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Goleman-Boyatzis Model of Emotional Intelligence for Dealing with Problems in Project Management

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Abstract

As projects grow in size and complexity the sizes of teams needed to manage them also increases. This places greater emphasis on the need for the project manager to develop people management skills, commonly called soft skills, of which emotional intelligence (EI) has been recognised as an important component. The objective of this research was to investigate the relevance of the Goleman-Boyatzis model of EI in dealing with the problems in large projects identified via a literature review. To achieve this end, a Delphi study using project managers who had been involved in the management of projects in excess of $500 million was used. The responses from the Delphi panel were analysed and the results showed that the competencies contained in the Goleman-Boyatzis model had a relevance of 95% or greater to the problems presented to the panel. A ranking of the various competencies contained within the model was also developed, some competencies being found to be more important than others. By confirming the importance of emotional intelligence, as described by the model, this research adds to the understanding of the necessary skills needed by a project manager to successfully manage large projects.

Keywords

Project management, Delphi study, emotional Intelligence

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Introduction

A Guide to the Project Management Body of Knowledge (PMBoK) defines a project as "a temporary endeavour undertaken to create a unique product, service or result" (PMI, 2013, Ch1, Sect 1.2). Thus, the skills identified in PMBoK are generally of a technical nature and referred to as hard skills. Whilst PMBoK is considered the authority for "hard" skills, project management involves the co-ordination of people. Thus, Goodman offers a more appropriate definition as "a set of diversely skilled people working together on a complex task over a limited period" (1976, p. 494). This latter definition has the advantage of emphasising that a team of individuals are involved in a joint endeavour and, thus, skills involving the management of people, called soft skills, are required. One of these skills is EI.

Reviews of the usage of skills contained in PMBoK, and their effectiveness, have been conducted by several authors including Crawford (2000), Gowan and Mathieu (2005), Crawford and Pollack (2007), and Papke-Shields et al. (2010). The need for soft skills, in general, as opposed to EI has been discussed in several papers (Azim et al., 2010; Gillard, 2009; Pant and Baroudi, 2008). The specific application of EI to project management, regarding a construction environment, has been the subject of several works which are summarised in Table 1. As Table 1 clearly shows the body of knowledge relating to EI in project management is expanding and this research adds to that knowledge by investigating the relevance of EI to the management of large projects using the Goleman-Boyatzis model of EI (Goleman, Boyatzis and McKee, 2013).

Table 1 Summary of papers discussing the role of EI in project management

Paper	Contribution
(Dainty, Cheng and Moore, 2005)	This study identified 12 core competencies for successful projects management. Whilst this study did not discuss EI, it is interesting to note that 10 of the 12 competencies are contained in the Goleman-Boyatzis model of EI.
(Mount, 2006)	This study of an international business found that EI was a contributor to superior performance in the company's project managers.
(Butler and Chinowsky, 2006)	This study used EIQ-i that is based on the Bar-On EI model to review the EI attributes of construction executives. It concluded the top three attributes were stress tolerance, independence, and optimism; the bottom three were empathy, interpersonal skills, and social.
(Koman and Wolff, 2008)	This study found that team performance was related to the EI of the team leader via the leader creating emotionally competent group norms.
(Clarke, 2010a)	After controlling for cognitive ability, EI was found to be positively associated with the project manager's ability to develop teamwork and manage conflict.

Table 1 continues on the next page

Table 1 (*Continued*)

Paper	Contribution
(Lindebaum and Cartwright, 2010)	The study found no relationship between transformational leadership (TFL) and EI. The paper suggests that one explanation for this may be the different requirement for managerial behaviour in the context of the construction industry.
(Anantatmula, 2010)	In his literature review, the author identified the following people-related factors as having been shown to be important to project success: clear communications, defined roles, and responsibilities, clearly communicated expectations, the establishment of trust, employee support and processes that reduce ambiguity.
(Clarke, 2010b)	This study reviewed the project managers' awareness of their team members' emotional state and the impact that awareness had on their decisions.
(Fisher, 2011)	Although not identified as such, EI issues scored highly in this paper that reviewed the skills practitioners found important in being an effective manager.
(Hobbs and Smyth, 2012)	This paper used the Goleman-Boyatzis model to examine the working relationship on a large construction project and found that EI, as depicted by this model, assisted the project's collaborative working strategy.
(Lindebaum and Jordan, 2012)	This study found that EI was only one of the necessary competencies required of a project manager in the construction industry. In addition, cognitive competencies are also important.
(Muller, Geraldi and Turner, 2012)	This study found that relationship between EI and project success was moderated by projects involving creating something unique, solving new problems, or dealing with high uncertainty.
(Druskat and Druskat, 2012)	The authors provide a discussion of the unique nature of projects and the effect this nature has on the project manager's EI skills.
(Boot-Handford and Smyth, 2013)	This study examines the impact of EI factors on the development of trust in the rail construction industry in the U.K. and found that EI had a positive impact.
(Obradovic et al., 2013)	This study of 75 project managers in Siberia found a high correlation between EI and professional success.
(Mazur et al., 2013)	This study reviewed megaproject (>$1 billion in value) project managers and found a relationship between EI, cognitive flexibility and project success.

Table 1 continues on the next page

Table 1 (*Continued*)

Paper	Contribution
(Kerzner, 2013)	Although not dealing specifically with EI, the author notes that projects fail to meet cost and time target due to motivational issues, poor morale, a lack of commitment and poor human relations.
(Vierimaa, 2013)	Research reported in this thesis conducted interviews with project managers and found that most those interviewed believed emotions played an important part in leadership.
(Zhang and Fan, 2013)	This study tested 11 of the competencies in Goleman-Boyatzis model and found support for the hypothesis that their possession by the project manager increased the likelihood of project success.
(Chang et al., 2015)	The research surveyed 370 respondents from 40 complex projects and found that team leadership EI is significantly positively correlated with project team members' rating of project success and that leadership teams' maximum EI is the best indicator.

A major advantage of this model is that the competencies it contains are situationally dependent. "It is not necessary to be competent in all 18 competencies. Research indicates the demands for emotional competencies are context specific" (Druskat and Druskat, 2012, p. 92). It is therefore possible to identify the context-specific competencies applicable to project management and thereby establish the relevance of the model in a project management context.

Emotional Intelligence

The underlying concepts of EI were published by Mayer and Salovey (1989; 1993; 1995; Mayer, Salovey and Sluyter 1997). In their original paper on emotional intelligence, EI was defined as "the subset of social intelligence that involves the ability to monitor one's own and others' feelings and emotions, to discriminate among them and to use this information to guide one's thinking and actions" (Mayer & Salovey (1989, p. 189). In a later paper, this definition was modified to: "Emotional intelligence concerns the ability to carry out accurate reasoning about emotions and the ability to use emotions and emotional knowledge to enhance thought" Mayer and Roberts (2008, p. 510).

Mayer and Salovey have attempted to position EI as ability based as opposed to trait or competency based. This stance has been criticised, and it has been suggested that EI as described by Mayer and Salovey is not a true ability. This is particularly the case if a self-reported measurement is used. See, for example, (Brody, 2004; Côté, 2010; Freudenthaler and Neubauer, 2007; Keele and Bell, 2008; Locke, 2005; Petrides, 2010; 2011).

Others, however, argue that the Mayer and Salovey model is indeed ability based (Cherniss, 2010; Cote and Miners, 2006; Daus and Ashkanasy, 2005; Joseph and Newman, 2010; Kong, 2014; Mayer, Caruso and Salovey, 1999; Mayer, Salovey and Caruso, 2004; 2008; Mayer et al., 2001; Newman, Joseph and MacCANN, 2010)

Mayer and Salovey's work was later popularised by Goleman (1995; 1996). Since that time, other models of EI have been developed. The most significant being by Bar-On (1988; 2000; 2006), Dulwich and Higgs (2004) and Petrides and Furnham (2001). These other models treat EI as a trait or a competency or a mixture of both traits and competencies, these later constructs being referred to as mixed models. Some authors (Cherniss, 2010; Joseph and Newman, 2010; Newman, Joseph and MacCANN, 2010) have suggested using the term EI to refer to ability-based models and emotional and social competence (ESC) to refer to mixed models as a means of differentiating the two constructs.

EI MEASUREMENT

It has been suggested that measurement of EI should be considered as originating from three distinct streams (Ashkanasy and Daus, 2005).

The results for stream 1 are generally obtained using the Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT). The test involves scoring against results determined by a panel of experts. Regarding such a test as objective has issues that have been noted by several authors including (O'Sullivan and Ekman, 2004; Ortony, Revelle and Zinbarg, 2007; Roberts, Zeidner and Matthews, 2001). The results may be affected by conformity to social norms (Matthews et al., 2006), theoretical knowledge about emotions (Austin, 2010), or stereotypical judgements (O'Sullivan, 2007).

Stream 2 results are obtained using the Self-reporting of Emotional Intelligence (SREI) that is based on the Meyer-Salovey model. The relationship between self-reported EI and results from MSCEIT have not been found to be strongly correlated (Brackett et al., 2006). A more recent study found that significant variance in results using SREI could be accounted for by personality and emotional well-being measures, while those from MSCEIT were largely related to IQ and only to a much lesser extent (14%) to personality and emotional well-being measures (Webb et al., 2013).

Stream 3 contains results from self-reporting tests that are based on models using competencies or traits or a combination of both. The most significant of these test are: (1) SREI (Schutte's self-reporting emotional intelligence test) used to measure ability EI; (2) EQ-i used to measure ESC as defined in the Bar-On model; (3) ECI-2 (Emotional competency inventory, version 2) used to measure EI competencies in the Goleman-Boyatzis model; (4) TEIQue (Trait emotional intelligence questionnaire) used with the Petrides and Furnham model; and (5) EIQ (Emotional quotient inventory) used in conjunction with the Dulwich and Higgs model.

The additional problems caused by the use of self-reporting tests for EI, as compared with a more objective test, has also been the subject of several papers (Boyatzis and Sala, 2004; Bratton, Dodd and Brown, 2011; Dunning, Heath and Suls, 2004; Freudenthaler and Neubauer, 2007; Grubb III and McDaniel, 2007; Harms and Credé, 2010a; b; Hoegl, Weinkauf and Gemuenden, 2004; Jacobs, Szer and Roodenburg, 2012; Kong, 2014; Siegling, Sfeir and Smyth, 2014; Tett et al., 2012). The problems identified in these papers includes the following:

- Results obtained when EI was compared to leadership ability using a single-source method were different from results comparing leadership and EI using two separate self-reporting sources.
- Other peoples' views of an individual's performance are more reliable than their self-reports. Problems with self-reporting include a large percentage of people rating

themselves as above average, overestimating the chance of them behaving in desirable ways and providing optimistic estimates of when projects will be completed.
- Respondents with a higher IQ can anticipate the desired responses of a particular position and adjust their responses accordingly.
- Understanding of how to behave emotionality (contained in self-reported tests) is not matched by actual emotional performance.
- Females tend to overestimate their EI scores more than males.
- Personality factors influence the accuracy of self-reporting.
- Ability EI is moderated by age and sex.
- Actual performance is higher for managers who underestimate their EI than for those who overestimate their EI.

Despite the issues identified all the models have achieved a measure of predictive validity (McEnrue and Groves, 2006; O'Boyle et al., 2011).

OTHER ISSUES

Other issues that must be addressed are: Can EI be differentiated from IQ and the Big Five personality dimensions (openness to experience, conscientiousness, extraversion, agreeableness, and neuroticism) (McCrae and Costa, 1985)? and can EI be developed?

EI COMPARISON WITH THE BIG FIVE PERSONALITY DIMENSIONS (PERSONALITY FACTORS)

Law et al. (2004) found EI does indeed measure emotion-related abilities that are distinct from personality traits, and EI is related to, but distinct from, the Big Five personality dimensions. Grubb III and McDaniel (2007) found, regarding the Bar-On model, that EI did not have predictive validity when compared to the Big Five personality dimensions.

Trait EI also has incremental predictive validity when compared with the Big Five personality dimensions, as well as when compared with the Eysenckian Giant Three dimensions (Petrides, Pita and Kokkinaki, 2007; Siegling et al., 2015). This work was confirmed in a meta-analysis (O'Boyle et al., 2011) that found that all the major measurements of EI had incremental predictive validity when compared to the Big Five personality dimensions. An alternative view is offered in a paper by Webb et al. (2013) that concluded that the Big Five dimensions could account for 62% of results from the EQ-I test but only 14% of results from the MSCEIT.

CAN EI BE DEVELOPED?

The result of training to improve EI was reviewed by McEnrue et al. (2010) who found previous research did not provide conclusive evidence that EI could be learned due to such issues as lack of a control group, limited training duration and measurement of trait EI as opposed to measurement of ability EI. Goleman et al. (2012) and Boyatzis and Sala (2004) make the assertion that EI is thought to increase with age. In doing this, the authors are referring to the Goleman and Boyatzis model. For other examples of EI increasing with training, see (Boyatzis and Saatcioglu, 2008; Clarke, 2010c; Kotsou et al., 2011; Martins, Ramalho and Morin, 2010; Nelis et al., 2011; Nelis et al., 2009; Reuben, Sapienza and Zingales, 2009; Sala, 2005) and Schutte et al. (2013), who provide a comprehensive review of the effect of training on EI and ESC.

GOLEMAN AND BOYATZIS MODEL

Goleman's original model of EI (1995; 1998) contained 27 competencies. Based on research involving 596 individuals intended to integrate the work of Goleman (1995; 1998) and Boyatzis (1982), the original 27 competencies were later reduced to 18 competencies. The following definition of EI was offered:

> **Emotional intelligence is observed when a person demonstrates the competencies that constitute self-awareness, self-management, social awareness and social skills at appropriate times and ways in sufficient frequency to be effective in the situation. (Boyatzis, Goleman and Rhee, 2000, p. 3).**

In his discussion of this model, Boyatzis (2008; 2009) defines a competency as a capability or ability that is a set of related but different behaviours organised around an underlying construct called the intent (Boyatzis, 2008; 2009). This concept is used to differentiate different types of behaviours; for example, that of asking questions and listening to the answers. This may be performed with the intent of understanding another individual and thereby demonstrating empathy or that of merely appearing interested as a means of ingratiation.

Their model identifies the competencies associated with awareness of the self and others and the management of one's self and others. It is summarised in Table 2, which is adapted from Goleman et al. (2013).

The nature of projects

As previously noted projects are temporary endeavours involving people. In today's environment, major project activities such as design, procurement and construction often take place in different locations. Finally, the requirements of tight timeframes, lack of complete information or lack of project definition when the project commences also bring their own problems. The impact of these factors is discussed in more detail in the following three sections.

THE IMPACT OF TIME

The impact of time on organisations has been recognised by several academics. Issues identified include the choice of the timescale over which an event is measured Zaheer et al. (1999), the effect of the time interval considered on a leader's performance Shamir (2011). Other issues suggested by George and Jones (2000) are summarised Table 3.

The need to recognise projects as temporary organisations was initially discussed by Packendorff (1995) and Lundin and Söderholm (1995). This initial work has been expanded to include the impact of time on trust (Meyerson, Weick and Kramer, 1996), Druskat and Druskat (2012), Winch (2010, p. 96), Vierimaa (2013), team members' organisational backgrounds, disciplines, and cultures Druskat and Druskat (2012) and lack of experience in working together Pryke and Smyth (2012).

Other issues identified include the impact on teams of them being drawn together for a relatively short period from the larger organisation (Hanisch and Wald, 2014; Tyssen, Wald and Spieth, 2013) and the need to resolve stakeholder conflicts in a reasonable timeframe Turner and Muller (2003).

THE IMPACT OF GEOGRAPHIC LOCATION

In addition to the effects of time on project teams, the different geographical locations of the teams involved in the design, management, procurement, and construction can be a factor. This issue was addressed by Vergburg et al. (2013) who concluded that for the successful

Table 2 Summary of the Goleman-Boyatzis model of EI

	Self	Other
Awareness	Self-awareness: reading you own emotions together and recognising their impact. Emotional self-awareness: recognising our emotions and their effects on personal performance including recognition of a tendency to avoid issues or situations that cause us discomfort. Accurate self-assessment: knowing our strengths and limits. Self-confidence: a strong sense of one's self-worth and capabilities.	Social awareness: attuned to how others feel. Empathy: understanding others' feelings and perspectives and taking an active interest in their concerns. Organisational awareness: understanding the organisation's issues, dynamics, and politics. Services orientation: recognising and meeting customer needs.
Management	Self-management: focused control towards the achievement of goals. Emotional self-control: keeping disruptive emotions and impulses under control. Transparency: maintaining integrity and acting congruently with one's values. Optimism: persistence in pursuing goals despite obstacles and setbacks. Adaptability: the ability to adapt to change and work effectively as circumstances change. Achievement orientation: the drive to meet an internal standard of excellence. Initiative: the readiness to act in order to seize an opportunity.	Relationship management: the ability to guide the emotional tone of the group. Developing others: sensing others' development needs and bolstering their abilities. Inspirational leadership: inspiring and guiding others either as a group or an individual. Influence: the ability to persuade others. Change catalyst: initiating or managing change. Conflict management: resolving disagreements when they occur or preventing a disagreement from happening or growing. Teamwork and collaboration: working with others towards shared goals and guiding the group to achieve a collective goal.

Table 3 The six dimensions of time adapted from George and Jones (2000)

Dimension	Description	Example
Past, future and present and subjective experience of time.	How is the past, future and present represented or understood?	What is the impact of experience and expectations on current behaviour?
Time aggregations.	How, in time, is the event meaningfully aggregated or bracketed?	When making a decision, does a person choose to remember particular experiences (good or bad) and associate them with their current decision?
Duration of steady states and rates of change.	What is the duration of the observed event and what is its rate of change?	How long does a person remain motivated? What is the rate of the change of their motivation?
Incremental and discontinuous change.	Does the observed event change in an incremental or discontinuous manner?	Is there a sudden or gradual increase in trust or motivation?
Frequency, rhythm, and cycles.	Does the observed event change in a rhythmic or in a cyclical fashion over time?	Does motivation vary as project duration varies?
Spirals and intensity.	Does the observed event vary in intensity, or does it spiral over time?	Does motivation reach a peak and then spiral down?

completion of geographically dispersed projects, the following human factors were important: clarity of communication, project management style and competence, obtaining organisational support and the ability to build trust. Similar findings have been presented in papers on this topic by (Cramton and Webber, 2005; Hertel, Geister and Konradt, 2005; Lee-Kelley and Sankey, 2008; MacGregor, 2005; Montoya et al., 2009). Again, key issues of these findings relate to human interaction rather than technical issues.

PROBLEMS IN PROJECT DECISION-MAKING

In addition to the impact of time and geographic dispersion several factors have been identified as impacting on project decision-making. These factors are: degree of ambiguity and uncertainty due to a lack of knowledge and experience associated with the project (Yeo, 1993), uncertainty and risk (Tyssen, Wald and Spieth, 2014), fundamental uncertainties that exist in project scope (Atkinson, Crawford and Ward, 2006), and the changing nature of projects (Anantatmula, 2010).

Additionally, a major topic of discussion in the UK initiative entitled "Rethinking Project Management", as reported by Atkinson et al. (2006), was the fundamental uncertainties that exist in project scope, all of which have an impact on project decision-making. This uncertainty was attributed to several issues including: lack of initial clarity in the project definition; lack

of experience with the activities required for the project; the occurrence of unplanned events; stakeholders' expectations; availability and experience of project resources; development and implementation of a control system; development and implementation of a project plan; and leadership and communication issues.

The works concerning the nature of projects discussed above have been reviewed and the following resultant project characteristics identified (Livesey 2016):

- Limited time duration for building a team, developing rapport with stakeholders, obtaining organisational support and building a working control system;
- The temporary nature of the project team formed within time constraints results in the need to blend team members from different professional and social backgrounds, and understand and develop relationships with stakeholders who are also from different backgrounds. All of whom may be in different geographic locations;
- The unique nature of the project requiring a solution in a condensed time frame puts pressure on the team to understand a particular project's requirements;
- The frequent lack of definition, often due to time constraints, results in considerable ambiguity and changes to scope coupled with changes to team membership. Changes in the external environment can exacerbate these problems.
- Team structure and stakeholder organisation may change as the project progresses due to a variety of forces including: pressure from competing projects, identification of additional or redundant skill sets and natural attrition. All resulting issues must be solved within the given timeframe for the project;
- Conflict results from communication problems, scope, and personnel changes.

Research method

To obtain a synthesised view of those project managers who had been involved with large projects it was decided to use a Delphi study. The original promoters of the Delphi technique for use by experts defined the method as "a method used to obtain the most reliable consensus of opinion of a group of experts by a series of intensive questionnaires interspaced with controlled feedback" (Dalkey and Helmer, 1963, p. 458). The application of the Delphi technique is described in detail by Linstone and Turoff (1979), and its further use as a research tool is discussed by Skulmoski et al. (2007). The construction of the survey was reviewed by Fink (2009).

The characteristics of a typical Delphi study have been described by several authors (Gordon, 1994; Jung-Erceg et al., 2007; Keeney, Hasson and McKenna, 2011; Rowe and Wright, 1999).

A pilot Delphi study was based on the problems identified in the literature review. Results from this pilot study were used to develop an E-Delphi (SurveyMonkey). Selection of the panel was based on the following criteria: over twenty years of experience in the management of mining or infrastructure. Participants had worked on projects acting either for the client or contractors. The type of contract, EPCM, Lump Sum, etc. on which the potential panel member had worked were not used as selection criteria.

The above criteria resulted in the selection of a panel size of 25 members of which 22 responded to the issues raised in this study, the demographics of the panel are summarised in Table 4. To ensure anonymity the panel members were unaware of the identity of the other panel members or the author of any of the comments received during the study.

The Goleman-Boyatzis model (Goleman, Boyatzis and McKee, 2013), as summarised in Table 2, together with background examples to give context, were presented to the panel

Table 4 Delphi panel members' demographics

Aspect	Percentage
Project involvement working for contractors	34%
Project involvement working for clients	37%
Project involvement working for consultants	29%
Degree qualified	91%
Certified in project management (all certified members were also degree qualified).	19%
Over 60 year of age	50%
50-60 years of age	40%
40-50 years of age	10%
Male	95%

in four rounds. In each round, the panel members were asked to rank the various competency clusters in order of importance in dealing with the problems in project management identified in the literature. The problems and the resultant issues that the panel members were asked to consider are summarised in Table 5. Details of the study design have been reported elsewhere (Livesey, 2016b).

The respondents were given the option of deciding that a specific competency was not relevant in dealing with a problem and in a prior round panel members had been asked to confirm that they had experienced these problems in their practice of project management (Livesey, 2016a). In addition to ranking the competencies, the panel members were encouraged to comment on the relevance of the competencies to the problems presented in each round. Whilst it is accepted that team members are also stakeholders, it was decided to analyse them as a subset of stakeholders because they have different motivations and relationships with the project manager than other stakeholders. For example, it is possible to remove a disgruntled member of the team from a project but a disgruntled stakeholder, who is not a team member, must be dealt with on a continuing basis.

Results and analysis

In ranking the panel members' responses, the relative importance index as reviewed by (Holt, 2013) and used in construction projects by other researchers (Gündüz, Nielsen and Özdemir, 2012; Kometa, Olomolaiye and Harris, 1994; Sambasivan and Soon, 2007) was used. The relative importance index being based on the following formula:

$$\text{Relative importance index} = \frac{\text{sum of the score given to the competency by respondents}}{\text{maximum score that a competency could have received.}}$$

To analyse the statistical significance of the difference in EI rankings obtained in the rounds of the Delphi study, the Friedman test was employed. Where appropriate, based on the Friedman test results, a post hoc test was performed using the Wilcoxon signed-rank test. Both tests are deemed appropriate for ordinate and continuous data. For a discussion of these tests, see (Sheldon, Fillyaw and Thompson, 1996; Zimmerman and Zumbo, 1993).

Table 5 Problems considered by the Delphi panel

Fundamental problem	Resultant impact of the problem considered in the evaluation
The project's limited time frame.	Building a cohesive team. Building trust within the team. Developing rapport with stakeholders. Developing a working control system. Obtaining organisational support.
The team members' diverse backgrounds	Team members' personal goals and resultant personal agendas. Team members' cultural backgrounds. Team members' professional backgrounds. Team members' communication needs. Team members' different geographic locations. Team members' native language differences.
The stakeholders' diverse backgrounds.	Stakeholders' personal goals and resultant personal agendas. Stakeholders' cultural backgrounds. Stakeholders' professional backgrounds. Stakeholders' communication needs. Stakeholders' different geographic locations. Stakeholders' native language differences.
The unique nature of each project	Understanding the issues involved in the particular project. Managing internal stakeholder expectations. Managing external stakeholder expectations. The belief that you and the project team can solve the project's problems.
Ambiguity and change.	Lack of a clearly defined project scope. Scope changes as the project progresses. Lack of information to make a fully informed decision. Team member changes. Unexpected and unforeseen events (e.g., subcontractor goes bankrupt). Changes in the external environment (e.g., legislative and economic).
Changes in the project team and stakeholder personnel	Loss of a cohesive team. Loss of trust between team members. Loss of relationships with key stakeholders.
Conflicts (the disagreements that arise prior to a formal dispute).	Those arising internal to the team. Those arising external to the team but internal to the parent organisation. Those arising with subcontractors. Those arising with other stakeholders.

In both tests, the hypotheses used were the null hypothesis (H0), that there is no difference in the distributions; and the alternative hypothesis (Ha), that there is a difference in the distributions. To test these hypotheses, a p-value of 0.05 was used.

Table 6 presents the importance index results for the self-awareness cluster. The above importance index rankings appeared very close. To check the statistical significance of the rankings, a Friedman test was performed. The results were $\chi 2(2) = 0.074$ and $p = 0.964$. Based on this, the null hypothesis was accepted, leading to the conclusion that there was no statistically significant difference in the EI rankings for the individual competencies in this cluster. The panel found the EI competencies in this cluster were 97% relevant in dealing with the project problems posed to them.

In discussing this cluster, the importance of self-confidence was the subject of commentary from the panel that is summarised below:

> **Self-confidence is fundamental to developing a following (trust, rapport, etc.) in a team. Who could be confident in a leader if the leader is not confident in him/herself? (Response 1)**
>
> **Self-confidence to work in different spaces and places. This includes being able to trust. (Response 2)**
>
> **Lack of self-confidence in a conflict can quickly make one a victim. Understanding what you know and what you can contribute is key. Assertiveness not aggression. (Response 3)**

Tables 7 summarises the results for the self-management cluster. To check the statistical significance of the rankings, a Friedman test was performed. The results were $\chi^2(5) = 19.327$

Table 6 Importance index for competencies in the self-awareness cluster

Problem Considered	Competency		
	Emotional self-awareness (E1)	Accurate self-assessment (E2)	Self-confidence (E3)
The project's limited time frame	0.65	0.68	0.65
The diverse team members' backgrounds	0.72	0.67	0.56
The stakeholders' diverse backgrounds	0.67	0.63	0.69
The unique nature of each project.	0.60	0.67	0.72
Ambiguity and change	0.64	0.71	0.61
Changes in project team and stakeholder personnel	0.65	0.61	0.72
Conflicts	0.84	0.60	0.56
Average	0.68	0.65	0.66
Rank	1	3	2

Table 7 Importance index for competencies in the self-management cluster

Problem Considered	Competency					
	Emotional self-control (E4)	Trustworthiness/ Transparency (E5)	Achievement orientation (E6)	Adaptability (E7)	Initiative (E8)	Optimism (E9)
The project's limited time frame	0.59	0.74	0.65	0.55	0.38	0.58
The diverse team members' backgrounds	0.67	0.81	0.48	0.73	0.45	0.36
The stakeholders' diverse backgrounds	0.81	0.84	0.38	0.65	0.47	0.33
The unique nature of each project.	0.60	0.67	0.58	0.74	0.38	0.52
Ambiguity and change	0.72	0.46	0.47	0.68	0.58	0.59
Changes in project team and stakeholder personnel	0.66	0.76	0.47	0.68	0.40	0.51
Conflicts	0.86	0.75	0.44	0.59	0.42	0.43
Average	0.70	0.72	0.50	0.66	0.44	0.48
Rank	2	1	4	3	6	5

and p=0.02. Based on this, the null hypothesis was rejected, leading to the conclusion that there was a statistically significant difference in the EI rankings for the individual competencies in this cluster.

A Wilcoxon tests was performed on the apparent group edges to establish that competencies could be regarded as being ranked statistically different. The results of this are summarised in Table 8.

From the above analysis the panel, clearly, ranked emotional self-control, trustworthiness/transparency, and adaptability higher than optimism, achievement orientation and initiative. The panel found all competencies—except for initiative which scored 95%—to have a relevance to the problems in excess of 99%. In terms of commentary, the two comments below provide insight into panel members' views of the importance of adaptability and the interaction of competencies needed for success. Response 5 also relates to the need for consistent messaging. Response 6 was interesting in that it dealt with the combined impact of optimism and the need for developing trust.

> **Adaptability is critical because every matter planned will not work out as predicted. When a timeline is tight, adaptability (as in ability to implement change) is critical. Without this characteristic, fast-moving projects will move too far in the wrong direction before the necessary change is executed. (Respondent 4)**

> **A leadership role requires retention of the vision (i.e., the objectives). Retaining that common focus will develop team cohesion, ensure consistent internal and external messaging and garner wider organisational support. Optimism and initiative rank highest as the beacons to success. (Respondent 5)**

> **With a diverse team . . . building trust leads to open communication. Lack of trust shuts it down! Poring optimism into the discussion helps collaboration, leading to solutions/resolution of problems. (Respondent 6)**

Tables 9 summarises the results for the social awareness cluster. The results of a Friedman test were $\chi 2$ (2) =2.000 and p=0.368. The null hypothesis was therefore accepted, indicating there was no statistically significant difference in the overall EI rankings. The panel found the competencies in this cluster to be 100% relevant to dealing with the project questions considered.

The importance of service orientation and its necessary interaction with other competencies are summarised in the following comments received from panel members:

> **I place service orientation at the top because regardless of the effort that is put into team, if the customer's real needs are not understood, then all else will fail. PMs are not taught these skills, so they don't make time to set projects up for success from the beginning. (Respondent 7)**

Table 8 Wilcoxon test results for self-management cluster

EI competencies	Wilcoxon asymmetrical p value	Comment
E5 to E7	0.309	Accept null hypothesis
E7 to E6	0.028	Accept null hypothesis
E6 to E8	0.352	Accept null hypothesis

Table 9 Importance index for competencies in the social-awareness cluster

Problem Considered	Competency		
	Empathy (E10)	Service orientation (E11)	Organisational awareness (E12)
The project's limited time frame	0.58	0.60	0.82
The diverse team members' backgrounds	0.79	0.49	0.72
The stakeholders' diverse backgrounds	0.67	0.71	0.63
The unique nature of each project.	0.56	0.65	0.79
Ambiguity and change	0.60	0.75	0.65
Changes in project team and stakeholder personnel	0.74	0.46	0.81
Conflicts	0.68	0.53	0.79
Average	0.66	0.60	0.74
Rank	2	3	1

> **Service orientation is a given but to be truly successful awareness and empathy are essential. (Respondent 8)**

Tables 10 summarises the results for the relationship management cluster. The panel found the competencies, except developing others, in this cluster to be 99% relevant to dealing with the project questions considered. Developing others was found to be 95% relevant. To check the statistical significance of the rankings, a Friedman test was performed. The results were χ^2 (5) =24.33 and p=0.000. Based on this, the null hypothesis was rejected, leading to the conclusion that there was a statistically significant difference in the EI rankings for the individual competencies in this cluster.

Wilcoxon tests were performed on the apparent group edges to establish that competencies could be regarded as being ranked statistically different. The results of the Wilcoxon are summarised in Table 11.

This analysis indicates that the competencies have been ranked into three statistically significant groups with some overlap. Group 1 consists of inspirational leadership, teamwork, and collaboration, influencing others and conflict management. Group 2 consists of conflict management and change catalyst. Group 3 consists of developing others.

As indicated in the comments below, the interaction of the competencies in this cluster, particularly with respect to their impact on stakeholders, was highlighted by panel members.

> **A very complex area given the parameters of both internal and external stakeholders, influence, leadership, and teamwork are all paramount. Managing change is an essential skill as the project moves forward and new challenges are encountered. (Respondent 9)**

Table 10 Importance index for competencies in the relationship management cluster

Problem Considered	Competency					
	Influence (E13)	Inspirational leadership (E14)	Change catalyst (E15)	Conflict management (E16)	Teamwork & collaboration (E17)	Developing others (E18)
The project's limited time frame	0.69	0.76	0.44	0.51	0.76	0.31
The diverse team members' backgrounds	0.64	0.72	0.35	0.59	0.87	0.31
The stakeholders' diverse backgrounds	0.43	0.72	0.43	0.60	0.64	0.33
The unique nature of each project.	0.70	0.75	0.51	0.54	0.75	0.23
Ambiguity and change	0.60	0.74	0.75	0.62	0.60	0.17
Changes in project team and stakeholder personnel	0.61	0.78	0.49	0.49	0.75	0.37
Conflicts	0.68	0.70	0.46	0.86	0.59	0.21
Average	0.62	0.74	0.49	0.60	0.71	0.28
Rank	3	1	5	4	2	6

Table 11 Wilcoxon test results for the relationship management cluster

EI competencies tested	Wilcoxon asymmetrical *p* value	Comment
E14 to E16	0.090	Accept null hypothesis
E14 to E15	0.027	Reject null hypothesis
E17 to E15	0.043	Reject null hypothesis
E13 to E15	0.75	Accept null hypothesis
E16 to E15	0.116	Accept null hypothesis
E16 to E15	0.043	Reject null hypothesis
E16 to E18	0.018	Reject null hypothesis
E17 to E18	0.018	Reject null hypothesis

> Stakeholders need to see and feel a cohesive project delivery organisation. Weaknesses here allow stakeholders to increase influence (positive & negative), leading to change. Hence the importance of influence and strong (inspirational) leadership. (Respondent 10)

Finally, one significant comment was made regarding the interaction of EI and IQ.

> I think you should not downplay the degree of IQ necessary in dealing with some of the above challenges. The crucial point is that there will be a dynamic interplay of the EI and IQ when dealing with some of these problems. (Respondent 11).

Conclusion

The Delphi study confirmed the relevance of the competencies in the Goleman-Boyatzis model (Goleman et al. 2013) in dealing with the issues identified in project management resulting from the nature of a project. In doing so it moves the need for EI for a project manager, particularly one who hopes to manage larger projects, from a nice to have, to a necessity. Whilst all the competencies contained within the model were found to have a relevance of at least 95%, most of the competencies achieved a relevance of over 98%. Some differences were found between the various competency clusters. The most significant competency group was the social awareness cluster which was 100% relevant in dealing with the problems identified. The top four competencies with an importance index of 0.7 or over were: organisational awareness (0.74); trustworthiness (0.72); teamwork and collaboration (0,71); and emotional self-control (0.70). And the bottom four with score at 0.5 or below were: developing others (0.28); initiative (0.44); optimism (0.48); and achievement orientation (0.50).

References

Anantatmula, V.S. 2010, 'Project Manager Leadership Role in Improving Project Performance', *Engineering Management Journal; EMJ*, vol. 22 no. 1, p. 13.

Ashkanasy, N.M. & Daus, C.S. 2005, 'Rumors of the Death of Emotional Intelligence in Organizational Behavior Are Vastly Exaggerated', *Journal of Organizational Behavior*, vol. 26 no. 4, pp. 441-452, https://doi.org/10.1002/job.320

Atkinson, R., Crawford, L. & Ward, S. 2006, 'Fundamental Uncertainties in Projects and the Scope of Project Management', *International Journal of Project Management*, vol. 24 no. 8, pp. 687-698, https://doi.org/10.1016/j.ijproman.2006.09.011

Austin, E.J. 2010, 'Measurement of Ability Emotional Intelligence: Results for Two New Tests', *British Journal of Psychology*, vol. 101 no. 3, pp. 563-578, https://doi.org/10.1348/000712609X474370

Azim, S., Gale, A., Lawlor-Wright, T., Kirkham, R., Khan, A. & Alam, M. 2010, 'The Importance of Soft Skills in Complex Projects', *International Journal of Managing Projects in Business*, vol. 3 no. 3, pp. 387-401, https://doi.org/10.1108/17538371011056048

Bar-On, R. 1988, *The Development of A Concept of Psychological Well-Being*, Rhodes University

Bar-On, R. 2000, Emotional and Social Intelligence: Insights from the Emotional Quotient Inventory

Bar-On, R.M. 2006, 'The Bar-On Model of Emotional-Social Intelligence (ESI)', *Psicothema*, vol. 18 no. 1, pp. 13-25

Boot-Handford, N. & Smyth, H. 2013, Akademika Forlag

Boyatzis, R.E. 1982, *The Competent Manager: A Model for Effective Performance*: John Wiley & Sons

Boyatzis, R.E. 2008, 'Competencies in the 21st Century', *Journal of Management Development*, vol. 27 no. 1, pp. 5-12, https://doi.org/10.1108/02621710810840730

Boyatzis, R.E. 2009, 'Competencies as a Behavioral Approach to Emotional Intelligence', *Journal of Management Development*, vol. 28 no. 9, pp. 749-770, https://doi.org/10.1108/02621710910987647

Boyatzis, R.E., Goleman, D. & Rhee, K. 2000, 'Clustering Competence in Emotional Intelligence: Insights from the Emotional Competence Inventory (ECI)', *Handbook of Emotional Intelligence*, pp. 343-362

Boyatzis, R.E. & Saatcioglu, A. 2008, 'A 20-Year View of Trying to Develop Emotional, Social and Cognitive Intelligence Competencies in Graduate Management Education', *Journal of Management Development*, vol. 27 no. 1, pp. 92-108, https://doi.org/10.1108/02621710810840785

Boyatzis, R.E. & Sala, F. 2004, 'Assessing Emotional Intelligence Competencies', *The Measurement of Emotional Intelligence*, pp. 147-180

Brackett, M.A., Rivers, S.E., Shiffman, S., Lerner, N. & Salovey, P. 2006, 'Relating Emotional Abilities to Social Functioning: a Comparison of Self-Report and Performance Measures of Emotional Intelligence', *Journal of Personality and Social Psychology*, vol. 91 no. 4, p. 780, https://doi.org/10.1037/0022-3514.91.4.780

Bratton, V.K., Dodd, N.G. & Brown, F.W. 2011, 'The Impact of Emotional Intelligence on Accuracy of Self-Awareness and Leadership Performance', *Leadership & Organization Development Journal*, vol. 32 no. 2, pp. 127-149, https://doi.org/10.1108/01437731111112971

Brody, N. 2004, 'What Cognitive Intelligence is and What Emotional Intelligence is Not', *Psychological Inquiry*, vol. 15 no. 3, pp. 234-238

Butler, C.J. & Chinowsky, P.S. 2006, 'Emotional Intelligence and Leadership Behavior in Construction Executives', *Journal of Management in Engineering*, vol. 22 no. 3, pp. 119-125, https://doi.org/10.1061/(ASCE)0742-597X(2006)22:3(119)

Chang, A., Mazur, A., Jordan, P., Barbour, J. & Ashkanasy, N. 2015, Is Member-Rated Project Success Influenced by Leadership Team Emotional Intelligence? *Poster Session Presented at. 30th Annual Conference of the Society for Industrial and Organizational Psychology*. Philadelphia, Pennsylvania

Cherniss, C. 2010, 'Emotional Intelligence: Toward Clarification of a Concept', *Industrial and Organizational Psychology*, vol. 3 no. 2, pp. 110-126, https://doi.org/10.1111/j.1754-9434.2010.01222.x and https://doi.org/10.1111/j.1754-9434.2010.01231.x

Clarke, N. 2010a, 'Emotional Intelligence and its Relationship to Transformational Leadership and Key Project Manager Competences', *Project Management Journal*, vol. 41 no. 2, pp. 5-20, https://doi.org/10.1002/pmj.20162

Clarke, N. 2010b, 'Projects are Emotional: How Project Managers' Emotional Awareness can Influence Decisions and Behaviours in Projects', *International Journal of Managing Projects in Business*, vol. 3 no. 4, pp. 604-624, https://doi.org/10.1108/17538371011076073

Clarke, N. 2010c, 'The Impact of A Training Programme Designed to Target the Emotional Intelligence Abilities of Project Managers', *International Journal of Project Management*, vol. 28 no. 5, pp. 461-468, https://doi.org/10.1016/j.ijproman.2009.08.004

Côté, S. 2010, 'Taking the "Intelligence" in Emotional Intelligence Seriously', *Industrial and Organizational Psychology*, vol. 3 no. 2, pp. 127-130, https://doi.org/10.1017/S1754942600002133 and https://doi.org/10.1111/j.1754-9434.2010.01211.x

Cote, S. & Miners, C.T. 2006, 'Emotional Intelligence, Cognitive Intelligence, and Job Performance', *Administrative Science Quarterly*, vol. 51 no. 1, pp. 1-28, https://doi.org/10.2189/asqu.51.1.1

Cramton, C.D. & Webber, S.S. 2005, 'Relationships Among Geographic Dispersion, Team Processes, And Effectiveness in Software Development Work Teams', *Journal of Business Research*, vol. 58 no. 6, pp. 758-765, https://doi.org/10.1016/j.jbusres.2003.10.006

Crawford, L. 2000, Proceedings of PMI Research Conference.

Crawford, L. & Pollack, J. 2007, 'How Generic are Project Management Knowledge and Practice?', *Project Management Journal*, vol. 38 no. 1, pp. 87-97

Dainty, A.R., Cheng, M.-I. & Moore, D.R. 2005, 'Competency-Based Model for Predicting Construction Project Managers' Performance', *Journal of Management in Engineering*, vol. 21 no. 1, pp. 2-9 https://doi.org/10.1061/(ASCE)0742-597X(2005)21:1(2)

Dalkey, N. & Helmer, O. 1963, 'An Experimental Application of the Delphi Method to the Use of Experts', *Management Science*, vol. 9 no. 3, pp. 458-467, https://doi.org/10.1287/mnsc.9.3.458

Daus, C.S. & Ashkanasy, N.M. 2005, 'The Case for the Ability-Based Model of Emotional Intelligence in Organizational Behavior', *Journal of Organizational Behavior*, vol. 26 no. 4, pp. 453-466, https://doi.org/10.1002/job.321

Druskat, V. & Druskat, P. 2012, 'Applying Emotional Inteligence in the Workplace', in: S. Pryke & H. Smyth eds: Wiley-Blackwell

Dulewicz, S. & Higgs, M. 2004, 'Design of a New Instrument to Assess Leadership Dimensions and Styles', *Selection and Development Review*, vol. 20 no. 2, pp. 7-12

Dunning, D., Heath, C. & Suls, J.M. 2004, 'Flawed Self-Assessment Implications for Health, Education, and the Workplace', *Psychological Science in the Public Interest*, vol. 5 no. 3, pp. 69-106, https://doi.org/10.1111/j.1529-1006.2004.00018.x

Fink, A. 2009, *How to Conduct Surveys: A Step-By-Step Guide*: Sage

Fisher, E. 2011, 'What Practitioners Consider to Be the Skills and Behaviours of an Effective People Project Manager', *International Journal of Project Management*, vol. 29 no. 8, pp. 994-1002, https://doi.org/10.1016/j.ijproman.2010.09.002

Freudenthaler, H.H. & Neubauer, A.C. 2007, 'Measuring Emotional Management Abilities: Further Evidence of the Importance to Distinguish Between Typical and Maximum Performance', *Personality and Individual Differences*, vol. 42 no. 8, pp. 1561-1572, https://doi.org/10.1016/j.paid.2006.10.031

George, J.M. & Jones, G.R. 2000, 'The Role of Time in Theory and Theory Building', *Journal of Management*, vol. 26 no. 4, pp. 657-684, https://doi.org/10.1177/014920630002600404

Gillard, S. 2009, 'Soft Skills and Technical Expertise of Effective Project Managers', *Issues in Informing Science and Information Technology*, vol. 6 no. 7

Goleman, D. 1995, *Emotional Intelligence*: New York: Bantam Books

Goleman, D. 1996, *Emotional Intelligence: Why it can Matter More than IQ*: Bantam

Goleman, D. 1998, *Working with Emotional Intelligence*: Random House LLC

Goleman, D., Boyatzis, R. & McKee, A. 2013, *Primal Leadership: Unleashing the Power of Emotional Intelligence*: Harvard Business Press

Goleman, D., Welch, S. & Welch, J. 2012, *What Makes a Leader?*, Findaway World, LLC

Goodman, R.A. & Goodman, L.P. 1976, 'Some Management Issues in Temporary Systems: A Study of Professional Development and Manpower-the Theater Case', *Administrative Science Quarterly*, pp. 494-501, https://doi.org/10.2307/2391857

Gordon, T.J. 1994, The delphi method, *Futures Research Methodology*, 2

Gowan Jr, J.A. & Mathieu, R.G. 2005, 'The Importance of Management Practices in IS Project Performance: An Empirical Study', *Journal of Enterprise Information Management*, vol. 18 no. 2, pp. 235-255, https://doi.org/10.1108/17410390510579936

Grubb III, W.L. & McDaniel, M.A. 2007, 'The Fakability of Bar-On's Emotional Quotient Inventory Short Form: Catch me if you can', *Human Performance*, vol. 20 no. 1, pp. 43-59, https://doi.org/10.1080/08959280709336928 and https://doi.org/10.1207/s15327043hup2001_3

Gündüz, M., Nielsen, Y. & Özdemir, M. 2012, 'Quantification of Delay Factors Using the Relative Importance Index Method for Construction Projects in Turkey', *Journal of Management in Engineering*, vol. 29 no. 2, pp. 133-139, https://doi.org/10.1061/(ASCE)ME.1943-5479.0000129

Hanisch, B. & Wald, A. 2014, 'Effects of Complexity on The Success of Temporary Organizations: Relationship Quality and Transparency as Substitutes for Formal Coordination Mechanisms', *Scandinavian Journal of Management*, vol. 30 no. 2, pp. 197-213, https://doi.org/10.1016/j.scaman.2013.08.005

Harms, P.D. & Credé, M., 2010a. 'Emotional Intelligence and Transformational and Transactional Leadership: A Meta-Analysis', *Journal of Leadership & Organizational Studies*, vol. 17 no. 1, pp. 5-17, https://doi.org/10.1177/1548051809350894

Harms, P.D. & Credé, M., 2010b. 'Remaining Issues In Emotional Intelligence Research: Construct Overlap, Method Artifacts, and Lack of Incremental Validity', *Industrial and Organizational Psychology*, vol. 3 no. 2, pp. 154-158, https://doi.org/10.1111/j.1754-9434.2010.01217.x

Hertel, G., Geister, S. & Konradt, U. 2005, 'Managing Virtual Teams: a Review of Current Empirical Research', *Human Resource Management Review*, vol. 15 no. 1, pp. 69-95, https://doi.org/10.1016/j.hrmr.2005.01.002

Hobbs, S. & Smyth, H. 2012, Emotional Intelligence in Engineering Project Teams

Hoegl, M., Weinkauf, K. & Gemuenden, H.G. 2004, 'Interteam Coordination, Project Commitment, and Teamwork in Multiteam R&D Projects: A Longitudinal Study', *Organization Science*, vol. 15 no. 1, pp. 38-55, https://doi.org/10.1287/orsc.1030.0053

Holt, G.D. 2013, 'Asking Questions, Analysing Answers: Relative Importance Revisited', *Construction Innovation: Information, Process, Management*, vol. 14 no. 1, pp. 2-16

Jacobs, K.E., Szer, D. & Roodenburg, J. 2012, 'The Moderating Effect of Personality on the Accuracy of Self-Estimates of Intelligence', *Personality and Individual Differences*, vol. 52 no. 6, pp. 744-749, https://doi.org/10.1016/j.paid.2011.12.040

Joseph, D.L. & Newman, D.A. 2010, 'Emotional Intelligence: An Integrative Meta-Analysis and Cascading Model', *Journal of Applied Psychology*, vol. 95 no. 1, p. 54, https://doi.org/10.1037/a0017286

Jung-Erceg, P., Pandza, K., Armbruster, H. & Dreher, C. 2007, 'Absorptive Capacity in European Manufacturing: A Delphi Study', *Industrial Management & Data Systems*, vol. 107 no. 1, pp. 37-51, https://doi.org/10.1108/02635570710719043

Keele, S.M. & Bell, R.C. 2008, 'The Factorial Validity Of Emotional Intelligence: An Unresolved Issue', *Personality and Individual Differences*, vol. 44 no. 2, pp. 487-500, https://doi.org/10.1016/j.paid.2007.09.013

Keeney, S., Hasson, F. & McKenna, H. 2011, 'The Delphi Technique', *The Delphi Technique in Nursing and Health Research*, pp. 1-17, https://doi.org/10.1002/9781444392029.ch1

Kerzner, H.R. 2013, *Project Management: a Systems Approach to Planning, Scheduling, and Controlling*: John Wiley & Sons

Koman, E.S. & Wolff, S.B. 2008, 'Emotional Intelligence Competencies in the Team and Team Leader: A Multi-Level Examination of the Impact of Emotional Intelligence on Team Performance', *Journal of Management Development*, vol. 27 no. 1, pp. 55-75, https://doi.org/10.1108/02621710810840767

Kometa, S.T., Olomolaiye, P.O. & Harris, F.C. 1994, 'Attributes of UK Construction Clients Influencing Project Consultants' Performance', *Construction Management and Economics*, vol. 12 no. 5, pp. 433-443, https://doi.org/10.1080/01446199400000053

Kong, D.T. 2014, 'Mayer–Salovey–Caruso Emotional Intelligence Test (MSCEIT/MEIS) and Overall, Verbal, and Nonverbal Intelligence: Meta-Analytic Evidence and Critical Contingencies', *Personality and Individual Differences*, 66, pp. 171-175, https://doi.org/10.1016/j.paid.2014.03.028

Kotsou, I., Nelis, D., Grégoire, J. & Mikolajczak, M. 2011, 'Emotional Plasticity: Conditions and Effects of Improving Emotional Competence in Adulthood', *Journal of Applied Psychology*, vol. 96 no. 4, p. 827, https://doi.org/10.1037/a0023047

Law, K.S., Wong, C.-S. & Song, L.J. 2004, 'The Construct and Criterion Validity of Emotional Intelligence and its Potential Utility for Management Studies', *Journal of Applied Psychology*, vol. 89 no. 3, pp. 483-496, https://doi.org/10.1037/0021-9010.89.3.483

Lee-Kelley, L. & Sankey, T. 2008, 'Global Virtual Teams for Value Creation and Project Success: a Case Study', *International Journal of Project Management*, vol. 26 no. 1, pp. 51-62, https://doi.org/10.1016/j.ijproman.2007.08.010

Lindebaum, D. & Cartwright, S. 2010, 'A Critical Examination of the Relationship Between Emotional Intelligence and Transformational Leadership', *Journal of Management Studies*, vol. 47 no. 7, pp. 1317-1342, https://doi.org/10.1111/j.1467-6486.2010.00933.x

Lindebaum, D. & Jordan, P.J. 2012, 'Relevant but Exaggerated: the Effects of Emotional Intelligence on Project Manager Performance in Construction', *Construction Management and Economics*, vol. 30 no. 7, pp. 575-583, https://doi.org/10.1080/01446193.2011.593184

Linstone, H.A. & Turoff, M. 1979, *The Delphi Method: Tecniques and Applications*: Addison-Wesley Massachusetts

Livesey, P.V., 2016a. 'Insights of Project Managers Into the Problems in Project Management', *Construction Economics and Building*, vol. 16 no. 1, pp. 90-103, https://doi.org/10.5130/AJCEB.v16i1.4600

Livesey, P.V., 2016b, *The Role of Emotional Intelligence in the Management of Large Construction Projects*

Locke, E.A. 2005, 'Why Emotional Intelligence is an Invalid Concept', *Journal of Organizational Behavior*, vol. 26 no. 4, pp. 425-431, https://doi.org/10.1002/job.318

MacGregor, S.P. 2005, 'Achieving Project Management Success Using Virtual Teams', *Journal of Product Innovation Management*, vol. 22 no. 3, pp. 293-295, https://doi.org/10.1111/j.0737-6782.2005.125_1.x

Martins, A., Ramalho, N. & Morin, E. 2010, 'A Comprehensive Meta-Analysis of the Relationship Between Emotional Intelligence and Health', *Personality and Individual Differences*, vol. 49 no. 6, pp. 554-564, https://doi.org/10.1016/j.paid.2010.05.029

Matthews, G., Emo, A.K., Roberts, R.D. & Zeidner, M. 2006, 'What is this Thing Called Emotional Intelligence?', in: K.R. Murphy ed. *A Critique of Emotional Intelligence: What are the Problems and how can They be Fixed?*: Lawrence Erlbaum Associates Publishers. pp. 3-36

Mayer, J.D., Caruso, D.R. & Salovey, P. 1999, 'Emotional Intelligence Meets Traditional Standards for an Intelligence', *Intelligence*, vol. 27 no. 4, pp. 267-298, https://doi.org/10.1016/S0160-2896(99)00016-1

Mayer, J.D., Roberts, R.D. & Barsade, S.G. 2008, 'Human Abilities: Emotional Intelligence', *Annu. Rev. Psychol.*, 59, pp. 507-536, https://doi.org/10.1146/annurev.psych.59.103006.093646

Mayer, J.D. & Salovey, P. 1989, 'Emotional Intelligence', *Imagination, Cognition and Personality*, vol. 9 no. 3, pp. 185-211, https://doi.org/10.2190/DUGG-P24E-52WK-6CDG

Mayer, J.D. & Salovey, P. 1993, 'The Intelligence of Emotional Intelligence', *Intelligence*, vol. 17 no. 4, pp. 433-442, https://doi.org/10.1016/0160-2896(93)90010-3

Mayer, J.D. & Salovey, P. 1995, 'Emotional Intelligence and the Construction and Regulation of Feelings', *Applied and Preventive Psychology*, vol. 4 no. 3, pp. 197-208, https://doi.org/10.1016/S0962-1849(05)80058-7

Mayer, J.D. Salovey, P. & D. J. Sluyter 1997, *Emotional Development and Emotional Intelligence*, New York

Mayer, J.D., Salovey, P. & Caruso, D.R. 2004, TARGET ARTICLES:" Emotional Intelligence: Theory, Findings, and Implications". *Psychological Inquiry*, vol. 15 no. 3, pp. 197-215, https://doi.org/10.1207/s15327965pli1503_02

Mayer, J.D., Salovey, P. & Caruso, D.R. 2008, 'Emotional Intelligence: New Ability or Eclectic Traits?' *American Psychologist*, vol. 63 no. 6, p. 503, https://doi.org/10.1037/0003-066X.63.6.503

Mayer, J.D., Salovey, P., Caruso, D.R. & Sitarenios, G. 2001, 'Emotional Intelligence as a Standard Intelligence', *Emotion*, 1, pp. 232-242, https://doi.org/10.1037/1528-3542.1.3.232

Mazur, A., Pisarski, A., Chang, A. & Ashkanasy, N. 2013, Rating Defense Mega-Project Success: the Role of Personal Attributes and Stakeholder Relationships

McCrae, R.R. & Costa, P.T. 1985, 'Comparison of EPI and Psychoticism Scales With Measures of the Five-Factor Model of Personality', *Personality and Individual Differences*, vol. 6 no. 5, pp. 587-597, https://doi.org/10.1016/0191-8869(85)90008-X

McEnrue, M.P. & Groves, K. 2006, 'Choosing Among Tests of Emotional Intelligence: What is the Evidence?' *Human Resource Development Quarterly*, vol. 17 no. 1, pp. 9-42, https://doi.org/10.1002/hrdq.1159

McEnrue, M.P., Groves, K.S. & Shen, W. 2010, 'Emotional Intelligence Training: Evidence Regarding its Efficacy for Developing Leaders', *Kravis Leadership Inst Leadership Rev*, 10, pp. 3-26

Meyerson, D., Weick, K.E. & Kramer, R.M. 1996, 'Swift Trust and Temporary Groups', *Trust in Organizations: Frontiers of Theory and Research*, 166, p. 195

Montoya, M.M., Massey, A.P., Hung, Y.T.C. & Crisp, C.B. 2009, 'Can You Hear Me Now? Communication in Virtual Product Development Teams', *Journal of Product Innovation Management*, vol. 26 no. 2, pp. 139-155, https://doi.org/10.1111/j.1540-5885.2009.00342.x

Mount, G. 2006, 'The role of Emotional Intelligence in Developing International Business Capability: EI Provides Traction', in D.V. U, S. F and G. Mount (eds), *Linking Emotional Intelligence and Performance at Work*. pp. 97-124

Muller, R., Geraldi, J. & Turner, J. 2012, 'Relationships Between Leadership and Success in Different Types of Project Complexities', *Engineering Management, IEEE Transactions on*, vol. 59 no. 1, pp. 77-90

Nelis, D., Kotsou, I., Quoidbach, J., Hansenne, M., Weytens, F., Dupuis, P. & Mikolajczak, M. 2011, 'Increasing Emotional Competence Improves Psychological and Physical Well-Being, Social Relationships, and Employability', *Emotion*, vol. 11 no. 2, p. 354, https://doi.org/10.1037/a0021554

Nelis, D., Quoidbach, J., Mikolajczak, M. & Hansenne, M. 2009, 'Increasing Emotional Intelligence:(How) is it Possible?' *Personality and Individual Differences*, vol. 47 no. 1, pp. 36-41, https://doi.org/10.1016/j.paid.2009.01.046

Newman, D.A., Joseph, D.L. & MacCANN, C. 2010, 'Emotional Intelligence and job Performance: The Importance of Emotion Regulation and Emotional Labor Context', *Industrial and Organizational Psychology*, vol. 3 no. 2, pp. 159-164, https://doi.org/10.1111/j.1754-9434.2010.01218.x

O'Boyle, E.H., Humphrey, R.H., Pollack, J.M., Hawver, T.H. & Story, P.A. 2011, 'The Relation Between Emotional Intelligence and Job Performance: A meta-analysis', *Journal of Organizational Behavior*, vol. 32 no. 5, pp. 788-818, https://doi.org/10.1002/job.714

O'Sullivan, M. 2007, 'Trolling for Trout, Trawling for Tuna: The Methodological Morass in Measuring Emotional Intelligence', in G. Matthews, M. Zeidner and R.D. Roberts eds. *The Science of Emotional Intelligence: Knowns and Unknowns*. Oxford University Press, New York. pp. 258-287

O'Sullivan, M. & Ekman, P. 2004, 'Facial Expression Recognition and Emotional Intelligence', in: G. Geher ed. *Measuring Emotional Intelligence: Common Ground and Controversy*, Nova Science Publishing. pp. 91-111

Obradovic, V., Jovanovic, P., Petrovic, D., Mihic, M. & Mitrovic, Z. 2013, 'Project Managers' Emotional Intelligence–A Ticket to Success', *Procedia-Social and Behavioral Sciences*, vol. 74, pp. 301-311, https://doi.org/10.1016/j.sbspro.2013.03.034

Ortony, A., Revelle, W. & Zinbarg, R. 2007, 'Why Emotional Intelligence Needs a Fluid Component', in G. Matthews, M. Zeidner and R.D. Roberts eds', *The Science of Emotional Intelligence: Knowns and Unknowns*, Oxford University Press, New York. pp. 288-304

Pant, I. & Baroudi, B. 2008, Project Management Education: 'The human Skills Imperative', *International Journal of Project Management*, vol. 26 no. 2, pp. 124-128, https://doi.org/10.1016/j.ijproman.2007.05.010

Papke-Shields, K.E., Beise, C. & Quan, J. 2010, 'Do Project Managers Practice What They Preach, and Does it Matter to Project Success?', *International Journal of Project Management*, vol. 28 no. 7, pp. 650-662, https://doi.org/10.1016/j.ijproman.2009.11.002

Petrides, K. 2010, 'Trait Emotional Intelligence Theory', *Industrial and Organizational Psychology*, vol. 3 no. 2, pp. 136-139, https://doi.org/10.1111/j.1754-9434.2010.01213.x

Petrides, K. 2011, 'Ability and Trait Emotional Intelligence', in. *The Wiley-Blackwell Handbook of Individual Differences*. pp. 656-678, https://doi.org/10.1002/9781444343120.ch25

Petrides, K. & Furnham, A. 2001, 'Trait Emotional Intelligence: Psychometric Investigation With Reference to Established Trait Taxonomies', *European Journal of Personality*, vol. 15 no. 6, pp. 425-448, https://doi.org/10.1002/per.416

Petrides, K.V., Pita, R. & Kokkinaki, F. 2007, 'The Location of Trait Emotional Intelligence in Personality Factor Space', *British Journal of Psychology*, vol. 98 no. 2, pp. 273-289. https://doi.org/10.1348/000712606X120618

PMI 2013, *A Guide to the Project Management Body of Knowledge*. 5th ed: Project Management Institute

Pryke, S. & Smyth, H. 2012, *The Management of Complex Projects: a Relationship Approach*, Wiley-Blackwell.

Reuben, E., Sapienza, P. & Zingales, L. 2009, 'Can we Teach Emotional Intelligence', *Columbia Business School Research Paper*.

Roberts, R.D., Zeidner, M. & Matthews, G. 2001, 'Does Emotional Intelligence Meet Traditional Standards for an Intelligence? Some New Data and Conclusions', *Emotion*, vol. 1 no. 3, p. 196, https://doi.org/10.1037/1528-3542.1.3.196

Rowe, G. & Wright, G. 1999, 'The Delphi Technique as a Forecasting Tool: Issues and Analysis', *International Journal of Forecasting*, vol. 15 no. 4, pp. 353-375, https://doi.org/10.1016/S0169-2070(99)00018-7

Sala, F. 2005, Do Programs Designed to Increase Emotional Intelligence at Work-Work

Sambasivan, M. & Soon, Y.W. 2007, 'Causes and Effects of Delays in Malaysian Construction Industry', *International Journal of Project Management*, vol. 25 no. 5, pp. 517-526, https://doi.org/10.1016/j.ijproman.2006.11.007

Schutte, N.S., Malouff, J.M. & Thorsteinsson, E.B. 2013, Increasing Emotional Intelligence Through Training: Current Status and Future Directions

Shamir, B. 2011, 'Leadership Takes Time: Some Implications of (Not) Taking Time Seriously in Leadership Research', *The Leadership Quarterly*, vol. 22 no. 2, pp. 307-315, https://doi.org/10.1016/j.leaqua.2011.02.006

Sheldon, M.R., Fillyaw, M.J. & Thompson, W.D. 1996, 'The use and Interpretation of the Friedman Test in the Analysis of Ordinal-Scale Data in Repeated Measures Designs', *Physiotherapy Research International*, vol. 1 no. 4, pp. 221-228, https://doi.org/10.1002/pri.66

Siegling, A., Sfeir, M. & Smyth, H.J. 2014, 'Measured and Self-Estimated Trait Emotional Intelligence in a UK Sample of Managers', *Personality and Individual Differences*, https://doi.org/10.1016/j.paid.2014.01.027

Siegling, A., Vesely, A.K., Petrides, K. & Saklofske, D.H. 2015, 'Incremental Validity of the Trait Emotional Intelligence Questionnaire–Short Form (TEIQue–SF)', *Journal of Personality Assessment*(ahead-of-print), pp. 1-11

Skulmoski, G.J., Hartman, F.T. & Krahn, J. 2007, 'The Delphi Method for Graduate Research', *Journal of Information Technology Education*, 6, p. 1

Tett, R.P., Freund, K.A., Christiansen, N.D., Fox, K.E. & Coaster, J. 2012, 'Faking on Self-Report Emotional Intelligence and Personality Tests: Effects of Faking Opportunity, Cognitive Ability, and Job Type', *Personality and Individual Differences*, vol. 52 no. 2, pp. 195-201, https://doi.org/10.1016/j.paid.2011.10.017

Turner, J.R. & Müller, R. 2003, 'On the Nature of the Project as a Temporary Organization', *International Journal of Project Management*, vol. 21 no. 1, pp. 1-8, https://doi.org/10.1016/S0263-7863(02)00020-0

Tyssen, A.K., Wald, A. & Spieth, P. 2013, 'Leadership in Temporary Organizations: A Review of Leadership Theories and a Research Agenda', *Project Management Journal*, vol. 44 no. 6, pp. 52-67, https://doi.org/10.1002/pmj.21380

Tyssen, A.K., Wald, A. & Spieth, P. 2014, 'The Challenge of Transactional and Transformational Leadership in Projects', *International Journal of Project Management*, vol. 32 no. 3, pp. 365-375, https://doi.org/10.1016/j.ijproman.2013.05.010

Verburg, R.M., Bosch-Sijtsema, P. & Vartiainen, M. 2013, 'Getting it Done: Critical Success Factors for Project Managers in Virtual Work Settings', *International Journal of Project Management*, vol. 31 no. 1, pp. 68-79, https://doi.org/10.1016/j.ijproman.2012.04.005

Vierimaa, J.C. 2013, *Emotional Intelligence and Project Leadership*. Masters, Department of Civil and Environmental Engineering, Chalmers University of Technlogy.

Webb, C.A., Schwab, Z.J., Weber, M., DelDonno, S., Kipman, M., Weiner, M.R. & Killgore, W.D. 2013, 'Convergent and Divergent Validity of Integrative Versus Mixed Model Measures of Emotional Intelligence', *Intelligence*, vol. 41 no. 3, pp. 149-156, https://doi.org/10.1016/j.intell.2013.01.004

Winch, G.M. 2010, *Managing Construction Projects.* John Wiley & Sons

Yeo, K. 1993, 'Systems Thinking and Project Management—Time to Reunite', *International Journal of Project Management*, vol. 11 no. 2, pp. 111-117, https://doi.org/10.1016/0263-7863(93)90019-J

Zaheer, S., Albert, S. & Zaheer, A. 1999, Time Scales and Organizational Theory. ♥, vol. 24 no. 4, pp. 725-741,

Zhang, L. & Fan, W. 2013, 'Improving Performance of Construction Projects: A Project Manager's Emotional Intelligence Approach', *Engineering, Construction and Architectural Management*, vol. 20 no. 2, pp. 195-207, https://doi.org/10.1108/09699981311303044

Zimmerman, D.W. & Zumbo, B.D. 1993, 'Relative Power of the Wilcoxon Test, the Friedman Test, and Repeated-Measures ANOVA on Ranks', *The Journal of Experimental Education*, vol. 62 no. 1, pp. 75-86, https://doi.org/10.1080/00220973.1993.9943832