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An empirical study of the benefits of construction partnering in Hong Kong

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Many construction companies have adopted partnering in their construction projects over the past 10–15 years due to favourable project outcomes achieved. Its use in construction projects has been increasing rapidly as its benefits become more apparent and pervasive. This paper reviews the partnering literature within the construction field and tries to portray the comprehensive picture of benefits for the partnering practice. Through partnering and the active involvement of all key project parties, the project is more likely to be completed within budget, on time, and with the least number of conflicts, claims and work defects. Also, this paper reports upon the findings of a questionnaire survey of partnering benefits in Hong Kong. Seventy-eight project participants completed a questionnaire to indicate the relative importance of partnering benefits. The perceived benefits were measured and ranked from the perspectives of the client, contractor and consultant for cross-comparison. The results revealed that ‘Improved relationship amongst project participants’, ‘Improved communication amongst project participants’ and ‘More responsive to the short-term emergency, changing project or business needs’ were the most significant benefits derived from the use of partnering. More partnering arrangements should be actively introduced into the construction procurement process so that every party can enjoy the full benefits of partnering.

Keywords: Partnering, benefits, construction projects, Hong Kong

Introduction

The construction industry in Hong Kong is a very competitive, high-risk business. It is faced with many problems, such as little co-operation, limited trust, and ineffective communication resulting in an adversarial relationship among all project stakeholders. This kind of relationship is reflected in project delays, difficulty in resolving claims, cost overruns, litigation, and a win–lose climate (Moore *et al.*, 1992). The need for a new procurement approach is therefore all the more urgent and compounded by the experiences of many within the industry, who in the past have suffered as a consequence of litigation or arbitration proceedings whilst attempting to overcome difficulties (Chan *et al.*, 2002).

Many new management techniques have gained popularity to help solve these hurdles (Schriener, 1991; Eckert, 1994; Sanders, 1994). Partnering is one such technique, which attempts to create an effective project management process between two or more organizations. It aims at generating an organizational environment of trust, open communication and employee involvement (Sanders & Moore, 1992). This is achieved through the rapid creation of a project culture, to fulfil the function, which is served by a corporate culture in longer lasting organizations (Chan *et al.*, 2002b).

Although the benefits of partnering are numerous, the successful implementation of a partnering process is hard work. Changing old habits and building trust do not magically happen (Cowan *et al.*, 1992). People have to make it work and the sceptics will be plentiful at the beginning. Through partnering and the active involvement of all key

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project parties (client, consultant, contractor, subcontractors, construction managers and suppliers), the project is more likely to be completed within budget, on time, and with the least number of conflicts, claims and work defects (Cook and Hancher, 1990; CII, 1991; Cowan *et al.*, 1992; Li *et al.*, 2001). With its emphasis on commitment, trust, equity, teamwork, continual project evaluations, minimized risks, and its mandate for open communication, partnering can help solve problems, and save time and money. The US Army Corps of Engineers and UK oil industry have adopted partnering on both large and small construction contracts since the 1980s. The objectives of this paper are to review the benefits of partnering in general, and report on the findings of a questionnaire survey on the potential benefits associated with partnering in Hong Kong in particular. Seventy-eight project participants representing different construction projects and organizations completed the questionnaires. The perceived benefits of partnering by the clients, contractors and consultants were measured and compared. Partnering principles should be adopted to the fullest possible extent in future projects for improved project performance.

What is partnering?

To understand the benefits of partnering, the meaning of partnering should be introduced first. Partnering is the simple process of establishing good working relations between project parties. This helps avoid problems with the project that, in recent times, more often than not leads to litigation (Moore *et al.*, 1992). Partnering is designed to minimize job costs and schedule overruns. Its premise is simple: all contracts build upon the implied covenant of good faith. The partnering process attempts to establish the working relationships between the parties through a mutually developed, formal strategy of commitment and communication aiming towards a 'win-win' outcome for all parties (CII, 1991, 1996).

Benefits of partnering

Partnering benefits all parties, including the owner, the general contractor, subcontractors, management, and on-site employees (Dozzi *et al.*, 1996; Larson and Drexler, 1997). The fundamental principles of partnering – commitment, trust, respect, communication, and equality – are designed to include proper consideration of the interests of all parties at every level (CII, 1991; Cowan *et al.*, 1992). The partnering process empowers all the project personnel accept responsibility and their jobs by delegating decision-making and problem-solving to the lowest possible level of authority (Dunston and Reed, 2000).

It is an opportunity to improve the open competitive bid process through the closer personal contacts that partnering requires to function.

Review of the literature indicates that common benefits of partnering can be grouped under thirteen headings: reduced litigation, better cost control, better time control, better quality product, efficient problem solving, closer relationship, enhanced communication, continuous improvement, potential for innovation, lower administrative cost, better safety performance, increased satisfaction and improved culture. Table 1 shows the matrix of the identified benefits and the frequency of their citation.

Reduced litigation

Litigation is a major problem in most construction projects. It does not help realize potential saving. In partnering arrangement, the problems of disputes, claims or litigations are greatly reduced through open communication and improved working relationship (Cook and Hancher, 1990; CII, 1991, 1996; Abudayyeh, 1994). Gransberg *et al.* (1999) advocated that dispute and claim cost on partnering projects was relatively low. Similar conclusions can be found in the research of Li *et al.* (2001) and Ruff *et al.* (1996). Bayliss (2002) reported that not a single dispute had escalated to litigation in these partnering projects. This was in stark contrast to the number of disputes received on non-partnered contracts of similar scale (Bloom, 1997).

Better cost control

Partnering has a great potential to improve cost performance (Albanese, 1994; Gransberg *et al.*, 1999). Partnering reduces the risk of budget overruns because of improved cost control (Cowan *et al.*, 1992; Moore *et al.*, 1992; Abudayyeh, 1994; Bates, 1994; Brown, 1994; CII, 1996; Hellard, 1996; Ruff *et al.*, 1996; Back & Sanders, 1996; Li *et al.*, 2001). The reasons for better cost performance are many, such as: alleviating rework, reducing scheduled time, heightening involvement of team members, improving trust, reducing scope definition problems, opening communication, lowering change order rates, improving problem solving, eliminating blame shifting, improving understanding of project objectives and decreasing adversarial relations (Albanese, 1994).

Better time control

Partnering can reduce delay as a result of better schedule performance (Cowan *et al.*, 1992; Moore *et al.*, 1992; CII, 1996; Ruff *et al.*, 1996; Thompson and Sanders, 1998; Black *et al.*, 2000), timely decisions (Albanese, 1994; Li *et al.*, 2001) and reliable programming (Hellard, 1996; Matthews *et al.*, 1996). A fair and

Table 1 Sources of reference for partnering benefits

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.
	Reduced litigation	Better cost control	Better time control	Better quality product	Efficient problem solving	Closer relationship	Enhanced communication	Continuous improvement	Potential for innovation	Lower administrative cost	Better safety performance	Increased satisfaction	Improved culture
Cook and Hancher (1990)	✓			✓	✓	✓			✓				
CII (1991)	✓			✓		✓	✓	✓		✓	✓		
Cowan <i>et al.</i> (1992)		✓	✓		✓	✓		✓		✓		✓	
Moore <i>et al.</i> (1992)		✓	✓	✓							✓	✓	
Sanders and Moore (1992)					✓		✓						
Abudayyeh (1994)	✓	✓							✓	✓			
Albanese (1994)		✓	✓	✓		✓					✓		
Bates (1994)		✓		✓	✓						✓	✓	
Brown (1994)		✓		✓			✓						✓
Harback <i>et al.</i> (1994)						✓							
Ellison and Miller (1995)						✓		✓					
Back and Sanders (1996)		✓										✓	
CII (1996)	✓	✓	✓	✓		✓				✓			
Hellard (1996)		✓	✓	✓	✓				✓	✓			
Matthews <i>et al.</i> (1996)			✓	✓		✓						✓	
Nielsen (1996)						✓						✓	
Ruff <i>et al.</i> (1996)	✓	✓	✓										✓
Bloom (1997)	✓												✓
Lazar (1997)						✓							
Thompson and Sanders (1998)			✓	✓									
Conley and Gregory (1999)					✓	✓							
Gransberg <i>et al.</i> (1999)	✓	✓	✓			✓							
Green (1999)						✓		✓					
Bayliss (2000)						✓				✓			
Black <i>et al.</i> (2000)			✓	✓		✓		✓		✓			
Drexler and Larson (2000)						✓							
Bourn (2001)									✓				
Li <i>et al.</i> (2001)	✓	✓	✓	✓		✓	✓						
Bayliss (2002)	✓												
Total	9	12	11	12	6	17	4	5	4	7	4	6	3

Note: The previous studies are ranked in the increasing order of year of publication followed by the alphabetical order of the authors.

equitable attitude resolves many disputes, discrepancies and changed conditions which arise during construction. Gransberg *et al.* (1999) also found that fewer number of liquidated damages were imposed on the partnered projects than the non-partnered ones.

Better quality product

Partnering produces high quality construction and service and reduces engineering rework (CII, 1991; Moore *et al.*, 1992; Bates, 1994; CII, 1996; Hellard, 1996; Matthews *et al.*, 1996; Thompson and Sanders, 1998; Black *et al.*,

2000; Li *et al.*, 2001). An effective partnering agreement improves project quality by replacing the potentially adversarial traditional relationship and case building with an atmosphere that fosters a team approach to achieve a set of common goals (Cook and Hancher, 1990; Brown, 1994). Albanese (1994) further explained that the partnering process facilitates communication of quality issues, enables earlier recognition of potential problems, and helps develop a quality consciousness. Many of the firms in Albanese's study were those who are practising total quality management, a management approach that usually involves the use of partnering.

Efficient problem solving

Partnering provides a way to develop a control and resolution mechanism for dealing with problems (Cowan *et al.*, 1992). The partners anticipate potential problems and devise an action plan addressing how those problems are jointly identified and resolved. The partnering agreement allows each party the opportunity of learning and using the other's problem-solving methods (Cook and Hancher, 1990; Bates, 1994; Hellard, 1996; Conley and Gregory, 1999). Sanders and Moore (1992) concluded that partnering helps eliminate many personal conflicts.

Closer relationship

The close working relationship between the owner, constructor, and engineer provided a better environment of project (Cook and Hancher, 1990; Bayliss, 2000; Drexler and Larson, 2000). Enhanced communication, the identification of shared goals and objectives, the recognition that problems arose, and the agreement to address those problems through a special design procedure facilitated a harmonious relationship (CII, 1991; Harback *et al.*, 1994; Matthews *et al.*, 1996).

Non-adversarial attitude

The traditional adversarial relationship between owner and contractor is stressful and inefficient (Cowan *et al.*, 1992). Partnering aims to reduce adversarial relationship that will allow focus on mutual goals to the benefit of both parties (CII, 1991; Albanese, 1994; CII, 1996; Nielsen, 1996; Conley and Gregory, 1999; Gransberg *et al.*, 1999; Black *et al.*, 2000). The transforming adversarial relationship is the actual change mechanism that transfers usual business into a trust based relationship (Lazar, 1997; Drexler and Larson, 2000).

High level of mutual trust

Partnering recognizes an implied covenant of good-faith dealing by all parties involved (Harback *et al.*, 1994; Lazar, 1997; Green, 1999). Within this atmosphere of cooperation and mutual trust, the parties can jointly determine and evaluate approaches to design, engineer, and construct the project and result in improving cost and schedule performance (Cook and Hancher, 1990; CII, 1991).

Sharing risk and resources

Partnering enables parties to share the benefits and resources collectively and develop management and technical advances jointly (Cook and Hancher, 1990; Cowan *et al.*, 1992; Li *et al.*, 2001). It also establishes the tools for both measurement and sharing of gains and risks (Ellison and Miller, 1995; Li *et al.*, 2001).

Greater responsiveness to problems

Partnering helps actualize the delegation of authority or empowerment to the project personnel. The flexibility and responsiveness of the owner increase under the partnering agreement (Cook and Hancher, 1990). It ensures problem solving at the lowest possible level of authority. A partner can be more responsive to short-term emergency, changing project or business needs (CII, 1991; Green, 1999).

Enhanced communication

To break the traditional hierarchical communication channels, partnering promotes openness, trust and efficient communication through common and alleviative language (CII, 1991; Sanders and Moore, 1992; Li *et al.*, 2001). Increased communication on various subjects means that the parties are less likely to be surprised by schedule delays and additional costs, which often lead to disputes and litigation (Sanders & Moore, 1992; Brown, 1994; Li *et al.*, 2001).

Continuous improvement

The traditional responsibility for improvement primarily rests with the contractor who is assumed as a burden maker, while the client and consultants act as a sceptical judge (Cowan *et al.*, 1992). Partnering provides a way for all parties to develop continuous improvement. It is a joint effort and with a long-term focus on eliminating for wasteful barriers to improvement (CII, 1991; Ellison and Miller, 1995; Green, 1999; Black *et al.*, 2000).

Potential for innovation

An effective partnering relationship encourages partners to evaluate advanced technology for its applicability (Cook and Hancher, 1990; Hellard, 1996). Proper use of innovation through open communication improves design and construction processes (Abudayyeh, 1994; Bourn, 2001).

Lower administrative cost

Partnering provides a way to lower administrative cost by eliminating defensive case building (Abudayyeh, 1994; CII, 1996; Hellard, 1996; Black *et al.*, 2000). Moreover, the cost to negotiate and administer contracts is decreased as partners become knowledgeable of the counterpart's legal and litigation concerns (CII, 1991). Hellard (1996) and Cowan *et al.* (1992) suggested other interesting benefits that partnering reduces paperwork and simplifies administrative procedure. Bayliss (2000) advocated that less paperwork and more face-to-face discussions were made possible in partnered projects.

Better safety performance

Taking joint responsibility to ensure a safe working environment for all parties reduces the risk of hazardous working conditions and avoids workplace accidents. Actually, the safety performance can be improved as partners better understand each other and as the knowledge of construction process and systems improves drastically (CII, 1991; Moore *et al.*, 1992; Albanese, 1994; Bates, 1994).

Increased satisfaction

Partnering provides a more conducive environment of achieving project objectives (Matthews *et al.*, 1996). All parties involved benefit from the partnering agreement. Partnering enhances customer satisfaction as the customer is closer to the construction process and better informed (Nielsen, 1996). Contractors obtain a reasonable profit and are assured of continued work at predetermined profit margins (Moore *et al.*, 1992; Back and Sanders, 1996). Joint satisfaction of all shareholders is possible (Cowan *et al.*, 1992). The work becomes enjoyable rather than a burden or an unreasonable risk (Bates, 1994). The project team – the contractors, suppliers, and designers – have higher levels of satisfaction and necessary actions are taken much sooner based on their active input (Nielsen, 1996).

Improved culture

Bloom (1997) indicated that evaluations of Army partnering contracts had shown a distinct improvement in the culture of the people working on the contract. When people work in a conflict-free environment, they concentrate on the job rather than on potential claims, and the morale and effectiveness of the whole 'team' is improved (Brown, 1994; Ruff *et al.*, 1996; Bloom, 1997).

Survey methodology

An empirical study was undertaken in Hong Kong in early 2001 to investigate the benefits of partnering. The 13 common partnering benefits identified in the literature were re-phrased and expanded into 24 statements, which formed the basis of an empirical questionnaire (Table 2). An industry-wide survey was conducted to explore the perceptions of benefits towards partnering by different project stakeholders. Respondents were requested to rate their degree of agreement against each of the identified benefits according to a five-point Likert scale (1 = Strongly Disagree and 5 = Strongly Agree) with reference to a particular partnering project they had been involved in.

In this research study, senior staff of the organizations, which were observed from local trade magazines, newspapers, Internet information and relevant sources, were contacted and some key project participants of partnering projects were identified. Also, with the support of the Hong Kong Housing Authority (HKHA) and the Association for Project Management, Hong Kong (APM-HK), 355 questionnaires were delivered to the potential respondents. Due to the limitation of time, the respondents were given only two weeks to complete and return the questionnaires. Table 3 shows the detailed breakdown of the received questionnaires. Finally, the response rate of this survey was 30.4%. Seventy-eight questionnaires were returned and used for analysis.

The 78 returned questionnaires included client's organizations (18 respondents), main contractors (37 respondents), consultants (17 respondents), and sub-contractor firms (three respondents). Three respondents could not be identified in terms of the type of organization (Figure 1).

Method of data analysis

Chan and Kumaraswamy (1996a) adopted the 'mean score' method to establish the relative importance of reasons for delay in civil engineering projects in Hong Kong, as suggested by the clients, consultants and contractors. The data collected from the current questionnaire survey was analysed using the same technique, within various groups as categorized according to the role of the parties involved in the Hong Kong building construction (whether clients, consultants or contractors). The five-point Likert scale (1 being strongly disagree and 5 being strongly agree) described previously was used to calculate the mean score for each benefit, which was then used to determine the relative ranking of different benefits by comparing the individual mean score for each benefits in descending order of importance. These rankings made it possible to cross-compare the relative importance of the benefits as postulated by the three various groups of respondents. The mean score (MS) for each benefit was computed by the following formula:

$$MS = \frac{\sum(f \times s)}{N}, (1 \leq MS \leq 5) \quad (1)$$

where s = score given to each benefit by the respondents and ranges from 1 to 5, where 1 is 'strongly disagree' and 5 is 'strongly agree';

f = frequency of response to each rating (1–5), for each benefit;

N = total number of response concerning that benefit.

Based on the nature of project participants, they were divided into three groups for analysis: the client's group, contractor's group and consultant's group. Kendall's

Table 2 Perceived benefits of partnering projects in Hong Kong (all respondents)

No.	Item (Benefits of partnering projects)*	<i>n</i>	Min.	Max.	Mean	Standard Deviation
1	Reduction in litigation	76	1.00	5.00	3.67	1.11
2	Reduction in dispute	78	2.00	5.00	3.77	0.88
3	Reduction in monetary claims	78	1.00	5.00	3.46	0.94
4	Reduction in variations	78	1.00	5.00	2.88	0.88
5	Cost saving was achieved	78	1.00	5.00	3.55	0.92
6	Better productivity was achieved	78	2.00	5.00	3.77	0.79
7	Faster construction time was achieved	78	1.00	5.00	3.62	0.89
8	Better design quality was achieved	77	2.00	5.00	3.44	0.82
9	Better workmanship was achieved	78	1.00	5.00	3.37	0.84
10	Reduction in engineering rework	78	1.00	5.00	3.35	0.87
11	Reduction of administrative cost because of elimination of defensive case building	78	1.00	5.00	3.37	1.01
12	Reduction of paperwork	78	1.00	5.00	3.00	1.08
13	Improved relationship amongst project participants	78	2.00	5.00	4.05	0.77
14	A win-win attitude was established amongst the project participants	78	1.00	5.00	3.79	0.86
15	A long-term trust relationship was achieved	78	1.00	5.00	3.77	0.85
16	Improved safety performance	78	2.00	5.00	3.38	0.71
17	More responsive to the short-term emergency, changing project or business needs	78	2.00	5.00	3.82	0.79
18	Continuous improvement was achieved	78	2.00	5.00	3.60	0.65
19	Improved communication amongst project participants	78	2.00	5.00	4.00	0.62
20	Increased opportunity for innovation	78	2.00	5.00	3.60	0.78
21	Improved conflict resolution strategies	78	2.00	5.00	3.71	0.79
22	Project risks were shared more equitably amongst project participants	78	1.00	5.00	3.40	0.96
23	Joint satisfaction amongst project participants was achieved	78	1.00	5.00	3.56	0.77
24	Improved corporate culture amongst project participants	77	1.00	5.00	3.73	0.75

* Items were rated on a five-point Likert scale with 1 = strongly disagree and 5 = strongly agree.

Table 3 Summary of data collection process

Sources	First stage data collection		Second stage data collection		Total
	Senior staff of organization involved in partnering		HKHA	APM-HK	
Total questionnaires sent out	136		36	183	355
Received	57		7	14	78
questionnaires	12		1	4	17
	6		/	7	13
Total received questionnaires	75		8	25	108
Response rate	55.15%		22.22%	13.66%	30.42%
	41.91%		19.44%	7.65%	21.97%

Note: HKHA – Hong Kong Housing Authority.

APM-HK – Association for Project Management, Hong Kong.

concordance analysis was conducted to measure the agreement of respondents within a group on their rankings of benefits. If the Kendall's coefficient of concordance (W) was significant at the level of 0.05, a

reasonable degree of consensus was indicated. The Kendall's coefficient of concordance (W) for the benefits was computed by the following formula (Siegel and Castellan, 1988):

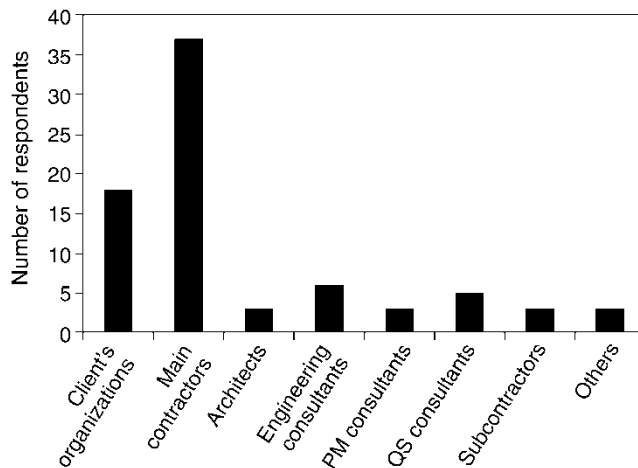


Figure 1 Organization types for respondents

$$W = \frac{\sum_{i=1}^n (\bar{R}_i - \bar{R})^2}{n(n^2 - 1)/12} \quad (2)$$

where n = number of benefits being ranked

\bar{R}_i = average of the ranks assigned to the i th benefit;

\bar{R} = the average of the ranks assigned across all benefits.

The agreement between two respondent groups on their rankings of benefits of partnering projects was measured by the Spearman rank correlation coefficient (r_s).

Again, if r_s was significant at the 0.05 level, an association between the two sets of rankings was established. The Spearman rank correlation coefficient (r_s) for the benefits was computed by the following formula (SPSS, 2002):

$$r_s = 1 - \frac{6 \sum d^2}{N(N^2 - 1)} \quad (3)$$

where d = the difference in rank of two parties;

N = total number of response concerning that benefit.

These analysis procedures had been used by other similar survey studies such as Chan (1998), Mezher & Tawil (1998), and Chan (2000).

Analysis of survey results

The perceived benefits of partnering projects were assessed from different perspectives of the client's group, contractor's group and consultant's group. The rankings by each respondent were transformed into a matrix as the imported data from the calculation of the Kendall's coefficient of concordance using the SPSS package (SPSS, 2001). The results of computation of the Kendall's coefficient of concordance and the rankings are presented in Table 4.

Kendall's coefficient of concordance (W) for the rankings of benefits among all respondents was 0.134; among the client's group, 0.157; among the contractor's group, 0.163; and among the consultant's group, 0.231. The computed W s were all significant at 0.000 (Table 4). The null hypothesis that the respondents' ratings within a certain group are unrelated to each other had to be rejected. Thus it can be concluded that there is significant amount of agreement among the respondents in each group and all respondents on the rankings of the benefits of their partnering projects.

The next stage of the analysis was to test whether there is any similar substantial agreement among the respondents in the three groups which is determined by the Spearman rank correlation coefficient (r_s) using the SPSS package (SPSS, 2001). The correlation coefficients of the ranking on benefits were 0.662, 0.707, and 0.802 for client and contractor, client and consultant, and contractor and consultant, respectively (Table 5). The null hypothesis that there is no significant disagreement between clients–contractors, clients–consultants, and contractors–consultants on the ranking of benefits for the partnering projects has to be accepted (Tables 5 and 6). Therefore, it was concluded with 99% confidence that there was a significant agreement on the ranking of benefits among clients, consultants and contractors.

Discussion of survey results

It should be stressed that the ranking exercise is based on perception, not an objective assessment. A subjective assessment of the ranking result is made to the analysis of the perceived relative importance of factors. The fact that this subjective assessment does not provide any absolute value on the ranking position is recognized. Emphasis is then given only to factors that are placed as the most important and the least important in the ranking list (Chan & Yeong, 1995; Chan & Kumaraswamy, 1996b).

The analysis of the ranking exercise indicates some interesting results which show a significant agreement among the participants of each group on the ranking of benefits. Table 4 reflects that the rankings of clients, consultants and contractors were not significantly different as deduced from the values of significance level (0.000). All of them believed and ranked the 'Improvement of relationship and communication amongst project participants' to be the top two benefits. The results are consistent with the findings reported in the publications of CII (1991), (1996) and CIB (1997). Bayliss (2000) and Drexler and Larson (2000) further explained that partnering provides a better working environment for and enhances the relationship among all contracting parties. It also creates an efficient hierarchy of communication channels to the clients, consultants and contractors

Table 4 Ranking and Kendall's Coefficient of Concordance for the benefits of partnering projects

No.	Item (Benefits of partnering projects)	All respondents		Client		Contractor		Consultant	
		Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
13	Improved relationship amongst project participants	4.03	1	4.00	2	4.09	1	3.94	1
19	Improved communication amongst project participants	3.99	2	4.00	2	4.03	2	3.88	2
17	More responsive to the short-term emergency, changing project or business needs	3.81	3	3.78	8	3.91	3	3.63	6
6	Reduction in dispute	3.79	4	3.83	6	3.71	8	3.88	2
2	Better productivity was achieved	3.77	5	4.00	2	3.66	10	3.69	4
14	A win-win attitude was established amongst the project participants	3.77	5	3.83	6	3.77	7	3.63	6
15	A long-term trust relationship was achieved	3.76	7	3.72	10	3.91	3	3.44	10
24	Improved corporate culture amongst project participants	3.75	8	3.78	8	3.83	5	3.69	4
1	Reduction in litigation	3.69	9	3.61	16	3.80	6	3.50	8
21	Improved conflict resolution strategies	3.68	10	3.89	5	3.60	13	3.50	8
7	Faster construction time was achieved	3.63	11	4.06	1	3.60	13	3.19	18
18	Continuous improvement was achieved	3.61	12	3.67	12	3.71	8	3.31	15
20	Increased opportunity for innovation	3.60	13	3.56	18	3.63	12	3.38	12
5	Cost saving was achieved	3.55	14	3.67	12	3.54	15	3.38	12
23	Joint satisfaction amongst project participants was achieved	3.55	14	3.67	12	3.66	10	3.25	17
3	Reduction in monetary claims	3.49	16	3.33	21	3.54	15	3.44	10
8	Better design quality was achieved	3.43	17	3.72	10	3.34	19	3.38	12
22	Project risks were shared more equitably amongst project participants	3.40	18	3.67	12	3.34	19	3.06	21
11	Better workmanship was achieved	3.37	19	3.17	23	3.49	18	3.13	20
16	Reduction in engineering rework	3.37	19	3.56	17	3.31	21	3.19	18
9	Reduction of administrative cost because of elimination of defensive case building	3.37	19	3.56	18	3.29	22	3.31	15
10	Improved safety performance	3.31	20	3.39	20	3.54	15	3.00	22
12	Reduction of paperwork	3.01	23	3.33	21	3.06	23	2.44	23
4	Reduction in variations	2.91	24	3.00	24	2.83	24	2.81	24
Number (n)		75		18		35		16	
Kendall's Coefficient of Concordance (W)		0.134		0.157		0.163		0.231	
Level of significance		0.000		0.000		0.000		0.000	

Note: Where H_0 = respondents' ratings are unrelated to each other within each group.

Table 5 Spearman rank correlation test between groups of respondents for the partnering benefits

	Client	Contractor	Consultant
Client	1.000 (NS)	0.662*	0.707*
Contractor	0.662*	1.000 (NS)	0.802*
Consultant	0.707*	0.802*	1.000 (NS)

Note: * $P < 0.01$; (2-tailed); NS = not significant.

(Sanders and Moore, 1992; Li *et al.*, 2001), as a result of enhanced mutual understanding.

It is rather surprising that clients considered item 7 'Achievement of faster construction time' as the most important benefit, while both contractors and consultants ranked it out of the top 10 benefits (Figure 2). The results indicated that the perceptions of project success are not the same across different groups. The clients may

Table 6 Comparison of the Spearman rank correlation coefficient and its level of significance for the partnering benefits

Comparison	r_s	Significance	Conclusion
Client ranking vs Contractor ranking	0.662	0.01	Accept H_0
Client ranking vs Consultant ranking	0.707	0.01	Accept H_0
Contractor ranking vs Consultant ranking	0.802	0.01	Accept H_0

Where H_0 = No significant disagreement on the ranking

H_a = Significant disagreement on the ranking

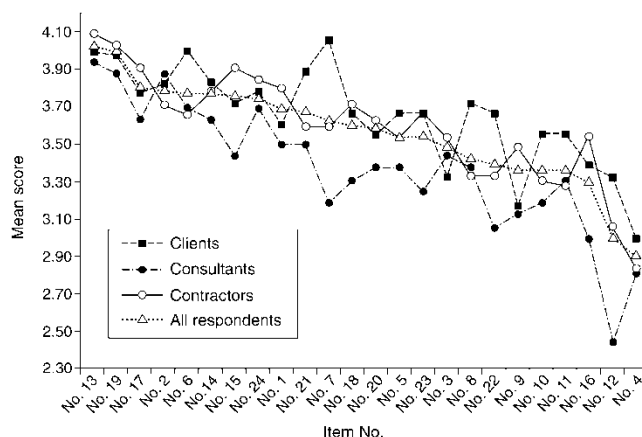


Figure 2 Cross-comparison of benefits among respondents

be more conscious about project time performance. Chan and Kumaraswamy (2002) explained that a project is regarded as successful if it is completed on time, within budget and to the level of quality standard specified by the client. The difference between the clients and consultants/contractors may indicate that the clients draw closer attention to the performance outcome especially on time. Thus, clients try to use partnering to secure a better project time performance for economic reasons such as the attractive capital returns anticipated from the finished buildings.

Similar results were also found in item 8 'Achievement in better design quality' which was ranked 10th by clients, but out of the top 10 benefits by both consultants and contractors. Chan and Kumaraswamy (2002) asserted the achievement of the level of quality standards specified by the clients to be one of the criteria for project success. Clients also believe that partnering could improve the design quality.

While clients ranked item 1 'Reduction in litigation' at 16, consultants ranked it eighth and contractors sixth. The difference may be attributed to their various areas of involvement in project activities. Contractors and consultants usually worked more closely on litigation issues and may find that much litigation can be reduced and eliminated via partnering agreements. Thus, they perceive that partnering could reduce the chance of litigation.

Clients and consultants ranked item 15 'Achievement of long term trust relationship' as the 10th benefit, whereas contractors ranked it third. Similarly, clients and consultants assigned a very high rank (second and fourth, respectively) for item 2 'Achievement of better productivity' whereas contractors assigned a relatively low rank (10th). An analogous result was also found for item 21 'Improvement of conflict resolution strategies'. Clients and consultants considered it fifth and eighth, whereas contractors evaluated it out of the top 10 benefits (13th in importance). Perhaps this is reflexive of the

real-life situation that the consultants (architects/engineers) usually act as agents of the client in all matters relating to the contract. The consultants represent the client as the project managers, and are responsible for design work and construction supervision of the project on site. Hence, they should establish a convergence of perceptions on the benefits (Chan and Kumaraswamy, 1996b). However, the contractors held different viewpoints on the ranking of this benefit. This disagreement may explain the different expectations and interpretation of partnering arrangement between consultants and contractors as to, for example, who is responsible for project delays and cost overruns. In an investigation of the reasons for project delays, Chan and Kumaraswamy (1996a) pointed out that the differences in the viewpoints between groups on the ranking exercise might be due to some 'group bias' in their perceptions, despite the considerably high and similar experience level of the survey respondents.

The result shown in Table 5 demonstrated that there was a substantial agreement on the rankings of partnering benefits between groups of respondents. One more noteworthy point is that the profiles for each of the 24 listed benefits of partnering indicate, in general, a close scatter pattern as shown in Figure 2. The closely scattered pattern may manifest that most project participants in Hong Kong exhibited a positive attitude towards partnering which could bring several perceived benefits to their projects. For example, Bayliss (2000) asserted that the Mass Transit Railway Corporation (MTRC) is willing to promote the use of partnering, as they intend to achieve excellence in construction through implementing partnering concept in their projects.

Conclusions

A questionnaire survey was conducted in order to find out the major benefits of partnering in the Hong Kong construction industry as perceived by clients, consultants and contractors. All parties generally agreed on the ranking of benefits. According to the clients, the most important benefit was 'Faster construction time', while both contractors and consultants ranked 'Improvement of relationship amongst project participants' as the most significant benefit. All three groups agreed that 'Improvement in communication amongst project participants' was one of the most important benefits. The findings are in line with the conclusions drawn in CII (1991), CII (1996), CIB (1997), and Bennett and Jayes (1998). Sanders and Moore (1992) and Li *et al.* (2001) further explained that team-building and problem-solving techniques are the essential elements of partnering success. The results also demonstrated that the position and role of project participants may influence their perceptions of partnering

benefits. A benefit to one group may be a burden to the others.

Partnering has evolved as an innovative approach to the procurement method in the Hong Kong construction industry over the years. Many organizations including clients and contractors are striving to gain real-life experience on partnering practice in solving potential problems facing the construction industry today. As always, those organizations which are more far sighted and gear themselves to operate efficiently in this new environment will reap rewards derived to the latecomers (Chan *et al.*, 2002a). Clients and contractors are more supportive of the partnering concept and should take the lead in promoting partnering.

The research study had identified the benefits of implementing the innovative procurement method – partnering. Although the results only reported some local findings, they are also useful to other countries for international comparison. A parallel study on the problems associated with partnering had been completed for comparison. After identifying the perceived benefits and potential problems of partnering in construction, a further investigation of the critical success factors (CSFs) for partnering projects can be launched to formulate effective strategies for implementation (Chan *et al.*, 2002a). Partnering is at a germinating stage of development in Hong Kong and the pace of introducing its concepts and applications in construction is gaining drastic momentum. As a major recommendation in the report by the local Construction Industry Review Committee (CIRC), the wider adoption of a partnering arrangement should be encouraged in the future so as to foster an efficient, innovative and productive construction industry (CIRC, 2001).

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