project success. *Project Management Journal, 23*(1), 8-18.

Garson, G. D. (2008). *Factor Analysis: Statnotes.* Retrieved August 4, 2010 from http://faculty.chass.ncsu.edu/garson/PA765/factor.htm

Goldstein, M. (2001). Knowing right from wrong: what research tells us about ways to increase the chances of project success. *Proceedings of the Project Management Institute Annual Seminar & Symposium, November 2001, Nashville, Tennessee.*

Gottschalk, P. & Karlsen, J. (2005). A comparison of leadership roles in internal IT projects versus outsourcing projects. *Industrial Management & Data Systems 105*(9), 1138-1149.

Gray, C. & Larson, E. (2008). *Project management: the managerial process (4th ed.).* New York, NY: McGraw-Hill Irwin.

Green, S. B. (1991). How many subjects does it take to do a regression analysis? *Multivariate Behavior Research, 26* (3), 499-510.

Grover, V., Jeong, S., Kettinger, W. & Lee, C. (1993). The chief information officer: a study of managerial roles. *Journal of Management Information Systems*, 10(2), 107-131.

Hill, R. (1977). Managing interpersonal conflict in project teams. *Sloan Management Review, 18*, 45-62.

Ibbs, C. & Kwak, Y. (1997). *The benefits of project management – financial and organizational rewards to corporations*. PMI Publications.

Jackson, S. E., Schuler, R. S., Rivero, J. C. (1989). Organizational characteristics as predictors of personnel. *Personnel Psychology, 42*(4), 727.

Jacques, P., Garger, J., & Thomas, M. (2008). Assessing leader behaviors in project managers. *Management Research News*, *31*(1), 4-11.

Jugdev, K. & Muller, R. (2005). A retrospective look at our evolving understanding of project success. *Project Management Journal, 36*(4), 19-31.

Kaplan, A. (1979). Managerial activities in an organized anarchy and a rational organization: community mental health centers contrasted to branch banks. Unpublished dissertation, Stanford University.

Katz, R. (1991). Skills of an effective administer. *Harvard Business Review*. Business Classics: fifteen key concepts for managerial success, 1991.

Kendra, K. & Taplin, L. (2004). Project success: a cultural framework. *Project Management Journal, 35*(1), 30-45.

Kerzner, H. (1987). In search of excellence in project management. *Journal of Systems Management 38*(2), 30-39.

Kerzner, H. (1998). *Project management: a systems approach to planning, scheduling, and controlling (6th edition)*. Hoboken, NJ: John Wiley & Sons.

Kerzner, H. (2004). *Advanced Project Management: best practices on implementation*. Hoboken, NJ: John Wiley & Sons.

Khang, D. & Moe, T. (2008). Success criteria and factors for international development projects: a life-cycle based framework. *Project Management Journal, 39*(1), 72-84.

Kotter, J. (1990). What leaders really do. *Harvard Business Review*, 1990, 103-111.

Kotter, J. (2001). What leaders really do. *Breakthrough Leadership*, 2001, 85-96.

Kurke, L. & Aldrich, H. (1983). Mintzberg was right!: a replication and extension of the nature of managerial work. *Management Science, 29,* 975-984.

Ley, D. (1978). An empirical examination of selected work activity correlates of managerial effectiveness in the hotel industry using a structured observation approach. Unpublished dissertation, Michigan State University.

Leybourne, S. (2007). The changing bias of project management research: a consideration of the literatures and an application of extant theory. *Project Management Journal 38*(1), 61-73.

Lipovetsky, S., Tishler, A., Dvir, D., and Shenhar, A. (1997). The relative importance of defense projects success dimensions. *R&D Management*, (27), 2.

Mansfield, E. (1968). *Industrial Research and Technical Innovation.* Norton, New York, NY.

Martinko, M. & Gardner, W. (1990). Structured observation of managerial work: a replication and synthesis. *Journal of Management Studies, 27*(3), 329-357.

McCall, M. & Segrist, C. (1980). *Technical report #14 - In pursuit of a manager's job: building on Mintzberg*. Greenboro, NC: Center for Creative Leadership.

Mintzberg, H. (1990). The manager's job: folklore and fact. *Harvard Business Review 68* (2), 163-177.

Mintzberg, H. (1993). *Structure in fives.* (2nd ed). Englewood Cliffs, NJ: Prentice Hall.

Mintzberg, H. (1994). Rounding out the manager's job. *Sloan Management Review 36*(1), 11-26.

Mintzberg, H. (2004). *Managers not MBAs.* Berret-Koeller: San Francisco, CA.

Morris, P. W. G., & Hough, G. (1987). *The anatomy of major projects: A study of the reality of project management, 1.* Chichester, UK: John Wiley & Sons, Ltd.

Muller, R. & Turner, J. (2007). Matching the project manager's leadership style to project type. *International Journal of Project Management, 25*(2007), 21-32.

Munns, A. & Bjeirmi, B. (1996). The role of project management in achieving project success. *International Journal of Project Management 14* (2), 81-87.

Murch, R. (2001). *Project Management.* Upper Saddle River, NJ: Prentice-Hall, Inc.

Myers, I. & McCaulley, M (1998). *MBTI manual: A guide to the development and use of the Myers Brigg Type indicator, 3rd edition.* Palo Alto, CA: Consulting Psychologist Press.

Neustadt, R. (1960). *Presidential Power.* New York: John Wiley, 1960, 153-154.

Ojiako, U., Johansen, E. & Greenwood, D. (2007). A qualitative re-construction of project measurement criteria. *Industrial Management & Data Systems 108*(3), 405-417.

Pettersen, N. (1991). Selecting project managers: an integrated list of predictors. *Project Management Journal 22*(2), 21-26.

Pinto, J. K. (1986). *Project implementation: a determination of its critical success factors, moderators, and their relative importance across the project life cycle.* University of Pittsburg.

Pinto, J. & Prescott, J. (1988). Variations in critical success factors over the stages in the project life cycle. *Journal of Management*, *14(*1), 5-18.

Pinto, J. & Slevin, D. (1987). Critical factors in successful project implementation. *IEEE Transactions of Engineering Management, 34*(1), 22-27.

Pinto, J. & Slevin, D. (1988). Project success: definitions and measurement techniques. *Project Management Journal, 19*(1), 67-72.

Pinto, J. & Slevin, D. (1989). Critical factors in R&D projects. *Research Technology Management, 32*(1), 31-35.

Pinto, J. & Slevin, D. (1992). *Project implementation profile.* Tuxedo, NY: Xicom Inc.

Pinto, J., Thomas, P., Trailer, J., Palmer, T., & Govekar, M. (1998) *Project Leadership from Theory to Practice.* Newton Square, PA: Project Management Institute.

Posner, B. (1987). What it takes to be a good project manager. *Project Management Journal 18*(1), 51-54.

Prabhakar, G. P. (2005). Switch leadership in projects: an empirical study reflecting the importance of transformational leadership on project success across twenty-eight nations. *Project Management Journal, 36*(4), 53-60.

Project Management Institute (2004). *A guide to the project management body of knowledge (PMBOK Guide) (*3rd. ed). Newton Square, PA.

Project Management Institute (2008). *A guide to the project management body of knowledge (PMBOK Guide) (*4th. ed). Newton Square, PA.

Rad, P. (2003). Project success attributes. *Cost Engineering, 45*(4), 23-29.

Richards, J. (2006). Short duration is key to e-business project success. *Computer Weekly, Jan 10 2006*, 28.

Robbins, S. (2000). *Essential of organizational behavior* (6th ed.). Upper Saddle River, NJ: Prentice Hall Publishers.

Sayles, L. (1964). *Managerial Behavior.* New York: McGraw-Hill, 1964.

Schermerhorn, J., Hunt, J., & Osborn, R. (2008). *Organizational Behavior (10th edition).* Hoboken, NJ: John Wiley & Sons.

Schlick, J. (1988). Developing project management skills. *Training and Development Journal, 42*(5), 20-28.

Schultz, R. & Slevin, D. (1983). The implementation profile. *Interfaces, 13,* 87-92.

Shenhar, A. (1992). Technological uncertainty and system scope: a construction model for the classification of engineering projects, working paper no. 40/92. The Israeli Institute of Business Research, Faculty of Management, Tel-Aviv Univerisity.

Shenhar, A. & Alkahar, S. (1994). Meeting the high technology system integration challenge: the BAT project case history working paper. Center for the Development of Technological Leadership, University of Minnesota.

Shenhar, A. & Dvir, D. (1996). Toward a typology theory of project management. *Research Policy 25*, 607-632.

Shenhar, A., & Dvir, D. (2007). *Reinventing project management: the diamond approach to successful growth and innovation.* Boston, Massachusetts: Harvard Business School Press.

Shenhar, A., Levy, O. & Dvir, D. (1997). Mapping the dimensions of project success. *Project Management Journal, 28*(2), 5-13.

Shenhar, A. & Wideman, R. (2000). Optimizing project success by matching pm style with project type. *PMForum.*

Slevin, D. & Pinto, J. (1991). Project leadership: understanding and consciously choosing your style. *Project Management Journal, 22*(1), 39-47.

Smith, L. (2001). The effects of project manager personality profiles on projects. *Proceedings of the PMI Annual Seminars & Symposium, November 2001, Nashville, Tennessee.*

Sproull, L. (1981). Managing educational programs: a micro-behavioral analysis. *Human Organization, 40,* 2, 113-122.

Stuckenbruck, L. C., (1986). Who determines project success? *Proceedings of the 18th Annual Seminar/Symposium* (Montreal, Canada), 85-93. Upper Darby, PA: Project Management Institute.

Sumner, M., Bock, D. & Giamartino, G. (2006). Exploring the linkage between the characteristics of IT project leaders and project success. *Information Systems Management, 23*(4), 43-49.

The Standish Group (1994). *Chaos Report.* West Yarmouth, MA: The Standish Group

The Standish Group (2001). *Extreme Chaos 2001.* West Yarmouth, MA: The Standish Group

Trochim, W. & Donnelly, J. (2007). The Research Methods Knowledge Base. Mason, OH: Thompson Custom Solutions.

Turner, J. R. (2004). Editorial – Five necessary conditions for project success. *International Journal of Project Management, 24,* 346-350.

Turner, J. & Muller, R. (2005). The project manager's leadership style as a success factor on projects: a literature review. *Project Management Journal, 36(*2), 49-61.

Wateridge, J. (1998). How can IT/IS projects be measured for success*? International Journal of Project Management, 16* (1), 59-63.

Wellman, J. (2007). Leadership behaviors in matrix organizations. *Project Management Journal, 38*(2), 62-74.

Westerveld, E. & Gaya-Walters, D. (2001). Project excellence model. Dementen (NL): Kluwer, 2001.

Willard, B. (2005). Project success: looking outside traditional project metrics. *PMForum.*

Zimmerer, T. & Yasin, M. (1998). A leadership profile of American project managers. *Project Management Journal, 29*(1) 31-45.

BIBLIOGRAPHY

Abdomerovic, M. (1992). Project management descriptors. *Project Management Journal, 23*(1), 42-48.

Akkermans, H., & Helden, K van (2002). Vicious and virtuous cycles in ERP implementations: a case study of interrelations between critical success factors. *European Journal of Informational Systems, 11*(1), 35-46.

Allen, W. E. (1995). Establishing some basic project-management body-of-knowledge concepts. *International Journal of Project Management, 13*(2), 77-82.

Anderson, E. (2006). Toward a project management theory for renewal projects. *Project Management Journal, 37*(4), 15-30.

Atkins, W. (1980). Selecting a project manager. *Journal of Systems Management.* Oct. 1980, 34-35.

Baker, B. (1988). *Project management handbook* (2nd ed.). Hoboken, NJ: John Wiley & Sons.

Blomquist, T. & Muller, R. (2006). Practices, roles, and responsibilities of middle managers in program and portfolio management. *Project Management Journal, 37*(1), 52-58.

Buckingham, M. & Coffman, C. (1999). *First, break all the rules.* New York, NY: Simon & Schuster.

Cagle, R. (1990). Controlling projects by life cycles. *American Association of Cost Engineers.* 1990 AACE Transactions, 51-55.

Carbone, T. & Gholston S. (2004). Project manager skill development: a survey of programs and practitioners. *Engineering Management Journal, 16*(3), 10-16.

Cicmil, S. (2006). Understanding project management practice through interpretative and critical research perspectives. *Project Management Journal 37*(2), 27-37.

Clarke, A. (1999). A practical use of key success factors to improve the effectiveness of project management. *International Journal of Project Management, 17*(3), 139-145.

Cleland, D. I. (1995). Leadership and the project-management body of knowledge. *International Journal of Project Management, 13*(2), 83-88.

Czuchry, A. J., & Yasin, M. M. (2003). Managing the project management process. *Industrial Management and Data Systems, 103,* 39-46.

Delisle, C. L. & Owen, D. (2004). Would the real project management language please stand up? *International Journal of Project Management, 22*(4), 327-337.

Dilts, D. M., & Rence, K. R. (2006). Impact of role in the decision to fail: an exploratory study of terminated projects. *Journal of Operations Management, 24*(4), 378-396.

Duncan, W. R. (1995). Developing a project-management body-of-knowledge document: the US project management institute's approach, 1983-94. *International Journal of Project Management, 13*(2), 89-94.

Duncan, W. R., Frame, J. D., & Jenett, E. (1994). The PMP and the PMBOK: common perceptions versus PMI positions. *Project Management Journal, 25*(4), 19-21.

Dvir, D., Raz, T., & Shenhar, A. J. (2003). An empirical analysis of the relationship between project planning and project success. *International Journal of Project Management, 21*(2), 89-95.

Einsiedel, A. (1987). Profile of effective project managers. *Project Management Journal, 18*(5), 51-56.

Elmes, M. & Wilemon, D. (1988). Organizational culture and project leader effectiveness. *Leadership Skills for Project Managers.* Newton Square, PA: Project Management Institute; Newton Square, PA.

Fretty, P. (2006). Why do projects really fail? *PM Network, 20*(3), 44-48.

Gedansky, L. (2002). Inspiring the direction of the profession. *Project Management Journal, 33*(1), 4.

Globerson, S. & Zwikael, O. (2002). The impact of the project manager on the project management planning processes. *Project Management Journal, 33*(3), 58-64.

Gobeli, D. & Larson, E. (1987). Relative effectiveness of different project structures. *Project Management Journal, 18*(2), 81-85.

Goldsmith, L. (1997). Approaches towards effective project management. *Proceedings of the 28th Annual Seminars & Symposium, Chicago, Illinois, PMI.*

Gray, N. (1999). Behavior competencies: a model for professional development – are they really important to good project management? *Proceedings of the Annual Seminars & Symposium, PMI.*

Hartman, F. & Ashrafi, R. (1996). Failed successes and failure. *Proceedings of the 28th Annual Seminars & Symposium, Boston, Massachusetts, PMI.*

Hyvari, I. (2006). Success of projects in different organizational conditions. *Project Management Journal 37*(4), 31-41.

Ireland, L. (1992). Customer satisfaction: the project manager's role. *International Journal of Project Management 10*(2), 123-127.

Ives, M. (2005). Identifying the contextual elements of project management within organizations and their impact on project success. *Project Management Journal, 36*(1), 37-50.

Jugdev, K. (2004). Through the looking glass: examining theory development in project management with the resource-based view lens. *Project Management Journal, 35*(3), 15-26.

Kanter, J. & Walsh, J. (2004). Toward more successful project management. *Information Systems Management 21*(2), 16-21.

Kliem, R. & Ludin, I. (1998). *Project management practitioner's handbook.* New York: American Management Association.

Kloppenborg, T. J., & Opfer, W. A. (2002). The current state of project management research: trends, interpretations, and predictions. *Project Management Journal, 33*(2), 5-18.

Koskela, L., & Howell, G. (2002). The theory of project management: explanation to novel methods. *Proceedings IGLC-10, Aug. 2002.*

Martin, A. (2004). Addressing the gap between theory and practice: IT project design. *Journal of Informational Technology Theory and Application, 6*(2), 23-42.

Martinko, M. & Gardner, W. (1990). Structured observation of managerial work: a replication and synthesis. *Journal of Management Studies, 27* (3), 329-357.

Matta, N. F., & Ashkenas, R. N. (2003). Why good projects fail anyway. *Harvard Business Review, 81*(9), 109-114.

McLaurin, J., Owens, S. & Taylor, R. (1995). An empirical study of communications skills of project managers. *Project Management Institute 26th Annual Seminar, New Orleans, October 16, 1995*

Morris, P. W. G. (2000). Research into revising the APM project management body of knowledge. *International Journal of Project Management, 18*(3), 155-164.

Morris, P. W. G. (2001). Updating the project management bodies of knowledge. *Project Management Journal, 32*(3), 21-30.

Morris, P. W. G. (2004). Science, objective knowledge, and the theory of project management. *Proceedings of the Institution of Civil Engineers, May 2002, 150*(12641) 82-90.

Morris, P. W. G. (2004). Project management effectiveness as a construct: a conceptual study. *South African Journal of Business Management, 35*(4) 73-94.

Morris, P. W. G. 'The validity of knowledge in project management and the challenge of learning and competency development' Chapter in Morris, P. and Pinto, J. *The Wiley Guide to Management Projects,* Wiley, NJ.

Morris, P. W. G., & Jamieson, A. (2005). Moving from corporate strategy to project strategy. *Project Management Journal, 36*(4), 5-18.

O'Brocha, M. (2002). Project success – what are the criteria and whose opinion counts? *Proceedings of the PMI Annual Seminars & Symposium, October 2002, San Antonio, Texas.*

Olsson, N., Johansen, A., Langlo, J., & Torp, O. (2008). Project ownership: implications on success measurement. *Measuring Business Excellence 12*(1), 39-46.

Onley, J. (1999). Measuring project manager competence, *PMNetwork*, October 1999, 78.

Pinto, J. K. & Covin, J. (1992). Project marketing: detailing the project manager's hidden responsibility. *Project Management Journal 22*(3), 29-35.

Pinto, J. K., & Mantel, S. J. (1990). The causes of project failure. *IEEE Transactions on Engineering Management, 37*(4), 269-276.

Project Failure Statistics. (n.d.) Retrieved from http://www.it-cortex.com/Stat_Failure_Cause.htm

Seay, S. (2005). *Dr. Kerzner's 16 Points to PM Maturity.* Retrieved from http://projectsteps.blogspot.com/2005/12/dr-kerzners-16-points-to-pm-maturity.html

Shenhar, A. (1996). Project management theory: the road to better practice. P*roceedings of the Project Management Institute 27th Annual Seminar & Symposium, October 1996, Boston, Massachusetts.*

Shenhar, A. & Dvir, D. (2007). Project management research – the challenge and opportunity. *Project Management Journal, 38*(2), 93-99.

Smallbone, T. & Quinton, S. (2004). Increasing business students' confidence in questioning the validity and reliability of their research. *Electronic Journal of Business Research Methods*, 2(2), 153-162.

Snider, K. F., & Nissen, M. E. (2003). Beyond the body of knowledge: a knowledge-flow approach to project management theory and practice. *Project Management Journal, 34*(2), 4-12.

Soderlund, J. (2004). Building theories of project management: past research, questions for the future. *International Journal of Project Management 22*(3), 183-190.

Thamhain, H. (1992). Developing the skills you need. *Research Technology Management 35*(2), 42-47.

Thamhain, H. & Gemmill, G. (1974). Influence styles of project managers: some project performance correlates. *Academy of Management Journal, 17*(2), 216-224.

Thiry, M. (2004). How can the benefits of PM training programs be improved? *International Journal of Project Management, 22*(1), 13-18.

Tukel, O. I. (2001). An empirical investigation of project evaluation criteria. *International Journal of Operations & Production Management, 21*(3), 400.

Turner, J. R. (1996). Editorial – International project management association global qualification, certification and accreditation. *International Journal of Project Management, 14*(1), 1-6.

Valentine, M. & Price, J. (1984). The leadership attributes and strengths of female project managers. *PMNetwork*, (April 1984), 27-29.

Verma, V. (1996). Human Resource Skills for the Project Manager. Project Management Institute; Newton Square, PA.

Verzuh, E. (2005). *The fast forward MBA in project management.* Hoboken, NJ: John Wiley & Sons.

Waller, R. (1997). A project manager competency model. *Proceedings of the 28th Annual Seminars & Symposium, Chicago, Illinois, PMI.*

Whitten, N. (1996). Attributes of the successful project leader. *PMNetwork.* (June 1996), 29-35.

Wideman, M.(n.d.). Expert project management – Globalization of the project management professional. Retrieved from http://www.maxwideman.com/guests/globalization/intro.htm

Willis, B. E. (1995). APM project-management body of knowledge: the European view. *International Journal of Project Management, 13*(2), 95-98.

Yasin, M. M., & Czuchry, A. J. (2002). Research note: project management practices: then and now. *Thunderbird International Business Review, 44*(2), 253-262.

Zobel, A. M., & Wearne, S. H. (2000). Project management topic coverage in recent conference. *Project Management Journal, 31*(2), 32-37.

Zwerman, B. L., Thomas, J. L., Haydt, S., & Williams, T. A. (2004). *Professionalization of Project Management: exploring the past to map the future.* Project Management Institute.

Zwikeal, O. & Globerson, S. (2004). Evaluating the quality of project planning: a model and field results. *International Journal of Production Research, 42*(8), 1545-1553.

Zwikeal, O. & Globerson, S. (2006). From critical success factors to critical success processes. *International Journal of Production Research, 44*(17), 3433-3449.

Appendix A

Survey Instrument

Access to Survey

Eligibility

Part 1: Organizational Characteristics

Part 2: Project Characteristics

Part 3: Project Life Cycle

Part 4: Project Manager Roles

Part 5: Project Success

Part 6: Project Manager Profile

Project Manager Roles Across the Life Cycle

Exit this survey

Accessing the survey

1. How did you access the survey link?

- PMI Research website
- LinkedIn Discussion Board
- Other

Prev Next

Project Manager Roles Across the Life Cycle

Exit this survey

Eligibility

1. Are you a member of PMI?

Yes

No

2. Are you a project manager?

Yes

No

3. Are you presently working on a project?

Yes

No

4. Are you 21 years old or older?

Yes

No

Prev Next

Project Manager Roles Across the Life Cycle

Exit this survey

Part 1 of 6: Organization Characteristics

Choose the answer that best describes your present organization.

7. Industry of Organization:

- Aerospace & Defense
- Automation Systems
- Consulting
- Construction
- E-Business
- Education & Training
- Financial Services
- Government
- Healthcare
- Human Resources
- Information Systems
- International Development
- IT & Telecom
- Manufacturing
- Marketing & Sales
- New Product Development
- Oil, Gas, & Petrochemical
- Pharmaceutical
- Retail
- Service & Outsourcing
- Utilities

8. Organization's Project Management Structure:

- Functional
- Matrixed
- Projectized

9. Organization's Project Management Maturity:

- Level 1 - Adhoc Stage (Basic PM Processes)
- Level 2 - Planned Stage (Individual Project Planning)
- Level 3 - Managed Stage (Systematic Project Planning and Control)
- Level 4 - Integrated Stage (Integrated Multi-Project Planning and Control)
- Level 5 - Substained Stage (Continuous PM Process Improvement)

Note. From "The benefits of project management - financial and organizational rewards." PMI Publications, by Ibbs, C, & Kwak, Y., 1997. Adopted with permission of the first author.

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Project Manager Roles Across the Life Cycle

Exit this survey

Part 2: Project Characteristics

Choose the answer that best describes your present project.

8. Project Type:

- Strategic
- Compliance
- Operational/Maintenance

9. Size of project team (number of team members you manage):

- 2-4
- 5-7
- 8-10
- 11-13
- 14-16
- 17-19
- 20+

10. Project Budget:

- $1-$50,000
- $50,000-$100,000
- $100,000-$500,000
- $500,000-$1,000,000
- $1,000,000-$5,000,000
- $5,000,000+

11. Project Duration:

- 1 day - 90 days
- 91 days - 180 days
- 181 days - 364 days
- 1 year - 3 years
- 4 years - 6 years
- 6+ years

Prev Next

Project Manager Roles Across the Life Cycle

Exit this survey

Part 3: Project Life Cycle

12. Which phase are you presently working in?

- Conceptualization (the initial project phase)
- Planning (establishing a formal set of plans to accomplish the project)
- Execution (performance of the work or the project)
- Termination (final steps that must be performed when the project is completed)

Note. From "Organizational life cycle implications for major projects." Project Management Quarterly, Vol. IX. 4, 32-39, by Adams, J. and Barndt, S., 1978. Adopted with permission of the first author and publisher.

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Project Manager Roles Across the Life Cycle

Exit this survey

Part 4: Project Manager Roles in the Life Cycle

13. Rate the importance of the following tasks in your current project phase:

	not important						very important
GL1-Evaluating the quality of team members' job performance							
GL2-Integrating team members' goals with the project work requirements							
GL3-Keeping in touch with and help team members with personal problems							
GL4-Resolving conflicts between team members							
GL5-Keeping track of team members' special skills to facilitate personal growth							
GL6-Allocating manpower to specific jobs or tasks							
GL7-Providing new team members with adequate training							
GL8-Seeing to that team members are alerted to problems that need attention							
GL9-Using your authority to ensure that your team members accomplish tasks							
GL10-Maintaining supervision over changes on the project							
GL11-Providing guidance to your team members on organizational issues							
GL12-Giving negative feedback (criticize team members when appropriate)							
GL13-Directing the work of your team members							
GL14-Forwarding important information to your team members							
GS1-Presiding at meetings as a representative of your project							
GS2-Serving as an expert to people outside of your project							
GS3-Informing others of your project's future plans							
GS4-Answering inquires on behalf of your project							
GS5-Keeping other people informed about your project's activities							
GM1-Assessing political events that may affect your project							
GM2-Keeping up with market changes and trends that impact your project							
GM3-Keeping up with information on the progress of operations in the company							
GM4-Keeping up with technological developments related to your project							
GM5-Gathering information about trends outside of your project							
GM6-Gathering information about customers and competitors							
GM7-Touring facilities for observational purposes							
GM8-Learning about new ideas originating outside your project							
GM9-Reading reports on activities in your own organization or other company							
GI1-Maintaining your personal network of contacts							
GI2-Attending social functions which allow you to keep up your contacts							
GI3-Attending conferences or meetings to maintain your contacts							
GI4-Attending social functions as a representative of your project							
GI5-Joining associations with might provide useful work-related contacts							
GI6-Staying attune to the grapevine							
GI7-Developing new contacts by answering request for information							
GI8-Developing personal relationships with people outside your project							
GI9-Developing contacts with important people outside your project							
GE1-Planning and implementing change							
GE2-Initiating controlled change on your project							
GE3-Solving problems by instituting needed changes on your project							
GR1-Distributing budgeted resources							
GR2-Making decisions about time parameters on the project							
GR3-Preventing the loss of resources valued by your project							
GR4-Allocating money within your project							
GR5-Deciding for which tasks to provide resources							
GR6-Allocating equipment or materials							

Note. From "Technical report #14 - In pursuit of a manager's job: building on Mintzberg." Greenboro, NC: Center for Creative Leadership, by McCall, M. & Segrist, C., 1980. Adapted with permission of the first author and publisher.

Prev Next

Project Manager Roles Across the Life Cycle

Exit this survey

Part 5: Project Success Status

14. At project completion, my current project will:

	Strongly disagree				Strongly agree
SD1-Complete on time or earlier					
SD2-Complete within or below budget					
SD3-Complete with only minor changes					
SD4-Achieve other efficiency measures					
SC1-Create a product that improves customer's performance					
SC2-Satisfy the customer					
SC3-Meet customer's requirements					
SC4-Create a product that will be used by the customer					
SC5-Cause customers to come back for future work					
ST1-Satisfy and motivate the project team					
ST2-Create a highly loyal project team					
ST3-Provide high energy and morale for the project team					
ST4-Create a fun working environment for the project team					
ST5-Provide personal growth for the project team					
ST6-Encourage team members to stay with the organization					
SO1-Achieve economic business success					
SO2-Increase the organization's profitability					
SO3-Create a positive return on investment					
SO4-Increase the organization's market share					
SO5-Contribute to shareholder's value					
SO6-Contribute to the organization's direct performance					
SF1-Contribute to future projects					
SF2-Lead to additional new products					
SF3-Help create new markets					
SF4-Create new technologies for future use					
SF5-Contribute to new business processes					
SF6-Develop better managerial capabilities					

Note. From Reinventing project management: the diamond approach to successful growth and innovation. Boston, Massachusetts: Harvard Business School Press by Shenhar, A., & Dvir, D., 2007. Adapted with permission of the first author.

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Project Manager Roles Across the Life Cycle

Exit this survey

Part 6: Project Manager Profile

15. Are you PMP certified?

- Yes
- No

16. Years in current Project Management position:

- less than 1 year
- 1-3 years
- 4-6 years
- 7-9 years
- 10-12 years
- 12+ years

17. Years of Project Management experience:

- less than 1 year
- 1-3 years
- 4-6 years
- 7-9 years
- 10-12 years
- 12+ years

18. Years of General Management experience:

- less than 1 year
- 1-3 years
- 4-6 years
- 7-9 years
- 10-12 years
- 12+ year

19. Number of Project Management courses taken:

- none
- 1-3 courses
- 4-6 courses
- 7-9 courses
- 10-12 courses
- 12+ courses

20. Number of General Management courses taken:

- none
- 1-3 courses
- 4-6 courses
- 7-9 courses
- 10-12 courses
- 12+ courses

21. Education level:

- High school
- Bachelors
- Masters
- Doctorate

22. Gender

- Male
- Female

23. Age:

- 21-25
- 26-30
- 31-35
- 36-40
- 41-45
- 46-50
- 51-55
- 56-60
- 61-65
- 66+

24. Region

- North America
- Asia Pacific
- EMEA
- Mexico, Latin America and Caribbean

Prev Next

Appendix B

Permissions

Permission to use and reprint the four-stage life cycle model

Permission to use and reprint Project Management Process Maturity Model

Permission to use and reprint Managerial Work Survey

Permission to use and reprint Multi-dimensional
Project Success Questionnaire

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October 28, 2009

Valecia Dyett
Lynn University
[redacted]

Publication: *Project Management Quarterly*® - 1978, Vol.IX

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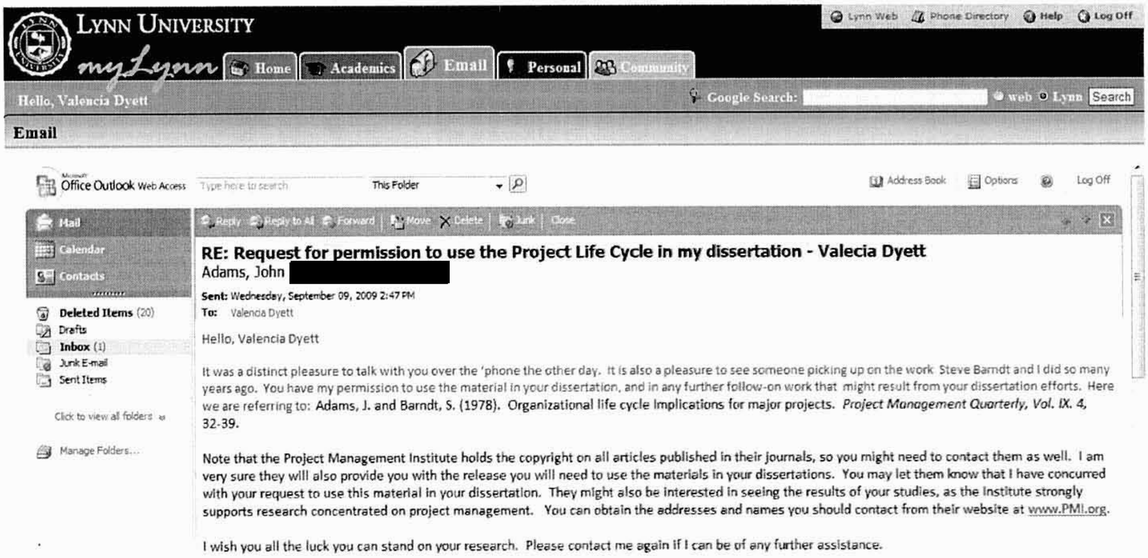

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Adams, John [redacted]

Sent: Wednesday, September 09, 2009 2:47 PM

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It was a distinct pleasure to talk with you over the 'phone the other day. It is also a pleasure to see someone picking up on the work Steve Barndt and I did so many years ago. You have my permission to use the material in your dissertation, and in any further follow-on work that might result from your dissertation efforts. Here we are referring to: Adams, J. and Barndt, S. (1978). Organizational life cycle Implications for major projects. *Project Management Quarterly, Vol. IX. 4,* 32-39.

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I wish you all the luck you can stand on your research. Please contact me again if I can be of any further assistance.

John R. Adams
Professor, Project Management

Director, Project Management Programs
Brenau University
500 Washington Street SE
Gainesville, Georgia 30501-3628

From: Valencia Dyett [mailto:[redacted]
Sent: Wednesday, September 09, 2009 9:19 AM
To: Adams, John
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Or
Dr. Joan Scialli
Lynn University, College of Business
Boca Raton, FL 33431
September 9, 2009

Dr. John Adams
Program Director, Project Management
School of Business and Mass Communication
Brenau University
500 Washington Street SE
Gainesville, GA 30501

Dear Dr. Adams,

It was good to speak with you last week. As a follow up to (and review of) our conversation, my name is Valecia Dyett. I am a doctoral candidate in the PhD program at Lynn University in Boca Raton, Florida. My major is Global Leadership, with a specialization in Corporate and Organizational Management. My dissertation focuses on project management, and the topic is "Roles and Characteristics of the Project Manager in Achieving Success Across the Project Life Cycle". I would like to determine if project managers switch roles (as defined by the Mintzberg Role Typology) during project execution.

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Drs. Ibbs and Kwak,

My name is Valecia Dyett. I am a doctoral candidate in the PhD program at Lynn University in Boca Raton, Florida. My major is Global Leadership, with a specialization in Corporate and Organizational Management. My dissertation focuses on project management, and the topic is "Roles and Characteristics of the Project Manager in Achieving Success Across the Project Life Cycle". I would like to determine if project managers switch roles (as defined by the Mintzberg Role Typology) during project execution.

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Valecia Dyett, PMP

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On Thu, Apr 8, 2010 at 5:04 PM, Valencia Dyett [redacted] wrote:

Drs. Ibbs and Kwak,

My name is Valecia Dyett. I am a doctoral candidate in the PhD program at Lynn University in Boca Raton, Florida. My major is Global Leadership, with a specialization in Corporate and Organizational Management. My dissertation focuses on project management, and the topic is "Roles and Characteristics of the Project Manager in Achieving Success Across the Project Life Cycle". I would like to determine if project managers switch roles (as defined by the Mintzberg Role Typology) during project execution.

This is a request for permission to use the Project Management Process Maturity Model in my dissertation. Upon completion, my dissertation will be published by ProQuest Information and Learning, who may supply copies of the dissertation on demand and may make the dissertation accessible in electronic formats. The requested permission extends to any future revisions and editions of my dissertation, including non-exclusive world rights in all languages, and to the prospective publication of my dissertation by ProQuest Information and Learning (ProQuest) through its UMI Dissertation Publishing business.

I am referencing the model from the following:

Ibbs, C. & Kwak, Y. (1997). *The benefits of project management – financial and organizational rewards to corporations*. PMI Publications.

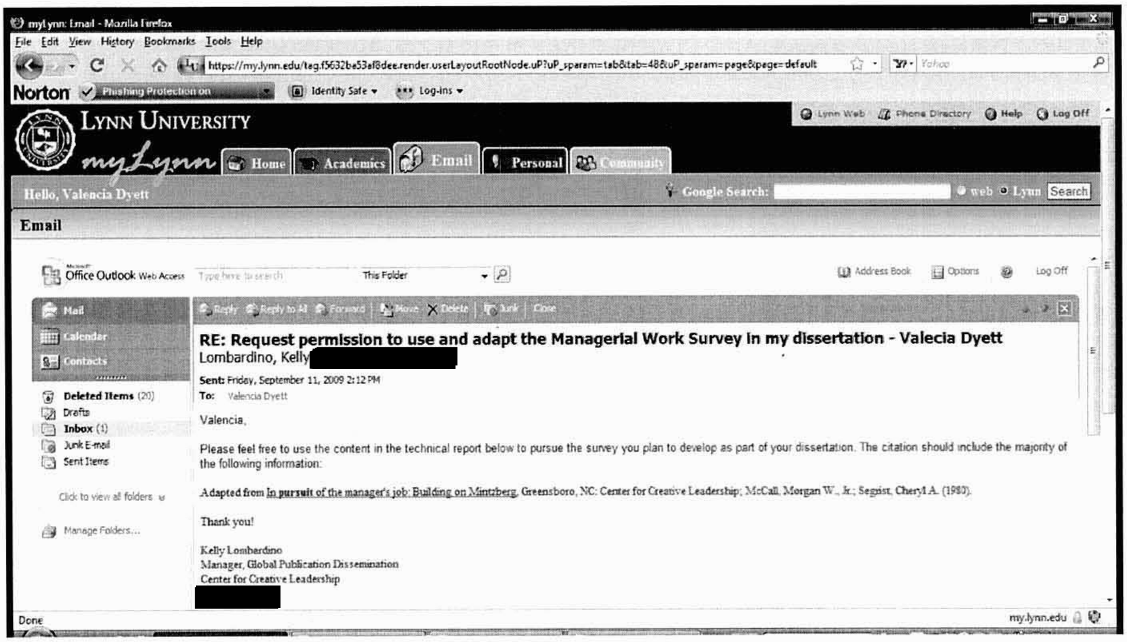
If permission is granted, I will include any statement of authorization for use that you request, or provide an APA note for permission. The copyright holder will be given full credit.

I would greatly appreciate your consent to my request. If you require any additional information, please do not hesitate to contact me. I can be reached at the email address of [redacted] or phone number of [redacted] My dissertation chair is Dr. Robert Green, who may be reached at the email of [redacted] or ([redacted]

Thank you for your consideration,

Valecia Dyett, PMP

--
Dr. William Ibbs
University of California
Ibbs Consulting
Ph: [redacted]



RE: Request permission to use and adapt the Managerial Work Survey in my dissertation - Valecia Dyett
Lombardino, Kelly [redacted]
Sent: Friday, September 11, 2009 2:12 PM
To: Valencia Dyett

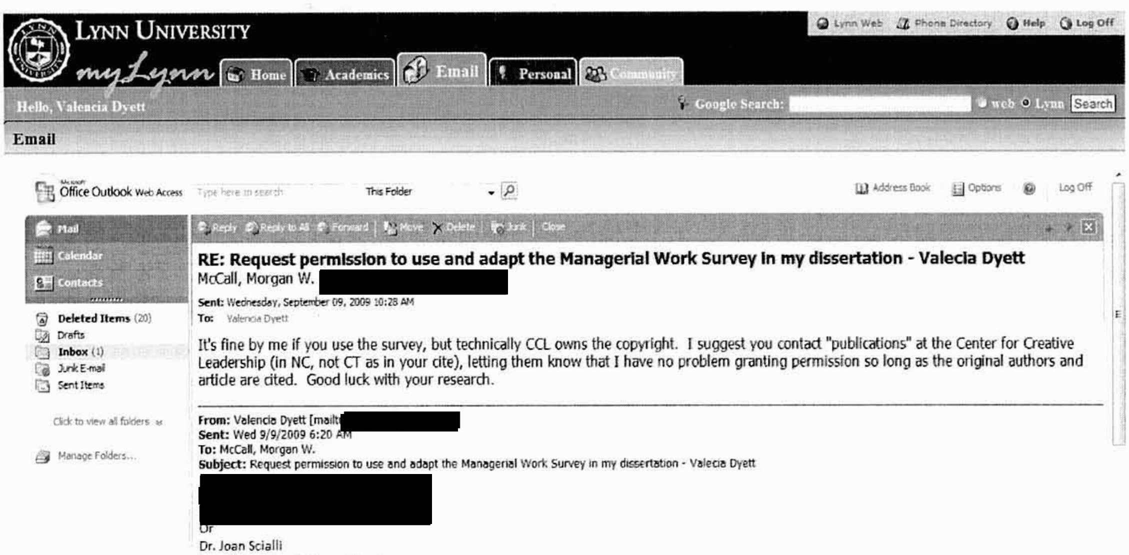
Valencia,

Please feel free to use the content in the technical report below to pursue the survey you plan to develop as part of your dissertation. The citation should include the majority of the following information:

Adapted from In pursuit of the manager's job: Building on Mintzberg. Greensboro, NC: Center for Creative Leadership; McCall, Morgan W., Jr.; Segrist, Cheryl A. (1980).

Thank you!

Kelly Lombardino
Manager, Global Publication Dissemination
Center for Creative Leadership
[redacted]



RE: Request permission to use and adapt the Managerial Work Survey in my dissertation - Valecia Dyett
McCall, Morgan W. [redacted]
Sent: Wednesday, September 09, 2009 10:28 AM
To: Valencia Dyett

It's fine by me if you use the survey, but technically CCL owns the copyright. I suggest you contact "publications" at the Center for Creative Leadership (in NC, not CT as in your cite), letting them know that I have no problem granting permission so long as the original authors and article are cited. Good luck with your research.

From: Valencia Dyett [mailt[redacted]
Sent: Wed 9/9/2009 6:20 AM
To: McCall, Morgan W.
Subject: Request permission to use and adapt the Managerial Work Survey in my dissertation - Valecia Dyett

[redacted]
Or
Dr. Joan Scialli

RE: Request permission to use and adapt the Managerial Work Survey in my dissertation - Valecia Dyett

Lombardino, Kelly [redacted]
Sent: Friday, September 11, 2009 2:12 PM
To: Valencia Dyett
Valencia,

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Adapted from In **pursuit** of the manager's job: Building on Mintzberg. Greensboro, NC: Center for Creative Leadership; McCall, Morgan W., Jr.; Segrist, Cheryl A. (1980).

Thank you!

Kelly Lombardino
Manager, Global Publication Dissemination
Center for Creative Leadership
[redacted]

From: Valencia Dyett [mailto[redacted]
Sent: Friday, September 11, 2009 11:04 AM
To: Lombardino, Kelly
Subject: FW: Request permission to use and adapt the Managerial Work Survey in my dissertation - Valecia Dyett

Ms. Lombardino,
Here is the email thread. Thank you for your assistance.
Valecia Dyett

From: McCall, Morgan W. [redacted]
Sent: Wednesday, September 09, 2009 10:28 AM
To: Valencia Dyett
Subject: RE: Request permission to use and adapt the Managerial Work Survey in my dissertation - Valecia Dyett

It's fine by me if you use the survey, but technically CCL owns the copyright. I suggest you contact "publications" at the Center for Creative Leadership (in NC, not CT as in your cite), letting them know that I have no problem granting permission so long as the original authors and article are cited. Good luck with your research.

From: Valencia Dyett [redacted]
Sent: Wed 9/9/2009 6:20 AM
To: McCall, Morgan W.
Subject: Request permission to use and adapt the Managerial Work Survey in my dissertation - Valecia Dyett

[redacted]

[redacted]
Or
Dr. Joan Scialli
Lynn University, College of Business
Boca Raton, FL 33431
September 9, 2009

Dr. Morgan W. McCall, Jr.
Professor of Management and Organization
University of Southern California
Marshall School of Business
Popovich Hall
630 Childs Way
Los Angeles, CA 90089

Dear Dr. Morgan McCall,
My name is Valecia Dyett. I am a doctoral candidate in the PhD program at Lynn University in Boca Raton, Florida. My major is Global Leadership, with a specialization in Corporate and Organizational Management. My dissertation focuses on project management, and the topic is "Roles and Characteristics of the Project Manager in Achieving Success Across the Project Life Cycle". I would like to determine if project managers switch roles (as defined by the Mintzberg Role Typology) during project execution.
This is a request for permission to use and adapt the Managerial Work Survey (MWS) in my dissertation. Upon completion, my dissertation will be published by ProQuest Information and Learning, who may supply copies of the dissertation on demand and may make the dissertation accessible in electronic formats. The requested permission extends to any future revisions and editions of my dissertation, including non-exclusive world rights in all languages, and to the prospective publication of my dissertation by ProQuest Information and Learning (ProQuest) through its UMI Dissertation Publishing business.

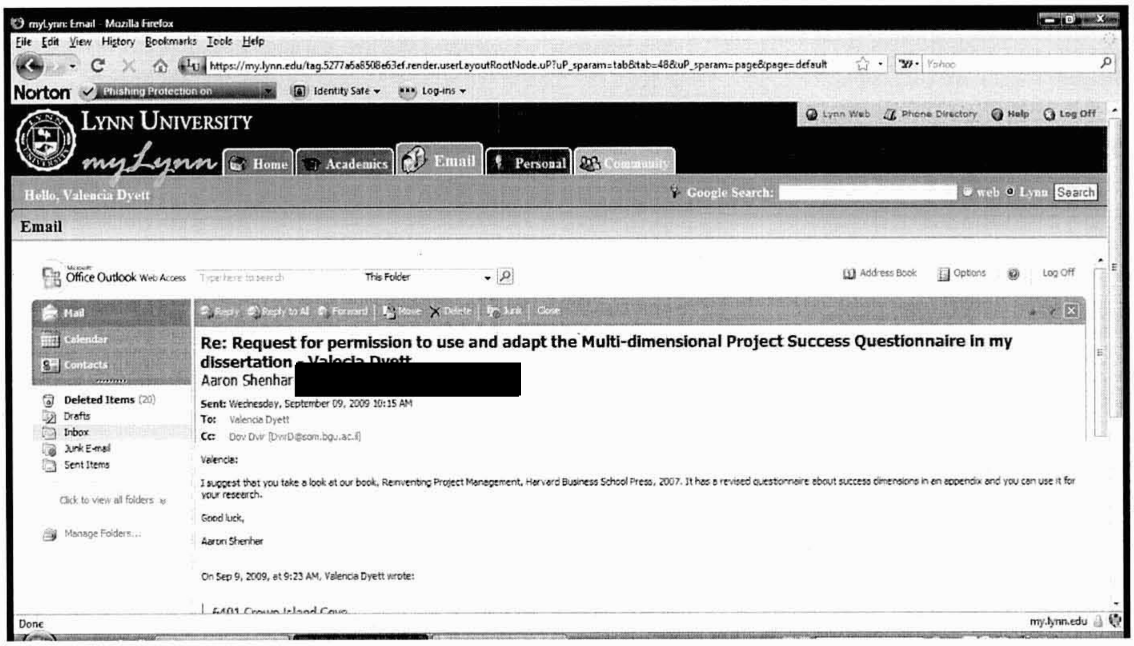
I am referencing the instrument from the following:

McCall, M. & Segrist, C. (1980). *Technical report #14 - In pursuit of a manager's job: building on Mintzberg*. Greenboro, CT: Center for Creative Leadership.

If permission is granted, I will include any statement of authorization for use that you request, or provide an APA note of permission. The copyright holder will be given full credit.

I would greatly appreciate your consent to my request. If you require any additional information, please do not hesitate to contact me. I can be reached at the above postal mail address, the e-mail address of [redacted] or phone number of [redacted] My dissertation Chair is Joan Scialli, Ed. D., who may be reached at the email of [redacted] and phone number of [redacted]

Thank you for your consideration,
Valecia Dyett, PMP



Re: Request for permission to use and adapt the Multi-dimensional Project Success Questionnaire in my dissertation - Valecia Dyett
Aaron Shenhar [redacted]]
Sent: Wednesday, September 09, 2009 10:15 AM
To: Valencia Dyett
Cc: Dov Dvir [[redacted]]
Valencia:

I suggest that you take a look at our book, Reinventing Project Management, Harvard Business School Press, 2007. It has a revised questionnaire about success dimensions in an appendix and you can use it for your research.

Good luck,

Aaron Shenhar

On Sep 9, 2009, at 9:23 AM, Valencia Dyett wrote:

[redacted]

Or

Dr. Joan Scialli

Lynn University, College of Business

Boca Raton, FL 33431

September 9, 2009

Dr. Aaron J. Shenhar

CIVET Instructor

Rutgers University

Popovich Hall

599 Taylor Way

Piscataway, NJ 08854

Dear Dr. Aaron Shenhar,

My name is Valecia Dyett (we met at the Montreal PMI Research conference in 2006). I am a doctoral candidate in the PhD program at Lynn University in Boca Raton, Florida. My major is Global Leadership, with a specialization in Corporate and Organizational Management. My dissertation focuses on project management, and the topic is "Roles and Characteristics of the Project Manager in Achieving Success Across the Project Life Cycle". I would like to determine if project managers switch roles (as defined by the Mintzberg Role Typology) during project execution.

This is a request for permission to use and adapt the Multi-dimensional Project Success Questionnaire in my dissertation. Upon completion, my dissertation will be published by ProQuest Information and Learning, who may supply copies of the dissertation on demand and may make the dissertation accessible in electronic formats. The requested permission extends to any future revisions and editions of my dissertation, including non-exclusive world rights in all languages, and to the prospective publication of my dissertation by ProQuest Information and Learning (ProQuest) through its UMI Dissertation Publishing business.

I am referencing the instrument from the following:

Shenhar, A., Levy, O. & Dvir, D. (1997). Mapping the dimensions of project success. *Project Management Journal (1997)*, 5-13.

If permission is granted, I will include any statement of authorization for use that you request, or provide an APA note of permission. The copyright holder will be given full credit.

I would greatly appreciate your consent to my request. If you require any additional information, please do not hesitate to contact me. I can be reached at the above postal mail address, the e-mail address o[redacted], or phone number o[redacted] [redacted]-[redacted] My dissertation Chair is Joan Scialli, Ed. D., who may be reached at the email of[redacted]and phone number of ([redacted]

Thank you for your consideration,
Valecia Dyett, PMP

Dr. Aaron J. Shenhar
Professor of Project and Program Management

Rutgers Business School
SCMMS Dept.
1 Washington Park, Room 974
Newark, NJ 07102-1897
[redacted]

"Rutgers SCMMS program ranked #11 in US by AMR Research"

Appendix C

Authorization for Voluntary Consent

AUTHORIZATION FOR VOLUNTARY CONSENT

PROJECT TITLE: Roles and Characteristics of the Project Manager in Achieving Success across the Project Life Cycle
Project IRB Number: 2010-S18B Lynn University 3601 N. Military Trail Boca Raton, Florida 33431

I Valecia Dyett, am a doctoral student at Lynn University. I am studying Global Leadership, with a specialization in Corporate and Organizational Management. One of my degree requirements is to conduct a research study.

DIRECTION FOR THE PARTICIPATION: You are being asked to participate in my research study. Please read this carefully. This form provides you with information about the study. The Principal Investigator (Valecia Dyett) will answer all of your questions. Ask questions about anything you don't understand before deciding whether or not to participate. You are free to ask questions at any time before, during, or after your participation in this study. Your participation is entirely voluntary and you can refuse to participate without penalty or loss of benefits to which you are otherwise entitled. You acknowledge that you are at least 18 years of age, and that you do not have medical problems or language or educational barriers that precludes understanding of explanations contained in this authorization for voluntary consent.

PURPOSE OF THIS RESEARCH STUDY: The study is about the relationship between organizational characteristics, project characteristics, project manager roles, the project life cycle, project manager characteristics, and project success. There will be approximately 300,000 invited to participate in this study. Participants represent that they are at least 18 years of age, and that they do not have medical problems or language or education barriers that preclude understanding of explanations contained in this authorization for voluntary consent. They are worldwide project managers who are members of the Project Management Institute.

PROCEDURES: You were invited through a LinkedIn discussion group. The survey is completed electronically and you can choose to begin by clicking the "Yes, I agree to participate in this study" button below. If you do not meet the criteria for participation, you will be directed out of the survey. If you meet the criteria for participation, you will be permitted to continue with the survey by clicking "Next". You will be asked to complete the survey on organizational and project characteristics, project manager roles and characteristics, and project success. The survey should take about 10 to 15 minutes to complete.

The researcher will not obtain any identifying information to link you to the survey data. The website, SurveyMonkey, will not track respondents' IP addresses or any personal identification information. At no time will you be asked to give your name, social security number, or other identifiers, which could reveal who you are.

POSSIBLE RISKS OR DISCOMFORT: This study involves minimal risk. You may find that some of the questions are sensitive in nature. In addition, participation in this study requires a minimal amount of your time and effort.

POSSIBLE BENEFITS: There may be no direct benefit to you in participating in this research. But knowledge may be gained which may help establish relationships among organizational characteristics, project characteristics, project manager roles, the project life cycle, project manager characteristics, and project success.

FINANCIAL CONSIDERATIONS: There is no financial compensation for your participation in this research. There are no costs to you as a result of your participation in this study.

ANONYMITY: Anonymity will be maintained to the degree permitted by the technology used. Specifically, no guarantees can be made regarding the interception of data sent via the Internet by any third parties. The researcher will not identify you and data will be reported as "group" responses. Participation in this survey is voluntary and return of the completed survey will constitute your informed consent to participate. All information will be held in strict confidence and will not be disclosed unless required by law or regulation.

The results of this study may be published in a dissertation, scientific journals or presented at professional meetings. In addition, your individual privacy will be maintained in all publications or presentations resulting from this study.

All the data gathered during this study, which were previously described, will be kept strictly confidential by the researcher. Data will be stored on password protected computers electronically. The data will be destroyed after ten years. All information will be held in strict confidence and will not be disclosed unless required by law or regulation.

RIGHT TO WITHDRAW: You are free to choose whether or not to participate in this study. There will be no penalty or loss of benefits to which you are otherwise entitled if you choose not to participate.

CONTACTS FOR QUESTIONS/ACCESS TO CONSENT FORM: Any further questions you have about this study or your participation in it, either now or any time in the future, will be answered by Valecia Dyett (Principal Investigator) who may be reached at: [redacted] and Dr. Robert Green, faculty advisor who may be reached at: [redacted] For any questions regarding your rights as a research subject, you may call Dr. Theodore Wasserman, Chair of the Lynn University Institutional Review Board for the Protection of Human Subjects, at [redacted] If any problems arise as a result of your participation in this study, please call the Principal Investigator (Valecia Dyett) and the faculty advisor (Dr. Robert Green) immediately.

RESEARCHER AFFIDAVIT: I hereby certify that a written explanation of the nature of the above project has been provided to the person participating in this project. A copy of the written documentation provided is attached hereto. By the person's consent to voluntary participate in this study, the person has represented that he/she is at least 18 years of age, and that he/she does not have a medical problem or language or educational barrier that precludes his/her understanding of my explanation. Therefore, I hereby certify that to the best of my knowledge the person participating in this project understands clearly the nature, demands, benefits, and risks involved in his/her participation.

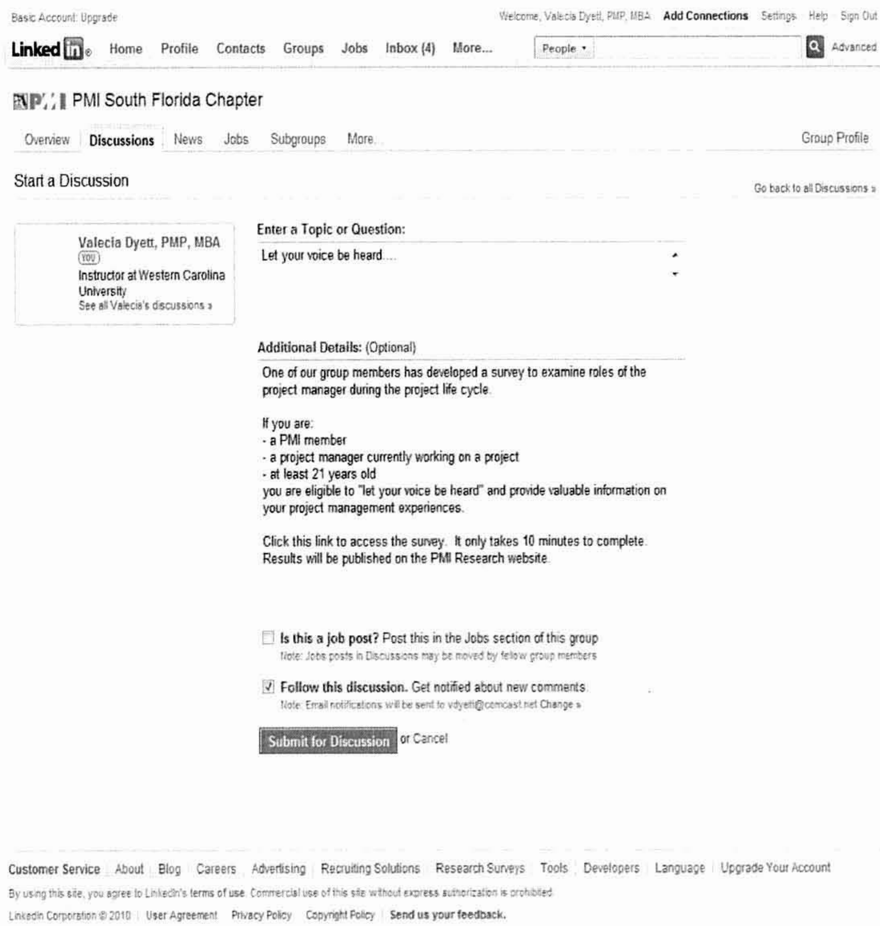
Valecia Dyett
Signature of Investigator

Date of IRB Approval: ___________

○ **Yes, I agree to participate in this study**
○ **No, I do not agree to participate in this study**

Appendix D

Invitation to Participate



Let your voice be heard…
One of our group members has developed a survey to examine roles of the project manager during the project life cycle.

If you are:
-a PMI member
-a project manager current working on a project
-at least 21 years old
You are eligible to "let your voice be heard" and provide valuable information on your project management experiences

Click this link to access the survey. It only takes 10 to 15 minutes to complete.
Results will be published on the PMI Research Website.

Appendix E

SurveyMonkey Confirmation

Confirmation of professional subscription with data encryption

and

Confirmation IP tracking feature is disabled

and

Confirmation allowing multiple responses per computer feature is disabled

SurveyMonkey.com
because knowledge is everything

Logged in as "vdyett" Log Off

Home | Create Survey | My Surveys | Address Book | My Account | Need Help?

- Account Summary
- Billing
- Transfer Survey
- Event Log

Caffeinated Monkeys...

We bought a fancy new espresso machine, and we now have 24-hour support...

- Sunday - Thursday (24 hours a day)
- Friday & Saturday (6am-9pm PST)
- Hour or less response time

Visit our Help Center

Account Summary

Account Details

Account Type: Professional Monthly Account — Upgrade to Annual Now

Subscription Renewal: **Enabled** (On November 26, 2009 your subscription will automatically renew.) — Cancel Renewal

Responses this Month: 0

Tired of paying response overage charges? Upgrade to an annual subscription **and get UNLIMITED responses for FREE! You'll also receive a 2 month discount!**

Login Settings

User Name: vdyett — edit

Password: ********** — edit

Contact Email: [redacted] — edit

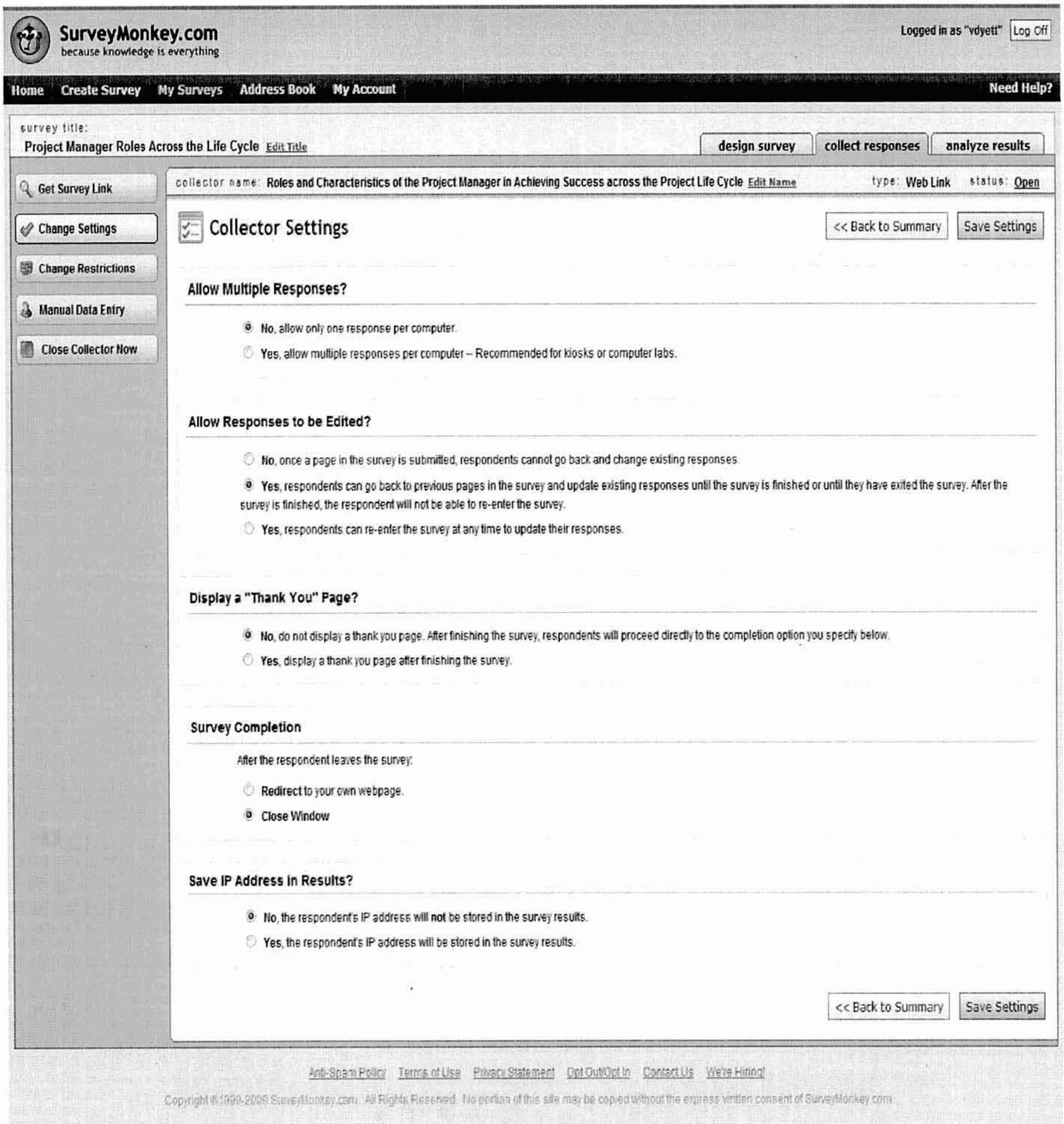
Preferences

Receive Newsletter and Other Non-Billing Related Emails: Yes — edit

Time Zone: (GMT-05:00) Eastern Time (US & Canada) — edit

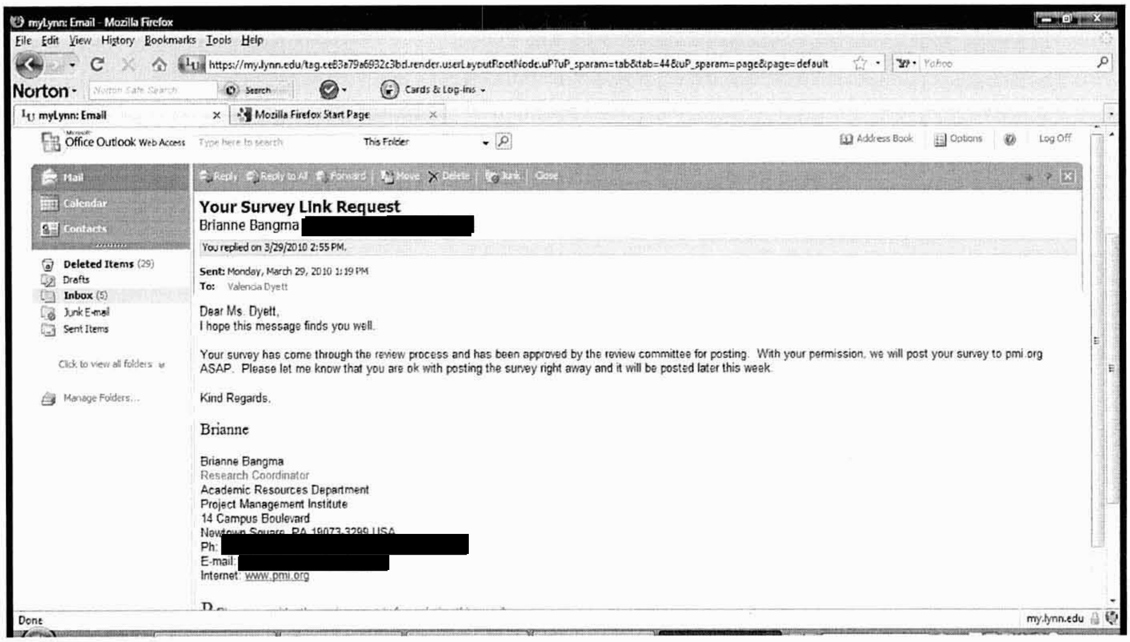
HTML Formatting: Disabled (ignore HTML tags in surveys) — edit

Anti-Spam Policy | Terms of Use | Privacy Statement | Opt Out/Opt In | Contact Us | We're Hiring!


SurveyMonkey.com
because knowledge is everything
Logged in as "vdyett" Log Off
Home Create Survey My Surveys Address Book My Account
Need Help?
survey title:
Project Manager Roles Across the Life Cycle Edit Title
design survey
collect responses
analyze results
Get Survey Link
Change Settings
Change Restrictions
Manual Data Entry
Close Collector Now
collector name: Roles and Characteristics of the Project Manager in Achieving Success across the Project Life Cycle Edit Name
type: Web Link
status: Open
Collector Settings
<< Back to Summary
Save Settings
Allow Multiple Responses?
No, allow only one response per computer.
Yes, allow multiple responses per computer -- Recommended for kiosks or computer labs.
Allow Responses to be Edited?
No, once a page in the survey is submitted, respondents cannot go back and change existing responses.
Yes, respondents can go back to previous pages in the survey and update existing responses until the survey is finished or until they have exited the survey. After the survey is finished, the respondent will not be able to re-enter the survey.
Yes, respondents can re-enter the survey at any time to update their responses.
Display a "Thank You" Page?
No, do not display a thank you page. After finishing the survey, respondents will proceed directly to the completion option you specify below.
Yes, display a thank you page after finishing the survey.
Survey Completion
After the respondent leaves the survey:
Redirect to your own webpage.
Close Window
Save IP Address in Results?
No, the respondent's IP address will not be stored in the survey results.
Yes, the respondent's IP address will be stored in the survey results.
<< Back to Summary
Save Settings
Anti-Spam Policy Terms of Use Privacy Statement Opt Out/Opt In Contact Us We're Hiring!

Appendix F

Permission for placement on PMI research website



Your Survey Link Request
Brianne Bangma [redacted]
You replied on 3/29/2010 2:55 PM.
Sent: Monday, March 29, 2010 1:19 PM
To: Valencia Dyett

Dear Ms. Dyett,
I hope this message finds you well.

Your survey has come through the review process and has been approved by the review committee for posting. With your permission, we will post your survey to pmi.org ASAP. Please let me know that you are ok with posting the survey right away and it will be posted later this week.

Kind Regards,

Brianne

Brianne Bangma
Research Coordinator
Academic Resources Department
Project Management Institute
14 Campus Boulevard
[redacted]
Ph: [redacted]
E-mail: [redacted]
Internet: www.pmi.org

Dear Ms. Dyett,

I hope this message finds you well.

Your survey has come through the review process and has been approve by the review committee for posting. With your permission, we will post your survey to pmi.org ASAP. Please let me know that you are ok with posting the survey right away and it will be posted later this week.

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Brianne

Brianne Bangma
Research Coordinator
Academic Resources Department
Project Management Institute