

# **Relational Contracting Culture and Teambuilding prospects and perspectives in Singapore**

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## **Abstract**

Targeting integration in construction, the study reported here compares the suitability of various factors and strategies, in order to provide suitable contractual and non-contractual incentives for building a Relational Contracting (RC) culture and effective teamwork. Results from statistical analyses of 96 questionnaire responses from Singapore contractors, consultants and clients are presented. Despite differences of perceptions among different groups of respondents on the relative priorities of various individual items, it was observed that trust should be at the core of RC. Also, some factors appear to be more important depending on the project, client, and other contracting parties. However, there are some factors that are substantially common. The results suggest the need for an interrelated and consolidated approach, both for propagating RC and building integrated project teams for RC. Like many other countries, the results indicate the readiness of Singaporean construction industry stakeholders to incorporate RC and teambuilding techniques in a move towards improved performance and value for money.

## **Keywords**

Construction, Culture, Integration, Relational Contracting, Teambuilding.

## **1. Introduction**

In order to enhance performance, integration in construction has long been called for by many industry reports worldwide. Application of Relational Contracting (RC) theory (Macneil, 1974) is one of the approaches that targets such integration. RC principles underpin various approaches such as partnering, alliancing, joint venturing, long term contracting and other collaborative working arrangements and better risk sharing mechanisms (Rahman and Kumaraswamy, 2002).

Previous research has identified, from among many others, that RC principles offer contractual flexibility, supply essential elements of teambuilding, lubricate transactional barriers, smoothen ongoing contractual relationships, and suggest rationalized selection criteria – in building effective project teams (Rahman and Kumaraswamy, 2004a). Moreover, the potential for implementing RC in construction and RC-based teambuilding protocols, e.g. joint risk management, has also been verified (Rahman and Kumaraswamy, 2004b). Despite such potential performance gains and suitability, industries are apparently hesitant in adopting RC, probably because of the perceived uncertainties, e.g. in possibly unclear responsibility allocations. It is felt essential to incorporate RC principles in related documents, through ‘less but more effective’ regulations, in order to ensure value for money and to build an RC culture in construction (PSIB, 2004). A general guideline appears to be useful for propagating the practice of RC and teambuilding in multi-participant construction projects, targeting a relational integration in various professional, organisational, operational, and regional/ national cultures.

Based on the above and in order to provide appropriate RC based contractual incentives in construction, a study was launched from Hong Kong. The target was to identify key factors (1) facilitating and (2) deterring RC, and key factors (3) facilitating and (4) deterring the building of integrated project teams for more effective RC. The survey was conducted in five different countries. This paper presents the perceptions of 96 respondents from Singapore. Space limitations only permit the presentation of key extracts of these results.

## 2. Questionnaire survey

The detailed methodological approach of the study has been reported elsewhere (Kumaraswamy et al, 2005), also conveying that the questionnaire was developed in Hong Kong on the basis of a recent broad study on “revitalised procurement strategies”. The individual factors were distilled from the above study and tuned to suit the specific purposes of the present study. The questionnaire included four specific sections, requesting the respondents to express their perceived importance on a scale from 0 – 6 (varying from lowest to highest) on: 24 factors facilitating RC, 28 factors deterring RC, 28 factors facilitating the building of integrated project teams, and 31 factors deterring the building of integrated project teams (see Appendix I). Research collaborators in Singapore helped to carry out the survey. As shown in Table 1, a total of 96 responses were received, with an average total experience of 12.7 years in construction and 3 years in RC approaches, respectively. It appears that RC approaches are relatively new in Singapore.

**Table 1: Questionnaire distribution and respondent profile**

	Contractor	Consultant	Client	Total
Questionnaire distributed	200	100	100	400
Responses received	60	21	15	96
<b>Total construction experience in years</b>				
Responded	58	14	8	80
Average experience	12.2	17.3	9.0	12.7
Range	2 - 30	3 - 35	2 - 24	2 - 35

Total experience in RC in years				
Responded	38	6	5	49
Average experience	2.3	6.5	3.4	3.0
Range	0 - 23	0 - 20	0 - 10	0 - 23
Experience in RC: number of projects				
Responded	38	7	5	50
Range	0-16	0-100	1-10	0-100

The mean scores of different groups of respondents on individual factors were ranked and compared. Statistical t-tests of the Mean at significance level 0.05 were undertaken to establish whether each factor is significantly important. ANOVA was carried out at 95% confidence level to determine whether the three groups of respondents had different perceptions on the relative importance of various factors. Finally, “Factor Analysis” was carried out to narrow down the long list of factors into a smaller number of representative “broad factors” or “components”. For the purpose of this exercise, the “Principal Component” method of extraction was applied, coupled with “Varimax with Kaiser Normalization” method of rotation. “Eigenvalues” for the extracted components of  $\geq 1.0$  were considered, and “factor loadings” of  $\geq 0.30$  were considered to contribute to different components. However, only the key extracts of the results are summarized here, in order to meet the space limitations.

### 3. Results

#### 3.1 Factors facilitating RC

It is found that ‘mutual trust’ (a07, score 5.36) is the most important factor for facilitating RC, followed by ‘open communication’ (06) and ‘teamworking and can do spirit’ (a10). ‘Effective coordination’ (a08) and ‘combined responsibility’ (a09) jointly hold the 4<sup>th</sup> rank. ‘Top management support of all contracting parties’ (a04, rank 7) is more important than ‘enlightened and enthusiastic client’ (a01, rank 17). ‘Mutually agreed performance appraisal mechanisms’ (a14) is the least important factor with a score of 3.65, which is more than average of the measuring scale (of 0 to 6), implying general importance of all the 24 factors. This is confirmed by the one-sample t test – all the factors are significant for facilitating RC. It is seen from the ANOVA results that clients and consultants have similar perceptions on all the 24 factors. But clients and contractors, and consultants and contractors have similar perception only on a few factors. On the whole, the three groups of respondents have similar perception of only 8 factors.

Table 2 shows the summary of the outcomes from “factor analysis” for factors facilitating RC. Five components emerged from this exercise, and together they account for over 68% of the total explained variations. The percentage variations explained by the five components are over 23%, 13%, 12%, 10%, and 8% respectively. All the components are seen to feed from the factors that contribute to more than one component, and as such 14 factors are seen to contribute to more than one component, even up to four components. For example, factor a08 contributes to components 1, 3, 4 and 5 with corresponding factor loadings of 0.30, 0.31, 0.60 and 0.39. Several factors are seen to contribute either equally or almost equally to more than one component, e.g. the factor ‘encouraging and motivating risk-reward plans’ (a23) is seen to contribute to components 1 and 2 with equal factor loading of 0.59. Thus, all the components are highly interrelated with ‘primary’

and ‘secondary’ contributions, although nomenclature of different components (see Table 2) are based on their ‘primary’ contributing factors only.

**Table 2: Factor analysis outcomes of factors facilitating RC**

Components	Primary factors*	Secondary factors*	Eigenvalues	% of Var. explained (Cumulative)
1: Client and top management support	a01, a03, a04, a02, a19, a18, a23, a14, a09	a22, a17, a15, a11, a13, a08, a12	5.65	23.55 (23.55)
2: Appropriate contractual incentives	a21, a20, a22, a24	a23, a07	3.16	13.18 (36.72)
3: Alignment of team objectives	a17, a16, a15, a11, a13	a14, a24, a08	3.07	12.77 (49.50)
4: Relationship building protocols	a07, a10, a06, a08	a09, a20	2.57	10.73 (60.22)
5: Resource utilization	a05, a12	a09, a06, a08	2.04	8.51 (68.73)

Notes: Rotation converged in 7 iterations. Kaiser-Meyer-Olkin Measure of Sampling Adequacy was 0.872. Bartlett's Test of Sphericity: Approx. Chi-Square 1442, df 276, p<0.000. \* See Appendix I

Component 1 is seen to feed from ‘primary’ contributions of nine factors and ‘secondary’ contributions of seven factors. This component share more than one-third of the total explained variations, indicating that ‘client and top management support’ is the prime requirement for facilitating RC. This component explains that ‘top management support’ (a03, a04) from all contracting parties, along with enlightened and knowledgeable cliental behaviour (a01, a02), helps formulate better ‘risk-reward plans’ (a23) and ‘mutually agreed performance appraisal mechanisms’ (a14) consisting ‘combined responsibility’ (a09), which promotes ‘positive attitude towards continuous improvement’ (a19) and encourages ‘learning environment in project team organization’ (a18). ‘Appropriate contractual incentives’ (component 2) include ‘clearly defined’ (a20) ‘equitable’ (a21) risk allocation/sharing arrangements among ‘all key parties’ (a24) under ‘flexible contracts’ (a22). ‘Alignment of team objectives’ (Component 3) cover alignment of mutual ‘project and commercial objectives’ (a15, a16, a17), with mutual ‘long-term commitment’ (a11) and ‘issue resolution mechanisms’ (a13). ‘Mutual trust’ (a07) and ‘teamworking and can do spirit’ (a10) are fundamental to build relationships among contracting parties (component 4), with operational arrangements like ‘open communication’ (a06) and ‘effective coordination’ (a08). Component 5 (resource utilization) indicates that ‘experienced’ (a05) parties can better utilize their ‘resources’ (a12) that they mobilize/ invest in a project.

### 3.2 Factors deterring RC

The one-sample t test showed that all the 28 factors are significant for deterring RC, except ‘incompatible public sector rules and regulations’ (b28). With a score of 3.15, this factor is also the least important factor that deters RC. On the other hand, ‘lack of trust’ (b12, score 5.20) is the most important factor that deters RC, followed by ‘lack of confidence’ (b19) and ‘teamworking

and can do spirit’ (b11) among all parties, and ‘commitment of top management’ (b07) of all parties. Exclusion of subcontractors (b21, rank 22), suppliers (b22, rank 23) and consultants (b20, rank 25) in risk reward plan are far less important than ‘unwilling participation’ (b18, rank 5), ‘lack of experience’ (b17, rank 6) in RC approaches and ‘improper risk allocation’ between contracting parties (b03, rank 7). However, ANOVA results indicated that clients and consultants have similar perceptions of the relative importance on all the 28 factors, but the three groups of respondents (i.e. contractors, consultants and clients) have similar perceptions on 9 factors only. The factor analysis exercise extracted six interrelated components (Table 3): (1) lack of relationship building protocols, (2) lack of top management support and appropriate planning, (3) lack of client initiative and contractual incentives, (4) incomplete risk-reward scheme, (5) persisting adversarial culture, and (6) persisting price based selection. 15 factors contribute to more than one component, e.g. factor b23 contributes to components 2, 3, 4 and 5, with factor loadings of 0.38, 0.50, 0.32 and 0.42 respectively. Thus, a complementary set of results was observed for factors facilitating and deterring RC.

**Table 3: Factor analysis outcomes of factors deterring RC**

Components	Primary factors*	Secondary factors*	Eigenvalues	% of Var. explained (Cumulative)
1: Lack of Relationship building protocols	b12, b11, b19, b16, b18, b17	b28, b14, b15, b03	4.100	14.643 (14.643)
2: Lack of top management support & appropriate planning	b09, b07, b01, b02, b28, b05	b27, b08, b23, b20, b06	3.829	13.674 (28.317)
3: Lack of client initiative and contractual incentives	b13, b27, b14, b10, b08, b23	b28, b20, b25	3.504	12.513 (40.830)
4: Incomplete risk-reward scheme	b21, b22, b20, b15	b01, b23, b24	3.186	11.378 (52.208)
5: Persisting adversarial Culture	b26, b03, b24, b25	b19, b05, b027, b23	2.745	9.805 (62.013)
6: Persisting price based selection	b04, b06	b05, b08, b25	1.801	6.432 (68.445)

Notes: Rotation converged in 8 iterations. Kaiser-Meyer-Olkin Measure of Sampling Adequacy was 0.841. Bartlett's Test of Sphericity: Approx. Chi-Square 1614, df 378, p<0.000. \* See Appendix I

### 3.3 Factors facilitating and deterring the building of integrated project teams for RC

Space limits preclude even a summary of the extracts of the results for factors facilitating and deterring the building of integrated project teams for RC. However, similar to the factors facilitating and deterring RC, these two categories of factors were also found to be complementary, in terms of relative importance of various factors. The one-sample t test results confirmed that all

the 28 factors for facilitating building integrated teams and 29 among 31 factors for deterring building integrated teams are significant. The ANOVA results showed that consultants and clients possess similar perceptions on the relative importance of all the factors in both the categories. But when considered together, the three groups of respondents significantly disagreed on the relative importance of most of the factors. The factor analysis exercise also suggested the value of an interrelated and consolidated approach. Components extracted from facilitating factors are: (1) overall learning and facilitating environment, (2) building capable and compatible project team, (3) enlightened and knowledgeable client, (4) improved selection and mobilization methodologies, and (5) innovative responsibility allocation and appropriate team selection. Components extracted from deterring factors are: (1) lack of top management commitment and client lenience, (2) lack of relationship building protocols, (3) incomplete relationship building mechanisms, (4) lack of integrated risk-reward scheme, (5) persisting adversarial environment, (6) inappropriate planning, and (7) lack of client's Knowledge.

#### **4. Conclusions**

Integration in construction implies mobilization of collaborative efforts from project team members and continuity of their harmonious relationships during project execution, in order to ensure value for money and optimized use of their resources. This requires construction contracts to offer appropriate protocols. As such, various factors and strategies were identified, in order to ascertain their relative importance and to offer any contractual or non-contractual incentives for designing appropriate RC-based project teams. Data was collected from the Singapore construction industry and was statistically analysed. Results led to the following observations:

- All the 24 factors for facilitating RC were found to be significant.
- 27 out of 28 factors deterring RC were found to be significant.
- All the 28 factors for facilitating building of integrated project teams were found to be significant.
- 29 out of 31 factors deterring building of integrated project teams were found to be significant.
- The groups of consultants and clients significantly agreed on the relative importance of all the factors in all the four categories. But when incorporating the group of contractors, the three groups of respondents significantly disagreed on the relative importance of most of the factors.
- It was found that trust and trust-based strategies and functional arrangements can offer effective incentives to both RC approaches and integrated teams, where support of top management and selection of capable and compatible team members play important roles.
- The categories of facilitating and deterring factors were found to be mostly complementary.
- The factor analysis exercise extracted five and six components for factors facilitating and deterring RC, respectively. On the other hand, five and seven components were extracted from factors facilitating and deterring the building of integrated project teams for RC, respectively.
- On the whole, results from factor analysis suggest the need for consolidated but interrelated approaches, both for RC culture development and integrated project teams.

#### **5. Acknowledgements**

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## 6. Appendix I

Factors facilitating RC: a01) Enlightened and enthusiastic client, a02) Knowledgeable client (about project processes), a03) Client's top management support, a04) Top management support of all contracting parties, a05) Experience in RC approaches (e.g. partnering, alliancing), a06) Open communication among all contracting parties, a07) Mutual trust among all contracting parties, a08) Effective coordination among all contracting parties, a09) Combined responsibility of all contracting parties, a10) Teamworking & 'can do' spirit of all contracting parties, a11) Long-term commitment to each other: all parties, a12) Adequate resources of all contracting parties, a13) Mutually agreed issue resolution mechanisms, a14) Mutually agreed performance appraisal mechanisms, a15) Alignment of project objectives of different parties, a16) Alignment of commercial objectives of different parties, a17) Alignment of mutual project and commercial objectives, a18) Learning climate/ environment in project team organization, a19) Positive attitude towards continuous improvement, a20) Clearly defined risk allocation/ sharing arrangements, a21) Equitable risk allocation/ sharing arrangements, a22) Flexible/ adjustable contracts to address uncertainties, a23) Encouraging and motivating risk-reward plans, a24) Inclusion of all key parties in risk-reward plans.

Factors inhibiting RC: b01) Inappropriate project planning, b02) Inappropriate procurement/ contract strategy, b03) Improper/ inappropriate risk allocation/ sharing b04) 'Price' only' selection methods, b05) Ambiguous/ unclear contract clauses/ documents, b06) Absence of risk-reward plan, b07) Lack of commitment: top management of all contracting parties, b08) Lack of client's initiatives, b09) Lack of contractor's capability, b10) Lack/ absence of scope for innovations, b11) Lack of teamworking attitude among all contracting parties, b12) Lack of trust/ reliability among all contracting parties, b13) Inter-personal/ cultural clash (individual level), b14) Incompatible organisational cultures (corporate level), b15) Inappropriate issue resolution mechanisms, b16) Separate coordination and monitoring plans, b17) Lack of experience in RC approaches (e.g. partnering), b18) Unwilling/ unenthusiastic participation in RC approaches, b19) Lack of confidence among all contracting parties, b20) Exclusion of consultants in risk-reward plan, b21) Exclusion of major sub-contractors in risk-reward plan, b22) Exclusion of major suppliers in risk-reward plan, b23) Unrelated/ separate risk-reward plans for different parties, b24) Potential legal liabilities (in resolving non-contractual issues), b25) Commercial pressures of contracting parties, b26) Win-lose environment among contracting parties, b27) Bureaucratic client organization, b28) Incompatible public sector rules and regulations.

## 7. References

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