

Emotional Intelligence in Engineering Project Teams

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Abstract

Emotional Intelligence (EI) has been associated with enhanced individual and group work performance. Despite tentative claims that it can improve the performance of project teams there has been little empirical research to confirm this assumption. The aim of this paper is to examine the theoretical proposition and claims through in-depth case-based analysis. The objective is to examine the extent to which EI facilitates collaborative team working in practice and evaluate any normative potential to improve management practice. This study addresses this under-researched area by applying the Goleman and Boyatzis EI competency model to a project to examine the extent of collaborative working practices between different construction-related organizations – client, professional and contracting organisations – from which were drawn the personnel comprising the temporary multi-organisational project teams.

A single case study is selected on the King's Cross Station Redevelopment Programme (KCSRP), located at a major rail terminus in the heart of London, UK. Network Rail commissioned this redevelopment project. The study used triangulation, including an innovative approach of filming meetings to measure the affect of EI in project teams. This helped address the common limitations associated with using conventional direct observation methods to achieve depth and rigor of analysis.

The case study findings of this research reflected evidence of certain competencies being displayed in project teams, which have contributed to related aspects of the KCSRP collaborative working strategy. Where other competencies were deficient this aligned with underperforming aspects of the programme's collaborative working strategy. Hence, the research concludes that EI facilitates the KCSRP collaborative working strategy and can therefore potentially enhance the effectiveness of project teams with appropriate management awareness, action and competency development.

The original contribution to knowledge arises from the depth of analysis around a single case, including the use of filming as a research method, to understand the contribution of EI and emotional competencies to collaborative working. The corresponding limitations of the study are the single case analysis, yet the study contributes to the growing weight of evidence supporting the pertinence of EI in project team working. Recommendations for management are presented in conclusion.

Keywords: Emotional Competencies, Emotional Intelligence, Project Teams, Collaborative Working

1. Introduction

Emotional Intelligence (EI) is associated with claims of enhanced individual and group work performance (e.g. Goleman, 1998a; Druskat and Druskat, 2006). Yet, the domain is contested (e.g. Matthews et al, 2002; Matthews et al, 2004; Zeidner *et al*, 2004) and there has been scant empirical confirmation related to project teams. The *aim* is to examine claims that EI enhances performance. The *objective* is to examine the extent to which EI facilitates collaborative project team working in practice by applying the EI competency model (Boyatzis *et al*, 2000; Goleman *et al*, 2002) to a multi-organizational engineering project team undertaking a major and complex infrastructure project. The organizations comprise the sponsor department in a national client body, professional and contracting organizations.

The literature review focuses upon EI and performance, particularly collaborative working strategies as a link between group behaviour and organizational operational performance. The research applied conceptual competency measures plus body language as a method of observing EI. A single in-depth case study is used, the King's Cross Station Redevelopment Program (KCSR), comprising a set of integrated projects for a rail terminus redevelopment in the heart of London, UK. Network Rail as the sponsoring client commissioned the project. The study employed the innovative approach of filming meetings to measure the affect of EI on KCSR project teams to help address common limitations of EI psychometric-style tests and questionnaires and of perceptual and indirect observation methods.

The case study found certain competencies evident in project teams, which contributed to the collaborative working strategy on KCSR. A further set of competencies was found to be deficient and corresponded with underperformance of aspects of the Program's collaborative working strategy. The analysis concludes that EI facilitated the KCSR strategy for collaborative working and can further enhance the effectiveness of engineering project teams. This makes an original contribution to knowledge on project team working and for the innovative methods for the observation of EI in operational contexts. The limitations are the single case analysis, yet the study contributes to the growing evidence of EI in project team working. Recommendations are presented in conclusion.

2. Literature Review

EI research has grown exponentially across disciplines, and management has been a mainstay. The scope of the review, therefore, needs clear parameters. Following a brief overview, the EI literature on performance plus group/team operations will provide the twin foci. Collaborative working provides the link between group behaviour and performance (Goleman, 1998a; Druskat and Druskat, 2006). The roots of EI are found in social intelligence. Salovey and Mayer formally defined EI as, *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* (1990:189). A series of models have emerged, three of the main ones being the Salovey-Mayer model (1990), Bar-On's model (Bar-On *et al*, 2006) and Goleman and Boyatzis' (Boyatzis *et al*, 2000; Goleman *et al*, 2002) competency model. The strengths and weaknesses of each are summarized in Table 1.

The Goleman-Boyatzis model (Boyatzis *et al*, 2000; Goleman *et al*, 2002) is adopted for several reasons. It has been developed for group EI (e.g. Elfenbein, 2006) and explored in project teams (Druskat and Druskat, 2006). It covers competencies aligned to collaborative working strategies. Goleman (1998a) first proposed that EI benefited efficient and effective performance at work, which other work substantiates (e.g. Bar-On *et al*, 2006). High individual levels of EI mark out the “star performers” from other employees (Day and Carroll, 2004: 1444). Goleman (1998b) proposed that high EI levels were attributed to effective leadership. Some research findings have confirmed initial claims (e.g. George, 2000; Palmer *et al*, 2001). Watkin (2000) concluded that organizations with higher EI accrue higher growth, greater shareholder value and sustainable competitive advantage. An organization with such a profile arises from recruitment policies and criteria and/or employees with high EI self-selection into organizations with these (nascent) attributes. Mount (2006) found EI competencies improved effectiveness across a range of roles including project management. EI induces effectiveness amongst project managers (Muller and Turner, 2010) and induces improved teamwork (Elfenbein, 2006), norms facilitating group trust, efficacy and networks (Druskat and Druskat, 2006).

Table 1: Strengths and Weaknesses of EI Models

<i>EI Model</i>	<i>Strength</i>	<i>Weaknesses</i>
<i>Salovey-Mayer Model</i>	Empirically proven (unlike other models) not to represent conventional personality traits. Seen as more representative of a cognitive intelligence than other models. (O'Connor and Little, 2003). Its measurement is objective (Mayer <i>et al</i> , 2000a).	Criticized for as not constituting being a cognitive intelligence but a 'learned skill' (Landy, 2005). Poor predictive validity of workforce performance (Bradberry and Su, 2003). Ambiguity over what constitutes a correct (emotionally intelligent) response during objective measures (Pérez <i>et al</i> , 2005). Confirmed lack of cultural variation sensitivity (Salovey, 2006). Empirically confirmed measurement gender bias (Salovey, 2006; Day and Carroll, 2004). Weak correlation with the other two EI models (Van Rooy <i>et al</i> , 2005).
<i>Bar-On Model</i>	EI develops with age and can be developed via training and therapy. Emotional and cognitive intelligence considered to contribute equally to a person's general intelligence, thus indicating an individual's chances of succeeding in life (Bar-On, 1997).	Criticism that model has little to do with emotion or intelligence. Measures overlap with existing personality traits (Matthews <i>et al</i> , 2004). Limitations of self-report measurement (e.g. Zeidner <i>et al</i> , 2004).
<i>Goleman-Boyatzis Model</i>	Assertion that EI competencies can enhance human performance (especially in aat work context) (Goleman, 1998a). Plentiful studies verifying the predictive validity of EI and work performance (Goleman, 1998a; Watkin, 2000). Advocated as more important than IQ in determining life success. EI competencies can be learnt at any age (Goleman, 1998a). Proficiency in all 18 competencies is not needed (Druskat and Druskat, 2006).	Criticised for being existing personality characteristics (Davies <i>et al</i> , 1998). Criticised for not constituting a cognitive intelligence (Matthews <i>et al</i> , 2002). Criticism model does not constitute EI concept (Brackett and Mayer, 2003). Limitations of self-report measurement (e.g. Zeidner <i>et al</i> , 2004). Criticism that performance enhancing benefits are anecdotal and lack empirical research (Matthews <i>et al</i> , 2002).

Yet the link between EI and performance including group EI and team performance remains contested (e.g. Davies et al, 1998; Matthews et al, 2002; Zeidner et al, 2004; Landy, 2005). Following Goleman (1998a) and Druskat and Druskat (2006), we propose the behavioural link between group EI and operational performance is collaborative working. Anvuur and Kumaswamy's (2008) definition of collaboration follows, for example, Hamel et al (1989), where it involves short-term alliances between clients, designers, suppliers and facilities managers to deliver integrated project services across organisational boundaries. The definition of project performance is complex and largely dependent upon decision-makers' perspectives (e.g. Morris and Hough, 1987). It can be ascribed to time-cost-quality/scope (project operational performance), value delivered (functionality), and/or benefits in use (client/end-user operations). The focus here is the former yet extends beyond project tasks to include the collaborative service experience. Teamwork and collaboration is an EI competency (Boyatzis *et al*, 2000; Goleman *et al*, 2002), defined as *working with others towards a shared goal and creating group synergy in pursuing collective goals* for projects (Druskat and Druskat 2006:86).

A 'collaborative working strategy' was adopted by Network Rail (NR) for KCSR (Mitchell, 2008). The strategy required adherence to a set of collaborative working values: a) unity of purpose, b) trust, c) win-win situations, d) interdependence, and e) the ability to challenge each other in the right way. The values were envisaged to inform a set of collaborative working behaviours, as follows:

- Talk first before taking other action, and listen to and consider other peoples' views.
- Do what we say we are going to do.
- Explain what we expect from other people and understand what they expect from us.
- Recognize achievements.
- See things from other peoples' perspectives.
- Be committed and professional.
- Be positive ambassadors for the program.
- Personally commit to the delivery of the project.
- Challenge below standard behaviours in a constructive manner.
- Be open with our problems and resolve them together as one team.

These behaviours provide an organizational context in which individual and group EI could be expected to be evident. The benefits were anticipated as: i) improved communications, ii) integrated team working, iii) improved team engagement and spirit, iv) sharing of resources and learning, v) expeditious resolution of issues, vi) proactive support, vii) greater innovation, viii) minimization of waste and inefficiency. The benefits constitute one possible assessment of performance, six of which EI could directly enhance, and EI could indirectly influence the remaining two benefits.

3. Methodology and Methods

The review supports the research question: *to what extent can emotional intelligence (EI) facilitate Network Rail's (NR) desire to implement a collaborative working strategy for the KCSR?* Methodologically, there is controversy over EI theory and its models (Salovey, 2006). For example, combining ability and trait dimensions has been criticized (e.g. Bar-On, 1997). This has some logical rigor, yet atomization causes disconnection with the social construction of behavior and action in reality. Statistical analysis of atomized data can yield connections that are functions of mathematical

logic, not actual processes.(Sayer, 1992). Behavior is informed by both trait and ability in practice, including collaboration for teams and in projects (Druskat and Druskat, 2006), in turn affecting project performance outcomes (e.g. Anvuur and Kumaraswamy, 2008).

A case-study approach is adopted for in-depth analysis of “how” and “what” questions. It *allows investigators to retain the holistic and meaningful characteristics of real-life events* (Yin, 2009:4), Case analysis trades off depth against generalization from any findings. The single case was KCSR, NR being sponsor and client and its contractors being the prime actors for the study: TW Construction (acquired by VINCI in 2008) and Fourway Communications (FC) as main contractors and Arup as consultant engineers. As significant organizations they establish trend others may follow. Other methodological problems include the unreliability of self-report EI measures (e.g. Zeidner et al, 2006) and the scoring measures (Matthews et al, 2004). Locke (2005) questioned whether people are able to monitor and discriminate between their emotions and emotion of others exhibited through behavior. Such assessments may not be measures for EI but a learned skill. Therefore self-report techniques were avoided in favour of direct observation. However, observation poses problems of interpretation by the observer. One strategy of mitigation is to capture data observed which is retained in tact after the event. Filming offers an anthropological means to observe and retain data in tact: *...videotape records retain sample sequences of observed activity for later scrutiny* (Schaeffer, 2003:255).

Filming as an observational technique is innovative for management and project management research. Captured footage increased the reliability and included information that might otherwise have been missed. Yet, filming introduces new challenges: room size, the number of meeting participants and their visibility, the ability to capture every meeting participant or to gain a full 360-degree view of participants. Further challenges include participants being distracted by the camera and any individual discomfort at being filmed. Confidentiality issues are heightened, for example will line managers view the footage. Assurance was provided by fully informing participants of the purposes for the research and a confidentiality form was signed. Subsequently, all individual and organizational actors gave consent for publication, including use of visual material. Only one project member had refused to participate and meetings were selected that excluded the person’s membership. A pilot was conducted on the 21st June 2010 to establish practical needs for satisfactorily filming future meetings in an unconstrained way. As direct observation can affect how events proceed (Yin, 2009), it was decided to film each type of meeting at least twice (Table 2). Participants were also informed that the camera would not always be switched on, so more meetings were set up for filming to facilitate the participants getting used to the camera presence. This appears to have been effective, participants providing feedback that they forgot the camera was in the room. Fourteen meetings were filmed – see Table 2. Body language was used for EI observation, raising socio-psychological issues of methodology and methods. EI competencies were mapped against key body language dimensions (e.g. Wainwright and Thompson, 2010; Ribbens and Whitear, 2007; Bowden 2010; Russell and Fernandez-Dols, 1997).

The analysis used abductive reasoning to frame the research questions from the literature, used inductive compare and contrast methods for the organizations and actors, and took the opportunity to use observation to evaluate the theoretical frame of reference applied.

Table 2: Schedule of Filmed Meetings

Type of Meeting	Date	Time
Western Concourse Progress	06/28/2010	1100-1230
Western Concourse Progress	07/12/2010	1100-1250
Technical Queries Progress	06/29/2010	1200-1300
Technical Queries Progress	07/13/2010	1200-1220
Suburban Train Shed Weekly Progress	06/30/2010	1300-1400
Suburban Train Shed Weekly Progress	07/07/2010	0900-1000
Suburban Train Shed Weekly Progress	07/14/2010	1300-1345
Arup Weekly Review	06/29/2010	1600-1800
Arup Weekly Review	07/06/2010	1600-1800
Arup Weekly Review	07/27/2010	1600-1800
Weekly Communications Meeting	07/28/2010	1100-1230
Weekly Communications Meeting	08/04/2010	1100-1230
Network Rail/Taylor Woodrow Board Meeting	06/24/2010	1430-1700
Network Rail/Taylor Woodrow Board Meeting	07/22/2010	1430-1700

Table 3: Schedule Mapping Body Language against Emotional Intelligence Competencies

Emotional Intelligence Competencies	Body Language
Empathy	<p><u>Active & concerned listening:</u></p> <ul style="list-style-type: none"> 1. Leaning forward or head tilted forward 2. Head cocked (slanted to one side) 3. Facial and body expression mirroring 4. Head supported by thumb & 1st two fingers 5. Index finger to chin touch 6. Steepled hands pointing forwards 7. Eye contact 8. Occasional Nods
	<p><u>Disinterest and not listening:</u></p> <ul style="list-style-type: none"> 1. Pushing chair back from table 2. Stacking paperwork on the table, eating, drinking, reading notes 3. Looking down or dropping head during conversation 4. Chin propped in palm during conversation 5. Looking towards ceiling or at watch/phone
Transparency	<p><u>Deceit & defensiveness:</u></p> <ul style="list-style-type: none"> 1. Scratching (especially back of head) 2. Excessive fidgeting 3. Nose touching or covering (by listener also) 4. Blushing 5. Becoming more expressive constructing (i.e. waving hands, being long-winded) 6. Avoid answering & pretend to not understand question 7. Eyebrows rise & come together (hidden fear) 8. Eyebrows pulled down & inward (hidden anger) 9. Eyes move to top left (hence constructing a thought rather than remembering it) 10. Avoid eye contact (or eye rubbing) 11. Touching ear lobes 12. Folded arms
	<p><u>Open, honest & trustworthy:</u></p> <ul style="list-style-type: none"> 1. Palms facing up or outwards 2. Open gestures from within the 'TruthPlane' (horizontal plane extending out 180 degrees from the navel)
	<p><u>Optimism</u></p> <ul style="list-style-type: none"> <u>Positive attitude:</u> 1. Leaning forward <u>Negative attitude:</u> 1. Leaning backwards
Teamwork & Collaboration	<p><u>Agreement or rapport:</u> 1. Posture congruence (similar postures among group members)</p>
	<p><u>Rejection, dismissive & disagreement:</u></p> <ul style="list-style-type: none"> 1. Brushing hand across knee or thigh 2. Shrugging 3. Head shaking 4. Folding arms & leaning back in chair 5. Fast nodding 6. Sitting back in chair & looking downward 7. Turning away when talking 8. 'Picking lint' (imaginary fluff off clothes) 9. Hand on shin of crossed leg
Self-confidence	<p><u>Anxiety:</u></p> <ul style="list-style-type: none"> 1. Shoulders tensed & raised 2. Excessive self-comfort rituals (facial touch or self-stroke) 3. Nail & lip biting 4. Tapping 5. Excessive straightening gestures (i.e. ties, hair, pens) 6. Nervous laughter 7. Wide eyes

	<p><u>Confidence & assertiveness:</u></p> <ol style="list-style-type: none"> 1. Upright relaxed posture 2. Calm and open gestures 3. Good physical distance (not too close or distant) 4. Good eye contact 	<ol style="list-style-type: none"> 5. Loosely clasped hands held at waist height 6. Steepled hands (pointing upwards) 7. 'Four cross position' (sat with ankle resting on other knee & hands clasped behind neck with elbows outstretched)
<i>Conflict Management</i>	<p><u>Conflict:</u></p> <ol style="list-style-type: none"> 1. Arms folded high on chest 2. Aggressive gestures (i.e. Pointing, chopping or dismissive hand-flapping, clenched fist, fist punched into opposite hand, desk thumping) 3. Constant unbroken staring 	<ol style="list-style-type: none"> 4. Baring or jutting lower jaw teeth 5. Increased blink rate 6. Self-harm (scratching, hitting-self) 7. Curling up of top lip
	<p><u>Resolution:</u></p> <ol style="list-style-type: none"> 1. Leaning forward 2. Raised slightly arched eyebrows 3. Relaxed lips 4. Palms turned out 5. Mirrored body language 6. Mirrored facial expressions 	<ol style="list-style-type: none"> 7. Nodding in time with other person's words 8. Person agreeing facing opponent 9. 'Pulling-in' gestures (by speaker showing acceptance) rather than 'pushing' behaviours.
<i>Inspirational leadership</i>	<ol style="list-style-type: none"> 1. Confident posture 	

4. Findings and Analysis

Table 4: Summary of Network Rail Climate Assessment Survey for KCSR

Climate Assessment Tool Item	Range of Scores (%)	Average Score (%)
Perception client and contractors work well together	65-77	68.50
Perception that the client and contractor will adopt a win-win approach (looking for mutual benefits)	61-73	70.00
Perception there is a good level of trust across the project team	56-83	68.75
Belief that project members know what they are accountable for	67-77	71.00
Feeling that project members are inspired by delivery team senior managers	63-69	66.50
Perception there is not a blame culture in the project team	61-70	65.00
Confidence the project will be delivered within programme	56-75	65.00
Belief that present work practices will overcome any future problems	61-73	69.00
Levels of understanding each others needs	67-73	70.50

Source: Network Rail internal documentation, 2009

The CAT survey provided a baseline for the empirical work and a benchmark to aid subsequent inductive analysis. The empirical findings first cover the EI competency measures (Tables 5 and 6) and, second, body language observation referred to in Table 3. The average score for each EI competency achieved by the individual organisations for each of the 14 meetings is set out in Table 5. Table 6 outlines the total of the average scores for each competency achieved by the individual organisations over the series of meetings for that project team, for example the range of average scores by Arup during the three Arup Weekly Review Meetings was -1 to +4.

Table 5: Average EI Competency Scores by Organization per Meeting

Meeting	Organization	Empathy	Transparency	Optimism	Teamwork & Collaboration	Self-Confidence	Conflict Management	Inspirational Leadership	Achievement Orientation
Technical Queries Progress 1	Taylor Woodrow	-1	-1	-1	1	-1	0	1	1
	Network Rail	0	0	0	0	-1	0	0	0
Technical Queries Progress 2	Taylor Woodrow	1	0	0	-1	-1	0	1	0
Western Concourse 1	Taylor Woodrow	0	0	1	1	0	1	-1	0
	Network Rail	0	-1	-2	2	2	1	1	1
Western Concourse 2	Taylor Woodrow	0	1	1	-1	0	-1	-1	0
	Network Rail	0	-2	-3	3	1	-2	0	2
Suburban Train Shed 1	Taylor Woodrow	1	1	1	1	2	0	0	1
	Network Rail	1	1	1	0	1	0	2	1
Suburban Train Shed 2	Taylor Woodrow	1	2	0	0	0	0	0	0
	Network Rail	1	0	0	0	0	0	1	1
Suburban Train Shed 3	Taylor Woodrow	1	0	0	0	2	0	1	1
	Network Rail	1	0	-1	0	0	0	2	1
Board 1	Taylor Woodrow	1	1	0	1	-2	0	0	2
	Network Rail	2	1	0	2	2	0	1	1
Board 2	Taylor Woodrow	1	2	1	1	1	0	2	3
	Network Rail	1	1	1	2	2	0	2	2
	Fourway Communications	1	0	0	0	0	0	0	0
Arup Weekly Review 1	Arup	1	0	0	2	0	0	1	1
	Network Rail	2	0	0	3	1	0	2	2
Arup Weekly Review 2	Arup	1	0	0	1	1	0	1	0
	Network Rail	1	0	0	-1	3	0	1	0
Arup Weekly Review 3	Taylor Woodrow	1	1	-1	1	0	0	2	0
	Arup	0	-1	0	1	1	0	1	0
	Network Rail	1	2	0	2	3	0	1	2
Weekly Communications 1	Fourway Communications	-1	-1	1	1	0	-3	-2	1
	Network Rail	0	-1	0	-1	0	-1	-1	1
Weekly Communications 2	Fourway Communications	1	-1	0	0	-1	0	-2	-1
	Network Rail	1	-1	-1	1	1	0	1	2

The two Technical Progress Queries meeting are considered first. A large number of both low and negative scores were evident, ranging from -1 to 1. The meetings were notable for the apparent lack of self-confidence displayed by both NR and Taylor Woodrow (TW) members. TW members demonstrated some leadership, collaborative and achievement competencies, especially for Meeting 1 (Table 5). They took personal responsibility for addressing important issues and suggested innovative solutions. Yet, meetings were also characterized by a lack of optimism – during the first meeting they were pessimistic when discussing the likelihood of past problems potentially re-occurring and in the

second meeting they used negative banter regarding the failure of a representative from another contractor to comply with a desired action – whilst the client failed to show positive leadership.

Table 6: Total Average EI competency Scores by Meeting Type

Meeting	Organization	Empathy	Transparency	Optimism	Teamwork & Collaboration	Self-Confidence	Conflict Management	Inspirational Leadership	Achievement Orientation
Technical Queries Progress	Taylor Woodrow	0	-1	-1	0	-2	0	2	1
	Network Rail	0	0	0	0	-1	0	0	0
Western Concourse	Taylor Woodrow	0	1	2	0	0	0	-2	0
	Network Rail	0	-3	-5	5	3	-1	1	3
Suburban Train Shed	Taylor Woodrow	3	3	1	1	4	0	1	2
	Network Rail	3	1	0	0	1	0	5	3
Board	Taylor Woodrow	2	3	1	2	-1	0	2	5
	Network Rail	3	2	1	4	4	0	3	3
	Fourway Communications	1	0	0	0	0	0	0	0
Arup Weekly Review	Taylor Woodrow	1	1	-1	1	0	0	2	0
	Arup	2	-1	0	4	2	0	3	1
	Network Rail	4	2	0	4	7	0	4	4
Weekly Communications	Fourway Communications	0	-2	1	1	-1	-3	-4	0
	Network Rail	1	-2	-1	0	1	-1	0	3

The Western Concourse Meetings were significant. A distinct lack of optimism existed amongst NR representatives (scoring -5, Table 6). They were concerned that risks would materialize. The TW project manager suggested several solutions to address risk, but NR representatives remained unconvinced and were pessimistic. This was reflected in body language displayed at meetings (Figure 1 in conference presentation (CP)) with NR representatives leaning back in their chairs in response to suggestions made. On the other hand, TW representatives lacked leadership, constraining their ability to persuade and influence. The second of the two meetings was marked by resultant conflict concerning delays and mitigation plans. Aggressive gestures were repeatedly used (Figure 2 in CP). Yet collaborative objectives were maintained (Figure 3 in CP), applying related EI competencies (Tables 5 and 6), for example when an NR representative asked, “*Is there anything NR can do to assist?*” The three Suburban Train Shed Meetings contained inspirational leadership from the NR project manager and empathy was in evidence. For example, the project manager motivated the contractor to improve work area cleanliness following complaints. Other members were receptive and empathetic (Table 6). Good eye contact, nodding as indicators listening and internalization and other gestures provided visual evidence in support (Figure 4 in CP).

The two Board Meetings observed showed teamwork and collaboration (Tables 5 and 6). In one incident the TW programme director reported collaborative working behaviours as highly effective on a package of work. Discussion considered rolling out these behaviours on further work package. One occasion involved the client calling for collaboration when one contractor complained another was causing delays and agreement was reached to do so. The meetings displayed high levels of the achievement orientation competency, particularly during a safety review that led to discussing innovative ways to prevent damage to a hoist re-occurring and to improve site security following a reported theft. The transparency competency was used, for example through honest responses to a question on the rigor of risk assessment: *“I couldn’t hand on heart say it is done consistently and rigorously enough”*. Members felt secure, the NR program director applauding the efforts made to create safe site processes, *“we are doing all the right things”*, which further encouraged transparency. Open hand gestures in the “truthplane” of 180° around waist level were used (Figure 5 in CP). Transparency can lead to necessary criticisms and reduced optimism in order to improve project action – one event induced a contractor programme director to hold his head in his hands with eyebrows raised for around a minute after everybody else had left one meeting, perhaps reflecting fear (Figure 6 in CP; cf. Table 5).

Arup Weekly Review Meetings exhibited a lack of transparency amongst Arup members (Table 6). Defensive, closed gestures were observed (Figures 7 and 8 in CP). A pessimistic tone was adopted; yet there were positive efforts to forge collaborative working from Arup and NR representatives with high levels of self-confidence and leadership present (Table 6). The Weekly Communications (“Comms”) Meetings were conducted with conflict in the absence of effective conflict management (Table 6). For example, conflict around a dust problem escalated into aggressive behavior from the contractor and weak leadership on the client side.

Analyzing EI competency for each organization, combining the KCSR CAT survey with the average EI competency scores (Tables 4 and 6), TW and NR showed high levels of empathy and TW displayed transparency. NR displayed teamwork and collaboration as their policy promotes, self-confidence, inspirational leadership and an achievement orientation. Negative EI competency emerged for Arup regarding transparency and for FC regarding transparency, self-confidence, conflict management and inspirational leadership. Whilst the observed meetings and individual EI competencies for the four organizations embodies some selectivity, reasonable levels of overall collaborative practices were found from the three data sources: the KCSR CAT survey, EI competency scores, and filmed body language. Lack of transparency, apart from TW representatives, was the dominant shortfall, frequently coupled with low optimism. It is probable that similar types of patterns would be in evidence in other meetings as representatives are not only mobilizing their personal EI competencies, but are doing so in representing their organization and the organizational interests. This could be expected to induce organizational consistency from key decision-makers.

5. Conclusion

The research has examined the extent EI facilitates collaborative working. It has done so in the context of the NR collaborative working strategy for the KCSR. This research makes an original

contribution to that project and construction literature by demonstrating that EI competencies in group working make positive contributions to collaboration. This is demonstrated through EI competency measures, and supported with evidence from a CAT survey and body language analysis.

The use of filmed observation makes a contribution to the development of research methods. Further contributions arise from the interdependent nature of EI competencies where the coupling of positive competencies and also the coupling of competency lacking that reinforce negative trends. The evidence shows scope for EI competency management, namely commitment to EI team development.

Limitations cited in the EI literature were addressed by avoiding dependence upon self-reporting and application of triangulated data to help eliminate analytical bias. Yet, subjectivity was still present, particularly how camera presence may moderate behavior and interpreting filmed observation. Finally, there is the problem of generalizing findings from case analysis. Despite the limitations, sufficient evidence has demonstrated the value of EI in collaborative teamwork to drive up performance. Organizational boundaries are socially constructed artefacts to manage project markets and EI competencies provide one means to facilitate management across organizational boundaries.

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