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# Exploring the Attributes of Collaborative Working in Construction Industry

*Shuwei Wu<sup>1</sup>, David Greenwood<sup>1</sup>, Glenn Steel<sup>1</sup>*

## ABSTRACT

Due to the increased level of uncertainty of construction market and the variety of building functions, the practitioners in construction need work together more closely, which means a higher degree of collaborative working is often necessary. There is evidence that higher degree of collaborative working can produce more successful projects, but there has been only limited research to examine the definition of collaborative working. The lack of understanding of collaborative working resulted in confusion of application of more collaborative approaches e.g. partnering or alliancing. The work presented here is part of an ongoing PhD study which aims to explore the impact of collaborative working on construction project performance. The aim of this paper is to identify a spectrum of attributes of collaborative working, which will facilitate the understanding what collaborative working is, why collaborative working is needed and how to work together. In order to identify those attributes of collaborative working, the method of '*identification test*' will be adopted, which is based on the recent related literature.

Keywords: attributes of collaborative working, collaborative working and identification test

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<sup>1</sup> School of the Built Environment, Northumbria University, Newcastle Upon Tyne NE1 8ST, UK  
[E-mail: shuwei.wu@northumbria.ac.uk](mailto:shuwei.wu@northumbria.ac.uk)

## 1.0 INTRODUCTION

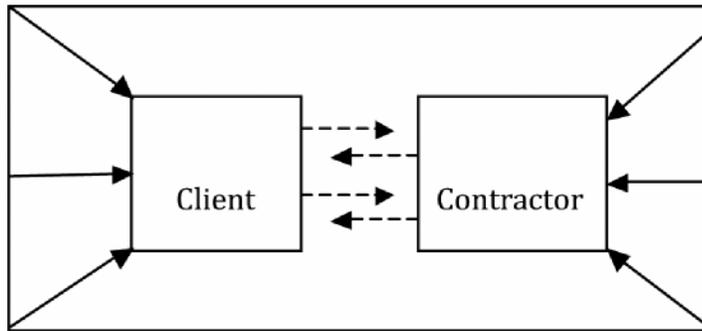
In comparing manufacturing industry and construction industry, the construction has more difficulties in building collaborative relationships and implementation of collaboration because of its fragmentation (Egan, 1998, Bresnen & Marshall, 2000c, Phua, 2006). Construction has been characterized by uncertainty, suspicion and adversarial attitudes for a long time. Fortunately, due to the efforts of the UK government and construction industry, there is a move from traditional, arms-length, contractual approaches towards more collaborative ones which are based on cooperation and trust (Barlow, 1997, Egan, 1998, Wood, 2005). Partnering, particularly, has been cited as one dominant collaborative approach at work and has attracted some empirical investigation in the past decade (Barlow, 1997, Bresnen and Marshall, 2002, Phua, 2006). It has been argued that such collaborative approaches e.g. partnering or alliancing have positive impacts on project performance such as saving cost, better quality, decreasing litigation and promoting greater innovation and improved user satisfaction (CII, 1989, NEDO, 1991, Bennett and Jayes, 1995, 1998).

However, as articulated by Bresnen and Marshall (2000a), less attention has been paid on the systematic investigation of the attributes of collaborative working that might account for these improved outcomes. Collaborative working is not just lip service; it needs participants to put actual efforts and resources on it. Furthermore, collaborative working needs to be done with the right people in a proper way and for proper reasons in suitable projects (Bresnen and Marshall, 2000a, Ng *et al.*, 2002, Eriksson and Pesämaa, 2007). As collaborative working involves lots of issues, Vaaland (2004) argued that it is not easy to achieve a certain appropriate level of collaborative working or even to describe it. But, the people need to work together to deliver value that would be impossible working individually to deliver (Planning Advisory Service, 2007). The Planning Advisory Service (2007) pointed out the underlying reason of people working together is to achieve the synergy generated by combining resources, expertise and ideas from multiple authorities. However, in construction why is collaborative working needed? The following section will explain it in detail.

## 2.0 REASONS OF WORKING TOGETHER IN CONSTRUCTION

The reason of client and contractor working together is because of their supply-demand relationship. But, working together more closely is because of a variety reasons which could be voluntary by evolutionary mechanism or engineered by compulsory mechanism (Bresnen and Marshall, 2002). For instance, an organization collaborates voluntarily to improve internal efficiency (Ellinger, 2000, Fawcett and Magnan, 2002) or is required to collaborate in response to external challenge (Planning Advisory Service, 2007). Particularly, long-term working together can decrease transaction costs through avoiding the repeated tendering costs and saving time. Based on the above description, the paper will examine why they need work together more closely from two perspectives (see fig.1): external forces and internal demands.

- External forces: As the increased complexity of construction technology, the variety of building function, time pressure, the uncertainty and stronger competition in construction market, client and contractor need work together more closely to face those issues (Gidado, 1996, Pietroforte, 1997, Eriksson and Pesämaa, 2007). Through working together more closely, the information and resources are shared to a greater extent, and clients and contractors are viewed as 'partnering or alliancing' to face the challenges from the market (Egan, 1998, Wood, 2005). Thus, the external forces **push** the construction companies to work more closely to achieve collaborative advantage which is the synergy generated by combining resources, expertise and ideas from multiple authorities (Planning Advisory Service, 2007).
- Internal demands: Organizations have for many years strived to improve the efficiency of their interactions with their partners (Barratt, 2004). Encouraging collaborative working can facilitate procurement process e.g. early involvement of contractor can make the contractor respond the client's



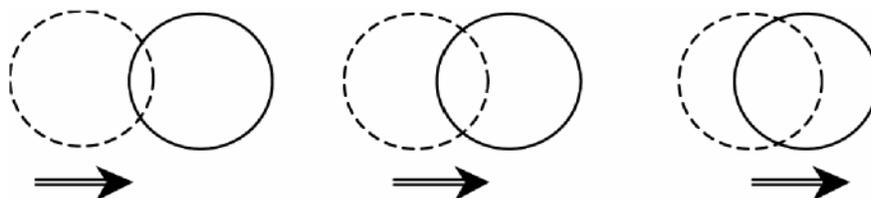
Note: External forces: push  
- - - -> Internal demands: attract

Fig. 10 The reasons of working together more closely in construction

requests more quickly and more effectively. Through long-term collaborative working, the client can achieve a higher level satisfaction and better project quality and the contractor can get a more stable workload (Egan, 1998, Wood, 2005). Otherwise, the constant replacement of actors between client and contractor will create cost inefficiencies and time wasting since a new learning curve must be climbed by the actors each time and the process of knowing each other will have to be made (Cox and Thompson, 1997). Thus, internal demands *attract* companies to enter into collaborative working to improve efficiency and to lower the transaction cost through changing traditional cultures and building a more collaborative relationship.

### 3.0 OVERVIEW OF COLLABORATIVE WORKING

When a certain degree of collaborative working occurs, correspondingly two parties working together will have a certain type of business relationship and vice versa. The business relationship between two parties is soft and invisible but it can be reflected by their collaborative working which is hard and visible. Their relationship can be considered as the relationship between temperature (business relationship) and thermometer (collaborative working). Webster (1992) proposed that the range of business relationship can be described as a continuum ranging from pure transaction to vertical integration. Sako (1992) also presented a framework to define business relationship from Arm's-length Contractual Relation (ACR) to Obligational Contractual Relation (OCR). ACR is characterized by specific discrete transactions where there is no mutual trust and commitment. Such relations are often short term or one-off. OCR is typified by high degrees of interdependence, trust and mutual benefits. Such relations are often long term and based on mutual collaboration. So in this continuum, when the degree of collaborative working is increased, the relationship tends towards OCR; otherwise, the relationship tends towards ACR, (see fig.2).



- The dashed circle – ACR
- The solid circle – OCR
- Overlap – Collaborative Working

Fig.2.0 Role of collaborative working from ACR to OCR

Likewise, Cooper and Gardner (1993) identified a range of relationship styles based on lower and higher degree of collaborative working: Arm’s length relationship; Typical small account relationship; National account selling; Strategic alliances; Joint ventures; Full vertical integration. In this range of inter-organisational relationships, Macbeth (1994) identified two end points: adversarial and collaborative. Furthermore, Harland (1996) followed this idea by defining the range of partnership (see fig. 3).

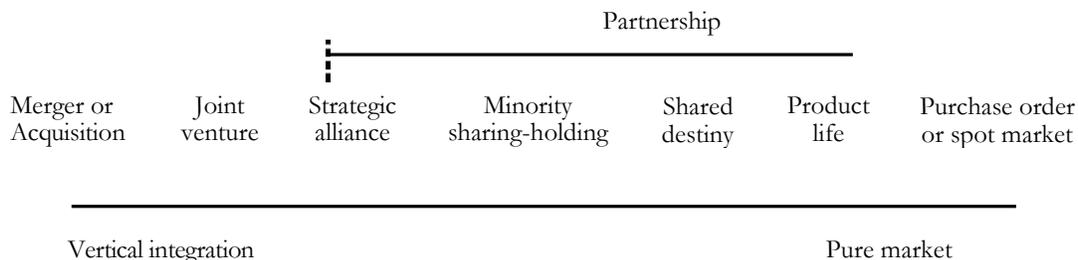


Fig.3.0 Partnership as on certain relationship (adapted from Harland, 1996)

One extreme side of the continuum represents a pure market, in which the degree of collaborative working is very low; the other extreme side is merger & acquisition, in which the degree of collaborative working is very high. In this spectrum, partnering from ‘product life’ to ‘strategic alliance’ could be viewed as a certain type of collaborative working. In construction industry, partnering has been viewed as a major form of collaborative working, which represents a significant change; another perspective for tackling fragmentation and the lack of integration; improving project performance; and counteracting traditional adversarial working environments (Egan, 1998, Bresnen and Marshall, 2000c, Dainty *et al.*, 2001, Wood and Ellis, 2005, Phua, 2006). However, partnering is a type of collaborative working. It could not represent all of collaborative working. Collaborative working is a broader concept than partnering. It is necessary to explore a full spectrum of collaborative working rather than just focus on partnering. In order to differentiate partnering and collaborative working, the definition of collaborative working needs to be clarified.

## **4.0 DEFINITION OF COLLABORATIVE WORKING**

‘Collaborate’ from Latin is comprised by ‘col (together)’ + ‘lab (work)’, which means working together (Oxford English Dictionary). By definition, all organizations or people working together are collaborating. Through collaborative working, people can achieve better results than working separately. Based on this, this research defines collaborative working as ***client and contractor jointly working together for mutual advantages, through which they can achieve bigger benefits than working separately.*** In terms of the suggestion of understanding partnering by Tyler and Matthews (1996), collaborative working also can be understood in two ways: firstly, by its ‘attributes’ such as commitment, trust and win-win philosophy and secondly by the ‘process’ such as achieving mutual benefits in terms of setting mutual goals through organizing workshops to communicate to each other. Long-term collaborative working can be understood as a type of procurement method e.g. strategic partnering. Short-term collaborative working can be understood as the specific interaction amongst construction participants in the project delivery process. Collaborative working can be effective or ineffective. The different degree of collaborative working could be expressed by a variety of indicators or attributes e.g. trust, commitment and so forth. This paper will explore attributes of collaborative working which determine the degree of collaborative working. In order to achieve this objective, an *identification test* will be adopted. The next section will introduce how to identify those attributes and the results of *identification test*, which will facilitate the measurement of degrees of collaborative working (CW).

## **5.0 IDENTIFYING THE ATTRIBUTES OF CW**

This section will introduce how to identify the attributes of collaborative working. This will comprise three parts. Firstly, the method used to identify attributes will be explained. Secondly, a sample of identification test will be presented. Meanwhile, why and how to choose this sample will be explained. Thirdly, the result of test will be compared with the previous research and then the final result will be identified.

### **5.1 Identification test**

Identification test refers to the identification of key issues from the past literature through collecting related key words from the target literature source. This method is especially useful to investigate those issues which are close with past literature but currently few people do it. This approach has been used by several researchers e.g. Tyler and Mathhews (1996), Li *et al.* (2000) and Chan *et al.* (2003). Noticeably, Tyler and Mathhews (1996) used an identification test to explore the elements of partnering. In their research, they reviewed total 20 papers (from 1990 to 1996) and a total of 117 phrases or key words were identified of which 18 were different. There are a 10 of prevalent phrases or key words identified. The specific results please see Table 1.

Table 1 presents the results identified by Tyler and Mathhews (1996), which are the key elements of partnering. Partnering, as a certain type of collaborative working, not only has some similarities with collaborative working but also has some differences. Therefore, differences and similarities can be identified. Also, some changes of elements of collaborative working could be examined from a longitudinal perspective. For instance, in the collaborative process as the time goes by, some elements may become more important and some may become less important, which could be identified by comparing their ranks at different times.

Table 1.0 Key elements of partnering (source from Tyler and Matthews, 1996)

	Most Prevalent Elements to Partnering	Frequency mentioned
1	Goals and Objectives	14
2	Trust	14
3	Problem Resolution	13
4	Commitment	12
5	Continuous Evaluation	7
6	Group Working / Teams	7
7	Equity	6
8	Shared Risk	3
9	Win-Win Philosophy	3
10	Collaboration / Co-operation	2

### 5.2 The list of papers chosen in identification test

This paper will review the articles published in the last 11 years (1996 to 2007) which are from five major construction management journals:

- Construction Management and Economics
- Journal of Construction Engineering and Management
- Engineering, Construction and Architectural Management
- Journal of Management in Engineering
- International Journal of Project Management.

These target journals have been given the higher scores regarding quality by Wing (1997) and the articles from those journals are widely cited by other researchers. The papers from these journals are appropriate to be the sample for identification test in this research. The above five journals (except International Journal of Project Management) have ever been used by Li *et al.* (2000), in which they reviewed last 10 years published papers and made a detailed examination of partnering research. In this research, a total of 26 published related papers are identified. The criteria of selecting sample articles please see table 2.

Table 2.0 The criteria of selecting sample articles

Year of paper published		Location of sample paper	Primary content of papers
1997: 1 paper	1998:1 paper	UK	Those are closely related to collaborative working e.g. collaboration, cooperation and partnering etc.
2000: 5 papers	2000: 4 papers	Hongkong (PRC)	
2002: 2 papers	2003: 1 paper	Sweden	
2004: 6 papers	2005: 4 papers	Singapore	
2007: 2 papers			

The specific method of choosing paper sample from target journals is to search key words from the title and abstract, such as partnering, alliancing, partnership, collaboration, collaborative working which is closely related to research topic. In particular, Phua (2004) and Phua and Rowlinson (2004) used the grounded and inductive approach to explore collaboration and its relationship with project success. In contrast, Chua *et al.* (1999), Black *et al.* (2000), Chan *et al.* (2001), Beach *et al.* (2005) used deductive and normative approach to investigate collaboration and its relationship with project success. Thus, this research has covered a broad range of papers which aims to examine collaborative working in different ways. The detailed summary of reviewed papers, please see table 3. They are listed in terms of date and alphabetical order (in same year).

*Table 3.0 Sample papers*

<b>Paper number</b>	<b>Author and time</b>	<b>Contents of paper</b>
1	(Crane <i>et al.</i> , 1997)	They developed one model to measure partnering. In this model, the measures are closely connected with the collaboration.
2	(Thompson and Sanders, 1998)	They gave a continuum of partnering and explain the relationship between different types of partnering.
3	(Black <i>et al.</i> , 2000)	They made a detailed analysis of success factors in partnering.
4	(Bresnen and Marshall, 2000a)	They used case study to describe how to build collaborative relationship.
5	(Bresnen and Marshall, 2000b)	The relationships among motivation, commitment and incentives are explained in partnerships and alliances.
6	(Cheng <i>et al.</i> , 2000)	They explored critical success factors for construction partnering. Especially, they developed good measures to measure those factors.
7	(Li <i>et al.</i> , 2000)	They detailedly reviewed the partnering in the literature and summarized the partnering research in the past.
8	(Cheng and Li, 2001)	They developed a conceptual model to build partnering: from partnering formation, application, completion and reactivation to success.
9	(Kwan and Ofori, 2001)	The relationship between Chinese culture and successful implementation of partnering has been examined.
10	(Li <i>et al.</i> , 2001)	They referred to partnering as an alliance and defined four level of partnering.
11	(Liu and Fellows, 2001)	They examined the nature and process of partnering from an eastern perspective.
12	(Bresnen and Marshall, 2002)	They argued whether the cooperation is engineered or evolutionary through two case studies.

13	(Cheng and Li, 2002)	A quantitative investigation about critical success factors has been made at three different stages: partnering formation, application, completion and reactivation
14	(Chan <i>et al.</i> , 2003)	They examined the problems for implementation of partnering in construction.
15	(Chan <i>et al.</i> , 2004)	They identified essential ingredients for partnering success and refined partnering success factor via factor analysis.
16	(Kadefors, 2004)	Detailed description of trust in project relationship
17	(Phua, 2004)	The research is a grounded exploration about determinants of project success.
18	(Phua and Rowlinson, 2004)	They explore the relationship between cooperation and project success.
19	(Vaaland, 2004)	Detailed description of role of confliction in collaboration.
20	(Wong and Cheung, 2004)	Examination of trust from different parties in partnering.
21	(Beach <i>et al.</i> , 2005)	Good evaluation of partnership: market relationships, vertical integration, partnering and strategic and project partnering.
22	(Nyström, 2005)	A very good description of partnering definition has been made via Wittgenstein family resemblance
23	(Wong and Cheung, 2005)	Structural equation model of trust and partnering success is built.
24	(Wood and Ellis, 2005)	Detailed description of experiences of partnering relationships from main contractor perspective.
25	(Lu and Yan, 2007)	A model is build to evaluate the applicability of partnering in China construction and identify the factors affecting partnering use.
26	(Yeung <i>et al.</i> , 2007)	A very good description of alliancing definition has been made via Wittgenstein family resemblance

### 5.3 Result of identification test

Through the critical review of the above 26 articles, a set of key words/ phrases have been identified which are mentioned in those articles as key aspects of collaborative working. The detailed results of this test are followed as Table 4.

Table 4.0 Results of identification test

	Attributes of CW	No. of paper	Frequency	
			This research	Previous research
1	Trust	2,3,4,6,7,8,9,10,11,13,14,15,16,20,21,22,25,26	18	14
2	Commitment	3,4,5,6,7,8,10,11,13,14,15,21,25,26	14	12
3	Problem Resolution	2,6,8,10,11,14,15,16,19,20,21,22,23,25,26	15	13
4	communication	3,6,8,10,13,14,15,17,18,20,21,23,26	13	
5	Goals & Objectives	1,2,4,6,7,10,11,13, 21,24,25,26	12	14
6	Collaboration/Cooperation	4,6,7,8,10,11,13,15,17,18,24,26	12	2
7	innovation, creativity	6,7,8,10,11,15,17,18,20,22,23	11	
8	Shared Risk & interests ( Equity)	2,3,7,10,11,14,17,18,22,24,26	11	3
9	Continuous Evaluation	1,2,3,8,10,14,16,21,22,25,26	11	7
10	Contracts, incentives	2,4,5,8,12,13,17,18,20,22,26	11	
11	Group Working\ teamwork	2,4,8,10,12,13,21,24,25	9	7
12	Attitude: learning and sharing	2,3,8,12,13,14,15,21,24	9	
13	Top management	6,7,8,13,14,15,22,25,26	9	
14	Mutuality, respect, mutual understanding	3,9,12,14,20,22,23,25	8	
15	Openness	2,8,10,20,22,23,24	7	
16	equality	10,11,17,18,21,26	6	6
17	Adequate resources	3,6,8,13,15,22,26	7	
18	Win-Win Philosophy	1,2,10,15,26	5	3
19	cost-driven, value	3,10,11,15,24	5	
20	Organizing, managing the project team	4,15,21,22,26	5	

Note: previous research refers to the research undertaken by Tyler and Matthews (1996)

Those words which occurred more than four times have been chosen. The other standards of choosing those words are:

- The author of paper considered them to be important in the implementation of collaborative working
- Those words can mostly reflect the characteristics and essence of collaborative working
- Those words are most representative of collaborative working or have closest meaning with collaborative working
- Those words are common in construction industry

In the process of screening attributes, the author incorporated some words into the same category. For example, benchmarking has been put into the range of continuous evaluation, and honesty and kindness have been put into the range of attitudes and so on. Some of them achieved high scores, such as charters, facilitation, facilitator, however, they are not this research is seeking for. Thus they have been deleted or incorporated into other categories.

From the table 4, there is no large difference in the comparison with the research by Tyler and Matthews (1996). However, there still are some new points such as good and open communication, technological innovation and creativity which are the essence of collaborative working as well but Tyler and Matthews omitted them. It is noticeably that, it does have some significant differences of item rank from a longitudinal perspective e.g. collaboration/cooperation and shared risk & interests (equity) become more important, comparing with their ranks in previous research.

Furthermore, connected with two seminal research projects by Mohr and Spekman (1994) and Lehtonen (2004), the former identified the key attributes of partnership: commitment, coordination, interdependence and trust; the latter summarized the attributes of partnering relations as: mutual trust, commitment, openness, sharing of risks and benefits, continuous development, involvement of all organisational levels. Finally, this research can identify the attributes of collaborative working: trust, commitment, sharing of risks/benefits (equity), interdependence, continuous evaluation/development, mutual goals/objectives, problem resolution, team working, collaboration/cooperation, equality, win/win philosophy, communication, mutual understanding/respect, innovation and creativity. Some of the above words/phrases need further modification and incorporation in terms of the future research requirements.

## **6.0 SUMMARY**

Exploring and identifying the attributes of collaborative working can help get a better understanding of how people should work together. In particular, it can help practitioners to remove the confusion of collaborative working in construction and facilitate the application of collaborative working. The research distinguishes partnering from collaborative working and presents a definition of collaborative working. By this definition, the relationship between collaborative working and business relationship has been examined. Particularly, the research presented the role of collaborative working in the business relationship evolution process from Arm's-length Contractual Relation (ACR) to Obligational Contractual Relation (OCR). Under different business relationships, there must be a certain degree of collaborative working which is determined by its attributes e.g. trust, commitment and so forth. In order to get a spectrum of attributes of collaborative working, 'identification test' has been adopted. Based on the results of identification test, further research will develop a measurement methodology to measure the different degrees of collaborative working. However, since all attributes obtained are from literature, there is still a need to test them with practitioners from industry and then make a final conclusion.

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