Relationship between Emotional Intelligence and Transformational Leadership in Project Management

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Abstract

Project managers should have both technical skills as well as interpersonal and nontechnical soft skills, referred to as emotional intelligence, to work effectively with their team and be transformational leaders. This research investigated emotional intelligence skills, leadership behaviors, and their relationship using 578 certified project management professionals from three Project Management Institute (PMI) chapters in the Washington, DC area and the global PMI Information Systems Specific Interest Group (PMI-ISSIG) to answer three research questions. A general questionnaire, the Bar-On Emotional Intelligence Inventory, and the Multifactor Leadership Questionnaire were used to collect data. Statistic analysis (cluster, discriminate, and regression) demonstrated a positive relationship between transformational leadership behaviors and emotional intelligence. Linear regression analysis revealed that nearly half of the variation in leadership behaviors is accounted for by variation in emotional intelligence data. More especially, a step-wise multiple regression analysis showed that 34% of the relationship was contributed directly by eight of the 15 EQ components: interpersonal, optimism, self actualization, general mood, happiness, reality testing, adaptability, and impulsive control. The study findings suggest that developing these eight emotional intelligence components in project managers provides a basis for cumulative, long-term benefits to organizations in managing complex and dynamic projects. The study contributes toward positive social change in the project management community by introducing a new paradigm highlighting how soft interpersonal skills of project managers play key roles in project success besides the traditional PMI triple constraints of cost, schedule, and quality.

Introduction

The close of the 20th century witnessed a paradigm shift in organizational settings from hierarchically structured entities to networked organizations. This transition forced organizational leaders to venture into an exploration of a broader range of leadership styles suited for the challenges of the 21st century. With the globalization of markets, the increasing diversity of workforces, and the emphasis on time as a critical element in an organization's ability to compete, the need to develop emotionally intelligent leadership skills and competencies has never been greater. Networked, interdependent, and culturally diverse organizations require transformational leadership more often than other organizations do (Cascio, 1995). The dynamic and complex nature of projects and their interdependence within the overall organizational setting indicates a need for project managers to be more effective.

Bass and Avolio (1995) showed interest in testing a new paradigm of transformational and transactional leadership and studied the connection between project management and leadership, including the behaviors that inspire and motivate followers. Project management, often described in the context of leadership, was ubiquitous in the past as the medium by which changes in societies occurred (Cleland &

Gareis, 2006). The real leaders of history were the people who managed political organizations, countries, explorations, war technologies, social change, and so forth. The principal challenge to managers is the need to create change for the better or to manage the change that affected their societies. The thinking process that project managers use must include managing intangible as well as tangible factors of projects. Project managers must be intuitive in making judgments and decisions, including having the capability for both conceptual analysis and integration. In addition to having skills and experience with project tools and techniques, project managers' effectiveness also depends on personal characteristics and the leadership qualities necessary to achieve the integration. Leadership is intrinsically an emotional process whereby leaders recognize followers' emotional states, attempt to evoke emotions in followers, and then seek to manage followers' emotional states accordingly (Humphrey, 2002). As it plays a key factor in an individual's ability to be socially effective, leadership literature also indicates that emotional intelligence is a key determinant of effectiveness in communicating with team members, key stakeholders, and external management.

Burns (1978) paved the way for the new leadership theory that changes focus from studying the traits of great men and transactional management to the interaction of leaders and how they lead as collaborators working toward mutual benefits. Burns contended that transformational leadership occurs when one or more persons engage with others in such a way that leaders and followers raise one another to higher levels of motivation and morality. Transformational leadership works toward a common goal with followers, puts followers in front and develops them, takes followers to the next level, and inspires followers to transcend their own self-interest in achieving superior results. According to Bass and Riggio (2006) a transformational leader recognizes and exploits an existing need or demand of potential followers and looks for potential motives in followers, seeks to satisfy higher needs, and engages the full person of the followers.

Lugo (2007) and Meredith (2007) revealed the effect of emotional intelligence on leadership transformation in various sectors of the economy. Project management as one of the modern management branches requires people involved in managing large and complex projects to combine their emotional intelligence skills to develop transformational leadership skills. Recognition of the strategic importance of project management in the corporate world is rapidly accelerating. One of the reasons for the acceleration is a strong belief by business leaders and executive managers that aligning project management principles with organizational business strategies will significantly enhance the achievement of organizational goals, strategies, and performance. A comprehensive understanding of what it takes to deliver complex projects is a challenge to organizational leaders and project managers across all sectors of the economy (Tessema, 2008). Emotional intelligence skills are a foundation for taking a project and its management to the next level.

Background

As a widely discussed topic in social sciences, emotional intelligence has become one of the cornerstones for identifying leadership and management styles in modern organizations. Emotional intelligence focuses on both head and heart and brings together the field of emotions and intelligence by viewing emotions as useful sources of information that help one make sense of and navigate the social environment (Salovey & Grewal, 2005, p. 339). In human history, the relationships between heart and head, thinking and emotion, and reason and passion have been a subject of debate (Meredith, 2007, p. 15). The theoretical foundation of emotional intelligence dates back to the early 1920s when E. L. Thorndike and his team first identified emotional intelligence as social intelligence (Goleman, Boyatzis, & McKee, 2002). Thorndike defined social intelligence as the ability to understand and manage men, women, boys, and girls to act wisely in human relations. The ability is prevalent in the nursery, on

the playground, and in the barracks. In 1937, Thorndike and Stern established a scale to measure social intelligence in three areas: (a) individuals' attitudes toward society and its various components, including politics, economics, and values; (b) individuals' social knowledge, such as being well-versed in sports, contemporary issues, and general information about society; and (c) individuals' degrees of social adjustment, categorized as introversion and extraversion. The George Washington Social Intelligence Test, developed by Thorndike's team, was the first test to measure an individual's judgment in social situations and in relationship problems (Goleman, 2001).

Over half a century passed without significant movement in the field of emotional intelligence until Gardner developed his groundbreaking theory of multiple intelligences (personal, interpersonal, and intrapersonal intelligence). In his research, Gardner (1993) questioned the idea that intelligence is a single entity, that it results from a single factor, and that an IQ test can easily measure intelligence. Various emotional intelligence models have been developed based on the foundational works of Thorndike and Gardner. As shown in Exhibit 1, Rosete and Ciarrochi (2005) categorized the new emotional intelligence models into two major groups: the ability model and the mixed model.

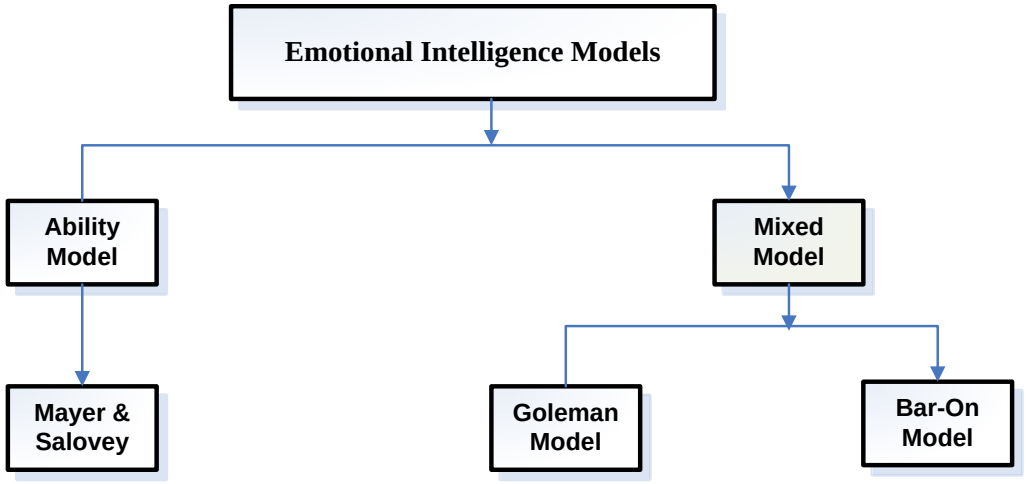

Exhibit1. Emotional intelligence models categorized by their function.

The focus of the ability model is one's capacity to perceive emotions, assimilate emotion-related feelings, understand the information of those emotions, and manage them. Salovey and Mayer's (1990) model of emotional intelligence is related to the ability model. The mixed model combines noncognitive and competency factors. Both the Bar-On (2004) and Goleman (1995) models fall into the mixed-model category. Building upon his doctoral research in 1988, Bar-On developed a model to measure emotional intelligence (Bar-On, 2004), defining emotional intelligence as "an array of emotional and social knowledge and abilities that influence our overall ability to effectively cope with environmental demands" (p. 14). After Bar-On's emotional quotient theory, Mayer and Salovey (1997) identified the ability to monitor one's own and others' feelings and emotions, to discriminate among them, and to use this information to guide one's thinking and action. Mayer and Salovey's model covers four major areas of abilities that range from basic psychological processes to more complex processes integrating emotion and cognition (Goleman et al., 2002). The four tiers were (a) a mental ability model that allows an individual to perceive, appraise, and express emotions; (b) using emotion to facilitate and prioritize thinking; (c) labeling and distinguishing between emotions by differentiating between liking and loving and by understanding a complex mixture of feelings; and (d) the general ability to marshal emotions in support of a social goal.

Within the same timeframe with Bar-On, Dulewicz and Higgs (2000a) have produced EiQ model derived from empirical research into personal factors related to EI, and particularly into "emotionally and socially competent behavior (Dulewicz, Higgs, and Slaski, 2003). In a seven-year longitudinal exploratory study Dulewicz and Higgs used 16 competencies on a sample of general managers resulted promising reliability and predictive validity. The outcome of this study and additional extensive literature review on the field helped the researchers to develop a tailored questionnaire (EiQ) to assess seven elements of an individual's emotional intelligence (Dulewicz and Higgs, 1999; 2000a).

Daniel Goleman used Salovey and Mayer's emotional intelligence model to build his five emotional and social dimensions model. Goleman (1995) contended that noncognitive skills play as much of a role as IQ in understanding how emotional intelligence matters in work life. Goleman (1995) also explored the relationship between emotional or social intelligence and people's value in the workplace. Goleman (1998) demonstrated a model of emotional intelligence based on the competencies that enable people to demonstrate an intelligent use of their emotions in managing themselves and working with others to be effective at work. A combination of the mind and heart (cognition and emotion) is the center point for Goleman's (1995) book and research. Goleman (1995)contended that some abilities are purely cognitive, like IQ or technical expertise, whereas other abilities integrate thought and feeling and fall within the domain of emotional intelligence.

Burns (1978) introduced his model of transactional and transformational leadership in 1978 and several researchers (Bass, 1990; Bass, Avolio, Jung, & Berson, 2003) attempted to apply the theory to organizational leadership and project management. Transformational leadership occurs when leaders broaden and elevate the interest of employees; while generating awareness and acceptance of the purpose and mission of the group, transformational leaders stir their employees to look beyond their own self-interests for the good of the group (Bass, 1990). Bass et al. (2003, p. 208) identified four components of transformational leadership, referred to as a higher order construct: (a) idealized influence, (b) inspirational motivation, (c) intellectual stimulation, and (d) individualized consideration.

The Challenge

Despite the influx of emotional intelligence models and leadership theories and their definitions, researchers and theorists continue to seek to understand the relationship between emotional intelligence and transformational leadership better as it applies to organizational development in general and project management in particular. Emotional intelligence as an emerging concept for developing leadership quality in project management is a topic of interest for modern organizational leaders. Effective project managers must have both hard technical skills to control the triple constraints (cost, time, and scope) and interpersonal and nontechnical soft skills (emotional intelligence) to work effectively with their team and stakeholders. Considering the temporary nature of project organizations, establishing a quick leadership structure that is based on trust between leaders and team members would play a pivotal role for the success of the project. Successful project leaders are becoming aware of associated links between project life-cycle stage completions and the necessary group virtues that facilitate each project stage (Kloppenborg and Petrick, 1999). Lee, Sweeney, and Shaughnessy (1999) argued that the success of project is based on visionary project leaders that foster project team participation, sharing decision making, and promotion of a cooperative atmosphere within the team.

Leban and Zulauf (2004) conducted a study using 24 project managers and their associated projects in six organizations, and the result showed that project managers' transformational leadership style had a positive impact on actual project performance. Furthermore, emotional intelligence ability

contributed to project managers' transformational leadership style and subsequent project performance. The study also showed a link between emotional intelligence abilities and transformational leadership style (p. 560). The researchers have also found that overall emotional intelligence and the ability to understand emotions were found to relate significantly with the inspirational motivations component of transformational leadership. Butler and Chinowsky (2006) conducted a study of 130 construction executives for their emotional intelligence as measured by their emotional quotient in relation to developing transformational leadership behaviors. The researchers identified five specific components of EQ that are related to transformational leadership.

Although the technique of improving emotional intelligence is well documented, a gap exists in the literature regarding the link between emotional intelligence and transformational leadership skills. Little empirical research has examined the relationship between emotional intelligence and transformational leadership in project management. A large number of Information Technology projects fail and are never brought to completion (Chulkov & Desai, 2005). Czurchy and Yasin (2003) and Gottshalk and Karlsen (2005) contended that ineffective leadership is one reason for project failure. The Project Management Institute (PMI) has identified this challenge as one of the potential research areas that might help to resolve issues related to project failure and improve project success. The PMI also encourages its members and affiliated research communities from various universities and research institutes to conduct research related to improving project managers' interpersonal and intrapersonal skills to better manage dynamic and complex projects (PMI, 2004). Roland Gareis (2004) argued that there are emotions in projects. He mapped out the various levels of emotions with the five phases of project life cycle – initiation, planning, execution, controlling, and closing

Bryson (2005), Kerr, Garvin, Heaton, and Boyle (2005), Matthews, Zeidner, and Roberts (2004), Meredith (2007), and Vitello-Cicciu (2001) attempted to connect emotional intelligence and leadership style, performance improvement, job satisfaction, and leadership effectiveness using empirical evidence. However, Bryson; Kerr et al.; Matthews et al.; Meredith, and Vitello-Cicciu mainly focused on high-level organizational settings in the public sector, in the military, or in academic institutions and conducted very little research on project management.

Transformational leaders elevate the desire of followers for achievement and self-development, while also promoting the development of groups and organizations. Instead of responding to the immediate self-interest of followers with either a carrot or a stick, transformational leaders arouse in the individual a heightened awareness of key issues for the group and organization, while increasing the confidence of followers and gradually moving them from concerns for existence to concerns for achievement, growth, and development (Bass, 1985). In the study transformational leadership was measured by the MLQ 5X developed by Bass and Avolio (1995). The subscales for the instrument were idealized influence, idealized attributes, inspirational motivation, intellectual stimulation, and individual consideration.

Research Questions and Hypotheses

Three research questions were used in the study to investigate the relationship between the variables identifying the emotional intelligence profile, common leadership practices, and leadership preferences of project managers. The dependent variables for the study were theperceived level transformational leadership behaviors. Because a survey captures information at a single point in time, it is not possible to manipulate the independent variables; thus, the nonmanipulated independent variables are components of emotional intelligence.

The Bar-On Emotional Quotient Inventory (EQ-i) and Multifactor Leadership Questionnaire (MLQ 5X) were used to gather data on the emotional intelligence and leadership skill profiles of PMPs from local PMI chapters in the Washington, DC area and a few specific interest groups around the world. The Bar-On EQ-i is a self-report instrument that measures the model's five composite scales (intrapersonal, interpersonal, stress management, adaptability, and general mood). The MLQ 5X is a comprehensive survey of 45 items measuring a broad range of leadership types including transformational, transactional, and nontransactional (passive, avoidant). The MLQ 5X is used to collect information from passive leaders, from leaders who give contingent rewards to followers, and from leaders who transform their followers into becoming leaders themselves.

Literature about emotional intelligence and leadership listed in the previous section provided the basis for the hypotheses of the study. The hypothesis used for the study was that project managers with a high degree of emotional intelligence are more likely to exhibit transformational leadership styles than are project managers with a low degree of emotional intelligence. The null hypotheses for the study were as follows:

$H_0$1: There is no difference in leadership behaviors between project managers with high emotional intelligence scores with those having low scores.

$H_0$2: Project managers with higher emotional intelligence scores do not demonstrate more transformational leadership behaviors than those with low scores.

$H_0$3: Project managers with lower emotional intelligence scores do not demonstrate a greater tendency to use transactional and laissez-faire leadership behaviors.

To support the hypotheses, the study addressed the following three research questions:

1. What are the emotional intelligence profiles of project managers?
2. What are the most common leadership styles reported by project managers?
3. What is the relationship between emotional intelligence and the leadership styles of project managers?

Research Design

PMI-certified professionals (project management professionals or PMPs) from three PMI local chapters (Washington, DC; Silver Spring, MD; and Montgomery County, MD) and the global PMI Information Systems Specific Interest Group (PMI-ISSIG) with over 15,000 members around the world were invited to participate in the study through an e-mail distribution to complete a general questionnaire, the Multifactor Leadership Questionnaire (MLQ) 5X, and the Bar-On Emotional Quotient Inventory (EQ-i) survey on the study's website at http://www.emotionsandleadership.com. The participants completed a consent form and were provided instruction on how to complete the survey. Eight hundred forty-two project managers visited the survey site, 264 completed some portion of the study, and 578 participants completed all three sections of the study. Of the total respondents, 53% were male and 47% were female. The study participants' experience was categorized by years of service: junior project managers had 1-5 years of experience, mid-level project managers had 6-10 years, and senior project managers had 11 years and above. The distribution of positions according to the level of experience as junior, mid-level, and senior project manager was also outlined. Exhibit 2 shows the respondents' breakdown by experience and gender.

Position description	Males	Females	Total
Junior project manager (1-5 years of experience)	42	43	85
Mid-level project manager (6-10 years of experience)	73	101	174
Senior project manager (11 years and above)	188	130	318

Exhibit2. Experience by Gender (N = 578)

The study was planned to cover a wide range of sectors of the economy by selecting the three Washington DC PMI chapters that have over 10,000 members collectively and the global PMI ISSIG, which has over 15,000 members. Exhibit 3 shows the distribution of the survey participants over 17 sectors.

Industry type	Males	Females	Total
Business services consultant	42	27	69
Communication carrier	4	6	10
Construction/architecture/engineering	10	6	16
Data processing services	24	10	34
Education	2	4	6
Federal government	39	40	79
Finance/banking/accounting	22	19	41
Health sector	9	19	28
Insurance/real estate	12	16	28
Legal services	0	2	2
Manufacturing	17	12	29
Other	30	42	72
No response	69	48	116
Publishing/broadcast/advertising/public relations/marketing	4	4	8
Research/development lab	5	6	11
Retailer/wholesaler/distributer	7	2	9
State or local government	6	7	13
Transportation	1	1	2

Utilities	2	3	5

Exhibit3. Survey Participants by Industry (N = 578)

The data were analyzed using a number of different methods to answer the three research questions. Each step of the analysis provided different pieces of information about the data.

In the descriptive statistics section, basic demographic data collected from the general questionnaire allowed the participants to be grouped by experience, gender, organizational type, education, age, and PMI certification level. This step also gave an overview and general patterns of the data. In the second step, analysis of variance (ANOVA) was completed to determine the statistical significance among differences in grouped variables. For the third and last step, multivariate data analysis techniques including cluster, discriminant, regression, and correlation analysis were applied to the data.

Cluster analysis of 21 components and subcomponents of emotional intelligence and 12 components of leadership behaviors created 11 clusters, which allowed the researchers to see if natural groupings existed within the data. After the cluster groups were identified, multiple discriminant and stepwise analyses were run to determine how the groups differed due to different independent variables. Bivariate and multiple regression analyses were also run to identify the components that most influenced the relationship between emotional intelligence and leadership behaviors. As the last step, correlation coefficient analysis was run to assess the relationship of emotional intelligence with each of the leadership behaviors further.

Data Analysis

In this section, the result of the quantitative study is reported

Emotional Intelligence

The Bar-On EQ-i was used to test emotional intelligence. The test has been set to the general population where each area's average score is 100. Scores falling above or below the general average of 100 are either better or worse than the overall population. The average emotional intelligence of the project managers who participated in the study was 101.07, with a range from 45 to 135 out of a total possible score of 140. The overall standard deviation was 13.02 compared with the general population score of 100 with standard deviation of 15.

Out of the five major components, stress management and adaptability had the highest score with 103.15 and 102.53, respectively, while intrapersonal was above the average with 101.7 but much closer to the mean of 100. Interpersonal and general mood had lower scores with 98.41 and 99.55, which is slightly lower than the average population. In the subcomponents analysis, a greater range of scores was seen, with interpersonal relationship scoring the lowest of the 15 with 97.02 and assertiveness, independence, stress tolerance, and problem solving all above 103. Five of the 15 subcomponents (self-regard, self-actualization, empathy, interpersonal relationship, and happiness) scored below the average. Self-regard scored only 0.01 below the average. The range of standard deviation for the various elements was tighter than in the general population and ranged from 10.78 to 15.67. Exhibit 4 outlines the descriptive statistics on the various emotional intelligence scales.

	Min.	Max.	*M*	*SD*
Total emotional intelligence	45	135	101.07	13.205

Intrapersonal	53	130	101.71	13.693
Self-regard	47	125	99.99	13.595
Emotional self-awareness	43	130	101.59	15.670
Assertiveness	46	131	103.35	13.504
Independence	55	126	104.29	12.381
Self-actualization	45	124	99.30	13.896
Interpersonal	27	130	98.41	14.471
Empathy	30	123	98.90	15.210
Social responsibility	41	122	100.23	13.076
Interpersonal relationship	38	128	97.02	15.533
Stress management	45	132	103.15	13.459
Stress tolerance	47	133	103.64	13.199
Impulse control	39	129	101.71	13.993
Adaptability	62	137	102.53	12.070
Reality testing	40	130	100.66	13.238
Flexibility	61	135	102.90	13.792
Problem solving	74	128	103.05	10.775
General mood	38	128	99.55	13.084
Optimism	50	127	101.27	12.093
Happiness	38	124	98.83	14.387

Exhibit4. Descriptive Statistics: Emotional Intelligence Components (N = 578)

Leadership Behaviors

The MLQ was used to report participants' responses on a 5-point scale. The MLQ is a self-report test where respondents choose descriptive statements characteristic of their leadership style. The 45 items on the test "identify and measure key leadership and effectiveness behaviors shown in prior research to be strongly linked with both individual and organizational success" (Avolio & Bass, 2004, p. 12). The test plotted responses according to leadership styles, including transformational, transactional, and laissez-faire leadership behaviors. Each of the five possible responses for the questions was given a numerical value of 1 through 5, where 1 = *not at all* and 5 = *frequently, if not always*.

Exhibit 5 outlines the descriptive statistics on the MLQ. The group averaged 4.23 for transformational leadership behavior. On this scale, the use of transformational leadership 100% of the time would score 5.0. Looking at the transformational leadership behaviors, on the average the group felt they engaged in those behaviors regularly.

	Min.	Max.	*M*	*SD*
Transformational leadership	4.06	4.35	4.23	0.1503
Idealized influence attribute	4.13	4.35	4.22	0.0925
Idealized influence behavior	4.13	4.13	4.22	0.0925
Inspirational motivation	3.86	4.38	4.19	0.2299
Intellectual stimulation	4.13	4.35	4.22	0.0925
Individual consideration	4.13	4.51	4.31	0.1862
Transactional leadership	2.63	4.15	3.16	0.6980
Contingent reward	3.61	4.60	4.05	0.4112
Management by exception (active)	2.66	3.58	2.92	0.4458
Management by exception (passive)	1.61	4.27	2.51	1.2371
Laissez-faire leadership	1.47	1.62	1.54	0.0621

Exhibit5. Descriptive Statistics: Multifactor Leadership Components (N = 578)

From the transformational leadership behaviors, individual consideration is the most highly scored behavior followed by idealized influences (both attribute and behaviors). Within the transactional leadership category, contingent reward scored higher followed by management by exception (active). The group had an average of 3.16, indicating a level just above the response of *sometimes*, where the contingent reward behavior average 4.05 represented *fairly often* and management by exception (active and passive) scored 2.92 and 2.51, respectively. Laissez-faire leadership behaviors scored 1.54, which represented somewhere between *not at all* and *once in a while* on the scale, indicating that the survey respondents did not report this leadership behavior frequently.

Analysis of Variance (ANOVA)

ANOVA was run by using gender, position, and position and gender as the factors or categorical independent variables. The dependent variables included scales of emotional intelligence and leadership behaviors. For the gender ANOVA, there was one degree of freedom because there were two groups: 1 = male, 2 = female. Exhibit 6 shows the *F* statistics and *p* values from the ANOVA.

Emotional intelligence variable	*F* statistics	*p* values
Emotional self-awareness	13.808	.000

Independence	5.942	.015
Interpersonal relationship	21.995	.000
Empathy	22.974	.000
Social responsibility	10.680	.001
Interpersonal relationships	19.606	.000
Happiness	6.010	.015

Exhibit6. ANOVA Result for Gender

Out of the 21 emotional intelligence scales and three leadership behaviors, eight emotional intelligence areas were considered significant and none of the leadership behaviors were found to be significant at the $p < .05$ level. For the ANOVA applied to experience levels, three groups (1 = senior project manager, 2 = mid-level project manager, and 3 = junior project manager) were used and the result are listed in Exhibit 7.

Variables	*F* statistics	*p* value
Total emotional intelligence	4.254	.015
Intrapersonal relationship	3.538	.030
Self-regard	3.324	.040
Independence	5.142	.040
Stress management	6.164	.002
Stress tolerance	10.867	.000
Adaptability	4.700	.009
Reality testing	6.115	.002
Problem solving	3.206	.041
General mood	4.078	.017
Optimism	5.199	.006

Exhibit7. ANOVA Results for Experience

The experience ANOVA showed a significant difference in 11 of the 21 emotional intelligence components. The remaining variables for experience were not significant at the $p < .05$ level. The final ANOVA was applied to the combination of gender and experience. Exhibit 8 summarizes the results and shows the areas found to be significant on the three different ANOVAs.

Variables	*F* statistics	*p* value
Interpersonal	6.08	.000
Empathy	6.284	.000
Stress tolerance	4.821	.001
Social responsibility	3.686	.006
Emotional self-awareness	3.140	.014
Optimism	2.944	.020
Assertiveness	2.91	,021
Intrapersonal	2.409	.048

Exhibit8. ANOVA Results for Gender and Experience

The categories generated by the interaction of position and gender are male, female + senior project manager, male + mid-level project manager, and male + senior project manager. Exhibit 9 summarizes the post hoc test results.

AS	PV	**ESA**	PV	**E**	PV	**IPS**	PV	**IPR**	PV	**O**	PV	**ST**	PV	**SR**	PV
M(1)															
2	.062	2	.120	2	**.016**	2	.201	2	**.008**	2	.517	2	.107	2	.105
3	.732	3	.881	3	.507	3	.458	3	.621	3	.542	3	.006	3	.818
4	.963	4	.091	4	**.003**	4	.402	4	**.002**	4	.881	4	**.047**	4	**.022**
6	.533	6	.067	6	**.001**	6	.883	6	**.003**	6	.131	6	**.000**	6	.152
F(2)															
1	.062	1	.120	1	**.016**	1	.201	1	**.008**	1	.517	1	.107	1	.105
3	**.002**	3	**.015**	3	**.012**	3	**.004**	3	**.002**	3	.070	3	.089	3	**.008**
4	**.028**	4	.701	4	.302	4	.668	4	.382	4	.325	4	.476	4	.275
6	**.046**	6	.724	6	.176	6	.073	6	.724	6	**.001**	6	**.002**	6	.711
FSM(3)															
1	.732	1	.881	1	.507	1	.458	1	.621	1	.542	1	**.006**	1	.818
2	**.002**	2	**.015**	2	**.012**	2	**.004**	2	**.002**	2	.070	2	.089	2	**.008**
4	.636	4	**.016**	4	**.002**	4	.046	4	**.001**	4	.591	4	.479	4	**.001**
6	.145	6	**.003**	6	**.000**	6	.170	6	**.000**	6	.195	6	.215	6	**.013**
MMP(4)															
1	.963	1	.091	1	**.003**	1	.402	1	**.002**	1	.881	1	**.047**	1	**.022**
2	**.028**	2	.701	2	.302	2	.668	2	.382	2	.325	2	.476	2	.275
3	.636	3	**.016**	3	**.002**	3	**.046**	3	**.001**	3	.591	3	.479	3	**.001**
6	.483	6	.905	6	.997	6	.322	6	.527	6	.101	6	.076	6	.150
MSP(5)															
1	.533	1	.067	1	**.001**	1	.883	1	**.003**	1	.131	1	**.000**	1	.152
2	**.046**	2	.724	2	.176	2	.073	2	.724	2	**.001**	2	**.002**	2	.711

3	.145	3	**.003**	3	**.000**	3	.170	3	**.000**	3	.195	3	.215	3	**.013**
4	.483	4	.905	4	.997	4	.322	4	.527	4	.101	4	.076	4	.150

Note. AS = assertiveness, PV = *p* value, ESA = emotional self-awareness, E = empathy, IPS = intrapersonal skills, IPR = interpersonal relationship, O = optimism, ST = stress tolerance, SR = social responsibility, M(1) = male, F(2) = female, FSM(3) = female + senior project manager, MMP(4) = male + mid-level project manager, MSP(4) = male + senior project manager.

Exhibit 9. Post hoc Test for ANOVA for the Combination of Gender and Experience

Each category (male = 1, female = 2, female and senior project manager = 3; male + mid-level project manager = 4; and male + senior project manager = 5) was compared to each of the other categories to determine if there were any differences in the means for each category of emotional intelligence. Differences in the means are denoted in bold because these means have *p* values of <.05, indicating that there is a difference between the means of each category identified in the table. Under assertiveness, there is a difference between the females and the categories female + senior project manager, male + mid-level project manager, and male + senior project manager. Most interesting is that the category female + senior project manager has differences with males, male + mid-level project manager, and male + senior project manager for the emotional intelligence variables emotional self-awareness, empathy, interpersonal relationships, and social responsibility. This result indicates that females with experience will have more self-awareness, higher interpersonal relationships, and higher social responsibility to manage projects than men will have. For the category male + senior project manager for the emotional intelligence of stress tolerance, differences exist between the categories male and female. These differences could be attributed to the way stress is handled differently between the genders. For the category of males versus the emotional intelligence variables empathy and interpersonal relationships, it shows differences between the categories of males, female + senior project manager, male + mid-level project manager, and male + senior project manager. There were no differences with females.

Cluster Analysis

Cluster analysis was performed on the two sets of variables, emotional intelligence components and leadership behaviors, to identify groups of respondents who share similarities. On the cluster analysis of the transformational leadership variable, convergence was achieved after nine iterations due to no or a small change in the cluster center creating three distinct groups, high, low, and middle, with 228, 124, and 225 cases, respectively. The cluster centers were 4.65 for the high group, 3.64 for the low group, and 4.14 for the middle group. The distance between high and medium cluster centers was 0.509, between medium and low was 0.499, and between high and low was 1.008. Exhibit 10 shows the cluster diagram with the three identified clusters.

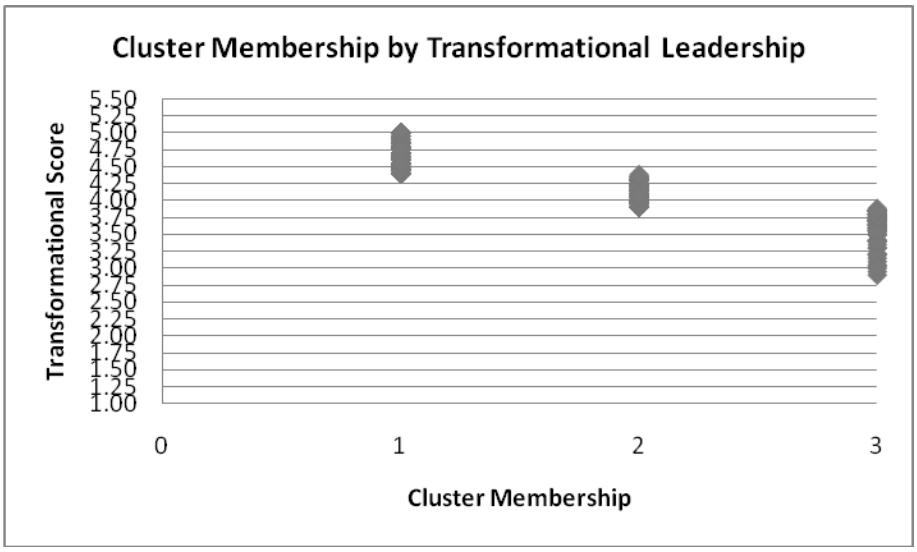

Exhibit10. Cluster membership by transformational leadership.

The analysis showed that the cluster with the highest transformational score had a higher average age, longer experience, and high emotional intelligence components. In contrast, the lowest cluster group had the lowest average of age, education, and emotional intelligence scores. Because the hypothesis of the research focused on the relationship between emotional intelligence and transformational leadership behaviors, to further examine these two variables, average emotional intelligence components and subcomponent scores were grouped under the three transformational leadership clusters.

Exhibit 11 shows the average emotional intelligence scores of the high, middle, and low transformational leadership behaviors. Cluster 1 scored high in average emotional intelligence with 107.27 and in every component and subcomponent of emotional intelligence followed by Cluster 2 with an average emotional intelligence score of 98.89 and Cluster 3 with a score of 93.46. The cluster analysis indicated a strong relationship existed between the two variables. The analysis also showed that in every emotional intelligence component and subcomponent, the high transformational leadership group's average emotional intelligence scores were higher than the middle group's scores, which in turn were higher than the average scores for the low group.

	High-level leadership (Cluster1)	Middle-level leadership (Cluster 2)	Low-level leadership (Clusters 3)
Total emotional intelligence	107.27	98.89	93.46
Intrapersonal	107.62	99.76	94.13
Self-regard	104.11	99.06	93.97
Emotional self awareness	107.23	99.29	94.98
Assertiveness	108.31	100.85	102.59
Independence	107.63	102.59	101.40

Self actualization	104.87	98.80	89.71
Interpersonal	105.47	95.97	89.71
Empathy	105.79	96.57	90.50
Social responsibility	105.64	98.57	93.30
Interpersonal relationship	103.63	94.60	89.02
Stress management	107.06	101.03	99.76
Stress tolerance	107.92	101.66	99.27
Impulse control	104.12	100.02	100.31
Adaptability	106.89	100.86	97.48
Reality testing	104.12	99.05	96.98
Flexibility	107.21	101.47	97.41
Problem solving	106.17	101.94	99.66
General mood	103.57	97.83	91.83
Optimism	101.35	101.77	100.06
Happiness	100.03	98.72	96.77

Exhibit11. Average EQ-i Score by Transformational Leadership Cluster (N = 578)

Multivariate Statistical Methods

Both discriminant analysis and multiple discriminant analysis were used for the scope of the study. Discriminant analysis is used when the dependent variable has two groups, and multiple discriminant analysis is used when the dependent variable has more than two groups. In some statistical books, multiple discriminant analysis is also called discriminant factor analysis or canonical discriminant analysis.

Because both dependent and independent variables have more than two groups, a phased analysis was performed. In the first phase, stepwise multiple discriminant analysis was performed on both transformational and total leadership clusters to identify important variables in explaining the difference in the clusters. Phase 2 of the analysis used variables identified in the first phase to run multiple discriminant analyses simultaneously to determine the function coefficients explaining the differences among clusters. A summary of each analysis is listed below. Various statistical techniques help discriminant analysis to recognize an accurate model. Among these techniques, Wilks's lambda and the *F* test allow researchers to see significance. If the *F* test shows significance, then the accuracy of classifying cases into correct groups is investigated (Butler, 2005, p. 109). The discriminant model makes the following assumptions: (a) the predictors are not highly correlated with each other, (b) the mean

and variance of a given predictor are not correlated, (c) the correlation between two predictors is constant across groups, and (d) the values of each predictor have a normal distribution.

Discriminant Analysis for Transformational Leadership Clusters

In Phase 1, stepwise multiple discriminant analysis was run on the three transformational leadership clusters with all of the emotional intelligence components and subcomponents to determine variables important in explaining the difference among the clusters. After 42 iterations, four of the 21 emotional intelligence components and subcomponents (self-actualization, optimism, empathy, and total emotional intelligence) were selected. In Phase 2, regular discriminant analysis was run simultaneously using these four subcomponents to identify the degree of relationship on the dependent variables.

The eigenvalues table (Exhibit 12), provides information about the relative efficacy of each discriminant function. When there are two groups, the canonical correlation is the most useful measure in the table, and it is equivalent to Pearson's correlation between the discriminant scores and the groups.

Function	Eigenvalue	% of variance	Cumulative %	Canonical correlation
1	.338[a]	92.0	92.0	.502
2	.029[a]	8.0	100.0	.169

Note. The first two canonical discriminant functions were used in the analysis.

Exhibit12. Eigenvalues

The standardized canonical discriminant function coefficients (Exhibit 13) allow a comparison between variables measured on different scales. According to the interpretation of Exhibit 13, coefficients with large absolute values correspond to variables with greater discriminating ability.

	Function	
	1[a]	2
Empathy	.602	-.028
Optimism	.463	.068
Self-actualization	.519	1.462
Total emotional intelligence	-.228	-1.487

[a] Significant function.

Exhibit13. Standardized Canonical Discriminant Function Coefficients

Exhibit 13 shows that in Function 1, the combination of a respondent's empathy, optimism, self-actualization, and total emotional intelligence is the most important in describing variance in transformational leadership behaviors. Exhibit 14 depicts the cluster center with respect to Function 1 versus Function 2.

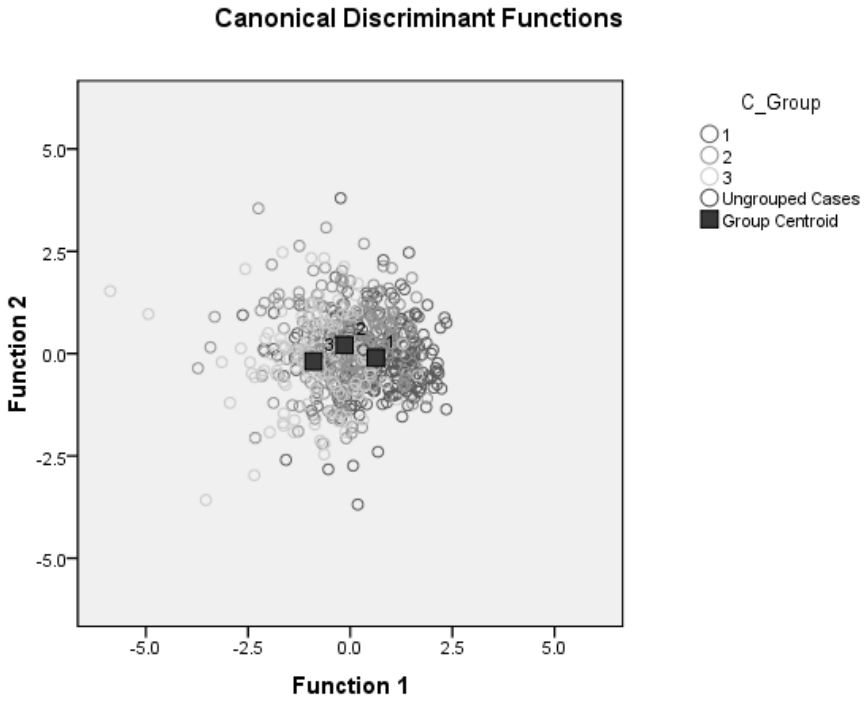

Exhibit14. Canonical discriminant functions.

Regression Analysis

Regression analysis was run to identify which components most influence the relationship between emotional intelligence and leadership behaviors. The basic bivariate regression in Exhibit 15 shows that there is a relationship between total emotional intelligence and transformational leadership behavior. The regression also shows that total emotional intelligence explains 16% of the variance of transformational leadership behavior. The unstandardized regression coefficient for total emotional intelligence was 0.014, meaning that for a one-point increase in total emotional intelligence, transformational leadership increased by 0.014 on the 5-point scale.

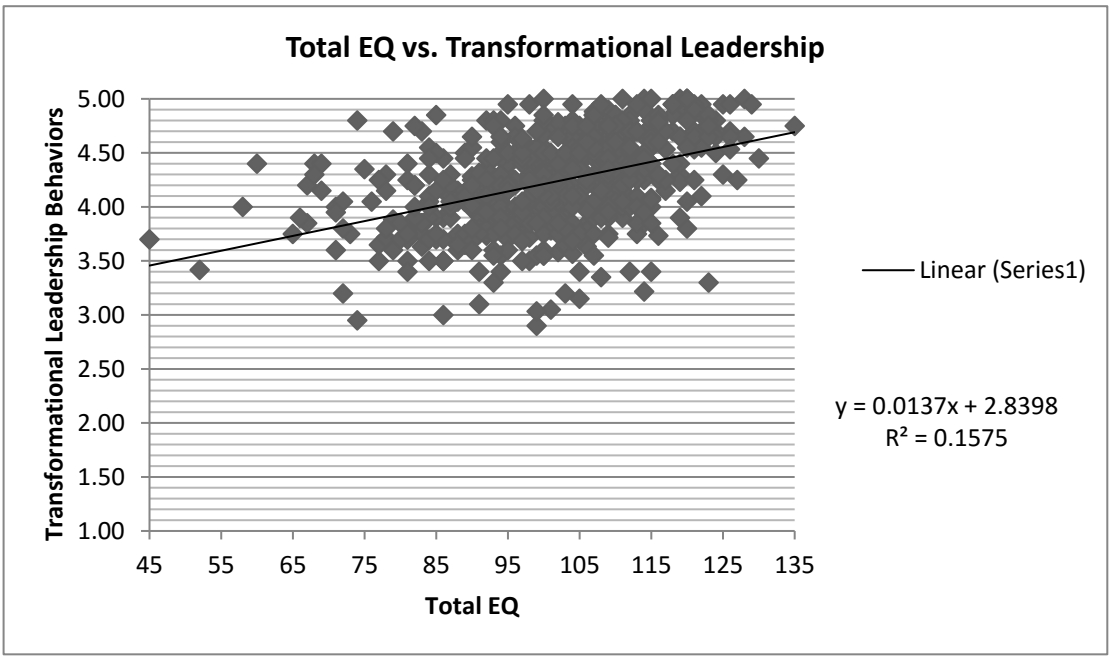

Exhibit 15. Total emotional intelligence versus transformational behaviors with regression equations and variance.

Multiple Regression

To specifically identify the components of emotional intelligence that have a direct effect on transformational leadership behaviors, a stepwise multiple regression was performedusing the five major components of emotional intelligence and its 15 subcomponents. Exhibit 16 shows the summery of this analysis.

Emotional intelligence variables	*R*	R^2
Total emotional intelligence	0.438	.0192
Five emotional intelligence components		
Interpersonal	0.447	.0200
Interpersonal, intrapersonal	0.480	.0230
Fifteen emotional intelligence subcomponents		
Interpersonal	0.447	0.200
Interpersonal, optimism	0.504	0.254
Interpersonal, optimism, self-actualization	0.515	0.265
Interpersonal, optimism, self-actualization, general mood	0.532	0.282
Interpersonal, optimism, self-actualization, general mood, happiness	0.559	0.313
Interpersonal, optimism, self-actualization, general mood, happiness, reality testing	0.573	0.328
Interpersonal, optimism, self-actualization, general mood, happiness, reality testing, adaptability	0.577	.0333
Interpersonal, optimism, self-actualization, general mood, happiness, reality testing, adaptability, impulse control	0.582	0.338

Exhibit16. Regression Analysis Results for Emotional Intelligence Versus Transformational Leadership

As shown in Exhibit 16, the total emotional intelligence composite score has an *R*-square of nearly 0.19, which indicates that variation in the total emotional intelligence data accounts for 19% of the variation in the leadership behavior data. Among the five major components of emotional intelligence, only two (interpersonal and intrapersonal) contribute to the relationship between emotional intelligence and transformational leadership. Eight of the 15 subcomponents of emotional intelligence (interpersonal, optimism, self-actualization, general mood, happiness, reality testing, adaptability, and impulse control) showed 34% contribution to the relationship between the dependent and independent variables. This analysis is represented in the equation

(R^2 = .34, $F(8, 568) = 36.28$, $p<.05$).

The highest single contributor to the relationship between emotional intelligence and transformational leadership behavior was interpersonal with 20%, which was slightly higher than the average emotional intelligence score.

Findings

The research focused on determining if a relationship exists between emotional intelligence and transformational leadership among PMI certified PMPs. The data analysis performed in the study confirmed the existence of the relationship. The hypothesis of the study was project managers scoring high in emotional intelligence would differentiate themselves in their leadership behaviors from the behaviors of leaders scoring lower in emotional intelligence. More specifically, the data showed that project managers with a high degree of emotional intelligence are more likely to exhibit transformational leadership styles than are project managers with a low degree of emotional intelligence.

The findings were categorized based on the research questions identified at the beginning of the study.

Emotional intelligence strengths: The first question asked was as follows: what are the emotional intelligence profiles of project managers? Project managers in the study had an overall average emotional intelligence score of 101.07 which is higher than the general population score of 100. Furthermore they scored above the average on 14 out of 21 emotional intelligence components and subcomponents.

Leadership Behaviors: The second research question was as follows: what are the most common leadership styles reported by project managers? Based on the data collected, project managers who participated in the survey see themselves as transformational leaders with occasional transactional leadership and fewer laissez-faire behaviors. From the transformational leadership group, individual consideration is the most highly scored behavior followed by idealized influences (both attribute and behaviors).

Relationship between EQ and Leadership Behavior: The third and final question was the center of the research, as from the beginning of the study it was thought that the most important part was determining if a relationship exists between emotional intelligence and leadership behaviors. The research question was as follows: What is the relationship between emotional intelligence and the leadership styles of project managers? As shown in Exhibit 16, the total emotional intelligence composite score has an R-square of nearly 0.19, which indicates that variation in the total emotional intelligence data accounts for 19% of the variation in the leadership behavior data.

Implications of the Study

The research findings identified key emotional intelligence components that have a direct influence on the development of transformational leadership behaviors that project and program managers require for building effective teams, planning and deciding effectively, motivating their team members, communicating a vision, promoting change, and creating effective interpersonal relationships in managing complex and dynamic projects. Caruso and Salovey (2004) and Mersino (2007) agreed that emotional intelligence can help project managers develop stakeholder relationships that support a project's success; manage large scale and complex projects; anticipate and avoid emotional breakdown; deal with difficult team members and manage conflict; leverage emotional information to make better decisions; communicate more effectively; create a positive work environment and high team morale; and cast a vision for shared project objectives that will attract, inspire, and motivate the project team. Sunindijo, Hadikusumo, and Ogunlana (2007 argue that project managers with high emotional intelligence demonstrated delegating, open communication, and proactive behavior within the team they are leading. Turner, Huemann, and Keegan (2008) touched the importance of human resource

management (interpersonal skills) in the project oriented organization. The finding of this research confirmed the finding by others that developing people skills helps organizations to manage projects, programs, and portfolios effectively. Exhibit 17 outlines the high-level description of how this study contributes to the body of knowledge in management in general and project management in particular.

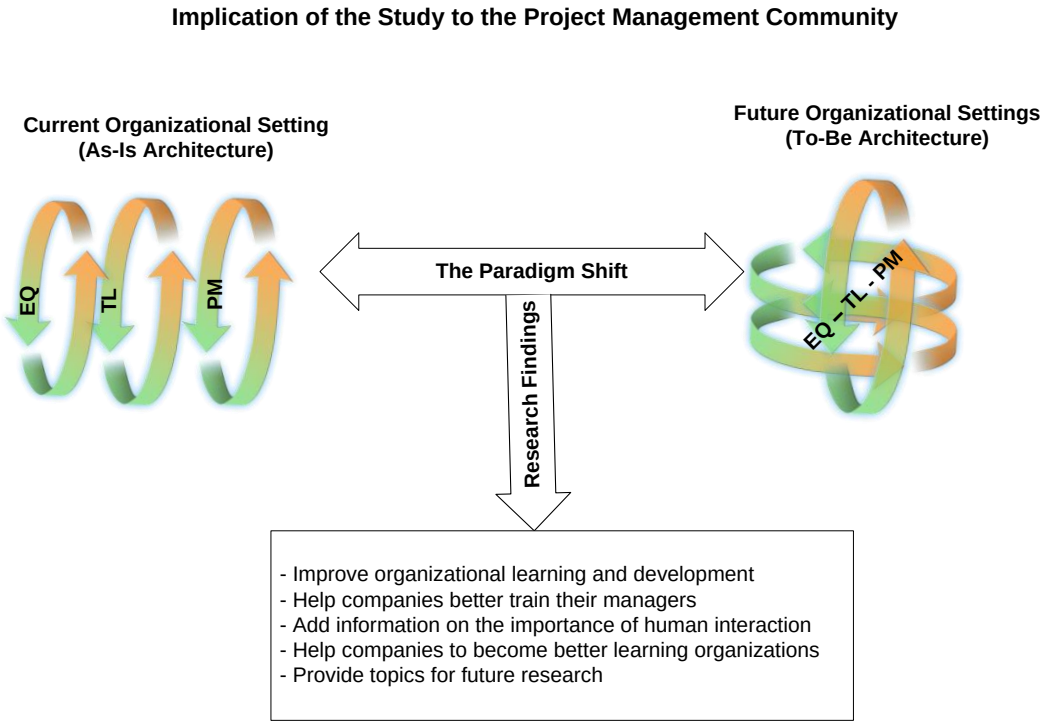

Exhibit17. High-level description of the study contribution:

Exhibit 17 illustrated the application of the results of this research in improving organizational learning and development, especially to help companies better train their managers to initiate, plan, execute, monitor, and control their projects and programs to make them competitive in the global dynamic and complex market. In his book *The Fifth Discipline*, Senge (1994) urged organizational leaders to invest in employees and in themselves to learn faster than the competition. Building on Bertalanffy's concept of treating every organization as a subset of a system, Senge et al. (1994) outlined five kinds of systems thinking: (a) open systems for seeing the world through flows and constraints, (b) social systems for seeing the world through human interaction, (c) process systems for seeing the world through information flow, (d) systems dynamics, and (e) living systems for seeing the world through the interaction of its self-creating entities. The current research adds information by underlining the importance of human interaction on increasing productivity and improving management practice. All five disciplines described in the theory of organizational learning (systems thinking, personal mastery, shared vision, mental model, and team learning) are cornerstones for creating an efficient and competitive organization. The findings of this research add substance to the effort of companies to become better learning organizations.

In a dynamic and complex environment, organizational leaders are struggling to find project managers who are emotionally intelligent and who use transformational leadership skills to solve critical problems

to bring their organization to the next level. The center of the illustration in Exhibit 18 shows the intersection of the three components. Most project managers are comfortable when they understand the importance of emotional intelligence, have knowledge of transformational leadership styles, and have the tools and techniques to manage the daily routines of a project. To reinforce the concept of using emotionally intelligent managers with transformational leadership skills to make organizations more competitive, the researcher reviewed several studies whose authors identified the relationship between emotional intelligence and transformational leadership in the construction industry and a not-for-profit organization. The results of the studies showed that leaders with high emotional intelligence demonstrated a transformational leadership style, thus empowering their team members (Butler, 2005; Meredith, 2007). The findings of this research will be used as a basis for further study on how emotional intelligence affects project managers' behaviors in the role they play as a leader, manager, mentor, and facilitator. Furthermore, several research themes in project management such as emotional intelligence and project success; emotional intelligence and group behavior; and emotional intelligence and project manager competency would be worth considering for future research opportunities.

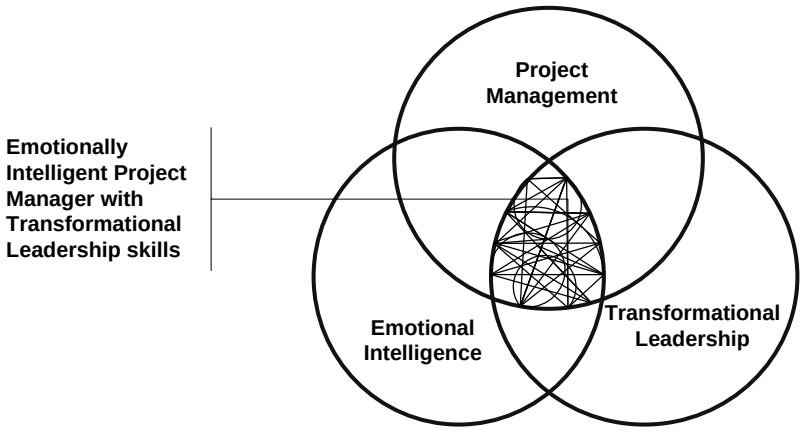

Exhibit18. Intersection of emotional intelligence, transformational leadership, and project management.

Conclusion

The study conducted was successful in attaining the goal of the research and providing practical information for PMPs around the globe. Furthermore, the research provides a foundation for future research in the area of emotional intelligenceand leadership behaviors of project managers in over 17 sectors. The study also demonstrates a relationship between emotional intelligence and transformational leadership in that project managers with higher emotional intelligence were more likely to use transformational leadership than those with lower emotional intelligence. Lower emotional intelligence is also linked with the tendency to use transactional and laissez-faire leadership behaviors. Eight of the 15 subcomponents of emotional intelligence accounted for 34% of the difference in scores in the use of transformational leadership behaviors. These subcomponents are interpersonal, optimism, self-actualization, general mood, happiness, reality testing, adaptability, and impulse control. Of the major components of emotional intelligence, intrapersonal skills and stress management have the greatest relationship with the use of transformational leadership behaviors. This research finding also supports Crawford's work on stress or satisfaction in a world of projects (2000) where she underlined the increasing pressure and stress level on project managers as a large number of organizations move

from process and operations to projects and the need to develop stress management techniques to cope with it. The study also shows that emotional intelligence can be improved through training; thus, if project managers develop their emotional intelligence in the eight subscales noted, they will be more likely to use transformational leadership behaviors to empower their team members and stakeholders to successfully complete their projects on time, with quality, under cost, and with customer satisfaction.

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