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Project Manager Trait Emotional Intelligence and Project Success

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This is to certify that the doctoral study by

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Abstract

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MS, Norwich University, 2008

BS, Buffalo State College, 2002

Doctoral Study Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Business Administration

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Abstract

Project success is a measure of both project manager efficacy and stakeholder satisfaction. One of the primary measures of success for construction projects is meeting cost targets and yet recent data indicates up to 9 out of 10 construction projects fail to meet this target. Unsuccessful construction projects can have ramifications that affect project teams, internal stakeholders, customers and the local community. The purpose of this correlational study was to examine the relationship between project managers' well-being, self-control, emotionality, and sociability and project success using Petrides and Furnham's theoretical framework of trait emotional intelligence. Using the Trait Emotional Intelligence Questionnaire short form self-assessment instrument, data were collected from a sample of 104 construction project managers in the United States who had executed a project in the last 5 years. Data analysis revealed both the combination of the four predictor variables, and the self-control variable taken individually, resulted in a statistically significant relationship to project success at the $p < .05$ level with each having a p value of .001. Hiring managers and organizational leadership can use this information to guide hiring processes and training programs to help improve success rates in the construction industry. Improved project success could result in positive social change through the stabilization of the job market and improved partnerships between construction organizations, local governments, and the community.

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Dedication

Overcoming the challenge presented by pursuing a terminal degree while balancing the daily requirements of family and career can be daunting. Without the support of my wife Jessica, I could not have accomplished this task. Thank you for your love, understanding and patience with my need to run everything by you multiple times to ensure it makes sense.

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Section 1: Foundation of the Study

Emotional intelligence (EI) is a relatively new construct studied over the last 25 years (Barchard, Brackett, & Mestre, 2016). Zhang and Fan (2013) identified EI as a possible indicator of job performance for construction project managers (PMs). It is important to understand all possible contributors to performance and success in the construction industry as 9 out of 10 construction PMs are failing to meet project cost targets (Lind & Brunes, 2015). The purpose of this study was to identify if the predictor variables well-being, self-control, emotionality, and sociability, made up of the four factors of trait emotional intelligence (TEI) correlated positively with project success.

Background of the Problem

Many definitions of success exist in project management literature. Traditional definitions include consideration of project cost, schedule, and quality (Davis, 2014). Beringer, Jonas, and Kock (2013) provided a definition focused on both internal and external factors. Research by Creasy and Anantatmula (2013) and Mazur, Pisarsky, Chang, and Ashkanasy (2014) introduced strategic and operational perspectives to the definition of success. Shenhar, Dvir, Levy, and Maltz (2001) presented a composite definition of success that included short and long-term organizational goals measured by project efficiency, impact on external customers, business success, and the impact the project has on the organization's future. This composite definition includes aspects of internal and external stakeholder perspective and is the definition for project success that I use for this study.

Obradovic, Jovanovic, Petrovic, Mihic, and Mitrovic (2013) suggested a positive correlation between PM EI and professional success. Chipulu, Neoh, Ojiako, and Williams (2013) identified PMs as important to project success and project success as an important factor in organizational success. Consequently, PM EI may affect not only individual professional success but also project and organizational success.

Despite the evidence of a link between EI and success, the construction industry has been slow to accept the competency as important. Lindebaum and Jordan (2012) stated the construction industry is slow to adopt new techniques. Similarly, Lindebaum and Cassell (2012) stated that while there is empirical evidence of a correlation between EI and general success, the culture of the construction industry prevents widespread acceptance of the competency. The slow acceptance of a proven tool for PMs could be a contributor to failed projects in the construction industry.

Badewi (2016) identified a lack of mature PM practices as one key reason for project failure. There is a direct link between EI and PM practices such as leadership, communication, and relationship building (Zhang & Fan, 2013). Relationships between PMs and stakeholders positively affect stakeholder perspective as well as PM understanding of requirements (Doloi, 2013). PMs who do not count EI among their skill set may be more likely to be ineffective in the management of successful projects.

Problem Statement

On average, PMs fail to meet cost targets on nine out of ten projects in the construction industry (Lind & Brunes, 2015). During the execution of construction projects, cost overruns of up to 50% of the total planned budget are common (Flyvbjerg,

2014). The general business problem is cost overruns and failed projects reduce profitability for organizations in the construction industry. The specific business problem is some construction PMs do not know the relationship between PM well-being, self-control, emotionality, and sociability and construction project success.

Purpose Statement

The purpose of this quantitative correlational study was to examine the relationship between construction PM well-being, self-control, emotionality, and sociability and project success. The predictor variables were well-being, self-control, emotionality, and sociability, the four factors of TEI. The dependent variable was project success. The sample population consisted of Project Management Institute (PMI) certified professionals in the United States who have led construction projects in the past five years. The implications for positive social change in the community include the potentials to reduce unemployment rates, raise tax revenues, and improve relationships with project stakeholders both internal and external to the organization.

Nature of the Study

I chose a quantitative methodology for this study. Quantitative methods are a deductive form of research that allow researchers to make use of statistical means to test hypotheses in a narrowly focused area where variables are identifiable and relationships are measurable (Yilmaz, 2013). In contrast, qualitative research is a method of explaining social phenomena where variables are too complex to clearly identify or measure (Yilmaz, 2013). The mixed method incorporates both qualitative and quantitative methods into a single study to strengthen and enhance the findings of the researchers

(Hesse-Biber, 2015). A mixed method approach was not suitable for this study because of time constraints and the intense data collection process required. The quantitative method was most appropriate for my study because the purpose was to analyze data in a field of study with a significant amount of existing research and clearly defined variables.

I chose correlation as the specific quantitative design for this study. Researchers use correlation designs to identify the extent and nature of relationships or associations among variables (Bryman & Bell, 2015). Other quantitative designs considered included experimental, quasi-experimental, causal-comparative, and descriptive. Because the intent of this study was to investigate the relationship among variables, and I had no control over the predictor variables, experimental and quasi-experimental designs were not appropriate. The causal-comparative design involves two or more groups and one variable (Perrin, 2014). For this study, I investigated the relationship between multiple variables in a single group, making a causal-comparative design inappropriate. Researchers use the descriptive design to describe a specific behavior, not the relationship among variables (Perrin, 2014). The correlation design was most appropriate because I examined the relationship between the dependent variable, project success, and a set of clearly identified predictor variables including well-being, self-control, emotionality, and sociability. The predictor variables form the primary constructs of TEI.

Research Question

The purpose of this quantitative correlation study was to examine the relationship between the four primary elements of TEI and project success. The research question for this study was:

Does a linear combination of construction PM well-being, self-control, emotionality, and sociability predict project success?

Hypotheses

(H_0): The linear combination of PM well-being, self-control, emotionality, and sociability will not significantly predict project success.

(H_1): The linear combination of PM well-being, self-control, emotionality, and sociability will significantly predict project success.

Theoretical Framework

I chose the trait-based framework of EI as the theoretical framework for this study. Petrides and Furnham (2001) developed the trait-based framework of EI theory and used the framework as an alternative view of traditional intelligence to help explain why some people lead better than others. Self-control, well-being, emotionality, and sociability are the constructs of the trait-based framework of EI theory. The major proposition of the trait model of EI theory are construct personality traits as opposed to abilities (Petrides & Furnham, 2001). Previous research conducted by Siegling, Nielsen, and Petrides (2014) identified TEI as a predictor of individual success. As applied to this study, the trait model of EI theory holds that the predictor variables, measured by the Trait Emotional Intelligence Questionnaire Short Form (TEIQue-SF), could predict project success.

Operational Definitions

Ability emotional intelligence: Ability emotional intelligence is a cognitive ability related to processing emotions (Fiori et al., 2014).

Emotional intelligence: Emotional intelligence is a means of problem solving and decision-making based in emotion, logic, and intuition (Salovey & Mayer, 1989).

Emotionality: Emotionality is a factor of trait emotional intelligence made up of emotional perception, trait empathy, emotional expression, and relationships (Siegling, Petrides, & Martskvishvili, 2015).

Project success: Project success is the effective completion of short term and long-term project related strategic organizational goals measured regarding efficiency, impact on customers, business success, and preparation for the future (Shenhar, Dvir, Levy, & Maltz, 2001).

Self-control: Self-control is a factor of trait emotional intelligence made up of emotion regulation, stress management, and low impulsiveness (Siegling, Petrides, & Martskvishvili, 2015).

Sociability: Sociability is a factor of trait emotional intelligence made up of assertiveness, emotion management, and social awareness (Siegling, Petrides, & Martskvishvili, 2015).

Trait emotional intelligence: Trait emotional intelligence is a group of emotion-related self-perceptions that exist in the lower level of personality hierarchies (Qualter et al., 2012).

Well-being: Well-being is a factor of trait emotional intelligence made up of self-esteem, happiness, and optimism (Andrei, Smith, Surcinelli, Baldaro, & Saklofske, 2016).

Assumptions, Limitations, and Delimitations

Assumptions

According to Andersen and Hanstad (2013), assumptions are likely true under appropriate conditions. Assumptions, combined with context, allow people to work within processes (Andersen & Hanstad, 2013). In the context of research, assumptions help a researcher provide relevance to the study. The primary assumption of my study was that EI is a PM competency that has some measurable effect on project success. Another assumption was that a survey offered online would result in a higher percentage of responses than a paper copy due to greater ease of survey completion as well as a simpler method of survey return. Finally, I assume that participants understood the questions provided in the survey and answered honestly.

Limitations

Limitations are self-reported weaknesses of a study that provide context to the scope and lend credibility to the author (Brutus, Aguinis, & Wassmer, 2013). Disclosing limitations and describing their impact on the study leads to the formation of recommendations for future research (Brutus, Aguinis, & Wassmer, 2013). The primary limitation of this study was reliance on self-reported data regarding EI and project success. Other limitations included sample size and longitudinal effects related to the constrained timeframe for study completion. Additionally, there is some question on the validity of data collected through online self-reported surveys (Steelman, Hammer, & Limayem, 2015). Mitigation for this phenomenon included limiting participants through filtering and selection criteria.

Delimitations

Simon and Goes (2013) stated delimitations help a researcher to bound scope and result from the researcher's decisions. Applying a quantitative correlational methodology was one delimitation for my study. Additionally, limiting the predictor variable to the factors of TEI as opposed to a more inclusive study that investigates general EI and ability EI provided bounding for the scope of the study. The use of EI theory provided a perspective that defines the concepts as they apply to the theory. These delimitations provided a structure that helped me focus the scope and align the information presented.

Significance of the Study

Value to Business

The value of this study to the practice of business is the opportunity to identify a relationship between construction PM TEI and project success. Identifying skills of successful PMs is important because more than 15 million new PM roles are expected to emerge in the decade from 2010 to 2020 (Ramazani & Jergeas, 2014). Siegling et al. (2014) stated PMs with strong TEI exhibit leadership skills necessary for project success and greater profitability for project management based organizations.

Contribution to Business Practice

Identifying the importance of TEI for PMs could improve business practice through increased awareness and training. Creasy and Anantatmula (2013) identified the important role PM competencies play in successful project outcomes. The definition of competencies includes trainability (Ortiz-Marcos, Benita, Aldeaneuva, & Colsa, 2013). Business practice in the construction project management industry could benefit from

training important EI competencies. By identifying a link between TEI and increased project success, leaders could be more likely to increase spending related to training.

Implications for Social Change

Successful business leads to a stable job market and improved relationships between business and local community stakeholders (Storberg-Walker, 2012). Improved project success could support business success, resulting in positive social change for individuals and the community. Identifying a trainable competency that can improve the success rate of construction projects could increase stakeholder value and lead to the preservation of jobs for the local economy. Partnerships between the community and local businesses increase the opportunity for communities to benefit from targeted corporate social responsibility initiatives.

A Review of the Professional and Academic Literature

The study of EI has advanced over the past 80 years since Thorndike identified social intelligence in the 1930's as an ability that improves one's relationships with others (Baklashova, Galishnikova, & Khafizova, 2016). However, Payne introduced the term EI in 1985 in his doctoral study (Payne, as cited in Cooper, 2016). Salovey and Mayer gave the term more legitimacy in 1990 through the publication of a peer-reviewed journal article in *Imagination, Cognition, and Personality* (MacCann, Joseph, Newman, Roberts, 2014). In 1995, EI gained popularity with the publication of *Emotional Intelligence: Why It Can Matter More Than IQ*, by Daniel Goleman (Downing, 2016). In 1998, K.V. Petrides identified the trait-based framework of EI used as the theoretical framework for this study.

The purpose of this study was to examine the relationship between TEI and project success. Despite the existence of a common set of PMI tools for the management of cost, schedule, and quality used throughout project management, projects still fail. Creasy and Anantatmula (2013) suggested hard skills, such as those that lead a PM to the successful measure of cost, schedule, and quality, are not enough; success requires practical skills and the type of adaptive leadership skills presented by PMs with high EI. Project team members echo the need for skills beyond the traditional technical skills of project management. Medina and Francis (2015) conducted a qualitative study designed to determine if self-assessed important PM attributes were similar to those attributes identified important by members of the project team. The results indicated that one of the most important skills of a successful PM is the ability to handle and understand people (Medina & Francis, 2015).

Emotional intelligence is one's ability to recognize both their emotions, and the emotions of others, and to use that information to guide decisions and behavior. Obradovic, Jovanovic, Petrovic, Mihic, and Mitrovic (2013) suggested PM EI is a predictor of project success. Joseph, Jin, Newman, and O'Boyle (2015) identified EI as having a greater relationship to job performance than other PM skills.

Hui-Hua and Schutte (2015) found a correlation specifically between TEI and performance. Utilizing a convenience sample of 180 undergraduate students, Hui-Hua and Schutte conducted a quantitative correlation that included TEI as a predictor variable and task performance as the dependent variable. The results indicated higher levels of TEI correlated positively with improved task performance (Hui-Hua & Schutte, 2015).

The four elements of the TEI framework presented in my hypothesis as distinct predictor variables may provide a multivariate explanation as to why different mixes of the traits can affect success. In the null hypothesis, I indicated the linear combination of PM well-being, self-control, emotionality, and sociability will not significantly predict project success. In contrast, in hypothesis 1, I indicated the linear combination of PM well-being, self-control, emotionality, and sociability will significantly predict project success.

Literature Review Organization and Strategy

The organization and strategy of the literature review helps to provide readers an understanding of the structure of the review. The next section includes an in-depth review of the theoretical framework followed by a review comparing and contrasting rival theories and methods of measurement. The literature review concludes with a review and explanation of the predictor variables I will use in the study.

At the outset of this review, I searched scholarly literature for *trait emotional intelligence* and *project success.* To develop a greater understanding of TEI, I included *well-being, self-control, emotionality,* and *sociability.* Adding *ability emotional intelligence* to the search helped to develop a review of competing theories. The databases used for the search included ABI/INFORM, Business Source Complete, and Google Scholar. To ensure the literature reviewed was recent and relevant to the study, 89% of citations used in the review consisted of peer-reviewed articles and 85% of all sources were published within the last five years of the expected publication of this study.

Table 1 provides a graphic depiction of the content of the citations used for this literature review.

Table 1

Literature Review Citations

Type	Citations	Peer Reviewed	% Peer Review	Published Within 5-years	Percent Within 5-years
Journal Article	91	86	95%	78	86%
Book	4	0	0%	2	50%
Dissertation	2	0	0%	2	100%
Total	97	86	89%	82	85%

Trait Based Framework of Emotional Intelligence

The theoretical framework for this study was the trait based framework of EI. Emotional intelligence was popularized by Salovey and Mayer (1989) as a framework for defining the skills needed to understand the emotions of oneself and others. The development of a formal EI framework came five years later in the form of a book written by Daniel Goleman. Goleman's framework consisted of the ability based view of EI discussed in greater detail in a later section.

The understanding and application of EI theory on project management has taken varied approaches. Petrides and Furnham (2001), six years after the publishing of Goleman's EI framework, identified TEI as a self-reported set of behavioral dispositions and self-perceived abilities. Petrides and Furnham identified the intrapersonal composite, interpersonal composite, adaptability composite, stress-management composite, and general mood composite as the factors of TEI.

Petrides (2009) redefined the factors of TEI as four distinct, yet interconnected dimensions known as self-control, well-being, emotionality, and sociability. Each factor contains facets meant to include core elements from previous models of EI. The factors depicted in Table 2 contain a total of 13 traits, known as facets, which are detailed further in this review. This trait-based framework of EI was the specific model used as the lens for this study.

Table 2

Factors and Facets of Trait Emotional Intelligence

Factors	Facets
Self-control	Emotion regulation
	Impulse control
	Stress management
Well-being	Trait optimism
	Trait happiness
	Self-esteem
Emotionality	Trait empathy
	Emotion perception
	Emotion expression
	Relationships
Sociability	Emotion management
	Assertiveness
	Social Awareness

Note. Adapted from "Psychometric Properties of the Trait Emtional Intelligence Questionnaire (TEIQue)," by K. V. Petrides, 2009, *Assessing Emotional Intelligence,* p. 85-101. Copyright 2009 by Springer.

Trait emotional intelligence is the framework for several studies related to project management in recent literature. The following section will delve into the identified relationships between TEI and general leadership. The review of the TEI framework concludes with a discussion of its relationship to project management.

TEI and leadership. Zhang, Zuo, and Zillante (2013) identified leadership as a top four soft skill for construction PM. The authors conducted a quantitative correlation to determine the soft skills important for PMs in the construction industry. The sample consisted of 275 construction PMs in the Chinese construction industry. In addition to leadership, Zhang, Zuo, and Zillante identified working with others as an important competency of PMs. The authors identified the regional focus of their research as one limitation; additional research into cultural and regional impacts is required (Zhang, Zuo, and Zillante, 2013).

Zhang and Fan (2013) conducted a study of 112 PMs in the Chinese construction industry. The purpose of the study was to explore the relationship between PM EI and performance. Zhang and Fan identified leadership as a PM competency related to EI.

Although not investigated in this study, the effect of TEI on leadership is similar in other PM driven industries. Ramazani and Jergeas (2015) also found PMs in the oil and gas industry benefit from soft skills such as leadership, not solely from technical skills. Understanding the link between TEI and leadership is important when justifying the importance of EI to PMs. The authors conducted a qualitative study of PMs in Calgary, Alberta. Among the findings, Ramazani and Jergeas identified interpersonal skills and leadership as necessary to successful project execution.

Siegling, Nielsen, and Petrides (2014) tied high levels of TEI as a positive correlate to leadership skills. The authors conducted a quantitative study to determine if TEI is predictive of both leaders and non-leaders. The participants included 96 employees of a large European multi-national company located in Denmark. The researchers

measured TEI using the full length and short form versions of the TEIQue. The findings included empirical evidence that TEI is predictive of leadership in the sample used in the study (Siegling, Nielsen, & Petrides, 2014).

Similarly, Yusof, Kadir, and Mahfar (2014) found a significant link between EI and leadership. The authors conducted a meta-analysis of peer reviewed journals and book chapters. Yusof, Kadir, and Mahfar found a positive correlation between emotionally intelligent leaders, leadership ability, and positive leadership outcomes.

TEI and construction project management. Despite the evidence regarding the importance of EI for PMs, the impact of high EI on construction project success is not widely studied (Pryke, Lunic, & Badi, 2015). Lawani (2016) cited a culture of masculinity as a possible reason for delayed adoption of EI as a PM competency. Due to the lack of research specific to the construction industry, and an industry culture that limits the acceptance of EI as a necessary tool for PMs, EI is not yet widely accepted in the construction industry (Zhang & Fan, 2013). Acceptance of EI on a more widespread basis could allow managers in the construction industry to identify PMs by their EI related traits and abilities. Measurement tools such as BAR-ON and MSCEIT exist to aid leadership in discerning different levels of EI ability, and the TEIQue is similar tool used for measuring TEI (Siegling, Petrides, & Martskvishvili, 2015).

Success in projects, including those in the construction industry, depends on PM skills (Rezvani et al., 2016). The definition of project success varies between industries and even between stakeholders. The traditional definition of success, known as the iron triangle, considers performance in the elements of cost, schedule, and quality as a means

of identifying a project as successful (Davis, 2014). Mir and Pinnington (2014) identified a framework that depends on the perception of success among multiple stakeholders. The varied frameworks for defining success arise from the varied definition of success itself. Organizations must consider the type, environment, and overall goal of a project when determining how to measure success (Shenhar, Dvir, Levy, & Maltz, 2001).

Lindebaum and Cassell (2010) indicated acceptance of EI might be limited in the construction industry due to the male dominated culture. Lindebaum and Jordan (2012) identified some relationship between EI and project success but labeled the connection as exaggerated and likely moderated by the culture of the construction industry. Additional research identifying the correlation between the elements of TEI and project success for construction project management could confirm the efficacy of EI as a tool in the industry.

Rival Theories

The primary rival theories to TEI include the ability and mixed-models. The ability model of EI is a collection of abilities measured on a maximum performance scale, as opposed to the collection of self-report traits provided in the TEI framework (Petrides & Furnham, 2001). The mixed-model includes both traits and abilities (McCleskey, 2014). The primary models used as the theoretical frameworks for recent research include the Salovey and Mayer ability model for ability EI, and the Boyatzis-Goleman model for mixed-model studies (McCleskey, 2014).

Salovey and Mayer ability model. The Salovey and Mayer model, developed in 1990, consists of four branches including perceiving emotions, using emotions to

facilitate thought, understanding emotions, and managing emotions (Joseph, 2015). Each branch contains abilities that allow someone to both reason about emotion, and use emotion to assist in reasoning (Joseph, 2015). Table 3 identifies the four factors of the Salovey and Mayer ability model and the abilities assigned to each factor.

Table 3

Salovey and Mayer Ability Model

Branches	Abilities
Perceiving Emotions	Sense our own emotional state Sense others' emotional state
Using emotions to facilitate thought	Build emotional response into decisions and problem-solving Build others' emotional response into decisions and problem-solving
Understanding emotions	Understand the meaning of our own emotions and learn from them Understand the meaning of others' emotions and learning from them
Managing emotions	Manage our own emotional states to function more effectively Help others manage their emotional states to function more effectively

Note. Adapted from "Emotional Intelligence," by P. Salovey and J. D. Mayer, 1989, *Imagination, Cognition, and Peronality, 9,* p. 185-211. Copyright 1990 by Sagepub.

The fundamental difference between the Salovey and Mayer model and that of Petrides and Furnham is in its definition and measurement. Salovey and Mayer defined EI as a mental ability requiring maximum performance measurement (Mayer, Salovey, & Caruso, 2016). Researchers conducted several recent studies using the ability model as their lens for EI.

One theme of ability EI in project management research involves the direct relationship between EI and project success. Mazur, Pisarski, Chang, and Ashkanasy

(2014) studied project success in the Australian defense industry. The authors utilized the Mayer and Salovey model to determine the role that EI plays in major defense project success. The results derived from a sample of 1582 respondents identified PMs' EI as positively related to positive stakeholder relationships and project success (Mazur, Pisarski, Change, & Ashkanasy, 2014).

Recently, researchers investigated the existence of mediating variables on the relationship between EI and project success. Revzani et al. (2016) measured PM ability EI to determine the affect of trust and job satisfaction as moderating variables on project success. The authors conducted a field study to validate a new conceptual framework which stated PM EI is positively related to their job satisfaction and trust in others. The authors also individually tested the existence of a positive relation between project success and PM job satisfaction and trust in others. The final hypothesis from the study, and the final part of the suggested framework, stated the PM job satisfaction and trust in others was a mediating factor between EI and project success. The authors identified the existence of a positive relationship between each of their variables and project success, as well as the existence of the mediating factors between EI and success (Revzani et al., 2016).

Boyatzis-Goleman mixed-model. The Boyatzis-Goleman mixed model, developed in 1999, includes both emotional and social competencies grouped into four clusters, self-awareness, social awareness, self-management, and relationship management (McCleskey, 2014). Like the Salovey and Mayer ability model, each cluster

contains facets that make up the cluster. Table 4 identifies the four clusters and the facets assigned to each.

Table 4

Boyatzis-Goleman Mixed-Model

Cluster	Facets
Self-awareness	Emotional self-awareness
	Accurate self-assessment
	Self-confidence
Social awareness	Empathy
	Organizational awareness
	Service orientation
Self-management	Self-control
	Transparency
	Adaptability
	Achievement drive
	Initiative
Relationship management	Inspirational leadership
	Developing others
	Influence
	Change catalyst
	Conflict management
	Building bonds
	Teamwork and collaboration

Note. Adapted from "Emotional Intelligence and Leadership: A Review of the Progress, Controversy, and Criticism" by J. McCleskey, 2014, *International Journal of Organizational Analysis, 22,* p. 76-93. Copyright 2014 by Emeraldinsight.

The clusters and facets of the Boyatzis-Goleman model share some of the same elements as that of the TEI model.

The Boyatzis-Goleman model is popular for researchers identifying important social competencies for PMs. Zhang, Zuo, and Zillante (2013) used the Boyatzis-Goleman model to identify competencies important for Chinese construction PMs.

Zadeh, Dehghan, Ruwanpura, and Jergeas (2016) used the model to identify PM competencies most important when faced with design changes.

Unlike the ability model, which is inherently different from TEI, when comparing the factors of the Boyatzis-Goleman model to TEI, there are several similarities. Self-control, empathy, emotional awareness, self-esteem, and relationship management all appear in both models in either factors or facets (Petrides, 2010; McCleskey, 2014). Petrides (2010) stated the development of the trait model included identifying core values from other models, which may explain the similarities.

Measurement

Emotional Intelligence. Each branch of EI has corresponding preferred measurement tools. The Mayer-Salovey-Caruso emotional intelligence test (MSCEIT) and the multifactor intelligence scale (MEIS), an earlier version of the MSCEIT, are the most popular tests for measuring the Salovey Mayer ability model (Kong, 2014; McCleskey, 2014). The emotional competence inventory (ECI) is the primary test of the Boyatzis-Goleman mixed model (McCleskey). The preferred test for TEI is the trait emotional intelligence questionnaire (TEIQue) (McCleskey).

Each preferred measurement tool has strengths and weaknesses according to recent research. Curci, Lanciano, Soleti, Zammuner, and Salovey (2013) found the MSCEIT discriminates EI ability from others forms of intelligence. However, other research has shown a correct answer is not always associated with the highest level of ability (Fiori et al., 2014).

The ECI, a combination self-report and multi-rater assessment, is the preferred test for the Boyatzis-Goleman mixed model. Joseph, Jin, Newman, and O'Boyle (2015) found the tool reliable for measuring self-report EI. However, McCleskey (2014) stated the ECI has low to moderate predictive validity.

The TEIQue, a self-report measure, is the preferred measurement tool for TEI. Developed in 2003, the TEIQue comes in a long and short form. The TEIQue-SF was the tool used to measure the predictor variables for this study.

The TEIQue-SF includes 30 Likert-scale type questions, two from each of the 15 facets of TEI (Siegling, Vesely, Petrides, & Saklofske, 2015). The subscales, which make up the four predictor variables for this study, score from 26 of the 30 questions with the other four contributing to a global TEI score (Siegling et al.). Reliability scores (Cronbach's alpha) averaged .86 for well-being, .72 for self-control, .68 for emotionality, and .72 for sociability (Siegling et al.).

Siegling, Vesely, Petrides, and Saklofske (2015) identified the TEIQue-SF as a reliable tool with good construct validity. The short form also scores well when compared against the TEIQue long form. Recent research indicates results supporting strong psychometric properties in the short form, as well as good predictive validity (Laborde, Allen, & Guillen, 2016; Stamatopoulou, Galanis, Prezerakos, 2016). The recent research stating the positive reliability and validity of the TEIQue-SF justified use of the tool to collect date on the predictor variables for my study.

Project Success. There are many definitions of project success in use in scholarly literature. The simplest definition includes comparing project performance against

planned budget, schedule, and quality (de Araujo & Pedron, 2015). Expanded definitions include stakeholder satisfaction as a measure of success (Bersanetti & Carvalho, 2015). Shenhar and Dvir (2001) identified a strategic view of success that includes project efficiency, impact on the customer, impact on the project team, business success, and preparation for the future. The Shenhar and Dvir definition of project success was the chosen model for this study.

Mir and Pinnington (2013) developed a Likert-scale project success measure designed around the five-element definition of success provided by Shenhar and Dvir (2001). The questions presented in the tool aid the researcher in collecting data specifically related to the Shenhar and Dvir definition of success. The authors conducted a pilot study to verify the adequacy of the instrument. Mir and Pinnington made suggested improvements resulting from the pilot study before conducting the main study. The verification of adequacy, as well as the design specific to the definition of success planned for this study, indicated this was an appropriate tool.

Predictor Variable Analysis

Researchers commonly use EI as a predictor variable for success in academic performance, job performance, interpersonal relationships, and project management. Studies comparing EI with academic success exist in both secondary and post-secondary education. Libbrecht, Lievens, Carette, and Cote (2014) found EI to be a predictor for success in medical school. The researchers collected data from 367 undergraduate students from a European university using the Situational Test of Emotional Understanding and Situational Test of Emotion Management to determine how subjects

would respond to job-related situations (Libbrecht, Lievens, Carette, & Cote, 2014). The researchers used a quantitative correlation method to show the positive relationship between strong EI and predicted success in medical school.

Ivcevic and Brackett (2014) showed a positive correlation between EI and academic success in high school students. The researchers collected data from 213 students in a New England private high school. Student's success identified through school records showed a positive correlation to EI measured using the Mayer, Salovey, and Caruso emotional intelligence test – youth version (Ivcevic & Brackett, 2014).

Emotional intelligence compared to successful job performance is also common in recent literature. Joseph, Jin, Newman, and O'Boyle (2015) conducted a meta-analytic correlation using 28 primary studies of mixed EI and job performance. The researchers accepted the previous results from the primary studies, that strong EI predicts strong job performance, and developed a theory to explain the correlation (Joseph, Jin, Newman, & O'Boyle, 2015).

Shooshtarian, Ameli, and Aminilari (2013) found a significant relationship between EI and job performance. The study consisted of data collected from 289 participants in the Iranian construction industry. The researchers determined that strong EI positively correlated to job satisfaction as well as job performance. Shooshtarian, Ameli, and Aminilari attributed the correlation to the workers with strong EI being more able to appraise and regulate their emotions and understand emotional effects on behavior and outcomes.

Success in interpersonal relationships is common to research conducted in the psychology field. Fernandez-Berrocal, Extremera, Lopes, and Ruiz-Aranda (2014) found individuals with high EI had a higher capacity for flexibility when interacting with others. That flexibility allows high EI individuals to adapt to the best methods of cooperating and collaborating depending on the relationship strategies presented by the other person (Fernandez-Berrocal, Extremera, Lopes, & Ruiz-Aranda, 2014). Malouff, Schutte, and Thorsteinsson (2014) found those with high EI not only excel in interpersonal relationships but also garner greater satisfaction from those relationships.

Research related to competencies most important for PM success includes an exploration of the importance of relationships. Through an action research project involving 83 PM professionals, Takey and Carvalho (2015) identified both relationships and EI as top PM competencies. Abidin, Fathi, Daud, and Baharum (2017) found behavioral competencies, including interpersonal skills, to be the most important to PMs. The researchers used a quantitative correlation method with data collected from 179 PM practitioners.

TEI Factors. The four interconnected factors of TEI comprised the predictor variables for this study. The four factors include self-control, well-being, emotionality, and sociability (Petrides, 2009). Petrides (2009) identified the factors as a means of capturing the 13 facets listed in Table 5 of TEI into distinct, but interrelated dimensions. The general attributes of high scorers in each factor frame that factor's definition. Those attributes include an individual having strong willpower (*Self-control*), being well-adapted (*Well-being),* having strong emotional capability *(Emotionality)*, and strong

social capability (*Sociability*) (Petrides). The remainder of this section includes detail on the facets that make up each factor of TEI.

Table 5

Trait EI Facet Definitions

Facets	**Skills**
Assertiveness	Forthright Frank Willing to stand up for their rights
Emotion perception (self and others)	Clear about their own and other people's feelings
Emotion expression	Capable of communicating their feelings to others.
Emotion management (others)	Capable of influencing other people's feelings
Emotion regulation	Capable of controlling their emotions
Impulsiveness (low)	Reflective and less likely to give in to their urges.
Relationships	Capable of having fulfilling personal relationships
Self-esteem	Successful Self-confident
Social awareness	Accomplished networkers Excellent social skills
Stress management	Capable of withstanding pressure and regulating stress
Trait empathy	Capable of taking another's perspective
Trait happiness	Cheerful and satisfied with their lives
Trait optimism	Confident and likely to "look on the bright side" of life

Note. Adapted from "Psychometric Properties of the Trait Emtional Intelligence Questionnaire (TEIQue)," by K. V. Petrides, 2009, *Assessing Emotional Intelligence,* p. 85-101. Copyright 2009 by Springer.

A great deal of research exists regarding the factors of TEI. Schermer, Petrides, and Vernon (2015) investigated the correlation between TEI and vocational interest. Siegling, Nielsen, and Petrides (2014) measured the correlation between TEI and leadership, and several studies exist that investigate TEI through the lens of personality

and psychology. Research exists on the factors of TEI in relation to cultural differences (Gokcen, Furnham, Mavroveli, & Petrides, 2014), as a comparison to ability EI factors (Di Fabio & Saklofske, 2014), and in relation to performance under pressure (Laborde, Lautenbach, Allen, Herbert, & Achtzehn, 2014). Where a dearth of information appears is in the relationship between the specific factors of TEI and project success.

Self-control. The self-control factor contains the facets of emotion regulation, impulse control, and stress management (Andrei, Smith, Surcinelli, Baldaro, & Saklofske, 2016). The facets of self-control contribute to the presentation of strong willpower. Individuals with high self-control identify with strong emotional control, are more thoughtful and less impulsive, and are better equipped to handle pressure and stressful situations (Andrei, Siegling, Aloe, Baldaro, & Petrides, 2015).

Emotion regulation affects a person's actions. Gross (2013) described emotion regulation as cultivating helpful emotions and managing harmful ones. Petrides (2010) identified the emotion regulation facet as describing individuals who are capable of controlling their own emotions.

Emotion regulation can affect PM performance in several ways. Cunha, Moura, and Vasconcellos (2016) stated hard decision-making could have emotional consequences. Negative emotions such as anxiety can be present in the decision-making process (Cunha, Moura, and Vasconcellos, 2016). The importance of decision-making in a PM role indicates a need for strong emotion regulation.

Kaplan, Cortina, Ruark, Laport, and Nicolaides (2014) stated people in management positions must regulate their emotions for individual and team performance

improvement. From an individual perspective, managing the interactions of team members requires emotional self-control (Kaplan, Cortina, Ruark, Laport, & Nicolaides, 2014). Managers model desired behaviors through their own emotional self-control (Kaplan, et al., 2014).

Impulse control is the second facet of self-control. An impulse is an unreflective desire to act. Sebastian, Jacob, Lieb, and Tuscher (2013) stated impulsiveness is distinguishable in individuals as a tendency to make quick decisions without thinking. Petrides (2010) identified individuals with impulse control as reflective and less driven by urges. Reflective people are more aware of the triggers that generate impulsive decisions. Impulse control, the opposite of impulsiveness, is necessary for both individual and social functioning (Sebastian, Jacob, Lieb, and Tuscher, 2013).

The final facet of self-control is stress management. Petrides (2010) identified good stress managers as those who can withstand pressure and regulate the impact of stress. Burnett and Pettijohn (2015) reported stress as negatively related to satisfaction, commitment, employee turnover, and employee productivity. The same authors also identified a relationship between high EI and lower perceived levels of workplace stress.

Joseph et al. (2015) found perceived stress scores decreased with an increase in EI scores. The authors conducted a quantitative correlation study of 406 students in medical school in India. Among the findings, the authors identified perceived stress levels among participants decreased in relation to increases in EI scores.

Self-control appears regularly as a PM competency in scholarly literature. Ahsan, Ho, and Khan (2013) identified self-control as having a positive relationship with PM

success. Takey and Carvalho (2015) included self-control in a framework for mapping important PM competencies. Carvalho, Patah, and de Souza Bido (2015) identified project management as having a positive impact on project success, linking the importance of PM competencies such as self-control with the success of managers and the projects they execute.

Well-being. Facets of well-being include trait optimism, happiness, and self-esteem (Andrei, Smith, Surcinelli, Baldaro, & Saklofske, 2016). Petrides (2009) identified those with high well-being as being well adapted. Individuals with high well-being identify with optimism, satisfaction, success, and self-confidence (Andrei, Siegling, Aloe, Baldaro, & Petrides, 2015).

Trait optimism is an orientation toward positive expectations of the future (Carver & Scheier, 2014). Petrides (2010) identified those with good trait optimism as confident individuals who can identify the bright side in any situation. Those who self-identify with high trait optimism have greater emotion regulation, strengthening the self-control factor of TEI and illustrating the interrelated nature of the factors. (Dolcos, Hu, Iordan, Moore, & Dolcos, 2016). Trait optimism also contributes to well-being through increased career satisfaction (Sundstrom, Lounsbury, Gibson, & Huang, 2016).

Happiness is merely a subjective emotional experience. How a person chooses to experience the emotion is a function of their EI. Petrides (2010) identified those with trait happiness as cheerful people satisfied with their lives. Extremera and Rey (2015) found a link between lower perceived stress and happiness. Joseph et al. (2015) identified high EI

as positively correlating to lower perceived stress. The link between lower perceived stress, happiness and EI further strengthens the interrelated nature of the TEI factors.

The final facet of well-being is self-esteem. Self-esteem relates to being successful and self-confident (Petrides, 2010). Self-esteem from a project management perspective develops through identification of successful team accomplishments (Ding, Ng, & Li, 2014). Self-esteem significantly influences both overall well-being and the happiness facet (Li & Zheng, 2014). Ekrot, Rank, and Gemunden (2016) noted PMs with high organizational self-esteem, those that see value in themselves as a member of their organization, are more likely to be committed to the success of their organization.

Bredillet, Tywoniak, & Dwivedula (2015) identified well-being as a key trait of *good* PMs. Well-being has an effect both personally and societally (Bredillet, 2014). Bredillet (2014) stated PMs committed to both personal and societal well-being are more likely to make wise choices. The inclusion of external stakeholders in the definition of success indicates a need to consider societal well-being in project success.

Emotionality. Trait empathy, emotion perception, emotion expression, and relationships make up the emotionality factory of TEI (Andrei, Smith, Surcinelli, Baldaro, & Saklofske, 2016). Individuals with high emotionality identify with understanding others' perspective, understanding their feelings and others', can communicate feelings, and are capable of positive, fulfilling relationships (Andrei, Siegling, Aloe, Baldaro, & Petrides, 2015). Those who score high in the emotionality factor are more in touch with their feelings and are more capable of strong relationships with others (Gokcen, Furnham, Mavroveli, & Petrides, 2014).

Davis (1983) defined trait empathy as one individual's reaction to another's observed experience. Petrides (2010) stated those with good trait empathy are more likely to understand others' perspective. The TEI framework reflects the definition of empathy as a trait as opposed to a learned skill. Zhang and Fan (2013) identified empathy, defined as the ability to read feelings, perspectives, and demands, as important to project management. Empathy has a significant impact on project performance, particularly in meeting owners' requirements (Zhang and Fan, 2013).

Emotion perception relates to understanding one's own and other's feelings (Petrides, 2010). Mulki, Jaramillo, Goad, and Pesquera (2015) conducted a quantitative correlation study resulting in the identification of emotion regulation as important to success for salespeople. The authors identified the need for emotion understanding, preceded by emotion perception, before being capable of emotion regulation (Mulki, Jaramillo, Goad, & Pesquera, 2015).

Interpersonal conflict on project teams has a negative impact on project success (Zhang & Huo, 2015). Zhang and Huo (2015) conducted a quantitative study resulting in the identification of interpersonal conflict and negative emotions as having a negative impact on project success. Emotion regulation and understanding, developed through a foundation of emotion perception, are integral to managing conflict (Mulki, Jaramillo, Goad, & Pesquera, 2015).

Individuals with good emotion expression can communicate their feelings (Petrides, 2010). As with emotion perception, a link exists between emotion regulation and emotion expression. Menges, Kilduff, Kern, and Bruch (2015) identified emotion

expression as modulated by emotion regulation. The interrelated aspects of emotion regulation, preceded by emotion perception (Mulki, Jaramillo, Goad, & Pesquera), and followed by emotion expression (Menges, Kilduff, Kern, & Bruch, 2015) contribute to success.

Individuals strong in the relationships facet of emotionality identify with the ability to have fulfilling interpersonal relationships (Petrides, 2010). The negative impact of interpersonal conflict on project success, identified by Zhang and Huo (2015) is strong justification for the need for PMs who excel in the relationships facet of emotionality. The emotionality factor contains trait empathy, emotion perception, emotion expression, and relationships. The identification of each facet as important to interpersonal relationships, and conflict management in previous research indicates a link between emotionality and project success.

Sociability. Sociability, the final factor of TEI, includes emotion management, assertiveness, and social awareness as its facets (Andrei, Smith, Surcinelli, Baldaro, & Saklofske, 2016). Individuals with high sociability identify with the capability to influence the feelings of others, are upfront and willing to stand up for themselves, and are networkers with strong social skills (Andrei, Siegling, Aloe, Baldaro, & Petrides, 2015). McCleskey (2014) identified sociability as having social competence, assertiveness, and the ability to manage others' emotions.

Petrides (2010) identified those with good emotion management as having the ability to influence the feelings of others. Kluemper, DeGroot, and Choi (2013) found emotion management ability a predictor of task performance. The quantitative correlation

study consisted of 220 participants in MBA and undergraduate classes. The researchers used the MSCEIT to measure emotion management ability and a Likert scale survey to measure task performance. The results indicated emotion management ability as the largest single predictor of task performance from the EI construct.

Vandewaa and Turnipseed (2014) found emotion management ability correlated to conscientiousness and improved task performance. The study consisted of self-report data collected from 137 participants and the researchers utilized a quantitative correlation methodology. The results indicated a significant correlation between conscientiousness, the performance of one's role at higher than minimal required levels, and emotion management.

Those with high levels of assertiveness are frank and forthright in communication and are willing stand up for what they feel is right (Petrides, 2010). Trivellas and Drimoussis (2013) found assertiveness self-reported at higher levels among successful PMs. The authors conducted a paired t-test using data collected from 97 PM respondents to a structured questionnaire. Results indicated PMs with a greater range of emotional competency, including assertiveness, are more likely to be successful (Trivellas & Drimoussis, 2013).

Szczepanska-Woszczyna and Dacko-Pikiewicz (2014) identified assertiveness as a core competency of managers. The authors based the quantitative survey on data collected from 101 managers using a 10-question Likert scale survey. Results indicated behavioral competencies, such as assertiveness, are important to management, but do not always meet the level expected of successful managers.

Social awareness ability indicates strengths in networking and social skills (Petrides, 2010). Alawneh and Sweis (2016) identified networking as significant to increasing the efficiency of PMs. The authors conducted a quantitative correlation between PM EI and performance with data collected from 59 project management consultation companies in Jordan. Alawneh and Sweis concluded project management requires more than giving orders and assigning tasks; success requires emotionally intelligent PMs.

Project Success

Project success, as it relates to the ability model of EI, is a common subject of recent research. Zhang and Fan (2013) observed a significant positive correlation between several factors of EI and project success in the construction management industry. The researchers used quantitative correlation to identify the relationship between 12 EI factors and 4 dimensions of project performance. Zhang and Fan selected the EI factors from both the ability and trait models. Among the highest positive relationships to success were emotional self-awareness, emotional self-control, empathy, organizational awareness, cultural understanding, and communication (Zhang & Fan, 2013).

Livesey (2016) conducted a Delphi study to determine the importance of EI to project success. Selecting 18 skills contained in the Boyatzis model of EI, the author identified project management situations where each EI skill was beneficial to success (Livesey, 2016). Of the 18 skills identified, conflict management, empathy, self-awareness, and self-control occur within the TEI framework.

Other recent literature points to project management as important to success. Joslin and Muller (2015) noted the need for a project management methodology to aid in project success. The authors identified adaptable leadership as an important facet of project management because of the inherent volatility of success criteria. Being well adapted is a hallmark of the well-being factor of TEI (Petrides, 2009).

The EI level of PM practitioners is the specific focus of the correlation between predictor variables and project success for this study. Creasy and Anantatmula (2013) described PMs and their skills and abilities as impactful to the successful execution of a project. The authors conducted a literature review based study that included communication apprehension, innovativeness, self-monitoring, conflict management, change initiation, and personality type as the predictor variables, and project success as the dependent variable (Creasy & Anantatmula, 2013). Communication apprehension, self-monitoring, and conflict management relate directly to elements of EI considered in my study.

Communication apprehension is a fear related to communicating with other people (Creasy & Anantatmula, 2013). The sociability factor of TEI is indicative of a person with strong social skills, who is upfront, willing to defend themselves, and a good networker (Andrei, Siegling, Aloe, Baldaro, & Petrides, 2015). Petrovici and Dobrescu (2014) identified the soft skills of EI as leading to strength in communication, a more traditional technical skill.

Self-monitoring, the ability to monitor one's feelings and emotions, is a precursor to self-awareness, and a facet of the emotionality factor (Creasy & Anantatmula, 2013).

The emotion regulation facet of the self-control factor of TEI relates closely to self-monitoring. PMs with good emotion regulation, like those with good self-awareness can identify and utilize helpful emotions, and monitor and control negative emotions (Gross, 2013).

Conflict management is the ability to manage the conflict that arises from differences in perception, opinions, and beliefs (Creasy & Anantatmula, 2013). Emotion management also contributes to the ability to manage conflict among project teams. Emotion management leads to emotional self-control and the ability to manage conflict and team performance (Kaplan, Cortina, Ruark, Laport, & Nicolaides, 2014). Empathy and emotion perception, elements of the emotionality factory of TEI also contribute to conflict management (Andrei, Smith, Surcinelli, Baldaro, & Saklofske, 2016). Strong emotionality indicates a person can understand others' perspective and understand their feelings as well as others' (Andrei, Siegling, Aloe, Baldaro, & Petrides, 2015).

Zhang, Zuo, and Zillante (2013) found a significant relationship between EI competencies in the dimensions *working with others* and *social awareness*, and construction PM success. The *working with others* dimension focuses on building and maintaining personal relationships, a facet of the emotionality factor of TEI (Zhang, Zuo, & Zillante, 2013). Social awareness is a facet of the sociability factor of TEI. The correlation between the identified dimensions led to the conclusion that EI is important to PM success in the construction project industry (Zhang, Zuo, and Zillante, 2013).

The definition of project success varies. Critical success factors (CSF) and key performance indicators (KPI) contribute to and benchmark project success respectively

(Ahimbisibwe, Cavana, & Daellenbach, 2015). Budget, schedule and quality, the iron triangle, were an early triumvirate, and still most common success measures that form the traditional understanding of a successful project (de Araujo & Pedron, 2015). Over time, definitions of success expanded to include considerations of stakeholder satisfaction. The introduction of stakeholder satisfaction meant a project could be a failure despite success in the iron triangle, or be considered successful despite being late and over budget (Bersanetti & Carvalho, 2015).

The following analysis of project success provides history and context for the dependent variable used in this study. To understand project success, understanding the factors that can affect successful project execution and the parameters that define a successful project is important. For this review I considered

- critical success factors,
- key performance indicators,
- efficiency (iron triangle), and
- effectiveness (stakeholder satisfaction).

Critical success factors. CSFs related to project management became popular in the 1960's (Fortune & White, 2015). Research exists on many project management focused CSFs. Support from senior management, clear objectives, detailed and maintained planning, communication, and user involvement are some of the many CSFs reviewed in recent literature (Rodriguez-Segura, Ortiz-Marcos, Romero, & Tafur-Segura, 2016).

The number of CSFs identified in recent literature approaches 30 distinct items for PM consideration (Fortune & White, 2006). One criticism of CSFs as a success measure is the sheer quantity of unique CSFs. The quantity lessens the perception of criticality and indicates a disagreement among contemporary authors as to the importance of any single success factor (Fortune & White). Another criticism of the CSF model is a lack of flexibility in the dynamism presented during the execution of a project (Fortune & White). Chileshe and Kikwasi (2014) identified industry type and location of the organization as additional factors driving variability into the importance of specific CSFs.

Zhang and Fan (2013) identified PM EI as a critical success factor accepted in many industries. High EI allows PMs to handle complex relationships with both internal and external stakeholders (Zhang & Fan, 2013). Balancing differing stakeholder objectives is an important facet of managing an effective program. Emotional intelligence helps the PM balance competing claims when addressing the stakeholder satisfaction critical success factor (Yang, Wang, & Jin, 2014).

Key performance indicators. KPIs, first identified in 1999 in the British construction industry, included consideration for safety, productivity, profitability, predictability, and satisfaction (Bal & Bryde, 2015). Bal and Bryde (2015) identified a shift in the construction industry over time, to relying on KPIs related to cost and quality. Simply put, KPIs are the criteria for judging success (Ahimbisibwe, Cavana, & Daellenbach, 2015). Mir and Pinnington (2014) identified KPIs as areas of actual, measurable achievement.

Where CSFs enable project success, KPIs are the actual results of successful management. Like the iron triangle success factors, the simplest project success KPIs relate to cost, schedule, and quality (Mir & Pinnington, 2014). At the most basic level, an efficient project completes within the approved budget, on time, and to the quality required by the customer.

Efficiency. Berssaneti and Carvalho (2015) identified efficiency as the successful execution of the cost, schedule, and quality KPIs. The authors stated that despite some criticism on the traditional measure of efficiency, the iron triangle is still the gold standard for success (Berssaneti & Carvalho, 2015). Badewi (2016) identified the importance of efficiency as relating to success, measured by successfully meeting cost, schedule and quality targets.

Recent research justifies the use of the traditional measures of project success in the contemporary environment. Badewi (2016) justified the definition of project success as meeting cost, time, and quality criteria for a quantitative correlation of the impact of project management and benefits management on project success. However, the majority of recent research adopts a more comprehensive definition of success that includes more than just the traditional iron triangle.

Effectiveness. Berssaneti and Carvalho (2015) identified project effectiveness as inclusive of customer satisfaction. Badewi (2016) identified effectiveness as the long-term organizational success derived from successful project execution. The significant difference between efficiency, defined by the iron triangle, and effectiveness is the inclusion of more than just measurement of cost, scope, and quality when defining

success. Shenhar, Dvir, Levy, and Maltz (2001) identified a strategic framework for project success that included project efficiency, impact on the customer, business success, and impact on the future of the business.

Mir and Pinnington (2014) conducted a quantitative correlation using project management performance factors as the predictor variables and project success as the dependent variable. The authors utilized the project success framework developed by Shenhar et al. as the means of measuring the predictor variable. Mir and Pinnington developed a project success measurement tool that collected data on the four elements of the Shenhar et al. framework. The Mir and Pinnington tool was the measurement tool used for this study.

Transition

In Section 1, I presented the foundation of the study of a correlation between TEI and project success in the construction industry. This section covered (a) the background and statement of the problem as well an introduction to the purpose, nature, and theoretical framework used to bound the research; (b) assumptions and limitations of the proposed study; (c) and a review of the possible significance of the study to the practice of business. Section 1 concluded with a comprehensive literature review of the current state of (a) TEI research; (b) competing EI theories; (c) measurement tools; (d) and variables for the proposed study. The following section includes an in-depth discussion of the processes planned to investigate the correlation between TEI and project success. The section includes (a) the role of the researcher and identification of participants; (b) a discussion of research methodology and design; (c) the role of, and adherence to, the

requirements of ethical research; (d) and a review of data collection and analysis techniques.

Section 2: The Project

This section includes a discussion of the processes used for the execution of the study. I begin with a restatement of the purpose, a discussion of the role of the researcher and identification of participants. I continue with an in-depth discussion of research methodology and design, population and sampling techniques, and the requirements of ethical research. I close this section with a review of data collection, analysis techniques, and study validity.

Purpose Statement

The purpose of this quantitative correlation study was to examine the relationship between construction PM well-being, self-control, emotionality, and sociability and project success. The predictor variables were well-being, self-control, emotionality, and sociability, the four factors of TEI. The dependent variable was project success. The sample population consisted of Project Management Institute (PMI) certified professionals in the United States who have led a construction project in the past five years. The implications for positive social change in the community include the potentials to reduce unemployment rates, raise tax revenues, and improve relationships with project stakeholders both internal and external to the organization.

Role of the Researcher

The role of the researcher in quantitative data collection will be minimal if the researcher uses proper methods. The quantitative method, unlike qualitative, does not place the researcher in the role of the data collection instrument but relies on empirical tools to gather measurable data on the selected topic (Caruth, 2013). For this study, my

role was to ensure collection of an adequate sample to increase the generalizability of my results. I gained access to eligible participants through the PMI Direct Mail Program.

In addition to adequate sampling, a researcher's role includes ensuring identification and mitigation of potential bias (Ginwright & Cammarota, 2015). Mitigating or eliminating bias allows the researcher to maintain objectivity and refrain from guiding inquiry to achieve anticipated results (Ginwright & Cammarota, 2015). As a program manager with five years' experience in a high technology Department of Defense contractor environment, there is potential for bias to exist in my research of construction project management. Wahyuni (2012) stated quantitative methods stress validity and repeatability of data by utilizing a quantitative method and a validated survey tool; by utilizing quantitative correlation with data collected from validated survey tools, I fulfilled my role of limiting the introduction of personal bias in my research.

The Belmont Report, published in 1974, highlighted respect, beneficence, and justice as the three principles required for ethical research involving human participants, and established the requirement for research proposal submission to an Institutional Review Board (IRB) for approval (Kawar, Pugh, & Scruth, 2016). These principles mean participants must have informed consent when choosing to participate (respect), the risk to the participant must be within reason when considering the benefits of participation (beneficence), and treatment of participants must be fair and equitable (justice) (Kawar, Pugh, & Scruth, 2016). Researchers must consider these principles regardless of the type of research, the scope of the study, or method of identifying participants. I ensured

informed consent for this study through an informed consent form. As indicated in the consent form, participants provided consent by submitting completed questionnaires.

Participants

Participants consisted of Project Management Institute (PMI) certified PMs experienced in construction projects. Limiting participants to specific eligibility criteria is one method of improving reliability and validity (Tasic & Feruh, 2012). The use of PMI certified PMs ensured understanding of the proposed definition of success and the concept of EI. PMI offers modules for training on the definitions of project success as well as the definition of, and the importance of EI for PMs (PMI, 2013).

I accessed eligible participants through the PMI Direct Mail Program and directed participants to Survey Monkey, an online survey distribution service. The use of online survey distribution tools can result in high quality data, rapid data collection, and high response rates (Gill, Leslie, Grech, & Latour, 2013). Mannix, Wilkes, and Daly (2014) stated online tools could enhance research without threatening the validity of data.

Developing trust and establishing a working relationship is a difficult prospect when using an online survey tool that removes the personal interaction between the researcher and participant. One way that I established a working relationship with participants is an introduction to my survey that details a shared background in project management. Fassinger and Morrow (2013) and Van Lange (2015) said that a trusting relationship is easier to develop when all parties are part of the same culture. Rindfuss, Choe, Tsuya, Bumpass, and Tamaki (2015) stated that respondents might have varying work schedules, affecting the time when they are available to respond to a survey. Using

an online tool also helped build a working relationship by allowing participants the flexibility to respond at their convenience.

Research Method and Design

The scope and purpose of a study, along with the worldview of the researcher, guide the selection of the method and design. In this study, I investigated the relationship between construction PMs' self-reported TEI competency and project success. This scope was well suited to a quantitative correlation study.

Research Method

I approached the method and design decisions based on my positivist worldview. Whetsell and Shields (2015) stated positivist research seeks empirical truth. I used a quantitative method focused on empirical data for this study. Codier and Odell (2013) stated researchers investigate a relationship between variables using the quantitative method. Yilmaz (2013) stated the quantitative method is most appropriate when previous research and established data collection tools exist (Yilmaz, 2013). Current research has utilized the quantitative method as a means of establishing the relationship between EI and other variables including academic success (Qualter, Gardner, Pope, Hutchinson, & Whitely, 2012), leadership ability (Sunindijo, Hadikusumo, & Ogunlana, 2007), and behavioral problems (Gugliandolo, Costa, Cuzzocrea, Larcan, & Petrides, 2015). Bahari (2010) stated quantitative researchers seek hard evidence to test existing theories.

My goal for this study was to investigate the relationship between variables through the lens of TEI theory, making a quantitative method most appropriate. Researchers use the qualitative method to explain social phenomena (Yilmaz, 2013).

Qualitative researchers typically view their research with humanistic or post-modern worldviews (Tsang, 2013). Because the researcher often is the data collection tool in qualitative research, there is greater potential for introducing bias into results (Yost & Chmielewski, 2013). When researchers seek unbiased, objective evidence to support hypotheses, the quantitative method is most appropriate (Yost & Chmielewski). My positivist worldview, including the desire to obtain unbiased empirical evidence, made quantitative research most appropriate for my study.

Research Design

I chose correlation as the design for this study because of my positivist worldview. Positivism tends to focus more on relationships than causality (Tsang, 2013). Experimental methods are more appropriate to establish causation (Bryman & Bell, 2015).The correlation design is appropriate when identifying the relationships between variables (Perrin, 2014).

Other possible quantitative research designs considered included experimental and quasi-experimental (Bryman & Bell, 2015). Bryman and Bell (2015) stated that experimental and quasi-experimental designs are most appropriate when the researcher has control over the predictor variables. Because I had no control over the variables, an experimental or quasi-experimental design was not appropriate.

Population and Sampling

The population included PMI certified PMs in the United States who have worked on construction projects. Attaining PMI certification requires PMs to become familiar with EI concepts as part of the foundational standards of the Project Management Body

of Knowledge.This requirement helped ensure the sample aligns with the overarching research question. Bayley et al. (2014) stated low participant recruitment could lead to inconclusive studies. Utilizing the United States as a population base to recruit participants helped limit the likelihood of under recruitment. As stated by Brandon, Long, Loraas, Mueller-Phillips, and Vansant (2014), the external validity of a study improves through identifying participant's desired characteristics. Limiting participants to those with experience in construction project management made the results more generalizable across the entire population.

Probabilistic, simple random sampling (SRS) was the chosen method to identify a representative group of participants for the study. Rowley (2014) stated probabilistic sampling is ideal because it is representative of a study population. Bornstein, Jager, and Putnick (2013) added that one advantage of probabilistic sampling is results generalizable to the target population. Mullinix, Leeper, Druckman, and Freese (2015) identified ensured inclusion of varied demographics as another strength of probabilistic sampling. In contrast, the weaknesses of probabilistic sampling include possible high cost of recruitment and increased need to ensure the target population is clearly defined (Bornstein, Jager, & Putnick, 2013).

SRS was the subcategory of probabilistic sampling for this study. In SRS, each member of the population has an equal chance of selection (Bornstein, Jager, & Putnick, 2013). The advantage of SRS is in limiting bias in the selection process (Cohen, Cohen, West, & Aiken, 2013). Ye, Wu, Huang, Ng, and Li (2013) stated the major disadvantage of SRS is the chance respondents will not provide useful data. I selected the sample by

picking every third potential participant to receive the invitation letter, resulting in a total possible sample of three hundred.

Low statistical power in quantitative research can result in findings that do not represent a true effect (Button et al., 2013). A power of 0.80 indicates a sample would be large enough for statistical significance in 80% of cases (Leppink, Winston, & O'Sullivan, 2016). G*Power is a statistical software package used to conduct sample size analysis, helping researchers determine the appropriate sample size to achieve sufficient statistical power (Faul, Erdfelder, Buchner, & Lang, 2009). A power analysis, using G*Power version 3.1.9.2 software, was conducted to determine the appropriate sample size for the study. An a priori power analysis, assuming a medium effect size (f^2= .15), α = .05, and four predictor variables, identified that a minimum sample size of 85 participants is required to achieve a power of .80. Increasing the sample size to 174 will increase power to .99. The final sample size N = 98, resulted in a statistical power of .87.

Effect size is an important facet of research. Leppink, O'Sullivan, and Winston (2016) stated effect size and the statistics used to calculate it must be reported together. When reported with study results, effect size helps identify the significance of results, allows comparison of similar studies, and use as a planning tool for future studies (Lakens, 2013). Leppink, Winston, and O'Sullivan (2016) stated a medium effect reduces the likelihood of obtaining a statistically significant result in cases where the null hypothesis is true. Based on a review of 25 articles where project success was the outcome measured, the use of medium effect size was appropriate for this study.

Ethical Research

Following the processes set by the Walden University Institutional Review Board (IRB) ensured the ethical conduct of the study and treatment of the participants. I received IRB approval to conduct the study in August 2017. The IRB approval number, 08-04-17-0533177, was included in the survey invitation letter to provide assurance of ethical conduct to participants. Ethics help researchers protect the rights of participants and maintain the legitimacy of study results. Researchers accomplish the aims of ethical research through protocols, including privacy and confidentiality, informed consent, protection of vulnerable groups, and avoidance of harm, that if followed by the researcher, guide an ethical study (Barker, 2013). Informed consent is a process used to ensure participants understand the scope of the study and any risks related to participation. I achieved voluntary informed consent through an informed consent form provided to participants through Survey Monkey, a service independent of the researcher. Using an independent agent to gain informed consent helps maintain the voluntary nature of consent (Dekking, Graaf, & van Delden, 2014).

Informed consent is one method of protecting participants; another method includes simple withdrawal from the study. Hadidi, Lindquist, Treat-Jacobson, and Swanson (2013) stated the main principle of an ethical study is the participants' right to withdraw. Participants were able to withdraw from this study by leaving questions blank or not submitting the survey. Largent, Grady, Miller, and Wertheimer (2012) stated monetary incentives offered for study participation could coerce participants and limit the voluntary nature of participation. Because there was no monetary incentive for

participating in this study, participants did not feel coerced to remain in the study if they chose to withdraw. The combination of voluntary informed consent, a simple withdrawal process, and a study scope that does not seek sensitive information ensured the protection of study participants.

Participant confidentiality and protection of data after collection are ethical concerns for researchers. Morse and Coulehan (2015) stated demographic information provided in a study could violate confidentiality even after changing participant names. This study did not include participant or organization names, and demographic information was limited to years of experience and geographic location within the United States. This information is not enough to compromise participant confidentiality. To help maintain confidentiality following the study, encrypted data will be stored securely for a 5-year period then destroyed. I will use an overwrite program, as suggested by De Chesnay (2014), to ensure complete deletion of data from the hard drive.

Data Collection Instruments

I identified two survey instruments to gather data required to measure the correlation between my predictor variables, the four factors of TEI, and the dependent variable, project success. Developed by Petrides in 2009, the Trait Emotional Intelligence Questionnaire – Short Form (TEIQue – SF) (Appendix B) is a survey that measures the four factors of TEI. In 2014, Mir and Pinnington developed the tool I used to measure five aspects of project success (Appendix C).

The TEIQue – SF is a 30 item self-report survey used to measure well-being, self-control, emotionality, and sociability, the four factors of TEI (Andrei, Siegling, Aloe,

Baldaro, & Petrides, 2015). The project success survey was used to measure multiple facets taken from academic literature to arrive at an overall project success score (Mir & Pinnington, 2014). The concepts measured include project efficiency, impact on the customer, impact on the project team, business success, and preparing for the future.

The four factors measured using the TEIQue-SF represent a collection of TEI facets. The facets of well-being include self-esteem, trait happiness, and trait optimism. Self-control facets include emotion regulation, stress management, and low impulsiveness. Emotionality is emotion perception, trait empathy, emotion expression, and relationships. Sociability facets include assertiveness, emotion management, and social awareness (Siegling, Vesely, Petrides, & Saklofsky, 2015). An additional two facets, adaptability and self-motivation, are measured by the TEIQue-SF but not included in any of the four factor measures (Siegling, Vesely, Petrides, & Saklofsky, 2015).

The project success instrument helps measure success as a comprehensive analysis of five factors. Project efficiency relates to meeting schedule and budget goals. Impact on customers takes into account how the product meets customer needs. Impact on the project team measures teamwork effectiveness. Business success includes how the project benefits the organization in the competitive marketplace. Preparing for the future is a strategic look at how the project creates opportunities for future growth of the organization (Mir & Pinnington, 2014).

Both the TEIQue-SF and the project success instrument use an ordinal scale of measurement. The TEIQue-SF measures the four factors of TEI using a Likert scale with a range of one to seven with one meaning completely disagree and seven meaning

completely agree (Stamatopoulou, Galanis, & Prezerakos, 2016). The project success tool also uses a Likert scale with five choices ranging from strongly agree to strongly disagree (Mir & Pinnington, 2014).

The TEIQue-SF is a tool designed to measure the constructs of TEI. The TEIQue-SF is a tool used to comprehensively measure the four factors of TEI (Siegling, Vesely, Petrides, & Saklofsky, 2015). Because my research question pertains to the correlation between a combination of the four factors of TEI and project success, a tool that provides factor scores as well as a composite TEI score is the most appropriate for this study.

The project success measure used for this study incorporates a wide array of success criteria first identified by Shenhar and Dvir (2001) as a comprehensive, strategic view of success. The tool incorporates the four factors of strategic project success identified by Shenhar and Dvir. Also included in the survey is the measure of impact on teams, a fifth factor noted as important to project success (Mir & Pinnington, 2014). This tool was the most appropriate for this study because it touches on all the current definitions of project success, helping to ensure a relevant view of the dependent variable.

Both the TEIQue-SF and the project success surveys were available to prospective respondents online through Survey Monkey. An invitation letter sent to a mailing list of prospective participants provided by the PMI Direct Mail Program included a link to the Survey Monkey site. Survey Monkey provides survey hosting to collect data from potential respondents (Capraro, 2016). The convenience of the Survey Monkey tool has contributed to it becoming a popular method of delivering surveys for

research purposes. There are no special requirements for responding. The surveys are similar in length and will take respondents approximately 5 minutes to complete. There is precedence for the use of Survey Monkey in doctoral research. Researchers used Survey Monkey for studies related to EI and other factors such as transformational leadership and sales performance (Potter, 2015; Reid, 2015).

The TEIQue-SF result was calculated using a score sheet provided free of charge through the website for the London Psychometric Laboratory (http://www.psychometriclab.com/Home/Default/14). The survey was set up to provide a summated score for each of the four factors of TEI. Responses to pre-selected questions combined to calculate a factor for each of the four factors with higher factor scores indicating the existence of a higher level in that specific factor.

The project success measure scoring was also a summation of responses to indicate a total score for project success. Because the factors each have dedicated questions, calculation of the score for each was a simple process of summing the results in a section. Summing each factor with equal weighting resulted in a final score for overall project success, the score used in data analysis.

The validity of the TEIQue-SF was in question as a means of assessing the type of higher order personality traits identified in the four factors (Andrei, Siegling, Aloe, Baldaro, & Petrides, 2015). Andrei, Siegling, Aloe, Baldaro, and Petrides (2015) conducted a literature review of 24 studies that investigated TEIQue-SF validity. The results of the review indicated that the TEIQue tool, in both the full version and short form, consistently reported significant results when investigating the incremental validity

of the tool (Andrei, Siegling, Aloe, Baldaro, & Petrides, 2015). The short form has recently been used to measure TEI among populations consisting of German occupational therapists (Jacobs, Sim, & Zimmerman, 2015), Greek adults of wide ranging ages and occupations (Stamatapoulou, Galanis, & Prezerakos, 2016) as well as Canadian and American populations (Siegling, Vesely, Petrides, & Saklofsky, 2015). In each case, the researchers confirmed the instrument's validity for measuring the TEI of the subject population.

Mir and Pinnington (2014) first used the project success instrument among a population of 1500 PMs in the United Arab Emirates. To establish validity, the researchers conducted a pilot questionnaire with a sample of five participants. The participants took the survey and provided feedback on possible changes (Mir & Pinnington, 2014). The researchers incorporated feedback from the pilot study to improve the final version of the survey.

Data Collection Technique

I collected data using two online surveys I made available through Survey Monkey. High quality data collected quickly with high response rates results from distributing surveys through online distributors such as Survey Monkey (Gill, Leslie, Grech, & Latour, 2013). Daly (2014) expanded on the research regarding the use of online distribution and determined that the method does not introduce threats to validity. I provided my participant requirements to the PMI Direct Mail Program, which provided a mailing list of potential participants to send a link to the survey. For this study, participants required experience as construction PMs in the last five years. This

participant requirement increased the likelihood that data collected was recent and relevant. After distributing the data collection instruments, data were collected through responses on Survey Monkey and results were tabulated.

As with any method of collecting data, the use of online surveys for data collection has advantages and disadvantages. Gill, Leslie, Grech, and Latour (2013) identified several advantages of online surveys including the high quality of data collection, ease and speed of instrument administration, and rapid collation of results. Goodman, Cryder, and Cheema (2013) and Schoenherr, Ellram, and Tate (2015) noted that using the internet to distribute data collection tools provides greater access to broader groups of participants. Disadvantages included possible ethical issues with the use of online surveys (Gill, Leslie, Grech, & Latour, 2013), failure of participants to report possible language barriers when responding to the instrument (Goodman, Cryder, & Cheema, 2013) and biased or incorrect responses to demographic information (Schoenherr, Ellram, & Tate, 2015).

Data Analysis

The overarching research question for this doctoral study was: Does a linear combination of construction PM well-being, self-control, emotionality, and sociability predict project success? This research question informs the following set of hypotheses:

(H_0): The linear combination of PM well-being, self-control, emotionality, and sociability will not significantly predict project success.

(H_1): The linear combination of PM well-being, self-control, emotionality, and sociability will significantly predict project success.

I conducted multiple linear regression using IBM SPSS 23. Green and Salkind (2014) identified SPSS as the most powerful data analysis package available. SPSS is the tool of choice for multiple EI studies with topics including its correlation to personality and job performance (Jeon & Koh, 2014; Siegling, Furnham & Petrides, 2015). Multiple linear regression (MLR) was the most applicable statistical test to identify the correlation between a dependent variable and multiple predictor variables (Casson & Farmer, 2014). MLR helps a researcher infer the importance of predictor variables related to a dependent variable (Nimon & Oswald, 2013). O'Neil, McLarnon, and Schneider (2014) stated multiple regression testing identifies the relationship between an dependent variable and more than one predictor variable.

Other options for measuring the significance of the relationship between variables included one-way analysis of variance (ANOVA), two-way ANOVA, and non-parametric testing. One-way and two-way ANOVA are means of testing the differences between multiple groups (Cardinal & Aitken, 2013). Because my hypotheses included a single group with multiple variables, ANOVA was not appropriate. Non-parametric tests were not appropriate for this study because of the assumption of a normal distribution. The central limit theorem indicates that a sample with a normal distribution is most appropriately tested using parametric tests (Mir & Pinnington, 2013).

Data cleaning is a method of identifying errors and missing information, making corrections, or mitigating the impact on the results of the study (Van den Broeck, 2005). Missing information is most likely to include demographic data (Van den Broeck, 2005). The demographic requirements for this study were minimal and the invitation letter

targeted participants who met the requirements. Data cleaning includes screening, diagnostic, and treatment phases (Van den Broeck, 2005; Osborne, 2012). According to Van den Broeck (2005), the screening phase includes investigating for a lack or excess of data, outliers, strange patterns in distribution, and unexpected results. I conducted the diagnostic phase to determine if apparent incorrect data was incorrect, and the treatment phase to correct the data, eliminate it, or leave it unchanged.

Methods used during the screening phase can include statistical methods as well as non-statistical. Descriptive statistics, conducted through IBM SPSS for the purpose of this study, are one method of statistical data screening (Van den Broeck, 2005, Van den Broeck & Fadnes, 2013). Another method used is comparing the calculated distribution to a standard distribution as described in the central limit theorem (Van den Broeck, 2005; Osborne, 2012; Van den Broeck & Fadnes, 2013). I screened data using both descriptive statistics and comparison of the distribution against the expected distribution described in the central limit theorem.

I accomplished the diagnostic phase of data cleaning primarily by using hard cut-offs. Hard cut-offs help researchers immediately diagnose erroneous data (Van den Broeck, 2005). Hard cut-offs are appropriate when data cannot possibly be correct. An example of this for my study is a survey that reports a higher than possible score for any of the variables.

Once identified, erroneous data must go through the treatment phase. Correcting, deleting, or keeping erroneous data are the only options for data cleaning (Van den

Broeck, 2005; Osborne, 2012). I deleted values that fell outside of pre-determined hard cut-offs. All other suspect data were treated on a case-by-case basis during data cleaning.

Missing data can result in both biased estimates and inaccurate hypothesis tests (Newman, 2014). Item level missing data, that is, participants' failure to respond to particular survey questions, can be handled by simply removing the respondent from the data set. Capraro (2016) and Motil (2015) both employed removal of responses with missing data as a means of preventing biased estimates and inaccurate hypothesis tests.

Assumptions made when conducting MLR include normally distributed variables, the existence of a linear relationship between the dependent variable and predictor variables, reliable measurement of variables, and the variance of errors is the same, or homoscedastic (Cohen & Cohen, 2013; Casson & Farmer, 2014; Osborne & Waters, 2002). Researchers must test assumptions and take appropriate actions if violations occur. Unreliable results lessen a researcher's ability to infer statistical results on a wider population (Cohen & Cohen, 2013). Several methods exist for handling violated assumptions. Data cleaning, consideration of acceptability of results, exclusion of results, and changing variables are all tools available to researchers to deal with violated assumptions (Osborne & Waters, 2002; Cohen & Cohen, 2013; Cohen, Cohen, West, & Aiken, 2013).

Data cleaning is one action to take to improve distribution of variables for regression analysis when normal distribution is violated (Osborne & Waters, 2002). Normal distribution is a manageable distribution of variables when conducting a regression analysis (Casson & Farmer, 2014; Osborne & Waters, 2002). Developing and

visually inspecting data plots can help identify problems with variable distribution (Osborne & Waters, 2002). I used IBM SPSS software to develop and inspect the distribution of plots from my collected data.

Plotting the dependent variable against predictor variables allows the researcher to identify linearity (Casson & Farmer, 2014; Osborne & Waters, 2002). Pearson's correlation coefficient identifies a linear relationship as one that falls from +1 to -1 (Mir & Pinnington, 2013). I used the IBM SPSS software to measure linearity between project success and each of the predictor variables. Violating linearity indicates a regression analysis that underestimates the relationship (Osborne & Waters, 2002). Any nonlinear aspects of the relationship between variables must be accounted for and considered when drawing conclusions (Osborne & Waters, 2002).

Violating the assumption regarding reliability of the measurement of variables can result in overstated or understated results (Osborne & Waters, 2002; Cohen & Cohen, 2013). Each additional variable can further complicate reliability results and lead to less accurate conclusions (Osborne & Waters, 2002). I verified reliability of measurements using Cronbach's alpha calculated through IBM SPSS software. Cronbach's alpha is a means of measuring scale reliability (Cohen, Cohen, West, & Aiken, 2013).

Violating the assumption of homoscedasticity results in a variance of error not equal across all levels of the predictor variable (Osborne & Waters, 2002). This assumption is observable through the SPSS software using a scatterplot. Significant heteroscedasticity, differences in the variance of error, can lead to distorted findings and may indicate the need for replacement of variables (Osborne & Waters, 2002).

I used an alpha level of 0.05 to determine inferential statistical analysis for this study. Norris, Plonskey, Ross, and Schoonen (2015) stated researchers must establish an initial alpha level to interpret comparisons. Previous researchers also used an alpha level of 0.05 when studying the correlation of EI to predictor variables (Mir & Pinnington, 2013; Porter, 2016). I verified statistical assumptions through descriptive statistics to justify the appropriateness of MLR as the primary inferential tool (Porter, 2016).

Study Validity

A Type I error is the rejection of a null hypothesis that is true, also known as a false positive (Ueno, Fastrich, & Murayama, 2016). Unreliable instruments, poor data assumptions, and improper sample size are causes of Type I errors. Type I errors are a threat to statistical conclusion validity.

Steps exist to mitigate each cause of Type I error. Instrument reliability is dependent on both the instrument and the population under study (Menold & Raykov, 2016; Raykov & Traynor, 2016). I used survey instruments vetted in previous studies as well as appropriate instruments for the identified population. Assuming accuracy of measured data and inadequate sample size are other possible ways to introduce a higher Type I error rate (Button et al., 2013; Garson, 2012). I verified accuracy of data by running descriptive statistics to observe for the expected mean, standard deviation, and range as suggested by Garson (2012). G*Power is a statistical software package that aids researchers in identifying adequate sample sizes (Faul, Erdfelder, Buchner, & Lang, 2009). I identified the adequate sample size to achieve statistical power for my study by using the G*Power statistical software package.

External validity and generalizability can also be improved using an appropriate sample size (Partridge et al., 2015; Collins, Ogudimu, & Altman, 2016; Riley et al., 2016). Generalizability of results to a larger population relies on the external validity of study findings (Mullinix, Leeper, Druckman, & Freese, 2015). I collected data from a population of construction PMs in the United States. With proper external validity, my results will be generalizable to a more geographically diverse population of construction PMs. Using the G*Power statistical software package to identify an appropriate sample size provided greater external validity and generalizability to my study.

Transition and Summary

Section 2 included a detailed discussion and rationale for selecting quantitative method and correlation design. Key points included (a) a discussion of the study population and sampling method, (b) a review of the TEIQue-SF and project success measure proposed for data collection and the method of instrument delivery, (c) data analysis techniques including descriptive and inferential statistic methods, (d) and a discussion of study validity and reliability. Section 3 contains (a) a presentation of my findings, (b) the application of the study results to professional practice, (c) implications for social change, (d) and recommendations for further research. Also included in section 3 will be reflections on the DBA doctoral study process.

Section 3: Application to Professional Practice and Implications for Change

Introduction

The purpose of this quantitative, correlational study was to examine the possible relationship between PM's trait emotional intelligence scores and project success in the construction industry. The results of multiple linear regression analysis indicate there is a statistically significant relationship between PM's TEI scores and project success. The relationship analysis between TEI and success produced $p < .05$ for the top-level analysis as well as for the self-control factor. The result of the analysis was statistically significant for the research question: Does a linear combination of construction PM well-being, self-control, emotionality, and sociability predict project success?

Presentation of the Findings

For this study, data were collected through an online self-report survey and analyzed using SPSS version 23 software. Participants accessed the survey through a link provided in the study invitation letter. The invitation letter included information on informed consent and the purpose of the study. I received 104 responses and removed six due to incomplete data resulting in 98 complete responses. Achieving statistical power between 80 and 99% required a participant size between 85 and 174.

Data analysis consisted of data cleaning and confirming the assumptions of multivariate normality to allow for accurate multiple regression analysis. I accomplished the screening phase of data cleaning through review of histograms of the variables against a normal curve, boxplots to review outliers, and descriptive statistics. The diagnostic phase included reviewing histograms and descriptive statistics to ensure no

results exceeded the possible response levels for each survey. The treatment phase of data cleaning included removing the results of eight surveys identified as having missing data.

The assumptions of multiple linear regression include normally distributed variables, a linear relationship between dependent and predictor variables, reliability of the measurement tools, and homoscedasticity. I verified normal distribution of the variables using histograms depicting the results of the surveys against a normal curve. Tests for linearity and homoscedasticity included P-P scatter plots of each predictor variable against the dependent variable as well as a scatter plot of predicted versus residual value. I tested reliability of the TEIQue-SF using Cronbach's alpha and the Omega reliability measure. The hypotheses listed below were tested using linear regression analysis.

(H_0): The linear combination of PM well-being, self-control, emotionality, and sociability will not significantly predict project success.

(H_1): The linear combination of PM well-being, self-control, emotionality, and sociability will significantly predict project success.

I present the results of each test, along with output from SPSS in this section.

To test for normality I used SPSS to create histograms for each variable and visually inspected for the existence of a skewed curve or kurtosis. There was a slightly right skewed distribution of the scores for well-being evidenced in Figure 1. However, the scores were within the standard range of the variable. The distribution of the scores for self-control (see Figure 2), emotionality (see Figure 3), sociability (see Figure 4), and success (see Figure 5) were normal.

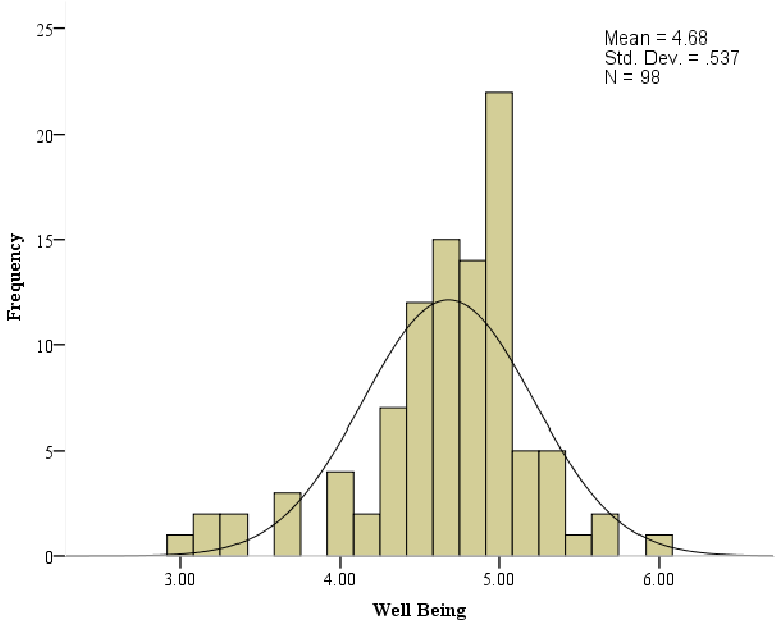

Figure 1. Histogram with a normal curve for well-being.

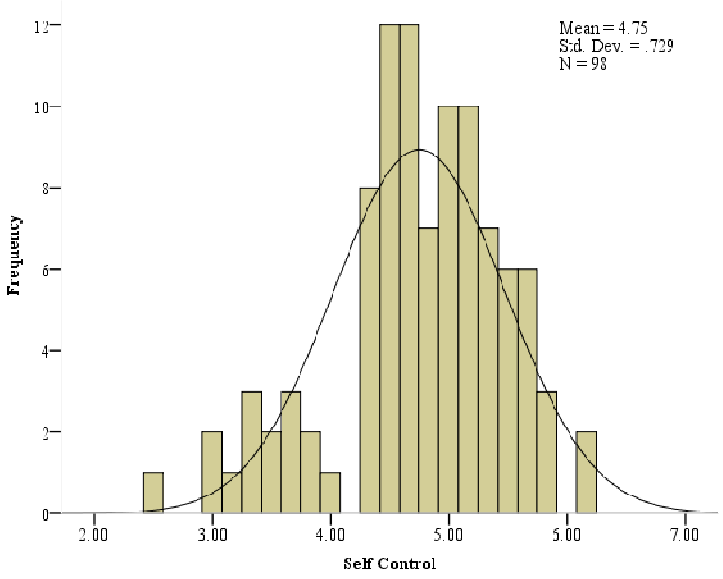

Figure 2. Histogram with a normal curve for self-control.

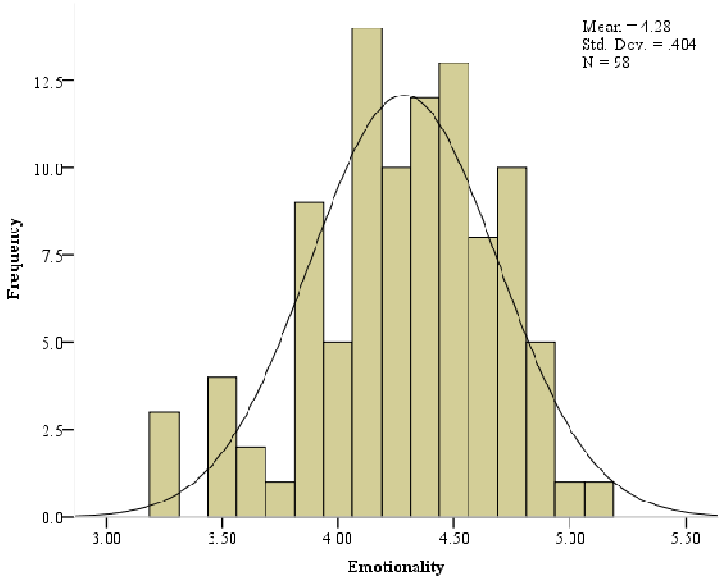

Figure 3. Histogram with a normal curve for emotionality.

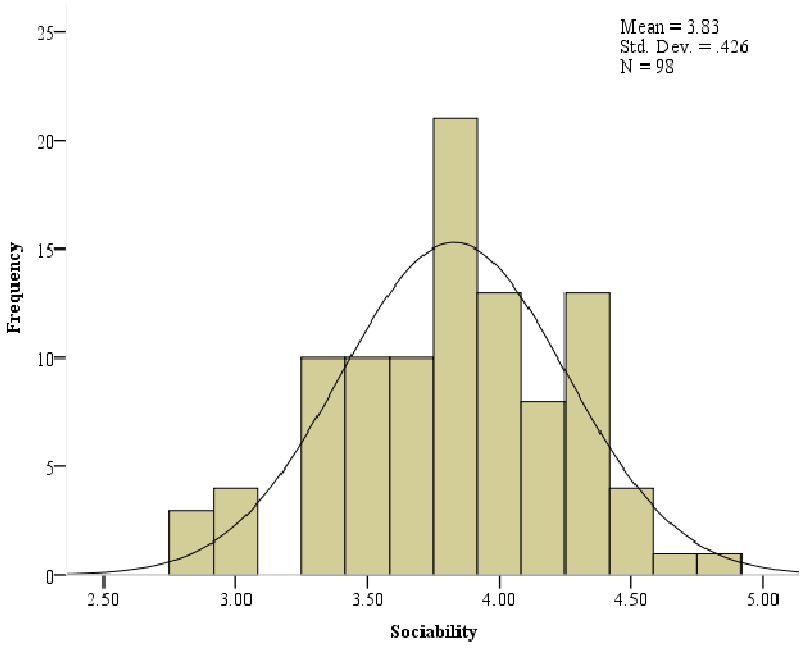

Figure 4. Histogram with a normal curve for sociability.

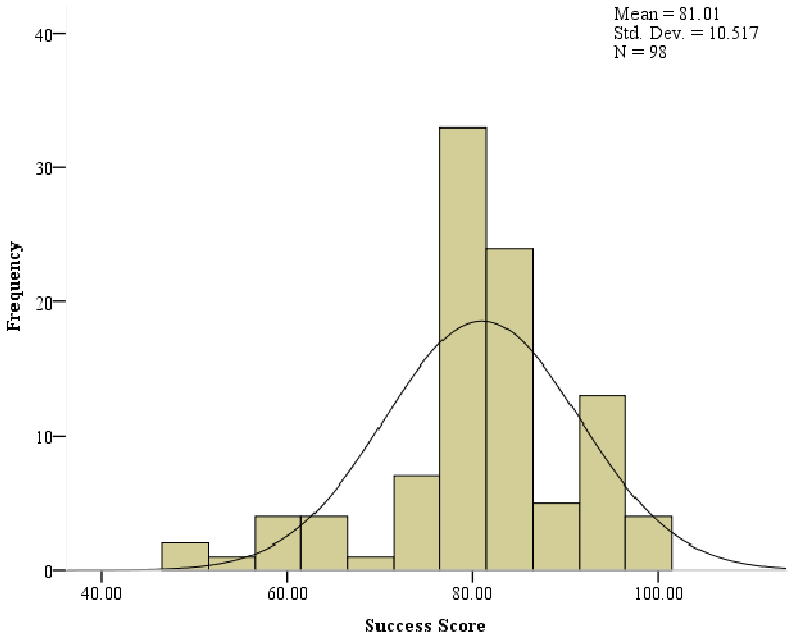

Figure 5. Histogram with a normal curve for success.

I assessed linearity by visual examination of a scatter plot of the dependent variable versus each predictor variable. Heteroscedasticity is evidenced by a bowing or fan shape in the residual data scatter (Osborne & Waters, 2002). I created scatter plots for each predictor variable against the dependent variable and the predicted value against the residual value (see Figures 6-10) and conducted visual examination to ensure there was no pattern in the distribution.

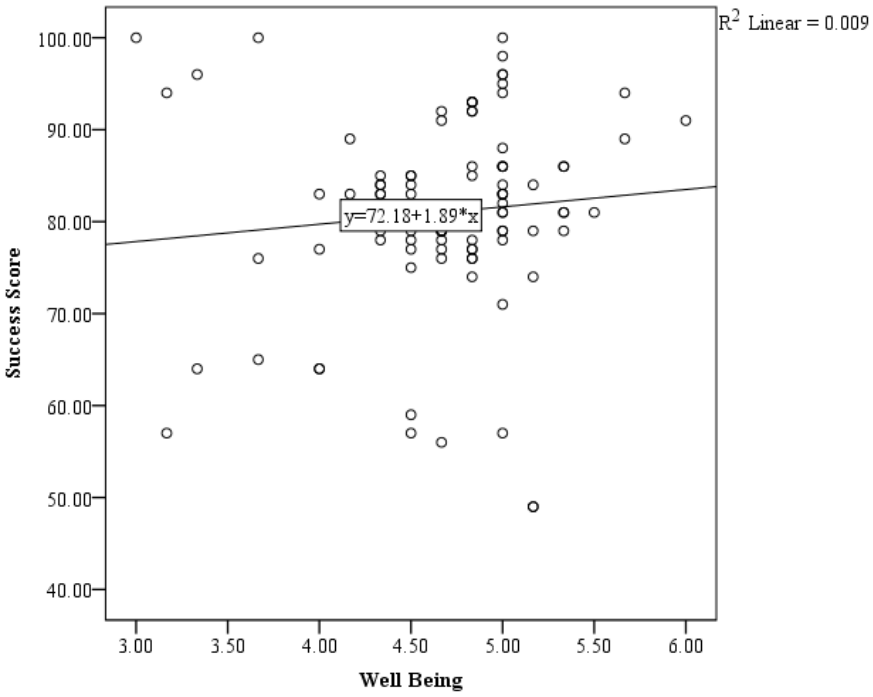

Figure 6. P-P scatter plot of well-being versus success.

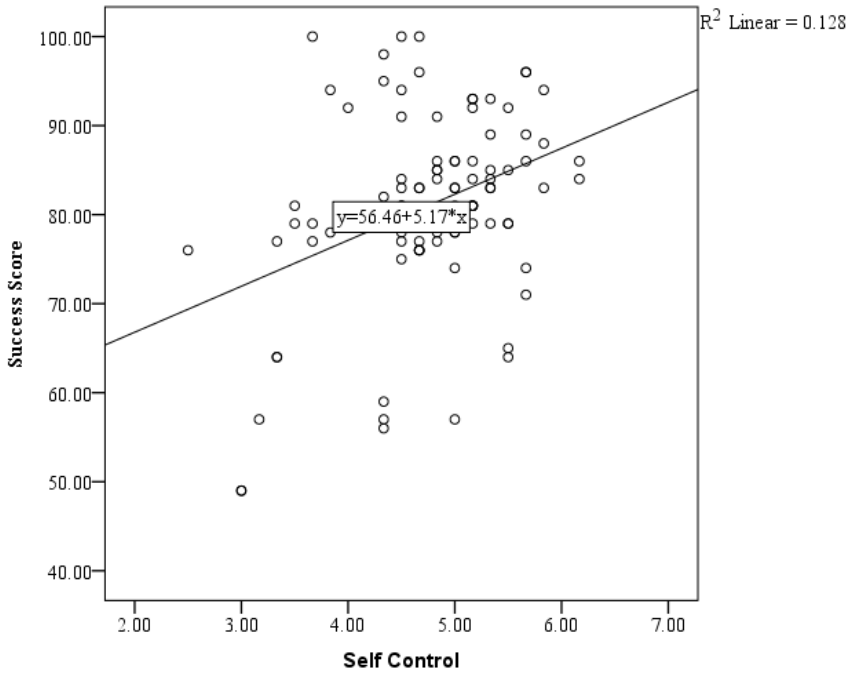

Figure 7. P-P scatter plot of self-control versus success.

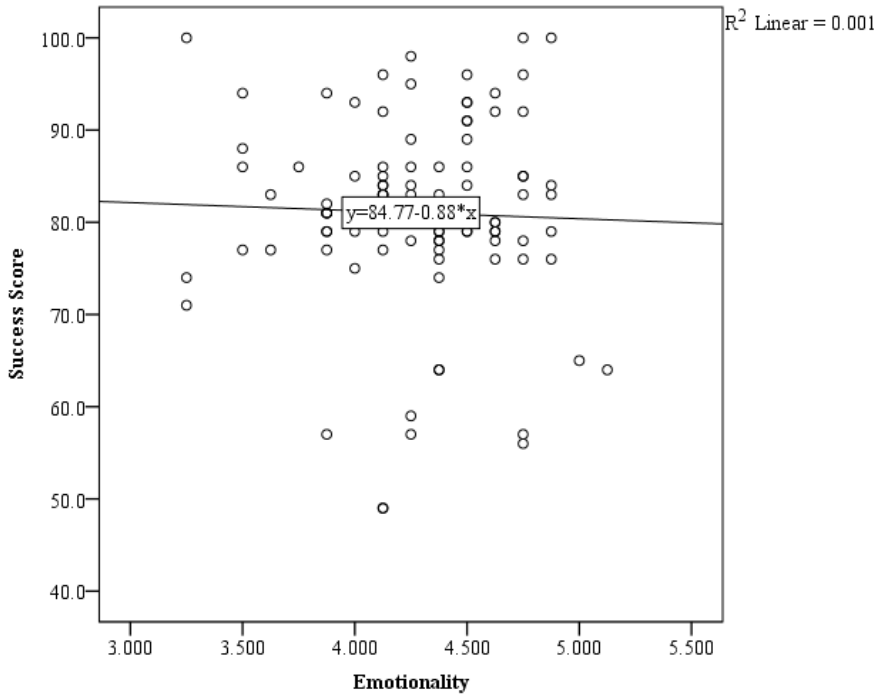

Figure 8. P-P scatter plot of emotionality versus success.

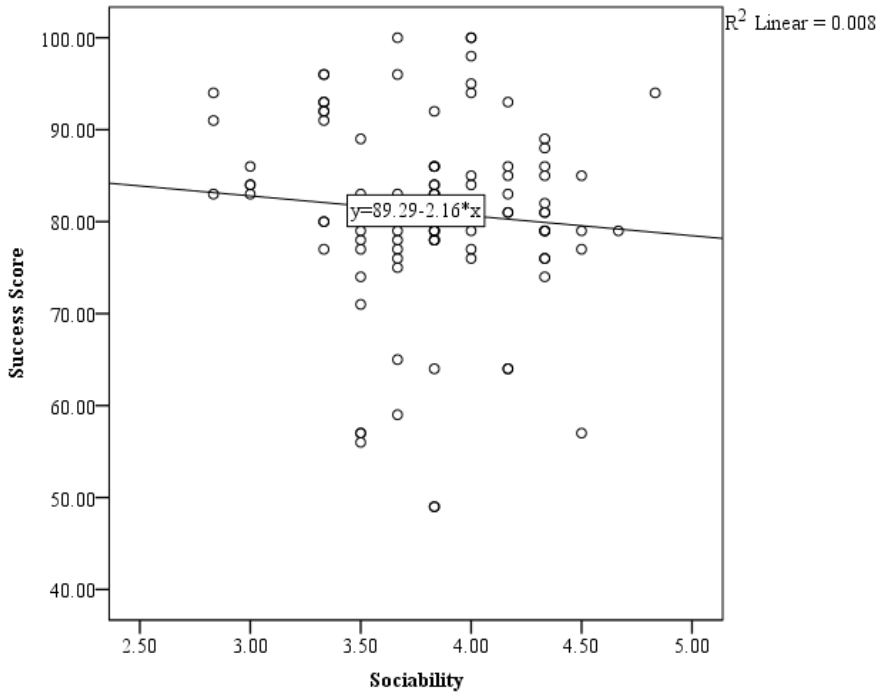

Figure 9. P-P scatter plot of emotionality versus success.

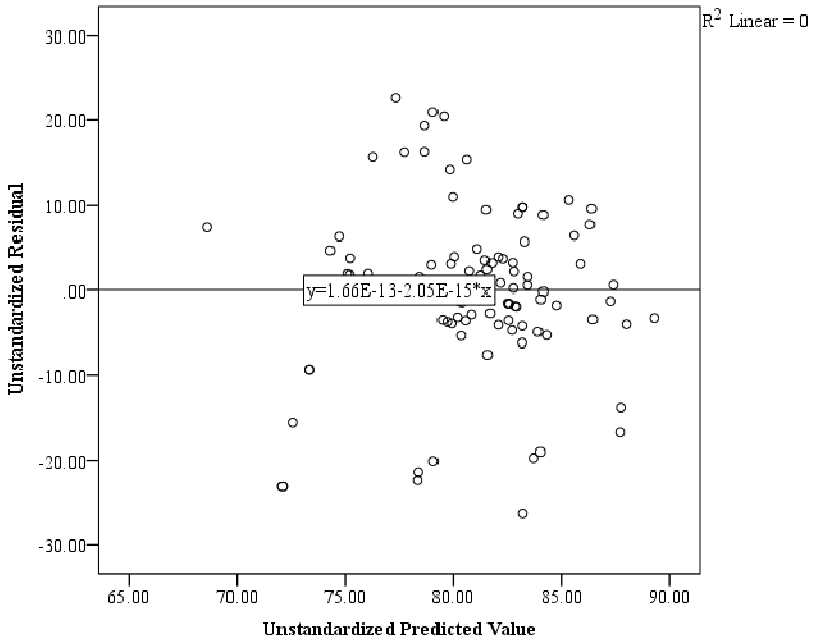

Figure 10. P-P scatter plot of residual value versus predicted value.

I identified possible outliers by generating box plots and examining the distribution and dispersion of data compared to the variables' range. Boxplots examining each of the predictor variables are included in Figures 11 – 15. Each predictor variable contained some outliers in the data points. However, none of the outliers fell outside of the possible range of scores for the variable.

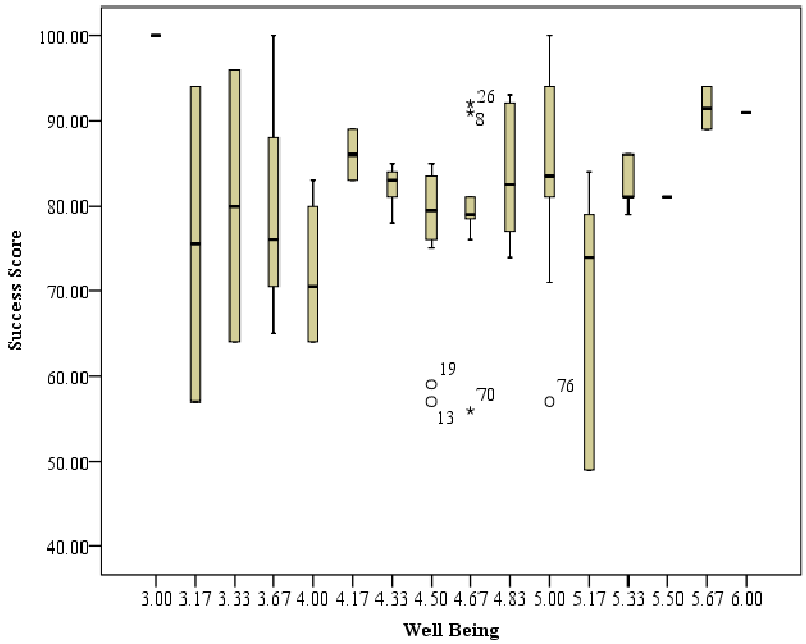

Figure 11. Boxplot examining well-being by success scores.

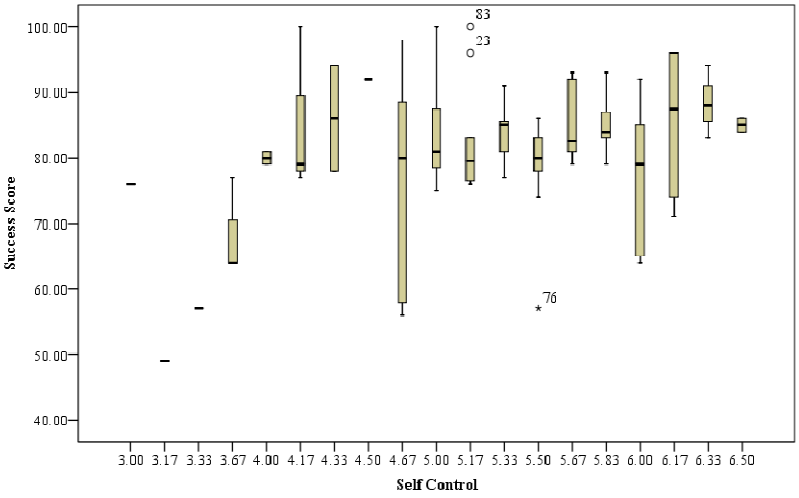

Figure 12. Boxplot examining self-control by success scores.

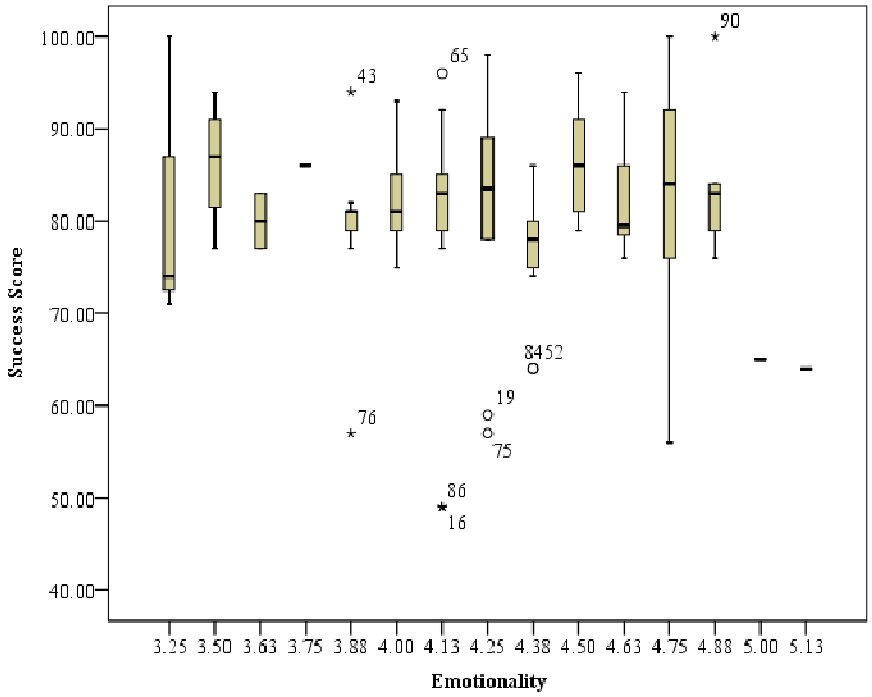

Figure 13. Boxplot examining emotionality by success scores.

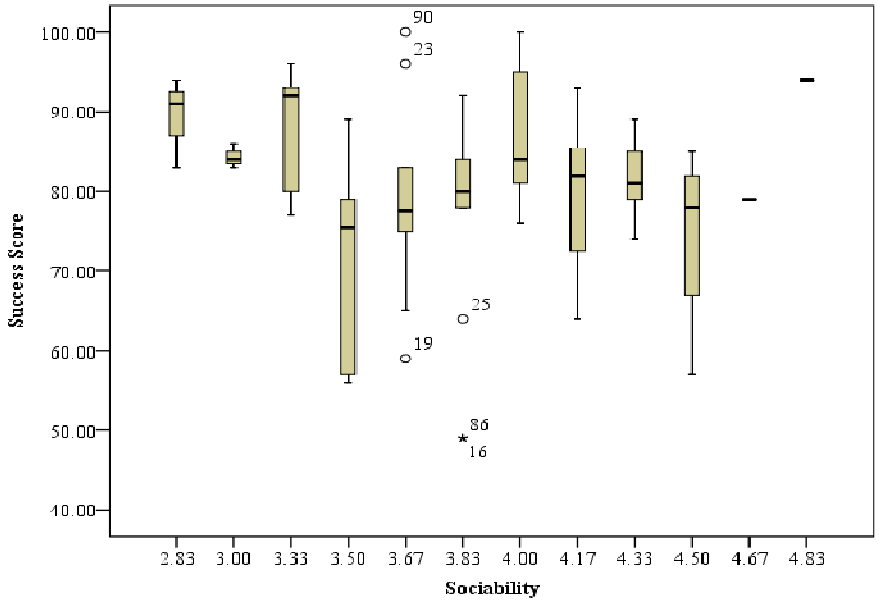

Figure 14. Boxplot examining sociability by success scores.

Variance inflation factor (VIF) less than or equal to 10 indicates multicollinearity among the predictor variables. The VIF among well-being, self-control, emotionality, and sociability scores fell between 1.045 and 1.109 indicating the assumption of multicollinearity was not violated (see Table 6).

Table 6

Collinearity Statistics (N = 98)

	Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
	B	Std. Error	Beta	t	Sig.	Tol.	VIF
(Constant)	68.080	19.978		3.408	.001		
Well Being	-0.204	1.984	-0.010	-1.03	.919	0.908	1.101
Self-Control	5.174	1.467	0.359	3.528	.001	0.902	1.109
Emotionality	-1.687	2.566	-0.065	-0.657	.513	0.957	1.045
Sociability	-0.908	2.478	-0.037	-0.366	.715	0.924	1.082

After verifying no violations existed for the assumptions of multivariate normality, I assessed the reliability of the TEIQue-SF. Using SPSS, the Cronbach's alpha score for the dataset was -0.009 (see Table 7) indicating a possible low reliability and overstatement of the results. A negative Cronbach's alpha score indicates a negative average covariance among items.

Table 7

TEIQue-SF Instrument Reliability

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
-0.009	-0.161	4

Previous research indicates that while Cronbach's alpha is the most popular method of measuring internal consistency reliability, the deficiencies noted in psychometric literature are numerous (Dunn, Baguley, & Brunsden, 2014). The most significant deficiency noted is that true score variance must be constant across all items, a requirement that is unrealistic for psychological scales (Dunn et al., 2014). Socan (2000) argued that particularly among scales in the personality domain, like the TEIQue-SF, unidimensionality, a requirement of accurate Cronbach's alpha scores, rarely exists. Cronbach and Shavelson (2004) concluded that the alpha formula is not appropriate in scales where questions are meant to target different areas.

An alternative to Cronbach's alpha, recommended by Dunn, Baguley, and Brunsden (2014) is the Omega reliability measure. According to Dunn et al. (2014) Omega is appropriate for measuring reliability when true score variance is not constant across all items. Furthermore, although true score variance cannot be measured, alpha and omega scores will be equivalent when the requirement is not violated. Using a freeware software tool known as Omega Reliability for Bifactor Models the same data set that achieved a -0.009 alpha score achieved a 0.67 omega score. This indicates that the dataset generated using the TEIQue-SF may not have constant true score variance across all items, causing the low alpha score to be generated by otherwise reliable data.

After measuring reliability, I conducted multiple regression analysis on the sample N = 98 which indicated a statistical power of 0.87 assuming a medium effect size. Descriptive statistics are included in Table 8.

Table 8

Descriptive Statistics (N = 98)

Variables	Minimum	Maximum	Mean	Std. Deviation
Well-being	3.00	6.00	4.68	0.537
Self-control	2.50	6.17	4.75	0.729
Emotionality	3.25	5.13	4.28	0.404
Sociability	2.83	4.83	3.83	0.426
Success	49.00	100.00	81.01	10.517

Multiple regression analysis revealed a significant statistical relationship [$F(4, 93) = 3.56$, $p = 0.009$] between PMs' trait emotional intelligence and project success. Table 9 depicts the results of the ANOVA test. Of the four predictor variables, only self-control showed an individually significant relationship to project success. The coefficients data (see Table 10) indicates a significant relationship ($p < .05$) for the self-control predictor. Therefore, regression analysis produced results demonstrating a statistically significant relationship for the research question.

Table 9

Results of ANOVA[a] Test (N = 98)

	Sum of squares	*df*	Mean square	*F*	Sig
Regression	1425.78	4	356.44	3.56	.009[b]
Residual	9303.21	93	100.04		
Total	10728.99	97			

a. Dependent variable: success score
b. Predictors: (Constant), well-being, self-control, emotionality, sociability

Table 10

Coefficients (N = 98)

Model Parameter	Unstandardized Coefficients		Standardized Coefficients			95% CI for *B*
	B	Std. Error	Beta	*t*	Sig.	
(Constant)	68.08	19.98		3.41	0.001	[28.41, 107.75]
Well-being	-0.20	1.98	-0.01	-0.10	0.919	[-4.14,3.74]
Self-control	5.17	1.47	0.36	3.53	0.001	[2.26,8.09]
Emotionality	-1.69	2.57	-0.07	-0.66	0.513	[-6.78,3.41]
Sociability	-0.91	2.48	-0.04	-0.37	0.715	[-5.83,4.01]

a. Dependent variable: success score

The results of the analysis indicate the linear combination of well-being, self-control, emotionality, and sociability relate significantly to project success. Due to the confidence interval associated with the regression analysis, the null hypothesis is rejected:

(H_0): The linear combination of PM well-being, self-control, emotionality, and sociability will not significantly predict project success.

Pryke, Lunic, and Badi (2015) identified a lack of research related to the relationship between PM emotional intelligence and project success in the construction industry. I used a self-assessed measure of emotional intelligence and project success to extend the understanding of EI and project success in construction management. The findings indicate the relationship between PMs' TEI and project success is statistically significant. Previous researchers identified possible relationships between general emotional intelligence and aspects of organizational, educational, and relationship success. Medina and Francis (2015) identified self-assessed emotional intelligence as important to overall PM ability to handle and understand people.

Hui-Hua and Shutte (2015) identified TEI as correlated to individual task performance. Takey and Carvalho (2015) found EI to be among the top PM competencies. In this study, I assessed the relationship between EI and general project success as opposed to individual task performance. The results indicated a similar positive correlation to that found by Hui-Hua and Schutte.

Although I was unable to locate any new research related to EI and construction project management, researchers have conducted additional research on EI and success in project management. Studies related to EI and business success include Bozionelos and Singh (2017) who identified EI relates positively to task performance. The authors also identified those with high EI have job performance advantages, and high EI performers benefit more from EI training than do those who start from a point of lower EI (Bozionelos & Singh, 2017). This is an interesting possible mediator of the benefit of training when considering the correlation identified in my study.

Other recent studies involving TEI identified its relationship to the execution of performance reviews as well as employee commitment and job satisfaction. Salminen and Ravaja (2017) identified high TEI managers as achieving results that are more positive during performance reviews than their lower TEI counterparts. Clarke and Mahadi (2017) identified TEI as a predictor of high mutual respect relationships between manager and subordinate, which in turn indicated higher subordinate job satisfaction. The results of my study, coupled with the plethora of studies showing a relationship between TEI and other important business functions indicates the importance of applying a greater understanding of TEI to professional practice.

Applications to Professional Practice

The findings of this study contribute to the overall base of understanding of how TEI relates to project management. Construction management organizations invest significant capital in the selection, training, and career development of PMs. Failed projects can be costly in terms of financial wellness and stakeholder perception of the organization.

The resulting data from this study shows a link between TEI and project success. Hiring managers can use this information to justify targeting potential PMs with high TEI and develop training programs to increase the level of the existing PM pool. Improving TEI could have a multi-faceted impact on organizational success. Researchers have identified a link not only between TEI and project success, but also between TEI and individual task success (Bozionelos & Singh, 2017), job satisfaction (Clarke & Mahadi, 2017), and a more positive relationship between managers and subordinates (Salminen & Ravaja, 2017).

Although a positive relationship existed between the linear combination of the elements of TEI and project success, only one of the individual elements correlated to success. The self-control variable showed a significant relationship to project success, and should be the focus for improvement in any TEI oriented training program. Hiring managers can also use existing tools to measure the self-control of potential PMs.

Implications for Social Change

The findings of this study have potential to benefit local job markets as well as relationships between businesses, local community stakeholders, and customers. By

identifying self-control as an element of TEI with a direct correlation to project success, hiring managers can choose to seek out PMs with high TEI with that skill. The improved TEI, and specifically the self-control facet, of PMs could increase project success resulting in organizational success and a stable job market. The proliferation of successful projects could also lead to sustained or improved relationships between organizations, local community, and customers in the form of targeted social responsibility projects and improved execution to budget, schedule and quality.

Recommendations for Action

Hiring managers should understand the link between TEI, and specifically self-control, and project success when considering new PMs and developing training plans. Understanding and accepting the role of TEI in PM success should provide incentive for construction management organizations to accept EI on a broader scale, and identify it as one of the many preferred skills in the search for new PMs. Acceptance of the business impact of TEI should also lead to the development of training programs that specifically target TEI elements to improve the skills among current PMs.

Dissemination of study results is an important step in ensuring that the results can lead to beneficial action. I will disseminate the results of my study through presentations to project management based organizations and discussions among interested parties. I also plan to work with human resources personnel within my own organization to help develop training plans that target the specific skills identified as beneficial to project success.

Recommendations for Further Research

Limitations of this study included the inherent inflation of self-report survey tools and limited sample size. Future researchers should identify additional means of measuring TEI in order to determine if the results are repeatable. Furthermore, future research should increase the sample size to improve statistical power and generalizability.

This study identified the self-control element of TEI as having a positive correlation to project success. Novo, Landis, and Haley (2017) identified self-control as an important leadership trait of highly emotionally intelligent PMs. Researchers should consider studying the link between leadership style, self-control, and project success to refine further the competencies that lead to increased project success.

Finally, future researchers should consider expanding to other industries. The results of this study indicate a link between PM TEI and project success in the construction industry. If that same link exists in other industries, hiring professionals and training developers could benefit from targeting potential PMs with competencies shown to correlate to improved success.

Reflections

At the outset of the doctoral study process, I had some bias and expectation that TEI would in fact correlate to project success. I believe that this bias existed because I personally work as a non-technical PM in a highly technical field. I rely on my EI and leadership ability to influence subordinates to be successful. Because I conducted a quantitative study using pre-validated survey tools, this bias had no impact on the conduct or results of my study.

The results of this study, and the discovery that other researchers have identified some link between leadership and self-control, has sparked a new question. Is there a relationship between TEI, leadership, and project success, and does leadership style impact that relationship in any way? Having learned and gained first-hand experience of the process involved with conducting scholarly literature I may choose to investigate that question to contribute additional knowledge to the profession of project management.

Summary and Study Conclusions

The results of this study are significant because of the identification of a positive correlation between PM TEI and project success. Understanding the results could help hiring managers and training developers target specific PM competencies that lead to increased project success. The successful execution of projects can lead to sustained business, improved job market stability, and the development of strong relationships between organizations, customers, and community stakeholders.

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Appendix A: Trait Emotional Intelligence Questionnaire – Short Form

TEIQue-SF

Instructions: Please answer each statement below by putting a circle around the number that best reflects your degree of agreement or disagreement with that statement. Do not think too long about the exact meaning of the statements. Work quickly and try to answer as accurately as possible. There are no right or wrong answers. There are seven possible responses to each statement ranging from 'Completely Disagree' (number 1) to 'Completely Agree' (number 7).

1 . . . . . 2 . . . . . 3 . . . . . 4 . . . . . 5 . . . . . 6 7

Completely Disagree **Completely Agree**

1. Expressing my emotions with words is not a problem f	1	2	3	4	5	6	7
2. I often find it difficult to see things from another person's viewpoint.	1	2	3	4	5	6	7
3. On the whole, I'm a highly motivated person.	1	2	3	4	5	6	7
4. I usually find it difficult to regulate my emotions.	1	2	3	4	5	6	7
5. I generally don't find life enjoyable.	1	2	3	4	5	6	7
6. I can deal effectively with people.	1	2	3	4	5	6	7
7. I tend to change my mind frequently.	1	2	3	4	5	6	7
8. Many times, I can't figure out what emotion I'm feeling.	1	2	3	4	5	6	7
9. I feel that I have a number of good qualities.	1	2	3	4	5	6	7
10. I often find it difficult to stand up for my rights.	1	2	3	4	5	6	7
11. I'm usually able to influence the way other people feel.	1	2	3	4	5	6	7
12. On the whole, I have a gloomy perspective on most things.	1	2	3	4	5	6	7
13. Those close to me often complain that I don't treat them right.	1	2	3	4	5	6	7
14. I often find it difficult to adjust my life according to the circumstances.	1	2	3	4	5	6	7
15. On the whole, I'm able to deal with stress.	1	2	3	4	5	6	7
16. I often find it difficult to show my affection to those close to me.	1	2	3	4	5	6	7
17. I'm normally able to "get into someone's shoes"	1	2	3	4	5	6	7

and experience their emotions.							
18. I normally find it difficult to keep myself motivated.	1	2	3	4	5	6	7
19. I'm usually able to find ways to control my emotions when I want to.	1	2	3	4	5	6	7
20. On the whole, I'm pleased with my life.	1	2	3	4	5	6	7
21. I would describe myself as a good negotiator.	1	2	3	4	5	6	7
22. I tend to get involved in things I later wish I could get out of.	1	2	3	4	5	6	7
23. I often pause and think about my feelings.	1	2	3	4	5	6	7
24. I believe I'm full of personal strengths.	1	2	3	4	5	6	7
25. I tend to "back down" even if I know I'm right.	1	2	3	4	5	6	7
26. I don't seem to have any power at all over other people's feelings.	1	2	3	4	5	6	7
27. I generally believe that things will work out fine in my life.	1	2	3	4	5	6	7
28. I find it difficult to bond well even with those close to me.	1	2	3	4	5	6	7
29. Generally, I'm able to adapt to new environments.	1	2	3	4	5	6	7
30. Others admire me for being relaxed.	1	2	3	4	5	6	7

Appendix B: Project Success Measure

The questionnaire should take you 5 minutes to complete. Your participation in this questionnaire will be kept entirely confidential. No personal data is requested in the questionnaire. The information you provide will be used in aggregated statistical data that will enable the researcher to analyze the relationship between project management performance and project success. Please be as open, fair and honest as you can be in your responses.

Project Success

Please choose a recently completed project. Within the context of this project, please indicate the extent to which the project achieved the objectives stated below:

1. Project Efficiency	**Strongly Agree**	**Agree**	**Neutral**	**Disagree**	**Strongly disagree**
a. The project was completed on time					
b. The project was completed on budget					
c. The completed project was managed in an efficient manner					
2. Impact on the Customer	**Strongly Agree**	**Agree**	**Neutral**	**Disagree**	**Strongly disagree**
a. The project met functional performance requirements					
b. The project met technical specifications					
c. The project fulfilled customer's needs					
d. The customer is using the product					
e. The customer was highly satisfied					
f. The project improved the customer's performance					
g. There is a high chance that the customer would come back for additional business					
3. Impact on the Project Team	**Strongly Agree**	**Agree**	**Neutral**	**Disagree**	**Strongly disagree**
a. Team members felt fulfilled and able to grow personally and professionally by working on this project					
b. Team members were highly energized at the end of the project (rather than exhausted)					
c. The project increased the loyalty of team members to the organization					
4. Business Success	**Strongly Agree**	**Agree**	**Neutral**	**Disagree**	**Strongly disagree**
a. The project resulted in commerical success for the organization					
b. The project increased the organization's profitability or helped other organizational goals (for example, incrased organizational assets or increased operational capabilities					
c. The project improved organizational reputation and stature					
d. The project increased the organization's market share					
5. Perparing for the Future	**Strongly Agree**	**Agree**	**Neutral**	**Disagree**	**Strongly disagree**
a. The project will lead to additional new business or new products or services					
b. The project will help create new markets or new customers/ users and increase organizational outreach					
c. The project created new technologies or new cpaabilities for future use					
d. The organization learned many lessons from the project to improve future performance					