



COBRA 2006

The construction and
building research
conference of the Royal
Institution of Chartered
Surveyors



University College London,
7-8 September 2006



COBRA 2006

PROCEEDINGS OF THE ANNUAL RESEARCH CONFERENCE OF THE ROYAL INSTITUTION OF CHARTERED SURVEYORS

**Held on Thursday 7th and Friday 8th September 2006
at University College London**

Joint Conference Directors

Stephen Brown

Stephen Pryke

Editor: Elaine Sivyer

COBRA 2006

Proceedings published by:

**The RICS,
12 Great George Street
Parliament Square
London SW1P 3AD**

In association with:

**The Bartlett School
University College London, WC1E 7HB**

**© RICS, The Bartlett School, UCL and the contributors
First published 2006**

ISBN: 978-1-84219-307-4

Cooperation in Construction: Towards a Research Agenda

A. Anvuur and M. Kumaraswamy

Department of Civil Engineering, University of Hong Kong, 6/F Haking Wong Building, Pokfulam Road, Hong Kong; anvuur@hku.hk

Over the last decade numerous research and industry reports have highlighted the importance of cooperation to construction project success. Cooperation is routinely cited for good performance and its absence blamed for poor performance of construction projects. Yet most of these studies have not directly measured cooperation and where this has been attempted, the measures used have lacked a unifying theoretical framework. Instead, researchers have relied on project performance measures (e.g. time, cost and quality) as indicators of the level of cooperation, if any, which existed. Important as they are, these project performance measures provide information about the past and any lessons learned can only influence the next project. These measures also confound the effects of a number of other input factors (e.g. procurement methods, project contextual conditions). As such, they do not provide real-time and accurate information to aid project managers in making proactive decisions to influence the outcomes of their projects. A definition of, a theoretical framework for, and the defining aspects of cooperation are set out in this paper. Since cooperation at any level must ultimately be reduced to cooperation between individuals (e.g. managers from different organisations), a micro-level perspective is required in a thorough study of the antecedents of cooperation. Such understanding is necessary to improve both the predictability and quality of construction project performance.

Keywords: cooperation, measurement, motivation, organisation, project management.

INTRODUCTION AND BACKGROUND

In construction, as in other project-based industries, the need for cooperation arises from uncertainty, interdependence and complexity (Dubois and Gadde 2002; Shirazi *et al.* 1996). Industry coping strategies designed to respond to these challenges have created an industry setting where commercial pressures, legal and contractual issues traditionally encourage reticence, caution and adversarial relationships (Dubois and Gadde 2002; Koskela 2003; Moore and Dainty 2001; Thompson *et al.* 1998). Industry reports (e.g. Latham, 1994) decried the prejudice-laden and adversarial nature of construction contracting as hampering innovation and performance and made sweeping recommendations, including the need to learn from other industries. Despite some scepticism (e.g. Male, 2003), it appears the commercial realities of construction contracting today make the reform agenda both necessary and largely irreversible (see Egan, 1998). Cooperative strategies like partnering and alliancing have thus become paradigmatic.

However, the basis for predicting a relationship between cooperation and project performance has remained typically logical and conceptual rather than empirical (Bresnen and Marshall 2000a). Cooperation lacks conceptual-definitional clarity and the discourse also tends to confound different units of analysis (Bresnen and Marshall

2000b). There is a dearth of research (Phua, 2004) addressing the socio-psychological factors that determine an individual's cooperative behaviour in construction and none, to the best of the authors' knowledge, which has included economic incentives and socio-psychological factors as variables in the same study. These observations reflect a wider practice where industry solutions to major problems are usually of an ad hoc, piecemeal nature involving a number of elements to be 'bolted' onto already ailing systems (Kumaraswamy, 1998), with academia mostly playing catch up (Tookey *et al.*, 2001). While these are teething problems in its development as a field of enquiry (Parsons and Shils, 1959), construction management research needs to move on from ad hoc classification systems and taxonomies to comprehensive conceptual frameworks and theoretical systems. This paper outlines a research project that uses a theory-based approach to investigate the factors that shape individuals' cooperative behaviours in construction project scenarios.

DEFINITION OF COOPERATION

Cooperation is a loosely defined term in the construction management literature. Many researchers seem to construe cooperation as having the same meaning as collaboration (e.g. Bresnen and Marshall, 2000a). Thompson and Sanders (1998) used the terms cooperation and collaboration to describe different degrees of alignment/ integration in the partnering relationship between organisations, with collaboration signifying a higher degree of integration than cooperation. Love *et al.* (2002) used the terms cooperation and collaboration to describe the longevity of alliances between organisations. They considered long-term alliances as cooperative and short-term alliances as collaborative. Phua and Rowlinson (2004) conclude that the cooperation motif has been "transformed into the much touted partnering relationship". The Oxford Dictionary of English (Oxford University Press, 2003) defines cooperation as "the action...of working together to the same end" and collaboration as "the action of working with someone to produce something". From these, it is clear that collaboration is not synonymous with cooperation.

Arguably, the confusion in terminology is a by-product of efforts to 'learn' from other industries. Collaboration has been the construction industry's response to project uncertainty and complexity (e.g. Eccles, 1981; Shirazi *et al.*, 1996). In manufacturing, collaboration is a relatively new concept (see Griffin 1997) and firms use collaboration typically to gain competitive advantage (Hamel *et al.* 1989). Dulaimi *et al.* (2003) argue that each collaborating partner in a construction project has every right to "pursue their own interests, sometimes even at the expense of others". Collaboration is, therefore, competition in a different form and can lead to competitive compromise (Hamel *et al.*, 1989). Cooperation develops from a similarity of objectives and competition, from a divergence of objectives (Pruitt and Carnevale, 1993). As a form of competition, collaboration is, therefore conceptually different from cooperation. Cooperation, while encompassing collaboration, also signifies an alignment of objectives. Therefore successful collaboration requires a significant degree of objective alignment (i.e. *cooperation*) between the different parties (Bennett and Jayes, 1995; Dulaimi *et al.*, 2003; Kanter, 1994). This concept of cooperation thus refers to behaviour that benefits both parties. Adopting a long-term perspective, Love *et al.*'s (2002) typology of alliances *could* be explained thus: a long-term alliance offers greater scope for objective alignment (i.e. cooperation) through inter-organisational learning than a short-term alliance, which could be just 'business as usual' (i.e. collaboration) (see Kanter, 1994).

Cooperation between different companies ultimately reduces to cooperation between individuals (e.g. managers) from these companies (see Bresnen, 1991; Kamann *et al.*, 2006; Smith *et al.*, 1995). This study therefore focuses on individuals' cooperation with

their proximal (project) workgroups. At the individual level of analysis, one's relationship with one's (project) organisation is not one of cooperation versus competition. In this sense, the opposite of cooperation is not competition, but no cooperation (Tyler and Blader, 2000). Consistent with the foregoing discussion, for the purposes of this study and in agreement with other researchers on the concept (e.g. Pinto and Pinto, 1990; Smith *et al.*, 1995; Tyler and Blader, 2000), this paper defines cooperation as "behaviour that promotes the goals of the workgroup to which one belongs". This definition is consistent with the literature on social dilemmas (see Komorita and Parks, 1994). This literature recognises that while individuals' long-term interests are aligned with group goals, their short-term self-interests are often in conflict with group goals. The pursuit of individuals' long-term self-interest thus requires the subordination of short-term self-interests.

COOPERATION METRICS IN CONSTRUCTION

The importance of cooperative relationships to construction project performance has been highlighted (e.g. Bennett and Jayes, 1995; Hauck *et al.*, 2004; Kale and Arditi, 2001). In their study of 209 military construction projects, Pocock and colleagues (Pocock and Hyun, 1996; Pocock and Liu, 1997) found that projects with high levels of cooperative interaction had better and consistent performance. Lack of cooperation has been blamed for the failure of well-intentioned change initiatives in construction (Cicmil and Marshall, 2005; Koskela, 2003; Moore and Dainty, 2001). Yet there is a dearth of research that directly measures cooperation. This is due to the (over) reliance on project performance outcomes (e.g. time, cost and quality) as indicators of the level, if any, of cooperation. Such feedback only leads to reactive project management. Also these project performance outcomes confound the effects and influences of many other factors, for example, procurement methods, project contextual conditions and client characteristics. Understanding the reasons for, as well as directly measuring, individuals' cooperative behaviours will help managers to promote initiatives that foster greater engagement in project teams and remove the 'hit or miss' element in many management initiatives.

Empirical evidence of the link between cooperation and organisational performance exists in other work settings (e.g. Katz *et al.*, 1985; Podsakoff *et al.*, 1997). In construction however, the evidence has remained largely intuitive and logical, except, perhaps, for the pioneering work of Phua and Rowlinson (2004). Using a grounded empirical approach, Phua and Rowlinson demonstrated that the cooperation construct in their study was the most important determinant of project success, explaining 28% of the variance. This finding is very significant considering that their measure of cooperation tapped only one dimension (*discretionary promoting* behaviours) of the construct. Many other factors identified in their study were antecedents or correlates of cooperation and therefore present possible confounds. These issues generally point to the usefulness of a theory-based and robust approach to the study and measurement of cooperation, such as proposed in this paper.

THEORETICAL FRAMEWORK

MOTIVATIONS FOR COOPERATIVE BEHAVIOUR

Lewin and Gold (1999) distinguish between two types of motivation for cooperative behaviour (behaviour = f [person, environment]): internal and extrinsic motivations. Project managers use performance incentives and sanctioning mechanisms in construction contracts to motivate project workgroup members to accept their authority and to cooperate, while mitigating opportunistic behaviour, in order to achieve the project's objectives. The underlying assumptions of incentives and sanctions emanate from social exchange theory. According to this theory, people interact in order to

exchange resources and will seek to maximise personal gain in such interactions (Lewin and Gold, 1999). Therefore, individuals might cooperate to the extent that their outcomes, in terms of rewards and sanctions, are influenced by their cooperation. The second aspect of Lewin and Gold's (1999) formula is internal motivations that flow from people's attitudes and values. Intrinsic motivation and organisational identification are two important attitudes that lead to individual self-facilitation (Deci, 1975; Hogg and Abrams, 1988).

From the perspective of project managers, organisational identification is a double-edged sword. While it yields positive results within the organisation, organisational identification may lead to bias and adversarial relations in the inter-organisational (i.e. project) context. The solution therefore lies in shaping the strength of workgroup members' awareness of organisational boundaries. One such strategy is to induce/create a superordinate identity that encourages inclusive categorisation (Gaertner *et al.*, 1993). As argued elsewhere (Anvur and Kumaraswamy, under review), superordinate identification is the primary objective of construction concepts/initiatives, including project culture, partnering/alliancing and teamwork. Personal morality and legitimacy are two important values that lead to self-regulation (Tyler and Blader, 2000). Tyler and Blader (2000) demonstrated that procedural justice has greater impact on legitimacy judgements than either the equitability or favourability of decisions made by leaders. They also found that people with high organisational identification evaluate their leaders more in terms of their procedural justice and less in terms of the equitability or favourability of their decisions and policies.

Situational factors influence the development and use of these two types of motivation. For instance, incentive and sanctioning systems are only effective in environments devoid of uncertainty and complexity (Ashley and Workman, 1986; Fernie *et al.*, 2006; Kohn, 1993; Simon, 1991; Thompson *et al.*, 1998). Also, clear systems of reward undermine individuals' intrinsic motivation (Deci, 1975). Therefore trade-offs exist in the use of these two types of motivation. Also, the relative effect sizes of cooperation from the two sources should weigh heavily in this trade-off analysis. Research in (other) work organisations has shown that most of the variance in people's cooperative behaviour is explained by their internal motivations and *not* the desire to win rewards or avoid punishment (Simon, 1991; Tyler and Blader, 2000). While some support for the independent effects of the two motivations for cooperation exists in the context of the construction industry (Ashley and Workman, 1986; Kadefors, 2005; Phua 2004), no research has included incentive/sanctioning mechanisms and socio-psychological factors as variables in the same study. This study outlines research that aims to fill this gap.

A THEORY-BASED MEASURE OF COOPERATION

The foregoing discussion leads to the four-component measure of cooperation shown in Table 1. Cooperative behaviour that derives from contractual obligations and formal structures of control (e.g. job design and description) is formal or programmed cooperation (Smith *et al.*, 1995). This form of cooperative behaviour is usually linked to reward and sanctioning systems and is, therefore, *mandatory* (Tyler and Blader, 2000). Informal or non-programmed cooperation results from adaptable arrangements in which behavioural norms (i.e. attitudes and values), rather than contractual obligations, determine the contribution of the individual. Phua (2004) defines this as the "intrinsic and voluntary leanings of individuals to wilfully contribute their personal efforts to the completion of interdependent jobs". This form of cooperation is, therefore, *discretionary* (Tyler and Blader, 2000).

Table 1 Types of cooperative behaviour

Function of the behaviour	Forms of cooperative behaviour	
	Mandatory	Discretionary
Promoting the project's goals	In-role	Extra-role
Limiting behaviours that harm the project	Compliance	Deference

Source: Tyler and Blader (2000)

There are also two functions of cooperative behaviour. First, there are behaviours that directly promote the project's goals. A proper definition of job roles ensures members' efforts are channelled into undertaking only what is necessary to achieve the organisation's goals. By undertaking the behaviours prescribed in their job roles, members are cooperating with their organisations. These task performance behaviours are referred to as *in-role* behaviours (O'Reilly and Chatman, 1986). Rarely, however, are role definitions exhaustive. Project complexity, and the flexibility required to cope with it, makes exhaustive job roles undesirable. This often requires members to take the initiative and act out of their internal motivations in ways that benefit the project. These cooperative behaviours that are not directly specified by a job description but which contribute directly to achieving the project's goals are contextual performance or 'organisational citizenship' behaviours (Organ, 1988). In other words, they are *extra-role* behaviours (O'Reilly and Chatman, 1986).

The second function of cooperative behaviour is the social coordination of members' activities and the avoidance of problems. Such cooperative behaviour is concerned with discouraging behaviour that is harmful to the project organisation or inhibits its smooth functioning and is therefore limiting behaviour (Tyler and Blader, 2000). This is often achieved through project rules (e.g. conditions of contract), which also spell out applicable sanctions for any breach of these rules. When members obey rules because not doing so may lead to their detection and punishment, they are *complying* with these rules since they construe them as being mandatory (see Thompson *et al.*, 1998). However, people can also *defer* to these rules because they feel it is the right and proper thing to do. Such rule following is discretionary in nature (Tyler and Blader, 2000). Empirical evidence that in-role and extra-role behaviours are conceptually different and have independent influences on organisational performance is provided in many studies (e.g. Motowidlo and Van Scotter, 1994; Orr *et al.*, 1989). Tyler and Blader (2000) have demonstrated the conceptual differences between compliance and deference.

CONCLUDING OBSERVATIONS AND RESEARCH QUESTIONS

The many cooperation initiatives and strategies in construction reflect, perhaps, the industry's desire to move away from a past dogged by adversarial relationships and poor performance. However, research on the concept of cooperation has lagged such efforts. Space does not allow for a more detailed conveyance of the proposed research framework in this paper. However, by providing conceptual-definitional clarity on cooperation and establishing its theoretical domain, this paper sets out the contextual basis for such research. As a starting point, further empirical evidence of the relationship between cooperation and project performance is required. Answers are required for the following research questions from different construction settings:

- What are the determinants of individuals' cooperative behaviours in project workgroups?
- What are the theoretical underpinnings and effectiveness of the many cooperation strategies for construction projects?

Finding answers to these questions is the focus of an ongoing research aimed at developing a model for more effective cooperation on construction projects. This research will use questionnaire surveys and three carefully selected case studies to address these research questions. This research aims at initial base findings and an outline research agenda aimed ultimately at 'restoring the handshake' to construction contracting. More research, and from different national settings and project scenarios, is required to extend and complement this effort.

ACKNOWLEDGEMENT

Grant HKU/7138/05E from the Hong Kong Research Grants Council is gratefully acknowledged for supporting this research project.

REFERENCES

Anvuur, A. M. and Kumaraswamy, M. M. (2006), "A conceptual model of partnering and alliancing", *Journal of Construction Engineering and Management*, in press.

Ashley, D. B. and Workman, B. W. (1986), "Incentives in construction contracts", Report to the Construction Industry Institute (CII), Source Document 8, Austin, TX, The University of Texas.

Bennett, J. and Jayes, S. (1995), "Trusting the team: the best practice guide to partnering in construction", Centre for Strategic Studies in Construction/ Reading Construction Forum, University of Reading.

Bresnen, M. (1991), "Construction contracting in theory and practice: a case study", *Journal of Construction Engineering and Management*, 9, 247-263.

Bresnen, M. and Marshall, N. (2000a), "Partnering in construction: a critical review of issues, problems and dilemmas", *Journal of Construction Engineering and Management*, 18(2), 229-237.

Bresnen, M. and Marshall, N. (2000b), "Motivation, commitment and the use of incentives in partnerships and alliances", *Journal of Construction Engineering and Management*, 18(5), 587-598.

Cicmil, S. and Marshall, D. (2005), "Insights into collaboration at the project level: complexity, social interaction and procurement mechanisms", *Building Research and Information*, 33(6), 523-535.

Deci, E. L. (1975), *Intrinsic Motivation*, Plenum Press, New York.

Dubois, A. and Gadde, L. E. (2002), "The construction industry as a loosely coupled system: implications for productivity and innovation", *Journal of Construction Engineering and Management*, 20(7), 621-631.

Dulaimi, M. F., Ling, F. Y. Y. and Bajracharya, A. (2003), "Organizational motivation and inter-organizational interaction in construction innovation in Singapore", *Construction, Management and Economics*, 21(3), 307-318.

Eccles, R. G. (1981), "Bureaucratic versus craft administration: the relationship of market structure to the construction firm", *Administrative Science Quarterly*, 26(3), 449-469.

- Egan, J. (1998), *Rethinking Construction*, HMSO, London.
- Fernie, S., Leiringer, R. and Thorpe, T. (2006), "Change in construction: a critical perspective", *Building Research and Information*, 34(2), 91-103.
- Gaertner, S. L., Dovidio, J. F., Anastasio, P. A., Bachman, B. A. and Rust, M. C. (1993), "The common ingroup identity model: recategorisation and the reduction of intergroup bias", *European Journal of Social Psychology*, 4, 1-26.
- Griffin, A. (1997), "PDMA research on new product development practices: updating trends and benchmarking best practices", *Journal of Product Innovation Management*, 14(6), 429-458.
- Hamel, G., Doz, Y. L. and Prahalad, C. (1989), "Collaborate with your competitors - and win", *Harvard Business Review*, January - February, 133.
- Hauck, A. J., Walker, D. H. T., Hampson, K. D. and Peters, R. J. (2004), "Project alliancing at National Museum of Australia - collaborative process", *Journal of Construction Engineering and Management*, 130(1), 143-152.
- Hogg, M. A. and Abrams, D. (1988), *Social Identifications: a Social Psychology of Intergroup Relations and Group Processes*, Routledge, London.
- Kadefors, A. (2005), "Fairness in interorganizational project relations: norms and strategies", *Journal of Construction Engineering and Management*, 23(8), 871 - 878.
- Kale, S. and Arditi, D. (2001), "General contractors' relationships with subcontractors: a strategic asset", *Journal of Construction Engineering and Management*, 19(5), 541-549.
- Kamann, D.-J. F., Snijders, C., Tazelaar, F. and Welling, D. T. (2006), "The ties that bind: buyer-supplier relations in the construction industry", *Journal of Purchasing and Supply Management*, 12(1), 28-38.
- Kanter, R. M. (1994), "Collaborative advantage: the art of alliances", *Harvard Business Review*, July - August, 96.
- Katz, H. C., Kochan, T. A. and Weber, M. R. (1985), "Assessing the effects of industrial relations systems and efforts to improve the quality of working life on organisational effectiveness", *Academy of Management Journal*, 28(3), 509-526.
- Kohn, A. (1993), "Why incentive plans cannot work", *Harvard Business Review*, September-October, 54-63.
- Komorita, S. S. and Parks, C. D. (1994), *Social Dilemmas*, Brown & Benchmark, Madison, WI.
- Koskela, L. (2003), "Is structural change the primary solution to the problems of construction?" *Building Research and Information*, 31(2), 85-96.
- Kumaraswamy, M. M. (1998), "Industry development through creative project packaging and integrated management", *Engineering, Construction and Architectural Management*, 5(3), 228-237.
- Latham, M. (1994), *Constructing the team*, HMSO, London.

Lewin, K. and Gold, M. (1999), *The Complete Social Scientist: a Kurt Lewin Reader*, 1st Edition, American Psychological Association, Washington, DC.

Love, P. E. D., Irani, Z., Cheng, E. and Li, H. (2002), "A model for supporting inter-organizational relations in the supply chain", *Engineering, Construction and Architectural Management*, 9(1), 2-15.

Male, S. (2003), "Faster building for commerce: NEDO (1988)". In Murray, M. and Langford, D. (Eds.), *Construction Reports 1944-98*, Blackwell Science, Oxford.

Moore, D. R. and Dainty, A. R. J. (2001), "Intra-team boundaries as inhibitors of performance improvement in UK design and build projects: a call for change", *Journal of Construction Engineering and Management*, 19(6), 559-562.

Motowidlo, S. J. and Van Scotter, J. R. (1994), "Evidence that task performance should be distinguished from contextual performance", *Journal of Applied Psychology*, 79(4), 475-480.

O'Reilly, C. I. and Chatman, J. (1986), "Organisational commitment and psychological attachment: the effects of compliance, identification, and internalization on prosocial behaviour", *Journal of Applied Psychology*, 71(3), 492-499.

Organ, D. W. (1988), *Organisational Citizenship Behaviour: the Good Soldier Syndrome*, Lexington Books, Lexington, MA.

Orr, J. M., Sackett, P. R. and Mercer, M. (1989), "The role of prescribed and nonprescribed behaviours in estimating the dollar value of performance", *Journal of Applied Psychology*, 74(1), 34-40.]

Parsons, T. and Shils, E. A. (1959), *Toward a General Theory of Action*, Harvard University Press, Cambridge, Mass.

Phua, F. T. T. (2004), "The antecedents of co-operative behaviour among project team members: an alternative perspective on an old issue", *Journal of Construction Engineering and Management*, 22, 1033-1045.

Phua, F. T. T. and Rowlinson, S. (2004), "How important is cooperation to construction project success? A grounded empirical quantification", *Engineering, Construction and Architectural Management*, 11(1), 45-54.

Pinto, M. B. and Pinto, J. K. (1990), "Project team communication and cross-functional cooperation in new program development", *Journal of Product Innovation Management*, 7(3), 200-212.

Pocock, J. B. and Hyun, C. T. (1996), "Relationship between project interaction and performance indicators", *Journal of Construction Engineering and Management*, 122(2), 165-176.

Pocock, J. B. and Liu, L. Y. (1997), "Impact of management approach on project interaction and performance", *Journal of Construction Engineering and Management*, 123(4), 411-418.

Podsakoff, P. M., Ahearne, M. and MacKenzie, S. B. (1997), "Organizational citizenship behavior and the quantity and quality of work group performance", *Journal of Applied Psychology*, 82(2), 262-270.

Pruitt, D. G. and Carnevale, P. J. (1993), *Negotiation in Social Conflict*, Open University Press, Buckingham.

Shirazi, B., Langford, D. A. and Rowlinson, S. M. (1996), Organizational structures in the construction industry. *Journal of Construction Engineering and Management*, 14(3), 199-212.

Simon, H. A. (1991), "Organizations and markets", *Journal of Economic Perspectives*, 5(2), 25-44.

Smith, K. G., Carroll, S. J. and Ashford, S. J. (1995), "Intra- and interorganizational cooperation: toward a research agenda", *Academy of Management Journal*, 38(1), 7-23.

Thompson, I., Cox, A. and Anderson, L. (1998), "Contracting strategies for the project environment", *European Journal of Social Psychology*, 4(1), 31-41.

Thompson, P. J. and Sanders, S. R. (1998), "Partnering continuum", *Journal of Management in Engineering*, 14(5), 73-78.

Tooke, J. E., Hardcastle, C., Murray, M. and Langford, D. (2001), "Construction procurement routes: re-defining the contours of construction procurement", *Engineering, Construction and Architectural Management*, 8(1), 20.

Tyler, T. R. and Blader, S. L. (2000), *Cooperation in Groups: Procedural Justice, Social Identity and Behavioural Engagement*, Psychology Press, Philadelphia.

WEBSITE REFERENCES

Oxford University Press (cited 2005), *The Oxford Dictionary of English*, <http://www.oxfordreference.com>>.