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"PARTNERING AND PROJECT PERFORMANCE" THE MEDIATING ROLE OF INNOVATION AND TQM PRACTICE IN HIGH-RISE BUILDING CONSTRUCTION PROJECTS IN JAKARTA, INDONESIA

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Abstract

Purpose of the research is to ascertain the perception, from the project manager's viewpoint, the relationship between Partnering, TQM practice, Innovation and project performance. Construction Partnering and its principles have increasingly been introduced to the construction industry to improve the efficiency of project delivery. However, little research has been carried out to examine the relationships between partnering and the mediating role of TQM practice and Innovation and how they relate to construction project performance. Results of the current study showed that Innovation improved project performance. Further, partnering impacted TQM practices and innovation. Yet, surprisingly, even though partnering was found to influence project performance through the mediation of innovation, it did not directly affect performance not even through TQM practices acting as a mediator. In this study, a survey of 71 managers of Indonesia's Construction firms was conducted. Multivariate analysis using partial least square modelling was used to test the hypotheses. The paper shows strategy at the project level and was limited to the construction sector in high-rise buildings in the Jakarta area. This suggests that companies might gain better outcomes by creating high levels of partnering in order to support TQM practices and Innovation as their organization strive for a competitive advantage.

Keywords: Partnering, TQM practice, Innovation, Project Performance, Construction

INTRODUCTION

The 'Global Construction 2025' report, found that construction will account for 13.5 percent of world output by 2025, with activity driven by rising populations in the developing world, plus increasing urbanization. Urbanization is one of the largest challenges facing the human race. Growth in the world's global mega cities gives rise to major challenges for the engineering and construction industry. Some two billion additional city-dwellers are expected by 2050, giving rise to challenges around providing power, water, sanitation, housing, offices and transportation as well as doing this sustainably and developing new cities of the future. While two-thirds of global construction will be focused in China, India and the U.S., the activity in emerging Asia will be increasingly driven by Vietnam, Indonesia and the Philippines, which they termed the new Asian Tigers. Indonesia as "perhaps the most dynamic" of their new Tigers, and forecast its construction market would post average annual growth of over 6 percent, up until 2025. Indonesia will become the world's third largest housing market globally by number of new homes that it needs to build each year, slightly more than the average number for the United States (Barnato, 2013). For the medium term, a number of construction trends expected to see, at the country level, Indonesia is the top rated country followed by China confirming the results from the previous survey. Indonesia scores particularly well in terms of market growth prospects over the next three years. At the city or metropolitan level, Jakarta is the top rated city in terms of market growth prospects (by a considerable distance), followed by Kuala Lumpur and Shanghai (Kandan, 2015).

The construction market in Indonesia is expected to grow 6 percent until 2025, with growth being above the economic growth. Although the Indonesian construction markets are growing, current figures show that a large amount of projects was won by foreign contractors. Foreign contractors working on 70% of the total value of Engineering, Procurement and Construction (EPC), while SOE Work amounted to 14 companies only do 10% only. (LPKJN, 2014). Many construction industry sectors have been experiencing chronic problems such as, low productivity, high waste, delay in the project delivery, poor innovation and insufficient quality (Alwi, Hampson, & Mohamed, 2002). The average number of waste estimated by as much as 32-36%. Wastage in the construction industry is estimated at around 57%. While waste in the manufacturing industry is 26% (Abduh, 2007). Low productivity and high number of waste in the construction project is influenced by: labour productivity, construction methods, rework, incomplete drawing, poor communication, inspection delay, supplier qualification, competence and training, technology for product, construction plants and equipment development (Arditi & Mochtar, 2000; Budiwibowo, Trigunarsyah, Abidin, & Soeparto, 2009; Hughes & Thorpe, 2014; Kaming, Holt, Kometa, & Olomolaiye, 1998; Suárez, AbouRizk, & Karapetrovic, 2014; Zhao &

Chua, 2003). Intense competitive pressures in the construction industry demands new ways to improve productivity, project performance to better satisfy customers' needs. Innovation and total quality management has increasingly been adopted by construction companies as an initiative to solve quality problems, improving construction project performance and to meet the needs of the final customer (Kanji & Wong, 1998) . As suggested by (Oakland & Aldridge, 1995) p. 1: 'if ever an industry needed to take up the concept of TQM it is the construction industry'. (Hoonakker, Carayon, & Loushine, 2010) advances the view that construction very probably promises a greater payback for performance improvement than any other service industry because of its magnitude.

Many studies have shown that firms have succeeded by employing Innovation, TQM practice and partnering, however there is a gap between empirical literature examining the mediating role of TQM practice, and Innovation between Partnering and Project Performance in high-rise building project. Accordingly, this paper investigates the mediating role of Innovation, and TQM practice, in the relationship between construction project performance and partnering. To summarize, this study has three objectives. The first objective of the study was to examine the relationship between Partnering, TQM practice, and Innovation and its impact to Project partnering in Jakarta high-rise building project construction. The second objective was to examine how partnering may influence construction's TQM practice and innovation, which in turn leads to greater Project Performance and the third objective is to investigate the mediating role of TQM practices and Innovation in the relationship between Partnering and project.

LITERATURE REVIEW

Partnering and Innovation

According to (Fulford & Standing, 2014) there are great potential productivity improvement in the construction industry, and collaboration is one way to move forward. (Dietrich & Eskerod, 2010) confirm this by saying that extensive interfirm collaboration is needed for the construction industry. Focusing on teamwork and group effort should result in improved project efficiency, better organization performance and strong partnership (Fulford & Standing, 2014). Partnering can be described as "a long term commitment between two or more organizations for the purpose of achieving specifics business objectives by maximizing the effectiveness of each participant's resources". *(CII, 1991, p. iv).* Partnering resulted in close collaboration and increase trust among the actor, lead to the exchange of information, information was easily accessed and transferred between the actors, cut lead times on information transfer, making the project more efficient (Lingegård & Lindahl, 2015). Kanji and Wong (1998, p. 124) defined project partnering in construction as follows: "Project partnering is a synergy, a cooperative,

collaborative management effort among contracting and related parties to complete a project in the most efficient, cost-effective method possible, by setting common goals, keeping lines of communication open and solving problems together when they arise".

Many scholars tend to agree that achieving project success and competitive advantage begin with fostering a close relationship among project participant in the construction project (Bygballe, Jahre, & Swärd, 2010; Erik Eriksson, Dickinson, & Khalfan, 2007; Ingirige & Sexton, 2006; Kadefors, 2004; Swan & Khalfan, 2007; Tang, Duffield, & Young, 2006). (Chan, Chan, & Ho, 2003) identified improved relationship amongst project participants as the most significant benefit of partnering projects. Additionally, partnering also increases the opportunities for innovation (Chan, Chan, Fan, Lam, & Yeung, 2008). Trust is the key element of the cooperative relationship (Tang et al., 2006). Other key success factors include: common goals and shared vision, high levels of mutual trust, senior management support, mutual understanding, effective communication, conflict resolution, openness, team building activity and collaboration (Jacobsson & Wilson, 2014; Tang et al., 2006; Zhang, Hong, Chan, & Chan, 2012; Zielina & Szewczyk, 2014).

According to (Blayse & Manley, 2004) construction firms need to innovate to win projects and to improve the financial results. They must innovate to compete. (Eaton, 2001) declares, "*without innovation a business does not have a rational source of competitive advantage in construction"*. (Gann & Salter, 2000) comments that construction firms need to improve their capabilities in managing innovation if they are to build reputations for technical excellence that set them apart from more traditional players. The construction industry contains both manufacturing and services; therefore, general manufacturing innovations are insufficient for construction innovation. (Blayse & Manley, 2004). A variety of definitions are given for construction innovation within the literature, as shown in Table 1.

Table 1. Overview of Definition of Construction Innovation

Author	Definition of Construction Innovation
(Seaden & Manseau, 2001)	The implementation of significantly new processes, products or management approaches in order to increase efficiency of an organization.
(Slaughter, 2000, pp. 1466).	"a non-trivial improvement in a product, process, or system that is actually used and which is novel to the company developing the change"
(Dulaimi, 2005)	The generation, development, and implementation of ideas that are new to an organization and that have practical or commercial benefits.
(Toole, 1998)	Application of technology that is new to an organization and that significantly improves the design and construction of a living space by decreasing installed cost, increasing installed performance, and/or improving the business process.

Although research in this area does not have a consistent definition of construction innovation, there are some inclinations and convergences in these definitions. Increasingly, the process, where the practice of new ideas improves the performance of a variety of organizations, can be regarded as innovation. There are several types of innovation exist: incremental (i.e. building on what exists), radical (a breakthrough in science or technology), structural (i.e. reorganizing the components of an object or system), systemic (i.e. involving stakeholder coordination), defensive (i.e. which extends the life of an existing object or system) and revolutionary (i.e. which completely changes the nature of what is on offer) 'modular' (a change in concept within a component only), 'architectural' (a change in links to other components or systems) (Blayse & Manley, 2004; Davidson, 2013). At a broader level, the Organisation for Economic Cooperation and Development categorises innovation in the Oslo Manual on the basis of international research across a number of industries. The manual describes innovation as being either 'technical' or 'organisational'. Technical innovation involves either 'product' or 'process' innovation, whereas organisational innovation includes changes to organisational structure, introduction of advanced management techniques, and implementation of new corporate strategic orientations (Blayse & Manley, 2004).

Much of the innovation in construction is co-developed with other project participants, such as clients, contractors, sub-contractors, suppliers, consultants, and designers, each part of which has a different role in the innovation process and requires the integration of technological, economic, society, management elements, completed in different phases, by different organizations with various professional backgrounds (Liu, Wang, Skibniewski, He, & Zhang, 2014). Innovation requires communicating new information effectively, precisely because of the process, in building project moves from being an idea to an on-the-ground reality, passes through many hands and is the subject of often-conflicting vested interests. (Davidson, 2013). The sources of construction innovation can be any participant, therefore partnering is necessary to the success of construction innovation (Liao, Chang, Tay, & Wu, 2008; Ozorhon, 2013; Zielina, 2010). Successful innovation requires effective collaboration, early stakeholder engagement, coordination and knowledge sharing among multiple disciplines between contractors and sub – contractors and supplier (Baharuddin, Wilkinson, & Costello, 2013; Erik Eriksson et al., 2007). Many study have shown that Partnering provides the conditions that can encourage innovation and promote learning from experience (Ozorhon, Abbott, Aouad, & Powell, 2010 & Powell, 2010). Therefore, effective collaboration, should enhance Innovation, and we hypothesize:

H1: Partnering is significantly related to Innovation

Innovation and Project Performance

Performance measurement is the process whereby an organization establishes the parameters within which programs, investments, and acquisitions are reaching the desired results (Office of the Chief Information Officer (OCIO) Enterprise Architecture Program 2007).Projects differ in size, uniqueness and complexity, thus the criteria for measuring success vary from project to project (Müller & Turner, 2007) making it unlikely that a universal set of project success criteria will be agreed. Individuals and stakeholders often will interpret project success in different ways (Cleland and Ireland, 2006). Furthermore, viewpoints about performance also vary across industries (Chan & Chan, 2004). Performance measurement in construction focuses on project performance in terms of time, cost, and quality (McLeod, Doolin, & MacDonell, 2012; Rolstadås, Ralf Müller, Tommelein, Morten Schiefloe, & Ballard, 2014; Yong & Mustaffa, 2012). With the development of performance measurement in the construction industry over the past decade, the performance measurement target has extended to the construction company level and the project stakeholder level. The focus of performance measurement has also changed to include client satisfaction, business performance, health, safety, environment, and so on (Yang, Yeung, Chan, Chiang, & Chan, 2010).

A number of alternative frameworks are available for measuring project success. (Müller, Geraldi, Söderland, & Jugdev, 2012) study which focuses on the evolution of the project success literature over the last decade neatly summaries this issue by asserting that it is a multi-dimensional and networked construct.

Starting with (Pinto & Mantel Jr, 1990) who recommend measurement for the success in the implementation process; the perceived value of the project; and client satisfaction. (Atkinson, 1999) divides project success into three categories: doing the process right; getting the system right and getting the benefits right. (Shenhar, Tishler, Dvir, Lipovetsky, & Lechler, 2002) identified three clusters of success – meeting design goals of time, budget, and performance, impact on the customer, and benefits to the organization. Project managers distinguished between four dimensions of success: (1) project efficiency; (2) impact on customers; (3) business success; and (4) strategic potential. Based on the review of performance measurement studies in construction, it can be concluded that researcher in this area has focused on levels of organization and time frame of process and product life cycle as shown in Table 2.

Table 2. Performance Measurement Criteria

Project Level		Organization Level	Stakeholder Level
Process success	Product Success		
On time, within budget environmental performance human resource performance procurement performance safety performance design performance participant's satisfaction, cost performance quality performance	Client satisfaction Client benefit technology innovation post-occupancy evaluation	Business benefit Strategic benefit	Project manager performance • team building • leadership • decision making • mutuality and approachability • honesty and integrity • communication; • learning, and application

According to (Lee, Abdul-Rahman, & Wang, 2014; Tajuddin, Iberahim, & Ismail, 2015) there is a positive and significant relationship of Innovation on Project Performance. Major outcomes of the innovation process for project participants such as improvement of human resources; better company, image; market penetration and growth; increase in technical and organizational capability; productivity; decrease in cost and duration; improvement in product quality; future business collaborations with project parties (Ozorhon, 2013). Based on the above discussion, and in line with (Lee et al., 2014; Tajuddin et al., 2015) findings, Innovation is hypothesized to be positively related to project performance, and mediating the relationship between Partnering and Project Performance.

H2: Innovation is significantly related to Project Performance

H3: Innovation mediating the relationship between Partnering and Project Performance

Partnering and TQM practice

The construction industry is a "project based" industry, most projects or their individual work phases are of relatively short duration. Each construction project is unique in its physical site constraints, basic processes are repeated from job to job, but the specifics of application always vary due to project constraints and site environments (Lau, Tang, & Li, 2015). In construction, an activity may be repeated at various stages, but it is done only one time for a specific work. If anything goes wrong, the nonconforming work is very difficult to rectify and remedial action is sometimes not possible Therefore, it has to be right from the onset (Rumane, 2010) Parties to projects have differing traditions and often opposing interests, leading, to resources being spent on defending the parties' positions, Short-term employment for migrant workers, which

discourages company loyalty, Multi-interfaces complicate the communication efficiency and little integration between designers and construction contractors, resulting in low buildability designs. Changes, both in design and in construction, are excessive and frequent, which cause delays, claims and confrontations. These characteristics have a substantial effect on the quality standards of the construction industry, which is considered to be lagging behind other industries (Lau et al., 2015; Rumane, 2010). Although construction industry had lived in the quality programme of inspection and quality control for years to accept and reject works and materials, based on the inspection and quality control. However, the introduction of TQM in 1980's had changed the perception of the construction industry's peoples in managing quality in construction (Abdullah, Asmoni, Mohammed, Mei, & Ting, 2015).

In general, Quality definition by International Organization for Standardization (ISO, 1994) is the totality of characteristics of an entity that bears on its ability to satisfy stated or implied needs. In construction industry, "needs" or requirements must be specifically mentioned as according to (Rumane, 2010) needs is "..the fulfilment of the owner's needs per defined scope of works within a budget and specified schedule to satisfy the owner's/user's requirements". (Rumane, 2010, p.40). According to Construction Industry Institute (CII) "Requirements are contractually established characteristics of a product, process, or service. The requirements are initially set by client/customer (ordinarily the user/operator of the facility) and are then translated during the preplanning phase into a conceptual design and estimate developed into a project scope and more fully defined. (CII Source Document 79 1992, p. 5). TQM is a management model that aims to meet customer needs and expectations within an organization through continuous improvement of the quality of goods and services and by integrating all functions and processes within an organization (Prajogo & McDermott, 2005).

The association between Partnering and TQM has been alluded to by several scholars who suggest that attempting better communication flow, mutual understanding, team work and collaboration in partnering is key to TQM success (Ghaffari, 2015; Irani, Beskese, & Love, 2004; Tang et al., 2006). The role of partnering in enhancing TQM in construction can also be largely attributed to share information which enables all participants to be much more integrated, the barriers can be substantially removed and as a result, is an improvement on risk management, monitoring cost reduction, and innovation (Ghaffari, 2015; Tang et al., 2006). Hence, it is expected that partnering will lead to better TQM practice, and we hypothesize:

H4: Partnering is significantly related to TQM practice.

TQM practice and Project Performance

The effect of TQM practice on project performance has been empirically verified in construction processes by several authors (Bryde & Robinson, 2007; Fotopoulos & Psomas, 2009; Kuo & Kuo, 2010; Langford, El-Tigani, & Marosszeky, 2000; Mir & Pinnington, 2014; Suárez et al., 2014; Zavadskas, Vilutienė, Turskis, & Šaparauskas, 2014). Actually, since long time ago, Deming's philosophy emphasized the significance of quality on the of processes and especially on the productivity: as quality improves, productivity increases due to a reduced amount of rework, fewer mistakes and delays (Deming, 1986) as quoted by (Suárez et al., 2014). (Zavadskas et al., 2014) describes the relationship between TQM practice on the performance of the project is causality through time management and budget management, which ultimately affects project performance, and (Suárez et al., 2014) explained the cause and effect variables relationship between number of non-conformance events and Quality level of project requirements. In contrast some report from The American Quality Foundation and Ernst & Young (1992) found that almost two thirds of US firms saw "zero competitive gain" from TQM, while (Soltani, Van Der Meer, & Williams, 2005) found that the majority of UK organizations have not received any tangible results from TQM. Similarly, there has been mixed findings in relation to the success of TQM in Australia (Taylor & Wright, 2003). According to (Lau et al., 2015) there is a significant improvement in project performance with the increase level of TQM practice in Hong Kong. Since there has been inconsistency reported in other industry about the TQM result, and not many report from construction industry, here TQM practice is hypothesized to be positively related to project performance, and mediating the relationship between Partnering and Project Performance.

H5: TQM performance is significantly related to Project Performance

H6: TQM practice mediating the relationship between Partnering and Project Performance

Partnering and Project Performance

Project Partnering is claimed to have a positive relationship with project performance directly. The link between Partnering and project performance is straightforward. Many study have shown that Partnering has positive effect impact to cost effectiveness, product quality and customer satisfaction, increased productivity, accelerate project implementation time, focus on learning, continuous improvement and participation at the level of innovation, customer satisfaction, and reduced litigation (Baharuddin et al., 2013; Cheng, Li, & Love, 2000; Hoonakker et al., 2010; Ling, Ke, Kumaraswamy, & Wang, 2013; Löfgren & Eriksson, 2009;

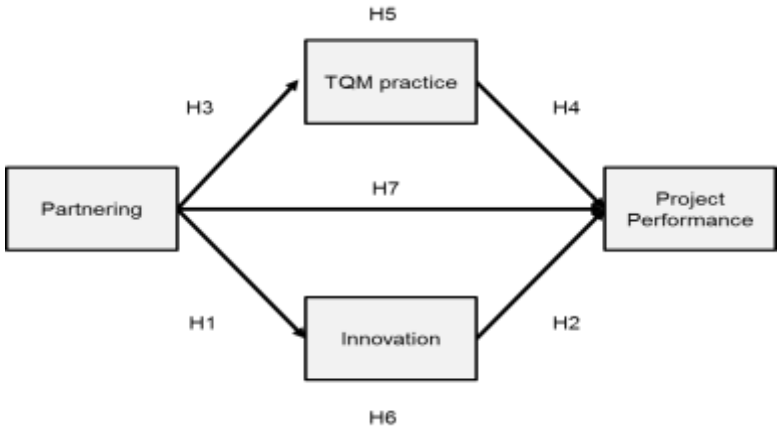
Zielina & Szewczyk, 2014). Consequently, we argue that a strong partnership is a critical source of a project performance, and thus we hypothesize:

H7: Partnering is significantly related to Project Performance

Research Framework

The five hypotheses above were captured in the research framework shown in Figure 1. In the framework, Partnering were treated as independent variables and Project performance considered as dependent variables. The five path relationships represent the five hypotheses tested in this study. TQM practice and Innovation is expected to have a mediating effect in the relationship between Partnering and Project Performance in high-rise building project.

Figure 1. Research framework



RESEARCH METHOD

The study adopted a descriptive research design. Survey questionnaires were distributed to all 83 project managers of contracting companies throughout DKI Jakarta. Prior to main distribution of the questionnaires, a preliminary test of their design was carried out to further improve the clarity of the content. Fieldwork on the final questionnaire occurred during August-December 2016. To further improve the response rate, follow-up telephone calls were made to request participation. The final response and useable questionnaires were 71, which provided the final effective response rate of 86%.

The measurement items to assess relationship between Partnering, Innovation and Project performance are formulated on the basis of thorough review of the literature. The instrument developed for this study comprises one scales of independent variables, two

mediators, and one scales of dependent variables. The instrument used, is a five-point Likert scale (1 – strongly disagree and 5 – strongly agree). The first section obtained descriptive data about respondents and their organizations. The next section dealt with main construct and asked respondents to agree or disagree with the given statements.

The scale developed by (Chan & Chan, 2004) was modified to measure Partnering, which composed of ten dimension twenty items in total. MBNQA criteria was selected to measure the TQM practice in 35 items of questions. For innovation, the content was derived from the construct used by (Manley, McFallan, & Kajewski, 2009). The innovation construct measures: the activeness, novelty, impact and adoption of listed technological and organizational advances. It has 3 questions of each type of innovation to measure the innovativeness of process, product and organization. Finally, this study adopts the work (Abduh, Soemardi, & Wirahadikusumah, 2007) for the firm performance measure, which comprises of 7 items. Level of Partnering in this study was measured using the ten items with significant factor loading in (Cheng et al., 2000; Tang et al., 2006). Those ten elements are: compatible goals, equity, commitment, team building activities, mutual understanding, trust, and communication.
Various criteria to measure the performance of TQM practice, among several available models, the MBNQA criteria were chosen to measure the implementation of TQM practices in construction. This award consists of six criteria of organizational practices and one criterion of organizational performance (business results). The organizational practices embody six criteria, namely leadership, strategic planning, customer focus, measurement, analysis and knowledge management, workforce focus and operation focus. There were several key reasons that underpinned this choice. First, the use of the Baldrige framework to articulate the content of TQM practices has been supported by a number of scholars in particular (Curkovic, Melnyk, Calantone, & Handfield, 2000; Dean & Bowen, 1994; Prajogo & McDermott, 2005) Second, the MBNQA criteria are applicable to construction industry (Brown, 2013). (Abdullah, Asmoni, Mohammed, Mei, & Ting, 2015) argue that construction is a project based industry which the definition of quality in the construction is meeting the customer's expectation, for that reason, the success of QMS should be measured at project level rather at company level. Furthermore, he suggested criteria to measure TQM practice as follows: client's commitment, integration of quality plan, measurement and improvement, education and training, team work and communication and the use of ICT, which underpinned most of award's criteria. Innovation in this paper was measured using four items in (Manley et al., 2009) the novelty and impact of innovations and adoption of listed technological and organizational advances, and the activeness of innovation.

Since selection of the measurement items was based on a review of the theoretical and empirical literature, it is important to assess questionnaires validity. A pilot questionnaire test was undertaken to 30 constructing companies located in DKI Jakarta.

ANALYSIS AND RESULTS

To test the conceptual model, structural equation modeling was employed using the partial least squares (PLS) approach. This tool is particularly suitable for small samples with complex models; a prediction-oriented method that does not require strong theory (Hair Jr, Hult, Ringle, & Sarstedt, 2014). In this regard, developing both measurement and structural models are important to adequately formulate the hypothesized relationships within the proposed model as presented below

Measurement Model

Evaluation of the measurement model includes Reliability and Validity of the construct (Hair Jr et al., 2014). Reliability test includes: composite reliability and individual indicator reliability. Validity test includes average variance extracted or AVE. To assess discriminant validity, the cross loadings and Fornell-Larcker criterion are used.

Reliability

Reliability for the measurement model is evaluated using Cronbach alpha, and composite reliability (CR). The composite reliability and Cronbach alpha varies between 0 and 1, with higher values indicating higher levels of reliability. The result in Table 3 shows Cronbach alpha and CR > 0.7 therefore, model evaluation criteria for reliability has been met.

Construct Validity

Validity of the construct for the measurement model is evaluated using Convergent validity and Discriminant validity. To establish Convergent validity, outer loading of the indicator was considered as well as the average variance extracted or AVE. As shown in Table 3, the outer loadings for all constructs in the conceptual model >0.708. One indicator mutual understanding (0.511) will be retained on the basis of their contribution to content validity, and according to (Hair Jr et al., 2014) outer loading should not lower 0.4. The AVE for all construct higher than 0.5, therefore criteria for convergent validity has been met. Discriminant validity was tested using two criteria: cross loading and Fornell-Larcker's criterion. Cross loading report provide evidence that all indicator's outer loading on the associated construct are greater than all of its loadings on other constructs. Fornell-Larcker criterion compares the square root of the AVE

values with the latent variable correlations. As shown in Table 4, the square root of each construct's AVE should be greater than its highest correlation with any other construct. The square root of Partnering's AVE (0.811) was lower than correlation between TQM and Partnering, therefore indicators with relatively low loading factors were removed in an attempt to more closely meet the criteria.

Table 3. Result of Measurement Model Evaluation

Latent Variable	Indicator	Loadings	Indicator Reliability	Cronbach alpha	Composite Reliability	AVE	Discriminant Validly?
Partnering	Compatible Goal	0.793	0.629	0.940	0.950	0.658	Yes
	Collaboration	0.807	0.651				
	Equity	0.811	0.658				
	Commitment	0.826	0.682				
	Team Building Activities	0.868	0.753				
	Mutual Understanding	0.511	0.261				
	Trust	0.804	0.646				
	Communication	0.871	0.759				
	Conflict Resolution	0.865	0.748				
	Openness	0.891	0.794				
TQM	Leadership	0.908	0.824	0.955	0.964	0.816	Yes
	Strategic Planning	0.905	0.819				
	Customer Focus	0.891	0.794				
	Analysis Measurement and Knowledge Management	0.918	0.843				
	Workforce Focus	0.912	0.832				
	Operational Focus	0.885	0.783				
Innovations	Activeness	0.893	0.797	0.878	0.916	0.732	Yes
	Novelty	0.810	0.656				
	Impact	0.882	0.778				
	Adoption	0.835	0.697				
Project Performance	Client Satisfaction	0.839	0.704	0.903	0.924	0.638	Yes
	Waste/Rework	0.631	0.398				
	Functionality	0.848	0.719				
	Productivity	0.894	0.799				
	According to budget	0.809	0.654				
	Timeliness	0.822	0.676				
	Lesson Learned	0.716	0.513				

After removal of the indicators, the evaluation of Fornell-Larcker is shown in Table 4. All square root of AVE values is 0.881 which is greater than its highest correlation with any other construct.

As can be seen all model evaluation criteria have been met, providing support for the measures reliability and validity.

Table 4. Result of Fornell-Larcker Evaluation

Latent Variable	Correlation				AVE	SQRT AVE
	Partnering	**TQM**	**Inovation**	**Project Performance**		
Partnering	1.000	0.879	0.713	0.058	0.777	0.881
TQM	0.879	1.000		0.277	0.816	0.903
Inovation	0.713		1.000	0.479	0.732	0.855
Project Performance	0.058	0.277	0.479	1.000	0.638	0.799

Structural Model

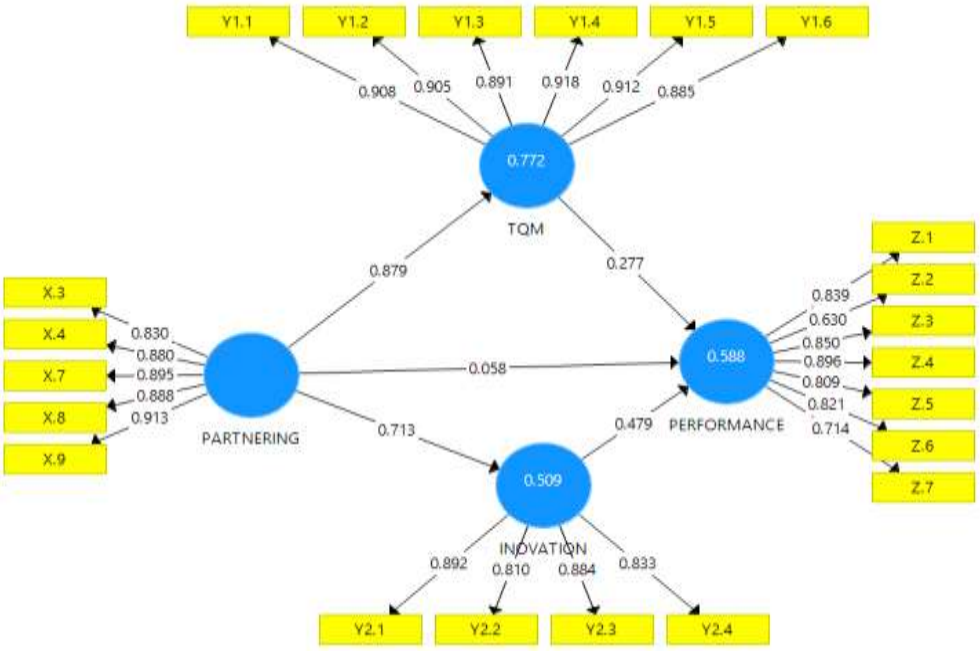
The structural model of the study as in Figure 1, was evaluated for its model's predictive capabilities and construct's relationship, using a set of criteria as shown in Table 6.

Table 6. Evaluation criteria for structural model

Criteria (Hair Jr et al., 2014).	Threshold limit
Path coefficient	-1 to 1, the number closer to 1 the strongest
R^2	0.75, 0.50 and 0.25 for endogenous constructs described as substantial, moderate, and weak.
f^2 effect size	The f2 values of 0.02, 0.15 and 0.35 are used as a guideline for small, medium and large effect sizes of the predictive variables
Q^2 (predictive relevant)	values larger than 0 suggest that the model has predictive relevance for a certain endogenous construct.

Partnering is the exogenous construct, with TQM practice and Innovation as intermediate endogenous constructs, and project performance as endogenous construct. Innovation and TQM practice has a strong relationship with Partnering (0.713 and 0.879), however only Innovation is the most important construct affecting Project Performance.

Figure 2. The Research's Model



The coefficient of determination R2 for each construct is: TQM practice 0.72 (large), Project Performance 0.588 (medium) and Innovation is 0.509 (medium). The report showed that the f2 effect size of Innovation on the Project Performance is 0.207 (medium), Partnering to Project Performance is (0.02), and TQM practice to Project Performance (0.032). The resulting Q2 values with omission distance D=7, for Innovation Q2 values (0.363), also for TQM practice (0.626), and Project Performance (0.354), indicate that the model has predictive relevance. Therefore, all criteria to evaluate the structural model has satisfied. The path coefficient between construct and structural equation is summarized in Table 7.

Table 7. Structural Equation Result

Relationship between construct	**Path Coefficient**	**Equation Model**
Partnering → Innovation	0.713	Innovation = 0.713 Partnering + 0.741
Partnering → TQM	0.879	TQM practice = 0.879 Partnering + 0.404
Partnering → Project Performance	0.058	Project Performance = 0.058 Partnering + 0.654
Innovation → Project Performance	0.479	Project Performance = 0.479 Innovation + 0.654
TQM→ Project Performance	0.277	Project Performance = 0.277 TQM practice + 0.654
Partnering→ TQM→Project Performance	0.879 and 0.277	Project Performance = 0.879 Partnering + 0.277TQM practice + 0.756
Partnering→Innovation→Project Performance	0.713 and 0.479	Project Performance = 0.713 Partnering + 0.479 Innovation + 0.658

The mediating effects of TQM practice and Innovation partially was tested for its significant t-value and value of variance accounted for (VAF) which determines the size of the indirect effect. To determine the value of VAF, a procedure of bootstrap sampling distribution of the indirect effect was utilized. The criteria is for VAF value > 80%, characterized a full mediation, and VAF value larger than 20% and less than 80% can be characterized as partial mediation (Hair Jr et al., 2014). The result of VAF value for Innovation is 35% with t-value 3.339, therefore Innovation can be characterized as significant and partially mediating the relationship between Partnering and Project Performance. The VAF values for TQM practice is 27% with t value of 1.515, and it is characterized that TQM has no mediating effect in relationship between Partnering and Project Performance

Hypothesis Testing

The t-values were calculated using a bootstrap resampling procedure with 500 subsamples.

Table 8. Result of Hypothesis Testing

Relationship between construct	Path Coefficient	t-value	VAF	Finding
Partnering → Innovation	0.713	12.489 *		H1 supported
Innovation → Project Performance	0.479	3.470 *		H2 supported
Partnering→ Innovation → Project Performance		3.339 *	35%	H3 supported
Partnering → TQM practice	0.879	28.501*		H4 supported
TQM practice → Project Performance	0.277	1.522		H5 not supported
Partnering→ TQM practice → Project Performance		1.515	27%	H6 not supported
Partnering → Project Performance	0.058	0.396		H7 not supported

Note: *Significant at 0.05(1-tailed)

DISCUSSION

The first objective of the study was to examine the relationship between Partnering, TQM practice, and Innovation and its impact to Project partnering in Jakarta high-rise building project construction. The empirical results provide strong support to the four hypothesized relationships as depicted in Fig. 1. Partnering is significantly related to Innovation, and TQM practice. These findings support (Erik Eriksson et al., 2007; Irani et al., 2004; Kanji & Wong, 1999; Lee et al., 2014) and highlight the importance of the Partnering factors (communication, openness, conflict resolution, team building activities and commitment) in providing an environment that is conducive to Innovation and TQM practice. Consistent with (Lee et al., 2014; Tajuddin et al., 2015) findings the analysis revealed a significant and positive relation between Innovation and

Project Performance. This indicates that effectiveness and the impact of both technological and organizational Innovation is positively associated with Project Performance.

Surprisingly, TQM practice was not significantly related to Project Performance. This is inconsistent wit+h (Kuo & Kuo, 2010; Suárez et al., 2014; Zavadskas et al., 2014) findings and suggest that strategic planning and leadership is the least important factor of TQM practices in enhancing Project Performance. The insignificant association between TQM practice and Project Performance may be attributed strategic planning and leadership. A possible explanation for this can be that TQM can be more easily implemented with strategic planning directed by strong leadership. It was found also that Partnering does not exhibit a significant relationship with Project Performance. This finding does not support (Tang et al., 2006; Zielina & Szewczyk, 2014) and suggest that conflict resolution and commitment to partnering were the least important of the five Partnering factors in enhancing Project Performance. The findings highlight again the role of the project managers to establish a project atmosphere that committed in facilitating conflict between parties in the project to prevent adversarial behavior and work collaboratively to achieve objectives,

The second objective of the study was to examine how partnering may influence construction's TQM practice, and Innovation, which in turn leads to greater Project Performance. The results revealed five important factors of Partnering: commitment, team building activities, communication, conflict resolution, and openness exhibited a significant positive relation with TQM practices. The openness, communication and conflict resolution was associated with both Innovation and TQM practice. These findings highlight the importance of the prevailing communication and openness in providing an environment that is conducive to the implementation of TQM practices and Innovation. Accordingly, management needs to be aware of such relations and attempt to change the prevailing communication, openness and conflict resolution to support TQM practices and Innovation.

The third objective of the study was to investigate the mediating role of TQM practices and Innovation in the relationship between Partnering and Project Performance. The results revealed that Innovation mediating partially the relationship between Partnering and Project Performance. The findings support (Lee et al., 2014) and suggest that commitment is the least important factor in enhancing innovation and novelty of innovation and adoption of advance technological and organizational innovation is the least factor in enhancing Project Performance. Conflict resolution and commitment was enhanced by Innovation, accordingly, organizations should devote more effort in conflict resolution and commitment to partnering to achieve project effectiveness in implementing novelty in innovation and adoption of technological and organizational advances, such as ICT. However, while it was reported that

Innovation mediating partially the relationship between Partnering and Project Performance, the current study found that no such TQM practice mediation existed in the relationship between Partnering and Project Performance. This is inconsistent with findings (Tang et al., 2006). A further possible explanation for this could be that as a project based industry with little integration between multi-interfaces involved, complicate the communication efficiency to deliver project in a given time. Limited skills and worker competency, and need extra effort for leader to create a culture for continual improvement in a short time.

The practical significance of these findings suggests that managers and decision makers within project aiming to maximizing project performance using innovation strategy, should dedicate their resources and attention to building competencies in team building activities, communication, conflict resolution and openness among parties involved in the project. The findings also suggest that organizations striving to achieve better project performance through innovation should focus their energies on creating novelty of innovation and the adoption of advance technological and organizational innovation.

CONCLUSION

Some interesting results obtained from our analysis have contributed to the literature in three ways. It is the first effort that focuses on the mediating role of innovation and TQM in the relationship between Partnering and Project Performance. These findings add to the construction literature by quantitatively uncovering the significance of Partnering to TQM practice and Innovation to Project Performance in the context of high rise building project. The research extends previous research that explored very much on project performance; we addressed the mediating effect of TQM and Innovation on the Project Performance.

The empirical analysis resulting from this study furthers our understanding of the inter-relationship between Partnering, TQM practice, Innovation and project performance, and the Partnering factors that affecting TQM practice, Innovation and Project Performance. The empirical analysis evokes a number of important findings. First, the results suggest that each factor of Partnering has a different contribution to the TQM practice, Innovation and Project Performance. A number of results of the study are consistent with past studies, and indicate that communication and openness are contributing the most to TQM practice and Innovation, and communication and team building activities contributing to Project Performance.

A second finding from this study suggests that Innovation is only significantly related to Project Performance. The relationship between Partnering to Innovation was also significant and it is also notable that Innovation partially mediating the relationship between partnering and project performance. Interestingly, within our sample, TQM practice, and Partnering was not

found significantly related to Project Performance, additionally the TQM practice was not mediating the relationship between Partnering and Project performance. These results suggest that firms should pursue only Innovation and Partnering. Hence, firms should consider developing complementary resources and practices to achieve high level of partnering in order to achieve better project performance.

We acknowledge several limitations inherent in this study, which warrant future research. First, the accuracy of the research data could be improved by involving more people in the partnering. This means assigning areas of the study to the other specific personnel with relevant function in the project partnering (consultant, client and supplier). Second, further research could replicate this study with a more detail structure of innovation (product, process and organizational) that reflects different mediating effects. Last, we could also explore the mediating role of both TQM and Innovation simultaneously in the relationship between TQM practice and project performance.

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