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ScienceDirect
International Journal of Project Management xx (2017) xxx – xxx
International Journal of Project Management
www.elsevier.com/locate/ijproman

# The mediation role of leadership styles in integrated project collaboration: An emotional intelligence perspective

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Received 16 January 2017; received in revised form 30 August 2017; accepted 30 August 2017

**Abstract**

Research on integrated project delivery (IPD) has considered collaboration satisfaction as an important factor for improving project outcomes. Yet, the potential mechanism influencing it remains unexplored in construction project management, especially in the aspects of human skills. The purpose of this paper is to examine whether leadership styles mediate the link between the emotional intelligence (EI) of authorized leader and four collaboration satisfaction outcomes perceived by other participants in an integrated team: performance contribution satisfaction (PCS), efficiency satisfaction (ES), relationship satisfaction (RS), and interests satisfaction (IS). Data was collected from 365 samples including project leaders and scholars who possess experience of IPD in China. The results show that transformational and active-transactional leadership fully mediate the relationships of EI with PCS, ES, and IS, and were partial mediators between EI and RS. In addition, the partial mediation role of passive-transactional leadership in the relationships of EI with RS and IS were identified, but its mediating effects between PCS and ES were not found. Similarly, owing to the non-significant effects of laissez-faire leadership on dimensions of collaboration satisfaction, this leadership style does not play mediating role in the relationships of EI with four dimensions of collaboration satisfaction. This paper makes contribution to the mediating mechanism research of revised full range leadership model by proposing collaboration satisfaction criteria and EI model in IPD project.


*Keywords:* Integrated project delivery; Emotional intelligence; Leadership styles; Collaboration satisfaction

## 1. Introduction

Over the last decades, there are strong arguments for incorporating all project parties into one team to perform a project and applying relational contracting appropriately (Kumaraswamy et al., 2005; Rahman and Kumaraswamy, 2011; Bygballe et al., 2016). Therefore, a new project delivery method known as integrated project delivery (IPD) emerged and the benefit of integrated process has been identified through professional institutes and living project samples (Lenferink et al., 2013; El Asmar et al., 2013; Sun et al., 2015). Bond by the three IPD principles of early involvement of all parties, shared risk and rewards, and multiparty agreement (Kent and Becerik-Gerber, 2010), collaboration among heterogeneous project parties has become the critical success factor for operating integrated projects (Phua and Rowlinson, 2004; Xue et al., 2010). Keeping favorable collaboration helps not only achieve short-term business objectives such as the three success criteria of cost, time, and quality (Iyer and Jha, 2005; Chiocchio et al., 2011; Kärnä et al., 2013; Brito et al., 2014), but also foster harmonious working relationships and important affective states crucial to long-term steady development (Eriksson, 2010; Chiocchio et al., 2011; Meng, 2012).

As a matter of fact, it is challengeable for contracting parties which are organized in different structures and interest demands to attain a high level of collaboration in IPD. The architects' reluctance to change decisions made by owners, for example, may lead to reduced satisfaction or even a collapse of collaboration. Thus, some scholars considered that project participants'

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http://dx.doi.org/10.1016/j.ijproman.2017.08.014
0263-7863/00/© 2017 Published by Elsevier Ltd.

collaboration satisfaction could provide a holistic perspective to measure complex project success (Kärnä et al., 2013). Heimbürger and Dietrich (2012) and Li et al. (2013) have contributed to the measures of participant satisfaction by establishing multi-factor hierarchical fuzzy evaluation model and theoretical framework respectively. However, there is still a lack of comprehensive collaboration satisfaction criteria for IPD and the exploration of potential influencing mechanisms at social and psychological level.

In the competitive construction environment, numerous organizations insist that their "greatest asset is our people" (Butler and Chinowsky, 2006) and choosing right participants to team is paramount (O'Connor, 2009). Leaders in IPD, referred to authorized representatives of each participant in this paper, are the critical factors that influence internal organization operation and external collaborative relationships. Their ideas of open and honest communication, collaborative decision and risk allocation may help improve organizational subordinates' commitment to IPD (Lok and Crawford, 2004; O'Connor, 2009). Moreover, project leaders can recognize the characteristics of different participants intuitively and then influence the project outcomes based on their emotional cognition and power (Nzekwe-Excel et al., 2010; Li et al., 2013). Many scholars argued that the leadership of project managers have great influence on project performance (Müller and Turner, 2007; Yang et al., 2011; Kasapoğlu, 2013). Therefore, leaders in IPD can achieve good project performance through appropriate leadership.

Recently, the full range of leadership (FRL) model (Bass, 1986; Bass and Avolio, 1990), consisting of transformational, transactional and laissez-faire leadership, has been considered as the most dominant theoretical approach to leadership (Peus et al., 2013; Gumusluoglu and Ilsev, 2009). However, previous research on primary nine-factor structure in varying contexts draws controversial conclusions (Tyssen et al., 2014). In addition, a large number of relevant studies focused on one-dimensional examination of the FRL model such as transformational leadership, ignoring the exploration of other dimensions (Ryan and Tipu, 2013). Consequently, a careful modification and examination of the complete set of FRL model in IPD are needed.

Current research highlights the importance of emotional intelligence (EI) in the project settings, involving the contributions of EI to leadership styles (Butler and Chinowsky, 2006; Sunindijo et al., 2007), and the benefits to collaboration satisfaction (Turner and Lloyd-Walker, 2008). However, there is a lack of empirical evidence that explores the mediation role of leadership styles in collaboration satisfaction from an EI perspective, although it is obvious that leaders with high EI can adapt their leadership styles to improve the collaboration satisfaction better. Moreover, the existing EI model which is often used directly in current studies may result in controversial results due to its lack of pertinence to some extent.

To advance the research further, the paper first modified the EI model based on Goleman's model and reclassified the leadership types based on FRL model. And then, collaboration satisfaction criteria of IPD was proposed in view of the projects' characteristics. In addition, the study investigated the mediating role of leadership styles of IPD leaders in the relationship between leaders' EI and other participants' collaboration satisfaction.

## 2. Literature review and developed hypotheses

### 2.1. Emotional intelligence

Both scholars and practitioners in construction have recently started to realize that operations management is not the panacea, and emotional intelligence is a key set of managerial skills contributing to project success (Love et al., 2011, Rezvani et al., 2016). EI theories were broadly divided into two distinct formulations: an ability model and a mixed model (Côté et al., 2010; Bratton et al., 2011). The ability model, labeled by the work of Mayer and Salovey (2007), has the key characteristics of comprehending and managing one's own and others' emotions which facilitates the formation of advantageous thoughts and behaviors (Mayer et al., 2008; Bratton et al., 2011) and can be improved in accordance with the development of age and experience of people (Shih and Susanto, 2010; Obradovic et al., 2013). Different from the ability model, Goleman (1996) advocated the mixed model of EI in broader sense, combining personality aspects with social behaviors and competencies. Subsequently, Bar-On (1997), whose research was associated with the work of Goleman (1998), concluded that "EI is an incorporation of non-cognitive capabilities, competencies, and skills that influence individual's ability to succeed in coping with environmental demands and pressures". Specifically, he stated that the application of individual personality could contribute to EI improvement, and thus impact the project performance (Bar-On, 2004).

Individual EI differences of leaders in IPD require to consider the personality traits due to their stable cognition shaping in long working experience before. Accordingly, we chose Goleman's framework as the foundation of EI model for IPD leaders. Then, the framework was modified specifically to focus on the most relevant concepts of IPD leaders' EI. In the framework, 12 first-order components were grouped into four high-ordered quadrants as the Fig. 1 shows: with self-awareness, leaders identify their own emotional states and their effects on themselves and others; Based on self-awareness, self-management means regulation of their own emotions to prevent negative thoughts and behaviors; as for social competences, social awareness helps leaders read people and situation while team management deals with development of strong relationships with others and improvement of their leadership abilities.

### 2.2. Styles of leading in construction

Leadership, the process of influencing subordinates to facilitate relevant organizational goals attainment, is important in every walk of life (Kasapoğlu, 2013), and the exploration of leadership in the project settings has attracted much attention due to its specific characteristics (Turner and Müller, 2005; Tyssen et al., 2014). Owing to the project-inherent characteristics such as peripheral dynamics and time-limited undertaking, project members are often less committed (Keegan and Den Hartog,

Please cite this article as: L. Zhang, et al., 2017. The mediation role of leadership styles in integrated project collaboration: An emotional intelligence perspective, Int. J. Proj. Manag. http://dx.doi.org/10.1016/j.ijproman.2017.06.004

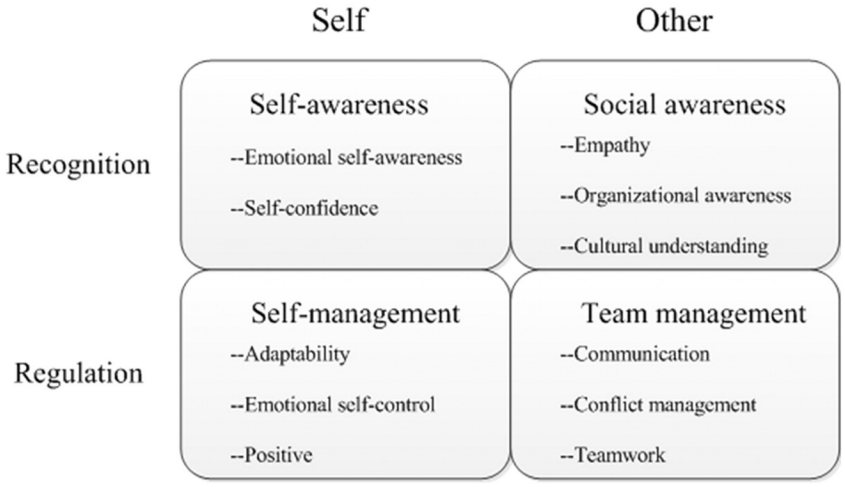


Fig. 1. 12 dimensions of emotional intelligence.

2004). Thus, effective project leadership is required since it enhances the team members' commitment by providing enough freedom for them to employ techniques, perform tasks and make decisions (McDonough, 2000). In addition, effective project leaders tend to create an open communication atmosphere for information sharing about project changes and development (Aga et al., 2016). Furthermore, effective project leadership may influence team members to pursue organization goals and manage conflicts whenever crises arises (Sunindijo et al., 2007). Conversely, lack of effective leadership in construction may cause project failures in terms of time and cost overruns.

Competency school encompassing intellectual, managerial and emotional competencies has been identified as the most comprehensive project leadership style (Dulewicz and Higgs, 2004). However, the high pertinence of the three dimensions may go against to the fact that leadership style is a combination of integrated competences. The full range of leadership (FRL) model ameliorated by Bass and Avolio (1997) incorporates nine leadership factors, which describes three broader leadership typologies: transformational, transactional and laissez-faire leadership. Nevertheless, the instability and ambiguity regarding the effects of this model on rated outcomes still exist (Tyssen et al., 2014), and this is partly because of strong interrelatedness among components (Ryan and Tipu, 2013; Peus et al., 2013). Thus, a fresh conceptual partition of leadership factors with more distinctive categories is urgently called for. In response, the original FRL model was modified slightly considering whether leaders increase subordinates' motivation toward extra efforts with incentives and what types of the motivation are. The revised model includes four dimensions:

*Transformational style.* Transformational leaders usually use their charming personalities to foster a collective sense of mission (Wang et al., 2005), and provide an inspirational vision of the future to enhance subordinates' confidence and passion (Densten, 2002). While solving problems, transformational leaders stimulate subordinates to challenge the traditional manners in new perspectives and put more emphasis on the importance of collaboration (Arnold and Loughlin, 2013). More notably, transformational leaders spend more time to address subordinates' individual needs for personal growth and achievement (Zacher et al., 2014). Thus, subordinates tend to generate intrinsic motivation and pay less attention on their self-interests. And finally, transformational behaviors are classified as "*incentives and intrinsic"* type.

*Transactional styles.* The original structure of transactional leadership incorporates contingent reward, management-by-exception active and management-by-exception passive (Bass and Avolio, 1997). However, a majority of empirical results show that items across dimensions of transactional leadership do not load together to reflect the characteristics of this type, but rather are divided into active and passive aspects (Ryan and Tipu, 2013). Accordingly, we redefined the classification of transactional leadership. The *active-transactional type* comprises contingent reward and management-by-exception active. Leaders offer extrinsic rewards and corrective actions to encourage subordinates to work harder (Walumbwa et al., 2008). Conversely, *passive-transactional type* comprises contingent punishment and management-by-exception passive. Leaders try to impose pressure upon subordinates through punishment to accomplish expected goals (Podsakoff et al., 2006). In conclusion, subordinates generate extrinsic motivations to make extra efforts, and two transactional types are respectively labeled as "*active or passive-incentives and extrinsic".*

Laissez-faire *style.* Laissez-faire leaders may avoid providing personal interaction or direction in critical issues and delegate authority completely to subordinates so as to create a free atmosphere (Bass and Avolio, 1997). The subordinates accomplish tasks basically depending on the enjoyment in realizing personal value without any feedback of leaders. Therefore, Laissez-faire behaviors are labeled as "*non-incentives and intrinsic*".

Please cite this article as: L. Zhang, et al., 2017. The mediation role of leadership styles in integrated project collaboration: An emotional intelligence perspective, Int. J. Proj. Manag. http://dx.doi.org/10.1016/j.ijproman.2017.06.004

### 2.3. Collaboration satisfaction criteria for IPD

Li et al. (2013) established a multi-factor hierarchical fuzzy comprehensive evaluation model to assess participants' satisfaction in major infrastructure and construction projects. According to Heimbürger and Dietrich (2012), a comprehensive theoretical framework to measure collaboration performance in facility service business was proposed, which incorporates 13 important elements involving participant benefits, fluency of interaction, leadership competencies, etc. After summarizing the previous research, we developed an "iron triangle" criteria from the perspective of evaluating performance contribution of other collaborators, and ameliorated the criteria according to the multi-dimensional concepts of collaboration satisfaction and the characteristics of IPD.

Delivering reliable messages and responding to requirements timely are essential anchors for successful collaboration because of the changing and competitive project settings (Ramanathan et al., 2011). Otherwise, other participants may be dissatisfied with operational efficiency and reluctant to allocate risk due to the lack of mutual trust (Heavey and Murphy, 2012). Moreover, only establishing good recognition and acknowledgement among participants can ensure long term collaborative relationships (Nzekwe-Excel et al., 2010), while fair and equitable interests sharing enhances the intrinsic motivation of participants to collaborate successfully (Eriksson, 2010). We describe the details of collaboration satisfaction criteria among IPD participants as follows: project performance contribution satisfaction(time, cost, quality), efficiency satisfaction (collaborative coordination, service timeliness, information timeliness), relationship satisfaction (collaborative trust, collaborative reliability, collaborative stability), interests satisfaction(risk allocation,profit sharing,incentive fairness).

### 2.4. Emotional intelligence and leadership styles

A growing body of studies have demonstrated that EI is an underlying factor associated with the behavioral styles of leaders (Harms and Credé, 2010; Foster and Roche, 2014). The relationship between EI and leadership in project management has been investigated at different levels (Gardner and Stough, 2002; Butler and Chinowsky, 2006; Clarke, 2010). Butler and Chinowsky (2006) found that EI behaviors such as interpersonal skills and empathy are significantly related to transformational leadership in construction executives. Similarly, Sunindijo et al. (2007) examined the relationships between EI and thirteen leadership behaviors in construction projects and found that project managers with higher EI prefer open communication and proactive leadership styles.

In FRL model, transformational leadership has gained the most attentions regarding the relationship with EI. (Barling et al., 2000; Cavazotte et al., 2012; Føllesdal and Hagtvet, 2013). Scholars found that EI competencies may contribute to some specific elements of transformational leadership (Berson and Avolio, 2004; Hur et al., 2011; Lam and O'Higgins, 2012). Firstly, self-aware and self-managed leaders are able to understand their emotions and regulate their behaviors which is propitious for subordinates' trust and respect for the leaders (Bratton et al., 2011). Secondly, leaders with high EI may be more motivated to impact subordinates and evoke their enthusiasm for challenging tasks (Berson and Avolio, 2004). Thirdly, leaders with high empathy may comprehend subordinates' expectations and achieve them accordingly (Humphrey, 2002). Finally, the competencies to coordinate social interaction and strengthen team management permit leaders to generate new ideas as well as facilitate collaboration, which contributes to intellectual stimulation and collaborative promotion (Polychroniou, 2009).

As for original transactional leadership, Barling et al. (2000) found that leaders with elevated EI prefer effective and equitable contingent reward behaviors. Moreover, EI competency of team management may help leaders to handle conflicts and correct deviances which are consistent with active management-by-exception (Wells and Welty Peachey, 2011). Thus, a relatively significant correlation between active-transactional leadership and EI could be supposed. Conversely, it has been suggested that passive-transactional leaders reflect task-oriented desires through inflicting punishment on subordinates, and this may go against empathy or self-insight of EI (Leban and Zulauf, 2004). Similarly, many scholars argued that laissez-faire leadership has no relationship with EI because such leaders show deficits in emotional behaviors toward subordinates (Gardner and Stough, 2002). As such, we expected EI would show negative relationship with laissez-faire style, because individuals with higher self-efficacy and initiative are likely to possess elevated EI (Goleman et al., 2001). Based on above discussions, the following hypotheses are developed:

**H1a**. Emotional intelligence is positively associated with transformational leadership.

**H1b**. Emotional intelligence is positively associated with active-transactional leadership.

**H1c**. Emotional intelligence is negatively associated with passive-transactional leadership.

**H1d**. Emotional intelligence is negatively associated with laissez-faire leadership.

### 2.5. Leadership styles and collaboration satisfaction

Transformational leaders, encouraging the subordinates to get involved in creativity and organizational learning (Kissi et al., 2013), may make contribution to cost saving, quality advancing and schedule accelerating. Transformational leaders can provide inspirational motivation to enhance subordinates' commitment to organization (Limsila and Ogunlana, 2008; Kotlyar et al., 2011). This may simplify the process of coordinating and controlling, hence increasing other participants' satisfaction with team efficiency. In addition, transformational leadership positively influences project team-building (Aga et al., 2016) which can help leaders to solve interpersonal problems as well as improve social relationships. Specifically, the individual consideration by transformational leader can improve subordinates' job satisfaction (McColl-Kennedy and

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Anderson, 2002) as well as elicit higher level of trust and diminish conflicts in integrated team (Zhu et al., 2013). As such, the satisfaction of long, stable relationships in integrated team can be perceived by other participants. Finally, subordinates and collaborators will reciprocate with more passion for risk allocation and profit sharing in response of transformational leader's collaboration promotion in IPD (Ertac and Gurdal, 2012).

Active-transactional leaders can earn trust, satisfaction, commitment, and effort of the subordinates through providing fair rewards and necessary restrictions (Connelly and Ruark, 2010). Thus, technological innovations and quality information flows will be increased, which in turn has positive effects on other participants' satisfaction with performance contribution and project efficiency (Heinz et al., 2006). In addition, active-transactional leaders tend to focus their minds on team discussions via positive rules of conduct, thus raising the participants' relationship satisfaction (Kotlyar et al., 2011). As for passive-transactional leadership, scholars hold that the fear of sanctions impedes subordinates' creativity and reduces their job satisfaction (Bono and Judge, 2004). Moreover, responding slowly to the requests resulting from the oppressive atmosphere may also lessen other participants' collaborative enthusiasm. Similarly, laissez-faire leadership such as avoidance of intervention would lead to subordinates' demotivation and bring negative risk of collaboration obstacle. Based on those arguments, the following hypotheses are developed:

**H2a**. Transformational leadership is positively associated with collaboration satisfaction (1. performance contribution; 2. efficiency; 3. relationship; 4. interests).

**H2b**. Active-transactional leadership is positively associated with collaboration satisfaction.

**H2c**. Passive-transactional leadership is negatively associated with collaboration satisfaction.

**H2d**. Laissez-faire leadership is negatively associated with collaboration satisfaction.

### *2.6. Emotional intelligence and collaboration satisfaction: mediating effects of leadership styles*

In the forgoing discussion we established the relationships between project managers' EI and leadership styles (H1) as well as the relationships between leadership styles and collaboration satisfaction (H2). We now argue that, following mediating effect principal (Preacher and Hayes, 2008), leadership styles serve as mediated role through which EI contributes to others' collaboration satisfaction.

Leaders' self-aware abilities to appraise and perceive own emotions may help organization exploit unique opportunities to maintain creativity, and the abilities of recognizing other participants' unhappiness or dissatisfaction are beneficial to creative problems solving (Barczak et al., 2010). The process of improving creativity may assist leaders to win other participants' satisfaction with their contribution to performance. The leaders' self-management ability equipped with EI can drive subordinates to adapt to changeful environment (Côté et al., 2010), which can improve efficiency satisfaction of other participants as well as facilitate organizational execution. More importantly, the leaders' empathy ability can help to realize other participants' underlying requirements in both mission and relationship as well as settle organizational conflict (Mersino, 2013). Project leaders equipped with emotional ability in team management are good at enhancing subordinates' task motivation by using incentive measures and building continually collaborative relationships based on mutual economic sharing among participants (Pinto et al., 2009).

In this research, we propose that EI makes contribution to collaboration satisfaction through leadership style which is influenced by EI. For project leaders, their EI facilitates the selection of appropriate leadership styles for producing desirable outcomes. Moreover, EI on its own may not result in superior outcomes without leadership styles. Project leaders transform their elements of EI into relevant leadership behaviors during the process of project implementation. Their different leadership styles affect participants' collaboration satisfaction directly. Based on those arguments, the following hypotheses are developed:

**H3**. Emotional intelligence is positively associated with collaboration satisfaction (1. performance contribution; 2. efficiency; 3. relationship; 4. interests).

**H4**. Leadership styles (a. transformational; b. active-transactional; c. passive-transactional; d. laissez-faire) mediate the relationships between EI and collaboration satisfaction (1. performance contribution; 2. efficiency; 3. relationship; 4. interests).

## 3. Methodology

### *3.1. Sample selection and data collection*

Based on aforementioned derivation and assumptions, a model encompassing proposed relationships among EI, leadership styles, and collaboration satisfaction is presented in hypotheses. Because the research model is measured with scales, we designed a questionnaire survey to collect data as well as conducted a pilot study to revise the questionnaire. For the subject of research, the questionnaire was composed of five sections; 1) basic introduction of the questionnaire survey, 2) leader's EI, 3) leadership styles, 4) collaboration satisfaction, and 5) personal information.

In the pilot study, firstly, we selected 10 managers from different projects possessing the characteristics of IPD as project leaders, such as EPC (Engineering Procurement Construction) projects and projects implementing early involvement of all parties with Building Information Modeling technology. And then, these "project leaders" were asked to identify a recent matching project and provide another participant's representative who was the closest collaborator to accomplish this project. Next, we asked these 10 project leaders and 10 collaborators selected by themselves to comment on the measurement items after explaining the research objectives briefly. Furthermore, we interviewed four experts of integrated project management and further discussed the measurement questionnaires. Finally, we

Please cite this article as: L. Zhang, et al., 2017. The mediation role of leadership styles in integrated project collaboration: An emotional intelligence perspective, Int. J. Proj. Manag. http://dx.doi.org/10.1016/j.ijproman.2017.03.009

removed 1 item from self-awareness dimension of EI model and determined the questionnaire for the formal data collection.

To explore the effects of EI and leadership styles on collaboration in the formal collection phase, we chose the authorized representatives of project participants themselves as target respondents at first. And then we included some subordinates and enterprise leaders who are well acquainted with project leaders to expand the range of respondents. Finally, we administered 582 questionnaires from August to October in 2016. The questionnaires were divided into web-based questionnaires and paper-based questionnaires. According to different questionnaire forms, we adopted on-site confirmation and emailed remind notes to increase response rate. At last, 365 questionnaires (267 web-based questionnaires and 98 paper-based questionnaires) were used in statistical analysis with SPSS and constituting a 62.7% response rate. And Table 1 summarized the respondents' profile for the questionnaires-based survey.

### 3.2. Measures

In this study, we referred to the existing scales that had been verified by various analysis samples to measure our constructs outlined before.

#### 3.2.1. Emotional intelligence

Based on the EI framework for IPD leaders modified in this study, we explored specific items to describe the dimensions of EI according to famous measure tools (EQ-i; Bar-On, 1997; MSCEIT; Mayer et al., 1999; ECI; Goleman, 1998). There were 15 items to measure the EI competences. Specifically, the original cluster of social skills was altered to obtain some elements of team management for IPD leaders. Sample items included, "I have good sense and cognition of why I have certain feelings most of time" and "I try my best to avoid personal feelings when solving conflicts in team management". Responses rated on a five-point Likert scale with ranging from 1 (strongly disagree) to 5 (strongly agree).

Table 1
Profile for respondents for the questionnaires-based survey.

| Measure | Category | Number | % |
|---|---|---|---|
| Gender | Male | 289 | 79.2 |
| | Female | 76 | 20.8 |
| Age | Below 25 | 12 | 3.3 |
| | 25–40 | 153 | 41.9 |
| | 41–55 | 183 | 50.1 |
| | Above 55 | 17 | 4.7 |
| Education | Below junior college | 64 | 17.5 |
| | Undergraduate | 218 | 59.7 |
| | Postgraduate | 70 | 19.2 |
| | Doctor | 13 | 3.6 |
| Division | Owner | 75 | 20.5 |
| | Designer | 69 | 18.9 |
| | Contractor | 94 | 25.8 |
| | Sub-contractor | 53 | 14.5 |
| | Consultants | 52 | 14.2 |
| | Others | 22 | 6.0 |
| Experience | Below 5 years | 57 | 15.6 |
| | 6–10 | 93 | 25.5 |
| | 11–15 | 96 | 26.3 |
| | Above 15 | 119 | 32.6 |

#### 3.2.2. Leadership styles

40 items used to measure IPD leaders' leadership styles were based on the Multifactor Leadership Questionnaire (MLQ-Form 5X-Short; Bass and Avolio, 1997). Hereinto, items measuring passive-transactional type were mainly in contrast with the active one and also consider the Leader-Member Exchange (LMX) theory. Sample items included, "I talk enthusiastically about what needs to be accomplished" and "I get others to look at problems from many different angles". Responses rated on a five-point Likert scale with ranging from 1 (strongly disagree) to 5 (strongly agree).

#### 3.2.3. Collaboration satisfaction

In order to identify whether other project participants felt satisfied for the collaborative process with target respondent's organization, the closest collaborator should assess the collaboration satisfaction in terms of 12 criteria mentioned above on a five-point Likert scale from quite dissatisfactory to satisfactory.

#### 3.2.4. Control variables

In addition to the substantive measures described above, we controlled human resource data for more accurate hierarchical regression analysis. Because past studies have showed that demographic variables such as age, gender, education level, and working experience may account for variance in EI, leadership styles as well as organizational or team outcomes.

## 4. Results and analysis

### 4.1. Reliability and validity

This questionnaire adopted Cronbach's α coefficient to calculate the internal consistency of the responses. The values of Cronbach's α above 0.7 are considered acceptable and those above 0.8 are considered meritorious (Litwin and Fink, 1995). Table 2 shows the final number of items, the Cronbach's alphas, and the means for the three core composite constructs used in this study.

The construct validity was tested by factor analysis. To avoid extract too many common factors, we limited factor extraction number and used varimax rotation to verify the validity of the theoretical constructs in this study. Additionally, in the light of Hair et al. (1986), if the factor loading of item from the rotated factor pattern is above 0.5 for a given factor, the item is considered to load on it. Results showed that items of EI were clustered into 4 factors; while laissez-faire, transformational, active-transactional, and passive-transactional items were clustered into 1, 5, 2, and 2 factors respectively; lastly, 4 factors were extracted for collaboration satisfaction. The factor loadings of the items were all between 0.5 and 0.9, indicating an acceptable degree of validity. Table 2 provides the range of factor loadings for each respective construct of the study.

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Table 2
Number of items, Cronbach's alpha, means, standard deviations and loading factors.

| Components | Dimension | Number of items | Cronbach's alpha | Mean | SD | Factor loadings |
|---|---|---|---|---|---|---|
| Emotional intelligence(EI) | Self-awareness | 3 | 0.804 | 3.71 | 0.48 | 0.809–0.845 |
| | Social-management | 4 | 0.876 | | | 0.746–0.834 |
| | Social awareness | 4 | 0.857 | | | 0.687–0.845 |
| | Team management | 4 | 0.823 | | | 0.723–0.834 |
| Transformational leadership(TFL) | Charisma | 4 | 0.793 | 3.70 | 0.54 | 0.745–0.845 |
| | Inspirational motivation | 4 | 0.785 | | | 0.722–0.853 |
| | Individualized consideration | 4 | 0.812 | | | 0.634–0.857 |
| | Intellectual stimulation | 4 | 0.845 | | | 0.711–0.778 |
| | Cooperation promotion | 3 | 0.833 | | | 0.734–0.854 |
| Active-transactional leadership (ATL) | Contingent reward | 4 | 0.824 | 3.72 | 0.53 | 0.734–0.823 |
| | active Management by exception | 4 | 0.813 | | | 0.672–0.812 |
| Passive-transactional leadership(PTL) | Contingent punishment | 4 | 0.798 | 2.50 | 0.57 | 0.623–0.811 |
| | passive Management by exception | 4 | 0.786 | | | 0.712–0.812 |
| Laissez-faire leadership(LFL) | | 1 | 0.821 | 3.10 | 0.69 | 0.735 |
| Collaboration Satisfaction | Performation contribution satisfaction (PCS) | 3 | 0.765 | 3.74 | 0.61 | 0.722–0.815 |
| | Efficiency satisfaction(ES) | 3 | 0.797 | | | 0.696–0.843 |
| | Relationship satisfaction(RS) | 3 | 0.828 | | | 0.689–0.821 |
| | Interests satisfaction(IS) | 3 | 0.897 | | | 0.732–0.825 |

### 4.2. Descriptive statistics

Table 3 shows the means, standard deviation and correlations coefficient of the survey variables. Most variables we studied in the model were significantly correlated. From a holistic look, a more significant correlation between EI and TFL was observed, and ATL had more important influence on collaboration satisfaction except the dimension of RS. In addition, RS and IS possessing IPD features were more significant related to EI and leadership styles.

In order to discover the sub-scales of IPD leaders' EI that can generate good leadership styles, we present the inter-correlations among the sub-dimensions of EI and leadership styles through the Table 4. As for TFL, dimension of team management of EI was most highly correlated with the components of TFL, and from another perspective, the charisma also emerged as the most prominent component of leadership styles considering the relationships with EI dimensions. Like TFL, the components of ATL had the strongest relationships with the team management, while LFL had the strongest negative relationship with it. Different with the three types above, PTL was affected most significantly negatively by the dimension of self-awareness, and however, its dimension of contingent punishment was not found significant correlation with the social awareness.

Table 3
Correlations coefficient of the survey constructs.

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.Age | – | | | | | | | | | | | |
| 2.Education | −0.019 | – | | | | | | | | | | |
| 3.Experiernce | −0.039 | 0.036 | – | | | | | | | | | |
| 4.Emotional intelligence | 0.017 | 0.018 | 0.098 | – | | | | | | | | |
| 5.Transformational leadership (TFL) | 0.071 | 0.097 | 0.056 | 0.589** | – | | | | | | | |
| 6.Active-transactional leadership (ATL) | −0.012 | 0.119 | 0.070 | 0.391** | 0.503** | – | | | | | | |
| 7.Passive-transactional leadership (PTL) | 0.007 | 0.002 | −0.0.12 | −0.456** | −0.295** | −311** | – | | | | | |
| 8.Laissez-faire leadership(LFL) | 0.050 | 0.080 | −0.010 | −0.415** | −0.303** | −0.152* | 0.125 | – | | | | |
| 9.Performation contribution Satisfaction (PCS) satisfaction | 0.041 | −0.031 | −0.001 | 0.293** | 0.343** | 0.411** | −0.218** | −0.085 | – | | | |
| 10.Efficiency satisfaction(ES) | 0.066 | −0.069 | −0.040 | 0.279** | 0.369** | 0.455** | −0.126 | −0.119 | 0.611** | – | | |
| 11.Relationship satisfaction(RS) | −0.088 | 0.003 | 0.068 | 0.465** | 0.529** | 0.512** | −0.398** | −0.174* | 0.512** | 0.491** | – | |
| 12.Interests satisfaction(IS) | −0.016 | 0.054 | 0.129 | 0.309** | 0.476** | 0.565** | −0.310** | −0.121 | 0.519** | 0.458** | 0.648** | – |

Note. Coefficients presented are betas.
* $p < 0.05$.
** $p < 0.001$.

Please cite this article as: L. Zhang, et al., 2017. The mediation role of leadership styles in integrated project collaboration: An emotional intelligence perspective, Int. J. Proj. Manag. http://dx.doi.org/10.1016/j.ijproman.2017.03.004

### 4.3. Hypotheses testing

In this part, we tested the hypotheses using hierarchical regression analyses and structural equation modeling. Consistent with Hypothesis 1, EI was positively related to TFL (1a: β = 0.589, $p < 0.01$) and ATL (1b: β = 0.391, $p < 0.01$), but was negatively related to PTL (1c: β = 0.456, $p < 0.01$) and LFL (1d: β = −0.415, $p < 0.01$). After controlling for age, level of education, and working experience, EI still accounted for significant amount of variance in leadership styles (TFL: β = 0.587, $p < 0.01$; ATL: β = 0.386, $p < 0.01$; PTL: β = − 0.460, $p < 0.01$; LFL: β = −0.421, $p < 0.01$).

Hypothesis 2a and 2b predicted that TFL and ATL would be positively associated with PCS, ES, RS, and IS. Zero-order correlations were TFL: $2a_1$: β = 0.343, $p < 0.01$; $2a_2$: β = 0.369, $p < 0.01$; $2a_3$: β = 0.529, $p < 0.01$; $2a_4$: β = 0.476, $p < 0.01$ and ATL: $2b_1$: β = 0.411, $p < 0.01$; $2b_2$: β = 0.455, $p < 0.01$; $2b_3$: β = 0.512, $p < 0.01$; $2b_4$: β = 0.565, $p < 0.01$.

Again we controlled the demographic variables. The results of the hierarchical regression analyses presented in Table 4 showed that both TFL and ATL significantly predicted the outcomes of collaboration satisfaction. However, compared with Hypothesis 2a and 2b, Hypothesis 2c stated that PTL would be negatively related to the dimensions of collaboration satisfaction. The results showed in the Table 4 indicated that PTL had significantly negative effects on PCS, RS, and IS whereas a non-significant effect on ES. Moreover, according to the Hypothesis 2d that LFL would be negatively associated with the collaboration satisfaction, the regression results displayed in Table 5 supported the negative correlations, but only the correlation with RS reached the significant level ($p < 0.05$).

Hypothesis 3 predicted the positive relationships between EI and the four outcome variables while Hypothesis 4 stated that leadership styles would mediate the relationships between EI and collaboration satisfaction variables. To test Hypothesis 3 and 4, we used the approach developed by Baron and Kenny (1986) and we recommended that a mediating effect is demonstrated when the following conditions apply: first, the independent variable must be significantly related to the dependent variable in line with the Hypothesis 3, which will guarantee the value of the mediating test because scarcely any research suggested the impediments of EI to outcomes; second, at least one of the two terms that the independent variable must be significantly related to the mediator (Hypothesis 1) or the mediator must significantly predict the dependent variable while holding the control and independent variables constant should meet a significant level; and third, if both of the two terms above meet the demand, the effect of the independent variable on the dependent variable should finally be non-significant or reduced; if only one of them reaches the significant level, we should adopt the Bootstrap method to test the indirect significance.

To test the mediating effects of leadership styles, we established a comparative table following the hierarchical regression analysis steps mentioned above. Table 5 shows that EI predicted all of dimensions of collaboration satisfaction significantly, supporting the Hypothesis 3. After the successful verification of the term of Hypothesis 1, the second step was to run a regression of both independent variable and the mediator in relation to the dependent variable. TFL and ATL predicted the four dimensions of CS at 1% level of significance in step 2 (TFL: β = 0.257, β = 0.313, β = 0.400, and β = 0.452; ATL: β = 0.362, β = 0.428, β = 0.395, and β = 0.522) while PTL significantly predicted two dimensions of RS and IS in the four (β = −0.257 and β = −0.218, $p < 0.01$). However, the impact of PTL on the other two dimensions of PCS and ES (β = −0.106, β = 0.004, ns) and LFL on collaboration satisfaction in step 2 ((β = 0.048, β = 0.002, β = 0.031, and β = 0.002, respectively) were not significantly confirmed in this research, so Bootstrap method would be adopted for further testing. As shown in Table 6, once the influence of TFL was controlled for, the correlations of EI with PCS (β = 0.145, ns), ES (β = 0.102, ns) and IS (β = 0.034, ns) were no longer significant, while the correlation with RS was reduced but significant (β = 0.229, $p < 0.01$). Thus, TFL fully mediated the relationships of EI with PSC, ES, and IS, and was a partial mediator between the relation of EI and RS. Similarly, there were full mediations of the variable ATL with regard to the correlations of EI and PCS (β = 0.156, ns), ES (β = 0.120, ns), and IS (β = 0.097, ns). And only the

Table 4
Correlation coefficients between 10 components of LSs and 4 dimensions of EI.

| Leadership styles | Emotional intelligence | | | | |
|---|---|---|---|---|---|
| | Total EI score | Self-awareness | Self-management | Social-awareness | Team management |
| Charisma | 0.644** | 0.362** | 0.441** | 0.473** | 0.718** |
| Inspirational motivation | 0.473** | 0.260** | 0.382** | 0.393** | 0.445** |
| Intellectual stimulation | 0.375** | 0.207** | 0.331** | 0.253** | 0.368** |
| Collaborative promotion | 0.454** | 0.260** | 0.377** | 0.332** | 0.445** |
| Individualized consideration | 0.512** | 0.277** | 0.392** | 0.396** | 0.530** |
| Contingent reward | 0.365** | 0.296** | 0.277** | 0.257** | 0.324** |
| Management-by-exception active | 0.321** | 0.236** | 0.211** | 0.249** | 0.323** |
| Contingent punishment | −0.296** | −0.437** | −0.256** | −0.116 | −0.185** |
| Management-by-exception passive | −0.521** | −0.709** | −0.392** | −0.383** | −0.257** |
| Laissez-faire | −0.415** | −0.191** | −0.294** | −0.296** | −0.499** |

Note. Coefficients presented are betas.
* $p < 0.05$.
** $p < 0.001$.

Please cite this article as: L. Zhang, et al., 2017. The mediation role of leadership styles in integrated project collaboration: An emotional intelligence perspective, Int. J. Proj. Manag. http://dx.doi.org/10.1016/j.ijproman.2017.06.004

Table 5
Hierarchical regression analyses of control variables, leadership styles on outcomes.

| | Performance contribution satisfaction | Efficiency satisfaction | Relationship satisfaction | Interests satisfaction |
|---|---|---|---|---|
| Age | 0.015 | 0.036 | −0.126 | −0.045 |
| Education | −0.063 | −0.103 | −0.053 | 0.003 |
| Experience | −0.018 | −0.056 | 0.035 | 0.100 |
| Transformational leadership | 0.343** | 0.373** | 0.536** | 0.472** |
| $\Delta R^2$ | 0.115 | 0.137 | 0.282 | 0.219 |
| $R^2$ | 0.118 | 0.147 | 0.294 | 0.238 |
| F | 6.622** | 8.531** | 20.649** | 15.452** |
| Age | 0.043 | 0.067 | −0.082 | −0.006 |
| Education | −0.079 | −0.122 | −0.061 | −0.016 |
| Experience | −0.026 | −0.066 | 0.031 | 0.091 |
| Active-transactional leadership | 0.423** | 0.474** | 0.516** | 0.560** |
| $\Delta R^2$ | 0.175 | 0.221 | 0.262 | 0.308 |
| $R^2$ | 0.178 | 0.231 | 0.274 | 0.327 |
| F | 10.718** | 14.885** | 18.643** | 24.068** |
| Age | 0.042 | 0.065 | −0.083 | −0.008 |
| Education | −0.030 | −0.066 | 0.000 | 0.050 |
| Experience | −0.001 | −0.037 | 0.060 | 0.123 |
| Passive-transactional Leadership | −0.218** | −0.127 | −0.397** | −0.309** |
| $\Delta R^2$ | 0.048 | 0.016 | 0.157 | 0.095 |
| $R^2$ | 0.050 | 0.026 | 0.169 | 0.114 |
| F | 2.614* | 1.342 | 10.092** | 6.395** |
| Age | 0.045 | 0.070 | −0.007 | −0.003 |
| Education | −0.023 | −0.057 | 0.013 | 0.059 |
| Experience | 0.000 | −0.036 | 0.063 | 0.126 |
| Laissez-faire leadership | −0.085 | −0.118 | −0.170* | −0.124 |
| $\Delta R^2$ | 0.007 | 0.014 | 0.029 | 0.015 |
| $R^2$ | 0.010 | 0.024 | 0.041 | 0.034 |
| F | 0.487 | 1.222 | 2.100 | 1.762 |

Note. Coefficients presented are betas.
* $p < 0.05$.
** $p < 0.001$.

relationship between EI and RS was partially mediated through ATL ($\beta = 0.312$, $p < 0.01$). Moreover, according to the reduced significance ($\beta = 0.357$ and $\beta = 0.198$, $p < 0.01$), we deduced the partially mediation influence of PTL on the relationships of EI with RS and IS.

We used Bootstrap method based on SEM to investigate if the addition of PTL and LFL to the model significantly decreased the direct effects of EI on the PCS and ES, and all dimensions of collaboration satisfaction, respectively. In model creation stage, we draw four models to test the mediation effects in the light of the leadership styles. We first included paths that linked EI to LSs, and then paths from leadership styles to PCS, ES, RS, and ES, finally as well as the direct paths linking EI and dimensions of collaboration satisfaction. As shown in Fig. 2, the dotted lines represent the non-significant paths, confirming again the complete mediation effects of TFL on the relationships of EI with PCS, ES, and RS dimensions; meanwhile, TFL was still a partial mediator between the relation of EI and RS. To improve the parsimony of the model, we deleted the non-significant paths and got good fit indices: $\chi^2 = 3.294$ ($p = 0.348$), comparative fit index (CFI) = 0.995, root-mean square error of approximation (RMSEA) = 0.022. The significance level of indirect effects of EI through TFL on ES, RS, and IS was $p < 0.001$, and the EI on PCS was $p = 0.026$. As for ATL, we got the same conclusion about full or partial mediation effects in SEM, and the fit indices were calculated by Fig. 3: $\chi^2 = 6.231$ ($p = 0.101$), CFI = 0.990, RMSEA = 0.073. The indirect effects of EI through ATL on four dimensions of collaboration satisfaction were all at the significant level of $p < 0.001$. Through the model presented in Fig. 4, we identified the PTL as partial mediation role between relationships of EI with RS and IS, meanwhile the indirect effects about RS and IS were significant at $p < 0.001$ levels. However, PTL did not play mediating roles between the relationships of EI with PCS and ES, because the significance levels of indirect effects were $p = 0.142$ and $p = 0.964$ respectively. Deleting the non-significant paths dotted lines represent as Fig. 5, we got the good fit indices: $\chi^2 = 3.023$ ($p = 0.221$), CFI = 0.995, RMSEA = 0.050. Owing to the non-significant effects of LFL on dimensions of collaboration satisfaction, mediation effects of LFL were not found in Bootstrap method. And the significance levels of indirect effects of EI on the four dimensions were $p_1 = 0.541$, $p_2 = 0.918$, $p_3 = 0.703$, and $p_4 = 0.865$.

## 5. Discussion

The main motivation to conduct our study was to examine the underlying mechanisms by which an important component of project leader skill - EI is related to participants' collaboration satisfaction factors in integrated project setting. To understand the underlying mechanisms linking project leaders' EI and collaboration satisfaction we developed an EI model for IPD leaders first of all. Using this qualified framework of EI competence for leaders in project setting, we investigated the relationship between EI and collaboration satisfaction and inferred that this relationship may be mediated by leadership styles. In addition, we modified the FRL model in order to better understand leadership behaviors in construction organizations as well as proposed collaboration satisfaction criteria for tapping into IPD process. We argued that leadership styles are variables that imply an emotional bond connecting EI and collaboration satisfaction. As such, project leaders with high degree of EI tend to create more open communication atmosphere and choose positive leadership behaviors by creating an emotional encouragement for team members, which further promote participants' collaboration satisfaction.

To be more detailed, considering the four leadership styles, TFL and ATL had similar impacts on the outcomes. They both fully mediated the relationships of EI with PSC, ES, and IS, indicating that leaders high on EI may be more apt to integrate emotional consideration and apply incentive mechanism. In addition, as emotional leaders prefer to develop harmonious personal relationship, their EI still had influence on the RS. Passive-transactional leaders with strict characteristics prefer to achieve good performance and efficiency by supervising the subordinates to complete tasks. However, they could not realize

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Table 6
Hierarchical regression analyses of control variables, EI, and LSs on outcomes.

| | Performance contribution satisfaction | | Efficiency satisfaction | | Relationship satisfaction | | Interests satisfaction | |
|---|---|---|---|---|---|---|---|---|
| | Step 1 | Step 2 | Step 1 | Step 2 | Step 1 | Step 2 | Step 1 | Step 2 |
| Age | 0.034 | 0.018 | 0.058 | 0.038 | −0.096 | −0.121 | −0.016 | −0.044 |
| Education | −0.034 | −0.057 | −0.071 | −0.098 | −0.008 | −0.043 | 0.045 | 0.005 |
| Experience | −0.028 | −0.028 | −0.063 | −0.063 | 0.019 | 0.020 | 0.098 | 0.098 |
| Emotional intelligence | 0.296** | 0.145 | 0.285** | 0.102 | 0.464** | 0.229** | 0.299** | 0.034 |
| Transformational leadership | | 0.257** | | 0.313** | | 0.400** | | 0.452** |
| $\Delta R^2$ | | 0.042 | | 0.063 | | 0.103 | | 0.131 |
| $R^2$ | 0.089 | 0.132 | 0.091 | 0.154 | 0.226 | 0.328 | 0.108 | 0.219 |
| $\Delta F$ | | 9.628** | | 14.632** | | 30.173** | | 33.903** |
| Age | 0.034 | 0.040 | 0.058 | 0.064 | −0.096 | −0.090 | −0.016 | −0.008 |
| Education | −0.034 | −0.074 | −0.071 | −0.118 | −0.008 | −0.051 | 0.045 | −0.013 |
| Experience | −0.028 | −0.038 | −0.063 | −0.075 | 0.019 | 0.009 | 0.098 | 0.084 |
| Emotional intelligence | 0.296** | 0.156 | 0.285** | 0.120 | 0.464** | 0.312** | 0.299** | 0.097 |
| Active-transactional leadership | | 0.362** | | 0.428** | | 0.395** | | 0.522** |
| $\Delta R^2$ | | 0.109 | | 0.152 | | 0.130 | | 0.227 |
| $R^2$ | 0.071 | 0.198 | 0.091 | 0.243 | 0.226 | 0.355 | 0.108 | 0.335 |
| $\Delta F$ | | 26.860** | | 39.701** | | 39.690** | | 67.394** |
| Age | 0.034 | 0.036 | 0.058 | 0.058 | −0.096 | −0.092 | −0.016 | −0.012 |
| Education | −0.034 | −0.033 | −0.071 | −0.071 | −0.008 | −0.006 | 0.046 | 0.046 |
| Experience | −0.028 | −0.024 | −0.063 | −0.063 | 0.019 | 0.027 | 0.098 | 0.105 |
| Emotional intelligence | 0.296** | 0.247** | 0.285** | 0.287** | 0.464** | 0.357** | 0.299** | 0.198** |
| Passive-transactional leadership | | −0.106 | | 0.004 | | −0.234** | | −218** |
| $\Delta R^2$ | | 0.009 | | 0.000 | | 0.043 | | 0.038 |
| $R^2$ | 0.089 | 0.098 | 0.091 | 0.091 | 0.226 | 0.269 | 0.108 | 0.145 |
| $\Delta F$ | | 1.926 | | 0.002 | | 11.681** | | 8.672** |
| Age | 0.034 | 0.031 | 0.058 | 0.058 | −0.096 | −0.097 | −0.016 | −0.016 |
| Education | −0.034 | −0.038 | −0.071 | −0.071 | −0.008 | −0.010 | 0.045 | 0.044 |
| Experience | −0.028 | −0.029 | −0.063 | −0.063 | 0.019 | 0.018 | 0.098 | 0.098 |
| Emotional intelligence | 0.296** | 0.316** | 0.285** | 0.286** | 0.464** | 0.477** | 0.299** | 0.300** |
| Laissez-faire leadership | | 0.048 | | 0.002 | | 0.031 | | 0.002 |
| $\Delta R^2$ | | 0.002 | | 0.000 | | 0.001 | | 0.000 |
| $R^2$ | 0.089 | 0.091 | 0.091 | 0.091 | 0.226 | 0.226 | 0.108 | 0.108 |
| $\Delta F$ | | 0.400 | | 0.001 | | 0.194 | | 0.001 |

Note. Coefficients presented are betas.
* $p < 0.05$.
** $p < 0.001$.

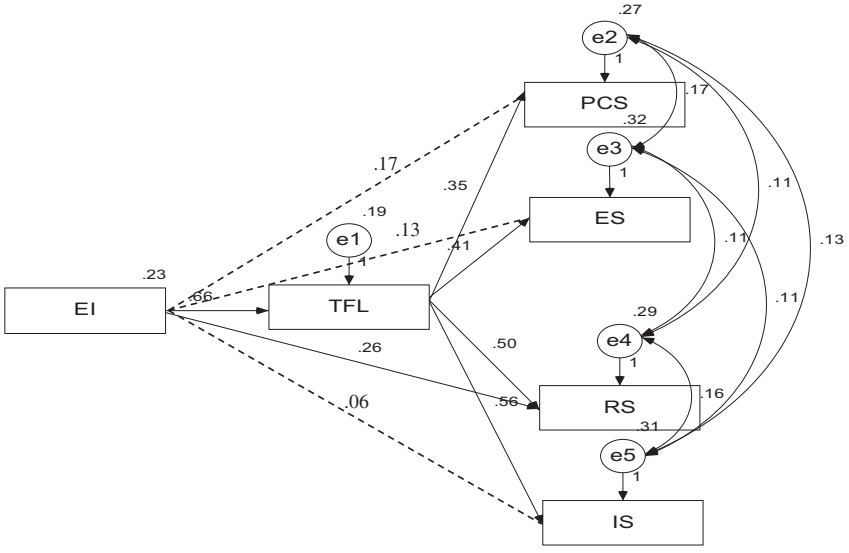


Fig. 2. Hypothesized path model with standardized coefficients.

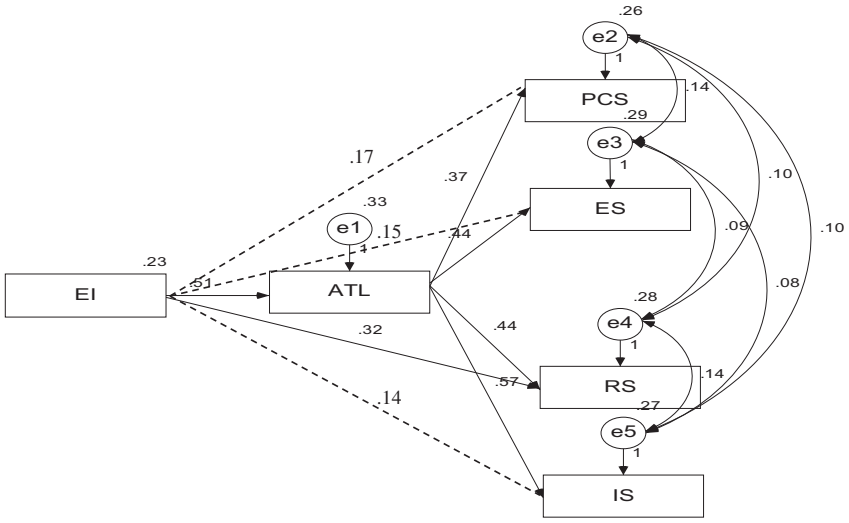


Fig. 3. Hypothesized path model with standardized coefficients.

the functions of emotions and motivation, so PTL style had negative impacts on RS and IS. Moreover, the mediation role of PTL to PCS and ES could not be confirmed because relation between them was insignificant. As for LFL, leaders did not identify the importance of personal interaction, so we could not find the influence of LFL on collaboration satisfaction even its mediation roles.

### 5.1. Theoretical and practical implications

This study contributed to the project management literature by integrating EI theory and a leadership model in the context of collaboration. The results of our study showed that leadership styles link the relationship between project leaders, EI and collaboration satisfaction. This advanced our understanding of EI and leadership styles in engendering participants' collaboration satisfaction. Many scholars suggested to pay more attention on project leadership rather than project management in the complex project settings (Kaulio, 2008; Tyssen, et al., 2014). Our study also added to project leadership theory by modifying the original FRL slightly according to whether leaders provide incentives toward subordinates' extra efforts and what types of the motivation are.

Understanding how EI links to collaboration satisfaction has practical implications for integrated project managers, particularly in the areas of leaders' appointment in integrated project. Our findings suggested that integrated project participants should consider appointing project managers who have high levels of EI since they can be expected to select appropriate leadership styles to promote collaboration. To make efficient use of human resource in IPD, leaders with high team management know better how to apply emotional support and incentive motivation to improve collaboration satisfaction. It is easier for

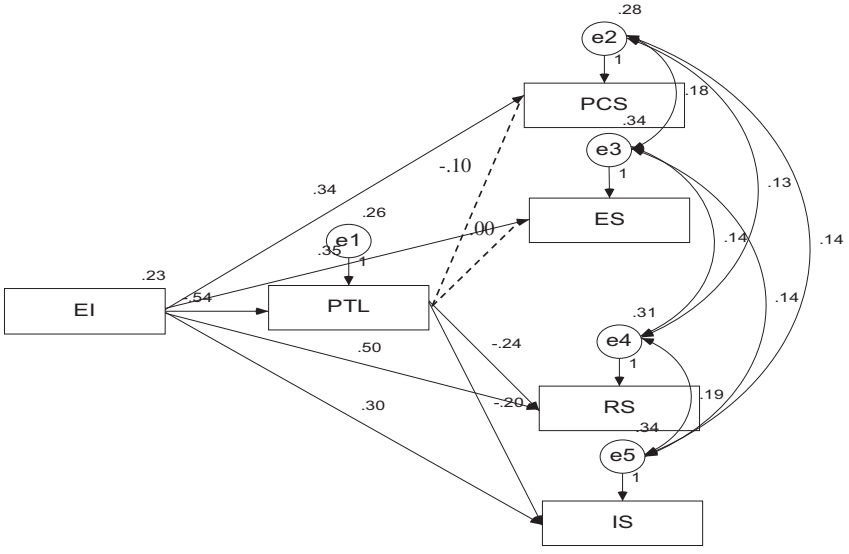


Fig. 4. Hypothesized path model with standardized coefficients.

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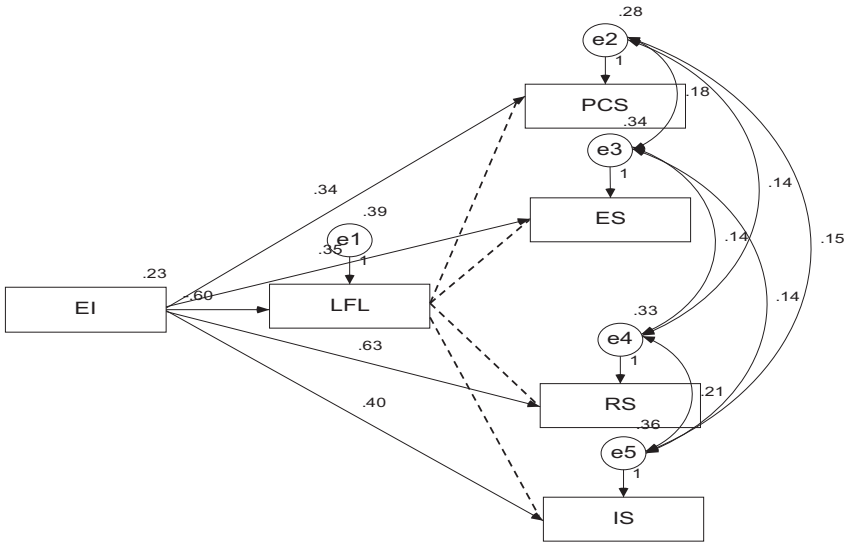


Fig. 5. Hypothesized path model with standardized coefficients.

transformational and active-transactional leaders to promote participants' satisfaction in view of the emphasis on relationship in integrated projects. In addition, charisma of TFL had the most significant influence on outcomes, indicating that setting an example to subordinates is essential. Although the relationship of EI with PTL was negative, we explored the positive function of it on performance and efficiency, thus we can apply it appropriately when task.

Finally, we note that top management should be aware of the importance of project managers' leadership styles equipped with EI, which can serve to boost collaboration satisfaction in integrated projects. As such, project leaders should be encouraged to adopt positive leadership styles such as transformational leadership styles for a better collaboration culture. In this regard, providing appropriate training programs for project leaders regarding to their EI and leadership styles can help to create satisfied collaborated atmosphere among participants in IPD.

### *5.2. Limitations and future directions*

Our study has several limitations that should be taken into account, and some of these points are opportunities for future study. First, the results of our study is general but might be affected by national culture since data were collected from one country -China. Chinese society is characteristic by "personalism" that command a high degree of employees' commitment and paternalistic leadership style would gain greater satisfaction. In this case, it might be useful to see if our findings replicate in other national culture. Second, common method bias could be concern since some questionnaires are self-report. The risk of common method variance leads to inflating or suppressing the magnitude of relationships being investigated. So we checked the presence of common method variance by using Harman's (1976) one-factor test (Podsakoff and Organ, 1986) to enter all construct measures into one single-factor analysis. The result showed that there was no single factor that could account for the majority of the covariance in the measures, which indicated that this sample was not influenced by this problem. Finally, while we justified leadership styles as mediators of the EI-collaboration satisfaction relationship, we also acknowledge that additional mechanisms might exist trough which EI may impact on collaboration satisfaction. Future research might consider other mechanisms, such as trust, communication and team building.

## Conflict of interest

There is no conflict of interest.

## Acknowledgements

The authors are grateful to the support of the National Natural Science Foundation of China (Project No. 71572126).

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Please cite this article as: L. Zhang, et al., 2017. The mediation role of leadership styles in integrated project collaboration: An emotional intelligence perspective, Int. J. Proj. Manag. http://dx.doi.org/10.1016/j.ijproman.2017.03.009

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