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Effects of interpersonal relations on public sector construction contracts in Vietnam

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Public owners and private contractors and consultants are expected to maintain arm's length relationships with each other to avoid any accusation of corruption. In the context of public construction projects in Vietnam, this study examines: the relational contracting (RC) related behavioural patterns that lead to better interpersonal relations during the construction stage and at the end of the project among public project owners, and private contractors and consultants; and the extent to which better interpersonal relations affect project performance. Using a questionnaire survey, data were collected from public owners and private contractors and consultants in Vietnam. Correlation analysis shows that there exist several behavioural patterns that significantly affect interpersonal relations among project team members during the construction stage and at the end of the project, and the general harmony during the construction stage. It was also found that cost performance is significantly correlated with project harmony level. Schedule performance is significantly correlated with interpersonal relations between project team members during the construction stage, and at the end of the project. The findings indicate the important role that interpersonal relations play in project outcomes and vice versa. The behavioural patterns that are found to be significantly correlated with harmony during the construction stage and/or relationships among project team members suggest that concrete actions may be taken by owners, consultants and contractors to improve relationships, and thereby improve cost and schedule outcomes. It is recommended that owners, consultants and contractors adopt some of the behavioural patterns identified.

Keywords: Behavioural patterns, interpersonal relations, project performance, relational contracting, Vietnam.

Introduction

In construction projects, interpersonal relations are important because the job requires interaction among team members who need to perform interdependent tasks (Landy and Rastegary, 1989). Walker (1998) found that high team harmony is associated with an improvement in project time performance. Studies have shown that the absence of disagreements leads to increased performance (Schwenk and Cosier, 1993). Relationship conflicts arising from interpersonal problems, friction and personality clashes cause group members to work less effectively and produce sub-optimal products (Argyris, 1962). This is because angry or antagonistic people lose perspective, and

have inhibited cognitive functioning, leading to a lower level of performance (Roseman *et al.*, 1994).

Rahman and Kumaraswamy (2002b) argued that an appropriate contracting method coupled with clear and equitable contract documents do not ensure project success because the attitudes of the contracting parties and the relationships among the project participants are also equally important. They found that relational contracting (RC) may be useful in reducing transaction costs as well as fostering cooperative relationships and better teamwork.

Projects in Vietnam have been found to have significantly poor cost and schedule performance (Ling and Tran, 2012). Hitherto, it is not known if certain behavioural patterns (as defined by Macneil, 1978) of

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team players can engender deeper interpersonal relations. It is also not known if the quality of interpersonal relations among owners, consultants and contractors has an effect on project performance. The aim of this study is to find out which RC related behavioural patterns can engender good relationships among public project owners and private contractors and consultants (hereinafter referred to as project participants). In the context of public construction projects in Vietnam, the specific objectives are to: (1) identify RC related behavioural patterns that lead to better interpersonal relations among project participants during the construction stage and at the end of the project; and (2) examine the effect of project participants' interpersonal relations on project performance.

As Vietnam is a relatively large country, the scope of this research is restricted to investigating public construction projects in Ho Chi Minh City and major cities in the Mekong river delta. This geographical area is selected because it is undergoing a construction boom. Public construction projects are investigated because unlike private projects, project participants in public projects need to maintain arm's length relationships to avoid any accusation of corruption. Vietnam's public projects are different from those in developed Western countries and deserve special study because of Vietnam's unique characteristics: its economy is dominated by state-owned enterprises, which produce about 40% of GDP (CIA, 2012); and Vietnam faces relatively high corruption (Transparency International, 2012).

Literature review

Behavioural patterns of contracting parties

The relational contract theory states that informal agreements and unwritten codes of conduct exist among contracting partners, and these are sustained by the value of future relationships (Macneil, 1978). RC principles may be mobilized to offer contractual incentives/flexibilities, improve relationships among contracting parties, and lubricate any transactional frictions. RC allows mutual future planning and considers contracts to be relationships among the parties, in the process of projecting exchange into the future (Macneil, 1978).

Interpersonal relations between the parties are important, particularly in complex, lengthy and evolving transactions (Rahman and Kumaraswamy, 2004a). RC is based on a dynamic relations scenario in which all segments are interrelated, and it provides the means to sustain ongoing relations in long and complex contracts by adjustment processes of a more thoroughly

transaction-specific, ongoing, administrative kind. This may or may not include an original agreement, and if it does, the need for the contract may be of less importance (Macneil, 1978). It is hypothesized that:

Hypothesis 1: Greater adoption of certain RC related behavioural patterns would lead to significantly higher quality of interpersonal relations between project participants.

The two constructs in Hypothesis 1 are RC related behavioural patterns (operationalized below) and quality of interpersonal relations (operationalized in the next section). Macneil's (1978, 1980, 1983) relational contract theory identified these commonly observed behavioural patterns and norms in contractual transactions: (1) role integrity; (2) contractual solidarity; (3) flexibility; (4) harmonization with the social matrix; (5) implementation of planning; (6) effectuation of consent; (7) restitution, reliance and expectation interests; (8) creation and restraint of power; (9) reciprocity; and (10) propriety of means. The RC related behavioural patterns are operationalized below in the context of project participants.

Role integrity: This describes complex, long-term behaviours involving diverse obligations and more personal relations (Prim-Allaz and Perrien, 2000). Macneil (1980) stated that there is a need for parties to be consistent in their roles to avoid internal conflict. In the context of construction projects, this entails showing long-term commitment (coded as B1), rather than merely focusing on present interests (Cheng *et al.*, 2000).

Contractual solidarity: Macneil (1980) specified that *contractual solidarity* is the norm of holding exchange together. Without this norm, no exchange is possible (Prim-Allaz and Perrien, 2000). This is operationalized into: showing effort in implementing RC practices (B2) (Black *et al.*, 2000; Chen and Chen, 2007); dividing responsibilities clearly among contracting parties (B3) (Halman and Braks, 1999; Anvuur and Kumaraswamy, 2007); and providing clear contract conditions (e.g. scope of contract, duties and responsibilities) (B4) (Wong *et al.*, 2005).

Flexibility: *Flexibility* means that any given contract has a capacity for change and will not break apart under the pressure of change (Macneil, 1980). The operationalized behavioural patterns are: showing flexibility when situations change (B5) (Ling *et al.*, 2006; Chen and Chen, 2007); compromising on unclear issues (B6) (Rahman and Kumaraswamy, 2004a, 2004b); and having adjustable contracts to address uncertainties (B7) (Rahman and Kumaraswamy, 2005).

Harmonization with the social matrix: This involves supra-contractual norms which reflect the influence

on the exchange of broader social principles such as justice, liberty and equality (Macneil, 1980). The behaviour would involve having mutual trust (B8) (Kumaraswamy *et al.*, 2005b; Xu *et al.*, 2005). If mutual trust occurs, there tend to be no weak links among project participants (Chan *et al.*, 2004), thereby helping in achieving a relationally integrated team.

Implementation of planning: The *implementation of planning* norm expresses the fact that the very existence of specialization of labour constitutes a form of planning intimately intertwined with the exchanges necessary to make the specialization pay off (Prim-Allaz and Perrien, 2000). Planning how to do things and how to structure operating relations has come to dominate many modern contracts (Macneil, 1980). This is operationalized as: investing in the development of collaborative working skills (B9) (Hastings, 1995; Dyer, 1996); combining responsibility in a pre-selected group comprising one person from each major party (B10) (Halman and Braks, 1999; Chan *et al.*, 2004); and having joint coordination and monitoring plans among contracting parties (B11) (Chan *et al.*, 2004; Yeung *et al.*, 2007).

Effectuation of consent: The *effectuation of consent* means that like the exercise of any other choice, the exercise of choice in contracts also entails the sacrifice of other opportunities (Macneil, 1980). This is operationalized as: accepting RC practices by project participants (B12) (Black *et al.*, 2000; Kumaraswamy *et al.*, 2005b); supporting RC practices by project participants' top management (B13) (Black *et al.*, 2000; Akintoye and Main, 2007); aligning objectives of different contracting parties (B14) (Cheng *et al.*, 2000; Rahman and Kumaraswamy, 2008); and committing to joint problem solving (B15) (Chan *et al.*, 2004; Chen and Chen, 2007).

Restitution, reliance and expectation interests (linking norm): According to Macneil (1980), the *restitution* interest in contracts is viewed in terms of the problems created when someone is enriched by making promises and then breaking them; the *reliance* interest is considered in terms of reasonable reliance on promises; and the *expectation* interest is equated with what has been promised. These are operationalized into: sharing of project information (B16) (Uzzi and Lancaster, 2003; Maurer and Ebers, 2006); having real gain-share/pain-share arrangement among contracting parties (B17) (Black *et al.*, 2000; Ling *et al.*, 2006); and organizing team building events (B18) (Cheng and Li, 2001, 2002; Tang *et al.*, 2006).

Creation and restraint of power: The *creation and restraint of power* norm is related to the idea that not only are many kinds of power present in contracts, but power is created in many ways other than by way

of promises and that contracts also inevitably are governed by some restriction of power (Prim-Allaz and Perrien, 2000). This is operationalized into: having mutual understanding (B19) (Black *et al.*, 2000; Love *et al.*, 2010); accepting a common performance appraisal system for the project (B20) (Rahman and Kumaraswamy, 2004a, 2004b); having clearly defined equitable risk sharing arrangements among contracting parties (B21) (Rahman and Kumaraswamy, 2002b; Ling *et al.*, 2006); and accepting a common dispute resolution mechanism for the project (B22) (Rahman and Kumaraswamy, 2004a, 2004b).

Reciprocity (Mutuality): *Mutuality* comes from the fact that the realization of the exchange reveals a division of the exchange surplus from which each party gains (Macneil, 1980). It does not reveal how even the division is (Prim-Allaz and Perrien, 2000). This norm calls not for equality, but for some kind of evenness, and is based on the principle of getting something back for something given (Macneil, 1980). This involves reciprocating and exhibiting face-saving gestures (B23) (Oliver, 1990; Pervan *et al.*, 2011).

Propriety of means: This involves decorum, decency and conformity to socially acceptable conduct (Macneil, 1980). This is operationalized as: adopting a team working attitude (B24) (Black *et al.*, 2000; Chen and Chen, 2007); and socializing outside the project (B25) (Gulati and Gargiulo, 1999; Castro *et al.*, 2009).

In the fieldwork, these operationalized behavioural patterns were tested to check their correlation to the quality of interpersonal relations.

Quality of interpersonal relations

The term 'interpersonal relations' denotes relations between two or a few people, and influences what one person thinks and feels about the other person, how he perceives the other person, what he does to the other person, what he expects the other person to do or think, and how he reacts to the action of the other person (Heider, 1958). Interpersonal relations are relevant among project participants because transactions of all kinds are rife with social connections, and in particular, the relationship between two parties is embedded in broader systems of social relations (Granovetter, 1985).

Powell (1990) discovered that transactions can take place through loose collections of individuals who maintain impersonal and constantly shifting exchange ties, as in markets, or through stable networks of exchange partners who maintain close social relationships. There is evidence that social institutions and traditions are deeply embedded and extremely persistent. Ling and Li (2012) found that network strategies are relevant to manage construction projects effectively.

It was hypothesized earlier that the adoption of certain behavioural patterns by contracting parties would significantly affect the quality of interpersonal relations (Hypothesis 1). Interpersonal relations quality is operationalized into the following components (Y1–Y7): harmony during the construction stage (e.g. low number of disputes) (Y1); interpersonal relations between clients and contractors (Y2), clients and consultants (Y3) and consultants and contractors (Y4) during the construction stage; and interpersonal relations between clients and contractors (Y5), clients and consultants (Y6) and consultants and contractors (Y7) at the end of the project.

Barrick *et al.*'s (1998) study showed that teams that are harmonious (members are agreeable with each other and are emotionally stable) are likely to perform better than those that are not. It is hypothesized that:

Hypothesis 2: Higher quality of interpersonal relations (Y1–Y7) leads to more positive outcomes of the project.

Outcomes of the project are operationalized in the conventional manner as: cost performance (Z1), schedule performance (Z2) and quality performance (Z3), following Konchar and Sanvido (1998).

Gap in knowledge

The relational contract theory (Macneil, 1978) has been studied and debated at length, in relation to e.g. job design in a repeated principal–agent relationship (Schottner, 2008); export performance (Styles *et al.*, 2008); and reforming the financial sector (Loftus and Purcell, 2008). RC has also been investigated in the construction industry (Rahman and Kumaraswamy, 2002a, 2002b, 2004a, 2004b, 2008; Kumaraswamy *et al.*, 2005a, 2005b). While behavioural patterns involving RC principles are less difficult to apply in private sector projects, it is not known if they are applicable in public projects. This is because public clients are not in a position to offer any future relationships, since most projects must be procured through competitive bidding. Public clients also cannot be seen to have a 'hand-in-glove' relationship with project team members from the private sector, since this may imply cronyism. The possible side effects of closer relationships include a perceived breakdown of carefully crafted contractual checks and balances, and the dangers of sliding from partnering-type collaboration to corruption. In addition, public projects are highly visible, and need to achieve the basic triple project goals (within budget, on schedule and to acceptable quality) because taxpayers' money is involved.

As yet, the extent to which behavioural patterns relating to RC could give rise to better interpersonal relations between/among owners, contractors and consultants is not known. It is also not known if there are tangible benefits in good interpersonal relations such as improving a project's time, cost and quality outcomes. If good interpersonal relations do indeed lead to better project performance, the gap in knowledge is that it is not known which are the more effective behavioural patterns relating to RC that give rise to better relationships in public construction projects in Vietnam. The fieldwork was thus undertaken to uncover the association between RC related behavioural patterns and interpersonal relations, and between interpersonal relations and project outcomes. The focus of this study is to find out specific RC related behavioural patterns that could give rise to high-quality member–member exchange in a project team, which can lead to positive outcomes of the project.

Research method

This paper reports a part of a large research project that investigated the performance of and relevance of RC in public construction projects. Surveys were conducted in 2011 in Beijing, Hong Kong, Singapore, Sydney and Vietnam.

The data collection instrument is a structured questionnaire survey. Respondents were requested to each provide data relating to a completed public sector project that they had been involved in. Objectives of the survey included evaluating the extent to which RC practices were present, observed, adopted or emphasized in the project; and assessing the factors that were driving and impeding adoption of those practices. This paper reports a part of the study, focusing on interpersonal relations between owners, consultants and contractors, project performance and the extent to which behavioural patterns relating to RC were adopted in Vietnam. The data from the five different cities were not amalgamated for a holistic analysis because the governance structure of public projects is very different in each city.

Section A of the questionnaire asked respondents to provide information about a specific completed public project. Respondents were also asked to assess the project outcomes as follows: cost performance (Z1: 1 = > 5% budget overrun; 3 = cost same as budget; 5 = > 5% below budget); time/schedule performance (Z2: 1 = > 5% late finish; 3 = finish on time; 5 = > 5% early finish); and product/output quality (Z3: 1 = expectations not met; 3 = expectations met; 5 = expectations exceeded). Respondents

also rated the interpersonal relations quality (Y1 to Y7 which were defined in the preceding section) between public owners and private consultants and contractors on a five-point scale, where 1 = low/bad; 3 = neutral; and 5 = high/excellent.

In Section B, respondents were asked to rate the extent to which behavioural patterns relating to RC (B1 to B25 which were defined in the literature review section and listed in Table 3) were present, observed, adopted or emphasized in the specific project identified in Section A, during the project implementation stage. The ratings were based on a five-point scale, where 1 = low; 3 = neutral; and 5 = high. Behavioural patterns are grouped into three categories: those adopted by only one project participant (coded with 'o', 'k' and 'c' suffixes for owners, contractors and consultants respectively in Table 3); those adopted by two project participants in tandem (coded with 'ok', 'oc' and 'kc' suffixes for dyads representing owners and contractors, owners and consultants, and contractors and consultants respectively); and those adopted by all project participants or at the project level (no suffix). A final Section C requested general information of respondents for data classification.

Prior to the industry-wide survey, a pilot survey was conducted with three experts in Vietnam. Thereafter, minor amendments were made to the

questionnaire to suit Vietnam's context. It was then translated into Vietnamese.

The population comprises contracting parties involved in developing, designing and constructing public construction projects in Vietnam. They include public sector officials, private architects, engineers, surveyors, project managers and contractors, who have undertaken public construction projects. Since there is no national registry of such officials/firms, the size of the population is not known. The sampling frame was public owners, private consultants and contractors who had completed public construction projects in Ho Chi Minh City and major cities in the Mekong delta.

The sampling methods were convenience sampling and snowball sampling. The survey package comprised a cover letter and the questionnaire. A multi-pronged approach was adopted for data collection: hand delivery, by post and via e-mail. This was to ensure the questionnaire reached a larger number of organizations, thus presenting a higher chance for a high response rate.

The SPSS software was used to conduct one sample t-test of the mean to ascertain: if there are significantly good performance outcomes (Z1 to Z3); if the quality of relationships (Y1 to Y7) is significantly high; and if RC related behavioural patterns (B1 to B25) are adopted to a significant extent. This is when

Table 1 Characteristics of respondents and their firms

Description	Number of respondents	Percentage (%)
<i>Experience in construction (years)</i>		
4–9	22	56
10–14	11	28
≥ 15	6	15
<i>Designation</i>		
Senior management	11	28
Middle management	10	26
Professionals and supervising staff	16	15
<i>Organization type</i>		
Contractor	9	27
Architectural/Engineering firm	14	42
Government/statutory board/public entities	5	15
Others	5	15
<i>Organization ownership</i>		
Public	9	25
Private	25	69
Public–private joint venture	2	6
<i>Size of workforce</i>		
Up to 49	23	64
50–199	10	28
≥ 200	3	9

Note: n ≠ 41 when some respondents did not provide the information.

$p < 0.05$ and the t -value is positive. If the t -value is negative and $p < 0.05$, performance/relationship is significantly poor. μ was set at 3, as this is the mid-point of the five-point scale.

Pearson's correlation analysis was employed to investigate: Hypothesis 1—the association between the extent to which RC related behavioural patterns are adopted and quality of interpersonal relations; and Hypothesis 2 – the association between quality of interpersonal relations and project outcomes. When $p < 0.05$, it is concluded that there is significant correlation.

Characteristics of respondents and projects

Out of a total of 100 questionnaires that were distributed, 41 completed questionnaires were received,

giving a response rate of 41%. The characteristics of respondents and their firms are shown in Table 1. Respondents' work experience ranges from 4 years to 26 years and the average is 10 years. Their designations span from senior management to professionals. The majority of the respondents' firms operate as private sector contractors and consultants. The firms have an average of 145 employees. The profile suggests that the findings may be more applicable to private sector small and medium sized firms in Vietnam that undertake public construction projects.

The respondents were requested to provide information on one specific public construction project that their firms have completed in Vietnam (see Table 2). The majority of the projects involve a construction area of at least 6000m², with an average of

Table 2 Characteristics of projects reported by respondents

Description	Number of respondents	Percentage (%)
<i>Total construction area (m²)</i>		
400–5999	19	46
6000–11 999	8	19
12 000–29 999	8	19
≥ 30 000	6	14
<i>Total construction cost (billion VND)</i>		
0.02–24.99	24	59
25–49.99	10	24
≥ 50	7	17
<i>Type of facility</i>		
Institutional	15	37
Office	8	20
Infrastructural	7	17
Industrial	4	10
Commercial	3	7
Residential	2	5
<i>Project duration (months)</i>		
5–11	8	20
12–23	17	43
24–35	9	23
≥ 36	6	16
<i>Type of client</i>		
One-off	13	32
On-off	11	27
Ongoing	17	41
<i>Procurement method</i>		
Open competitive bidding	24	59
Selective bidding	9	22
Direct appointment	8	19
<i>Basis of award</i>		
Lowest bid	14	36
Quality	14	36
Combination of price and quality	11	28

Note: $n \neq 41$ when some respondents did not provide the information.

T
value

RC related behavioural patterns	T value	Y1		Y2		Y3		Y4		Y5		Y6		Y7	
		Mean	Sig	Coeff	Sig	Coeff	Sig	Coeff	Sig	Coeff	Sig	Coeff	Sig	Coeff	Sig
Owner showing long-term commitment (B1o)	3.77	3.953	0.466	0.445											
Contractor showing long-term commitment (B1k)	4.14	6.428	0.001	0.019	0.023										
Consultant showing long-term commitment (B1c)	3.76	3.947	0.000			0.397									
Owner showing effort in implementing RC practices (B2o)	3.73	4.626	0.000	0.528	0.036	0.504	0.478	0.461	0.474	0.474				0.402	
Contractor showing effort in implementing RC practices (B2k)	3.74	5.158	0.000	0.003	0.005	0.005	0.008	0.010	0.009	0.009	0.478			0.028	
Consultant showing effort in implementing RC practices (B2c)	3.77	5.652	0.000	0.444	0.365	0.365	0.466			0.004					
Dividing responsibilities clearly among contracting parties (B3)	4.10	6.731	0.000	0.009	0.031	0.031	0.009			0.354	0.040				
Providing clear contract conditions (e.g. scope of contract, duties and responsibilities) (B4)	4.27	8.327	0.000	0.554	0.441	0.441	0.416	0.370	0.356	0.331	0.042			0.396	
Consultant showing flexibility when situations change (B5c)	3.94	6.043	0.000	0.002	0.002	0.002	0.001	0.024	0.001	0.001				0.010	
Having adjustable contracts to address uncertainties (B7)	3.66	3.526	0.000	0.608	0.027	0.608	0.691	0.567							
Owner-contractor having mutual trust (B8ok)	3.94	5.760	0.001	0.379	0.000	0.563	0.646	0.547	0.387	0.552	0.406				
Owner-consultant having mutual trust (B8oc)	3.91	5.715	0.000	0.027	0.000	0.000	0.000	0.001	0.024	0.001	0.016				
Consultant-contractor having mutual trust (B8ck)	3.83	5.310	0.000	0.419	0.747	0.747	0.630	0.650	0.437	0.591	0.418				
Combining responsibility in a pre-selected group comprising one person from each major party (B10)	3.54	3.571	0.000	0.017	0.000	0.000	0.000	0.000	0.012	0.000	0.015				
Having joint coordination and monitoring plans among contracting parties (B11)	4.07	6.806	0.000	0.432	0.760	0.760	0.773	0.555	0.492	0.452	0.359				
Owner accepting RC practices (B12o)	3.83	4.446	0.000	0.011	0.000	0.000	0.000	0.001	0.003	0.009	0.034				
Contractor accepting RC practices (B12k)	3.76	4.490	0.000	0.367	0.381	0.367	0.381								
		0.001	0.030	0.030	0.032	0.030	0.032								
		6.806	0.606	0.606	0.627	0.606	0.627	0.569	0.492	0.414					
		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.010					
		4.446	0.412												
		0.000													
		4.490	0.623	0.623	0.628	0.628	0.648	0.555	0.739	0.552	0.555				
		0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.002	0.001				

(Continued)

Table 3 (Continued)

RC related behavioural patterns	T value		Y1		Y2		Y3		Y4		Y5		Y6		Y7	
	Mean	Sig	Coeff	Sig	Coeff	Sig	Coeff	Sig	Coeff	Sig	Coeff	Sig	Coeff	Sig	Coeff	Sig
Consultant accepting RC practices (B12c)	3.85	6.055	0.552	0.570	0.590	0.593	0.523	0.387	0.366							
Owner's top management supporting RC practices (B13o)	4.12	6.257	0.411	0.001	0.000	0.000	0.002	0.026	0.033							
Contractor's top management supporting RC practices (B13k)	4.03	5.900	0.407	0.407				0.395								
Consultant's top management supporting RC practices (B13c)	4.09	7.329	0.028	0.028	0.372		0.517	0.046								
Committing to joint problem solving (B15)	4.22	8.345	0.324	0.500	0.488	0.346	0.455	0.381								
Owner-contractor sharing of project information (B16ok)	4.10	5.848	0.041	0.002	0.004	0.042	0.003	0.018								
Owner-consultant sharing of project information (B16oc)	3.97	5.112					0.006	0.416								
Consultant-contractor sharing of project information (B16ck)	4.16	6.242					0.050	0.028								
Having real gain-share/pain-share arrangement among contracting parties (B17)	3.54	3.130			0.487	0.561	0.342	0.376								
Organizing team building events (B18)	4.00	7.275			0.003	0.001	0.031	0.020								
Accepting a common performance appraisal system for the project (B20)	4.00	7.159	0.582	0.713	0.689	0.629										
Having clearly defined equitable risk sharing arrangements among contracting parties (B21)	3.98	5.329	0.000	0.000	0.000	0.000	0.388	0.383								
Accepting a common dispute resolution mechanism for the project (B22)	3.90	5.534			0.000	0.000	0.013	0.018								
Owner adopting teamworking attitude (B24o)	3.62	2.857	0.000	0.571	0.579	0.486	0.594									
Contractor adopting teamworking attitude (B24k)	3.87	4.590	0.008	0.002	0.002	0.012	0.002									
Consultant adopting teamworking attitude (B24c)	3.81	4.463			0.561	0.453	0.401									
		0.000			0.003	0.014	0.028									
		0.000			0.503	0.479	0.465									
		0.000			0.009	0.010	0.008									

Note: only significant correlations are shown. Items B6, B9, B14, B19, B23 and B25 are not significantly correlated with Y1-Y7, hence not presented.

16 164m². Construction cost ranges from 0.02 billion VND (1 million VND \approx US\$50) to 1000 billion VND with an average of 59.55 billion VND. A variety of facilities were reported, with a focus on building projects such as institutional, office, industrial buildings. Project duration ranges from 5 to 77 months with an average of 21.5 months. There is a spread in construction sophistication of owners: 41% undertake construction projects on an ongoing basis and 32% are one-off owners. Table 2 shows that the majority of the projects used open competitive bidding to select contractors. There were a variety of criteria for awarding tenders, with lowest bid and quality taking equal share.

The results of respondents' ratings of project performance (Z1 to Z3) and quality of interpersonal relations (Y1 to Y7) are shown in Table 4. Public projects reported by respondents had significantly poor cost performance (Z1), suggesting widespread cost overrun. Time (Z2) and quality (Z3) outcomes were generally within expectations. Table 4 also shows that the projects reported by respondents had enjoyed significantly good interpersonal relations. There was significant harmony at the project level (Y1). During the construction stage (Y2–Y4), as well as at the end of the project (Y5–Y7), dyadic interpersonal relations between pairs of owners–contractors, owners–consultants, and contractors–consultants were reported to be of significantly high quality. These good relationships suggest that the RC related behavioural patterns are worth studying and emulating.

Results and discussion of testing Hypothesis 1

Objective 1 of the study is to identify RC related behavioural patterns that lead to better relationships during the construction stage and at the end of the project. This was achieved through testing Hypothesis 1 (i.e. whether the adoption of certain RC related behavioural patterns by project participants would significantly affect relationship quality). Table 3 shows that several of the RC related behavioural patterns (B1 to B25) are significantly correlated with harmony during construction stage (Y1). In addition, many behavioural patterns are significantly correlated with interpersonal relationships at the construction stage (Y2 to Y4) and at the end of project (Y5–Y7).

Table 3 shows that projects in which owners and consultants show long-term commitment (B1) are also more likely to experience harmony during the construction stage (Y1) and good interpersonal relationships (Y2). This suggests that parties have a

history together, and a future which shapes their present interactions and the link has meaning to them in which the understood form of present and future interactions influences their behaviour today (Sheppard and Tuchinsky, 1996). Trust is developed, leading to formation of long-term commitment (Steffel and Ellis, 2009).

When owners, consultants and contractors individually put in more effort in implementing RC practices (B2), quality of interpersonal relations would also increase (Y1–Y5, Y7). Putting in the effort demonstrates commitment to RC, and commitment has been found to be an important success factor for achieving outstanding RC performance (e.g. Black *et al.*, 2000; Kumaraswamy *et al.*, 2005a).

Accepting RC practices by project participants (B12) and supporting RC practices by top management (B13) are behavioural patterns that are significantly correlated with quality of interpersonal relations during the construction stage and at the end of the project (see Table 3). These findings reveal that owners play an important role in setting the tone of the relationship in the project. When owners accept and support RC practices, the need to comply with every letter of the formal contract is reduced. Parties that adopt these RC related behaviours do not need to strictly adhere to the legal mechanisms provided in specific contracts, but instead operate from a dynamic standpoint within a collective framework of contractual, economic and behavioural forces (Macaulay, 1963).

Dividing responsibilities clearly (B3), providing clear contract conditions (B4), having clearly defined equitable risk sharing arrangements (B21), having real gain-share/pain-share among contracting parties (B17), accepting a common performance appraisal system for the project (B20), and accepting a common dispute resolution mechanism (B22) are also significantly correlated with interpersonal relations during the construction stage and at the end of the project (see Table 3). These practices need to be stated in the formal contract so that they can be properly implemented, and relationships may be built up (Camén *et al.*, 2011). With these RC practices in place, the likelihood of tension, animosity and annoyance is reduced (Jehn, 1995), leading to deeper relationships.

Table 3 shows the importance of being flexible. Consultants who show flexibility when situations change (B5) also have good quality interpersonal relationships with owners (Y3). Contracts that are adjustable to address uncertainties (B7) would see good interpersonal relations among owners, contractors and consultants during the construction stage (Y2–Y4). The results suggest the importance of the contract or

parties' behaviours having a capacity for change to prevent the relationship from breaking apart under the pressure of change (Macneil, 1980; Lim *et al.*, 2011).

Table 3 shows that mutual trust between project participants (B8) is significantly correlated with all the interpersonal relation measures (Y1–Y7), suggesting that it is a very important behavioural pattern. Trust is used as the control mechanism in place of contractual safeguards (Macaulay, 1963; Ling and Tran, 2012). The social expectation of trust is the abstention from opportunism, which makes behaviours more predictable, and eradicates fears (Granovetter, 1985) that create difficulties among project participants.

Significant correlation is found between quality of interpersonal relations and having joint coordination and monitoring plans (B11). This practice enables groups to become cohesive, and thereby have a favourable attitude towards each other, cooperate with each other and exhibit teamwork (Shaw and Shaw, 1962; Gittell, 2008). When team members accept organizational goals, productivity will increase (Greene, 1989; Gittell, 2008).

The commitment of contracting parties to joint problem solving (B15) not only leads to better relationships at the end of the project, but also harmony during the construction stage (see Table 3). Joint problem solving ensures that conflicting facts and viewpoints are not suppressed (Wittenbaum and Stasser, 1996; Aibinu *et al.*, 2011), leading to better decision outcomes.

Adopting a teamworking attitude (B24) leads to better relationships during the construction stage and at the end of the project (see Table 3). A teamworking attitude leads to team spirit, which engenders higher collective professional effort and more effective performance of teams (Thamhain and Wilemon, 1987; Rahman and Kumaraswamy, 2008).

Sharing of project information (B16) is significantly correlated with Y5 and Y6 (see Table 3). Pooling information, sharing unique information and integrating alternative perspectives are important as these increase effectiveness of group decision making (Watson *et al.*, 1991). Admittedly, this often only happens when the pricing structure is cost-plus.

Among the behavioural patterns proposed by Macneil (1978, 1980, 1983), reciprocity (mutuality) behaviour is not significantly correlated with any of the interpersonal relations, nor project harmony. Reciprocating and exhibiting face-saving gestures (B23) are not exhibited to a significant extent because loyalty may not have a place in public projects. As most projects are awarded through open tenders, contractors do not reward public owners with price

discounts, and owners also do not reward contractors by awarding future projects to them. The need to reciprocate is therefore not present.

The results in Table 3 show that Hypothesis 1 is supported to a large extent. There exist many RC related behavioural patterns that are significantly correlated with project harmony, and quality of interpersonal relations among clients, contractors and consultants during the construction stage, and at the end of the project.

Results and discussion of testing Hypothesis 2

Objective 2 of the study is to examine the effect of public owners and private consultants and contractors' relationships on project outcomes. The results are revealed through testing Hypothesis 2 (i.e. whether quality of interpersonal relations affects project outcomes) (see Table 4).

The results in Table 4 show that when project harmony (Y1) is high, cost performance (Z1) is also good. This suggests that when there is harmony during the construction stage, the project may be completed within budget and/or vice versa. Harmony also leads to good interpersonal relations (as shown by significant correlations between Y1 and Y2, Y3, Y4 and Y5). The finding agrees with studies by Guzzo and Shea (1992) and Gittell (2008) who found that interpersonal relationships among group members lead to improved task performance. Good relationships allow members to collaborate to develop good designs which may be cost effective, thereby leading to good cost performance. Another explanation is that harmony may be seen as cordiality. On this premise, Y1 may be regarded as a whole-sample test and operationalized further by Y2, Y3 and Y4.

Table 4 further shows significant positive correlations between good interpersonal relations (Y2 to Y7) and schedule performance (Z2). This suggests that good relationships enhance the effectiveness and efficiency of members (Akintoye, 1994; Rahman and Kumaraswamy, 2008), leading to better performance or vice versa.

There are significant correlations between interpersonal relations of client–contractor and client–consultant pairs during the construction stage and at the end of the project (Y2 and Y5; Y3 and Y6). This suggests that during the construction stage, goodwill and loyalty have already been formed (Gulati, 1995). This facilitates friendship in work groups (Jehn and Shah, 1997; Parise and Rollag, 2010), leading to good relationships at the end of the project. When people have worked with each other, they are more comfortable around each other, and this leads to less anxiety and

Table 4 Testing Hypothesis 2 (project outcomes and relationship quality)

Code	Variable (measurement scale)	Mean	T-value Sig (2-tailed)	Z1	Z2	Z3	Y1	Y2	Y3	Y4	Y5	Y6
Z1	Cost performance of the facility (1: overrun budget by >5%; 2: overrun budget by ≤5%; 3: cost same as budget; 4: below budget by ≤5%; and 5: below budget by >5%)	2.51	-3.053 0.004	1								
Z2	Time/schedule performance of the facility (1: late finish by >5%; 2: late finish by ≤5%; 3: finish on time; 4: early finish by ≤5%; and 5: early finish by >5%)	2.74	-1.658 0.106		1							
Z3	Product/output quality of the facility (1: Expectations not met; 3: Expectations met; 5: expectations exceeded)	3.03	0.330 0.744			1						
Y1	Level of harmony during construction stage (e.g. low number of disputes) (1 = Low; 3 = Neutral; 5 = High)	3.58	3.601 0.001	0.341 0.036			1					
Y2	Quality of interpersonal relations between clients and contractors during construction stage (1 = Low; 3 = Neutral; 5 = High)	3.94	6.952 0.000		0.494 0.003		0.516 0.002	1				
Y3	Quality of interpersonal relations between clients and consultant during construction stage (1 = Low; 3 = Neutral; 5 = High)	3.97	6.881 0.000		0.599 0.000		0.561 0.001	0.949 0.000	1			
Y4	Quality of interpersonal relations between contractors and consultants during construction stage (1 = Low; 3 = Neutral; 5 = High)	4.00	7.355 0.000		0.358 0.038		0.484 0.004	0.934 0.000	0.930 0.000	1		
Y5	Quality of interpersonal relations between clients and contractors at the end of the project (1 = Low; 3 = Neutral; 5 = High)	4.10	8.270 0.000		0.464 0.003		0.383 0.015	0.530 0.001	0.548 0.001	0.429 0.011	1	
Y6	Quality of interpersonal relations between clients and consultant at the end of the project (1 = Low; 3 = Neutral; 5 = High)	4.34	10.597 0.000		0.509 0.002			0.408 0.020	0.468 0.007	0.547 0.000	1	
Y7	Quality of interpersonal relations between contractors and consultants at the end of the project (1 = Low; 3 = Neutral; 5 = High)	4.34	11.793 0.000		0.376 0.018			0.338 0.047	0.385 0.027	0.572 0.000	0.955 0.000	

Notes: Only significant correlations are shown. For correlation results, within each cell, top row is the correlation coefficient and bottom row is the significance.

the ability to understand the nature of each other's work (Katz, 1982).

Interestingly, there is no significant correlation between interpersonal relations of contractors and consultants during the construction stage and at the end of the project (Y4 and Y7). This finding departs from Walker and Guest (1952) who found that when team members have worked with each other, they have had the chance to interact, leading to cohesiveness. One possible reason is that variations are valued and accounts finalized at the end of the project. It is during this period that contractors may display claims conscious behaviour, thereby affecting the quality of interpersonal relations at the end of the project. It is suggested that contractors endeavour to preserve good interpersonal relations with consultants to the end of the project as they may meet the same consultants who would evaluate their tenders in future projects.

The results in Table 4 show that harmony in the project may lead to better cost performance (Z1), and good interpersonal relations may lead to good schedule performance (Z2). There is no significant correlation among relationships and quality performance (Z3). It is concluded that Hypothesis 2 is supported for cost and schedule performance, but not supported for quality performance.

Conclusion

The purpose of this research was to uncover RC related behavioural patterns that could give rise to high-quality relationships among three players (owners, contractors and consultants) in project teams, which can lead to positive project outcomes.

Using the questionnaire survey approach, RC related behavioural patterns that are significantly correlated with relationship quality during the construction stage and at the end of the project were identified (see Table 3). The behavioural pattern that affects the most sets of relationships is mutual trust among owners, contractors and consultants (B8); and contractors and consultants' acceptance of RC practices (B12). There are also other behavioural patterns that affect several relationship quality components. From the two most significant behavioural patterns (B8 and B12), it is concluded that harmonization of social matrix by way of mutual trust is important because it has influence on the exchange of broader social principles such as justice, liberty and equality. True acceptance of RC practices (B12) is important as this relates to effectuation of consent.

Another set of findings is that cost performance (Z1) is significantly correlated with harmony during the construction stage (Y1), and time performance

(Z2) is significantly correlated with relationship quality among owners, contractors and consultants during the construction stage (Y2–Y4) and at the end of the project (Y5–Y7). The findings add to knowledge by showing that good interpersonal relations are important and have an effect on performance of public projects in Vietnam. It is concluded that building, nurturing and maintaining good interpersonal relations among project participants is important to achieve time and cost objectives of the project. Good relationships enable trust to be developed and firms can then opt for looser practices instead of cautious contracting, leading to good cost performance. Interestingly, quality of relationships and project harmony are not significantly correlated with quality performance (Z3). One possible explanation is that output quality is dependent on input quality such as workmen's competence, property of materials and resources, and quality control.

This research was conceptualized based on Macneil's (1978, 1980, 1983) relational contract theory and its 10 behavioural patterns. Based on the findings, the theoretical implication is that for public projects, nine of these patterns are supported, but the one relating to reciprocity/mutuality is not relevant. This may be because each public project is 'atomized', and parties engage in transactions with minimum interdependence and little expectation for future interaction or repeat business since fresh tenders need to be invited for new projects. Macneil's (1978, 1980, 1983) other behavioural patterns are supported, suggesting that there is evidence of social structural influences on market behaviour.

The practical implication of the findings is that there are several behavioural patterns, which when adopted, could give rise to good quality interpersonal relations among owners, contractors and consultants. It is recommended that project team members adopt the practices identified in Table 3, so as to achieve better quality interpersonal relations in their projects, as these lead to better cost and schedule performance.

The findings have several limitations. Respondents were asked to rate the quality of interpersonal relations on a five-point Likert scale. This may not be totally reliable because different respondents may attach different values to different points of the scale. Respondents may also suffer from hindsight bias, in which they believed the relationship among parties to be better than it actually was because the outcome was positive. Finally, it is acknowledged that project outcomes are subject to many other factors such as characteristics of project and the environment. This research has only investigated the outcome from the angle of relationships and RC related behavioural patterns that were adopted.

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