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Achieving Supply Chain Sustainability: The Role of Relationship Management, Culture and Procurement Form

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ACHIEVING SUPPLY CHAIN SUSTAINABILITY: THE ROLE OF RELATIONSHIP MANAGEMENT, CULTURE AND PROCUREMENT FORM

S. Rowlinson,¹ Y.K.F. Cheung² and A.M.M Liu³

ABSTRACT

In this research we examined, by means of case studies, the mechanisms by which relationships can be managed and by which communication and cooperation can be enhanced in developing sustainable supply chains. The research was predicated on the contention that the development of a sustainable supply chain depends, in part, on the transfer of knowledge and capabilities from the larger players in the supply chain. A sustainable supply chain requires proactive relationship management and the development of an appropriate organisational culture, and trust. By legitimising individuals' expectations of the type of culture which is appropriate to their company and empowering employees to address mismatches that may occur, a situation can be created whereby the collaborating organisations develop their competences symbiotically and so facilitate a sustainable supply chain.

Effective supply chain management enhances organisation performance and competitiveness through the management of operations across organisational boundaries. Relational contracting approaches facilitate the exchange of information and knowledge and build capacity in the supply chain, thus enhancing its sustainability. Relationship management also provides the conditions necessary for the development of collaborative and cooperative relationships. However, often subcontractors and suppliers are not empowered to attend project meetings or to have direct communication with project based staff. With this being a common phenomenon in the construction industry, one might ask: what are the barriers to implementation of relationship management through the supply chain? In other words, the problem addressed in this research is the engagement of the supply chain through relationship management.

KEYWORDS: supply chain sustainability, relationship management, culture, convergence

INTRODUCTION

Relationship management is a system that provides a collaborative environment and a framework for all participants to adapt their behaviour to project (and longer term) objectives. It is about open communication, sharing resources and experiences, exposing the 'hidden' risks in the project. Case studies suggest that leadership has a strong influence on the relationship management climate which needs to be facilitated and nurtured. Commitment and action by senior management (and, so, parent organisations) can have a strong impact on the team and relationship management culture, indicating relationship management has a high chance of failure when there is inadequate support from top management. Like all relational contracting approaches, trust between relationship management partners is important. The authors contend that without a positive approach to relationship management a sustainable industry and continuous improvement are not possible. So, the authors postulate that a 'sustainable supply chain' is essentially tautological without the existence of a clear relational vision that leads to

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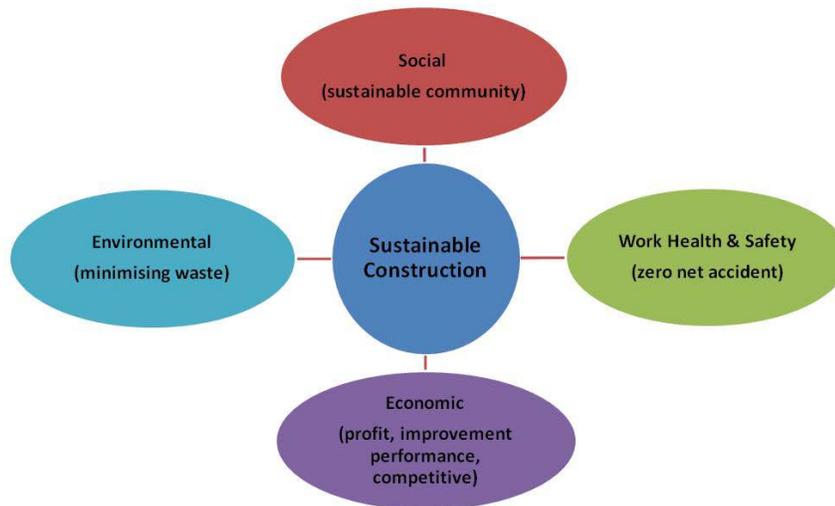
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provision of both soft and hard infrastructure to assist and inform decision making and encourage relationship building.

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Relationship management is a business strategy. It is a system that provides a collaborative environment and a framework for all participants to adapt their behaviour to project objectives and allows for engagement with the supply chain. On the other hand, relational contracting is an approach. A relational contract tends to be of a fixed duration, with exchange of relations in light of opportunities for future cooperation among the contracting parties. After all, companies do not collaborate for the sake of collaboration. They would only engage in relational exchanges when the perceived benefits derived from these activities outweigh the cost incurred.

SUSTAINABLE CONSTRUCTION AND A SUSTAINABLE SUPPLY CHAIN



Note: Sustainable construction is one of the Queensland Government’s priorities.

Figure 1: Definition of Sustainable Construction

At this point the distinction needs to be made between sustainable construction and a sustainable supply chain. Sustainable construction focuses on achieving a balance between all of the elements shown in Figure 1 i.e. environment, economics, social and safety dimensions. A sustainable supply chain is different in that the concept involves the mentoring and growth of subcontractors and suppliers and the move toward collaborative relationships and the empowerment of those organisations and individuals “lower down the food chain”. The longer

term impact of this is, of course, a sustainable industry sector and competence development at the firm level.

RELATIONSHIP MANAGEMENT

There are many definitions of relationship management (RM). One of the most widely adopted definitions is Berry's description of RM as 'attracting, maintaining and – in multi-service organisations – enhancing customer relationships' (Berry, 1983, p.25). Grönroos (1996) describes RM as a process of managing the organisation's market relationships which allows organisations to identify and establish, maintain and enhance and, when necessary, terminate relationships with customers and other stakeholders, at a profit so that the objectives of all parties involved are met through mutual exchange and fulfilment of promises (Grönroos, 2007) i.e. interactions and continuous improvement. Sheth's definition of RM reflects a similar theme. Sheth (1994, p.2) describes RM as 'the understanding, explanation and management of the on-going collaborative business relationship between suppliers and customers' and companies must align their business processes to achieve higher level of efficiency and effectiveness when operating under a RM regime (Sheth & Sisodia, 2002). One common message is relationships are built on past behaviour and future promises.

In construction, the traditional hard-dollar procurement system can be seen to less suitable for today's complex construction environment, where rapid change and unanticipated decision situations are constantly encountered (Shirazi, Langford, & Rowlinson, 1996). One cause of this is that the construction industry is not unitary but comprises temporary multi-organisations (Murray, Langford, Hardcastle, & Tookey, 1999). While a pure mechanistic organisation form was appropriate for a completely stable environment (Winch, 2000a); for flexible and changing environments, an organic organisation form is much more suitable. The project team changes its structure and organisation style in different phases of the project life cycle and hence is described as a 'living organism' (Sidwell, 1990). The project organisation is made up of members drawn from parent organisations. Sidwell also points out that all projects have a distinct life-cycle, the organisational forms change over time from chaotic to mechanistic to bureaucratic, depending on the project stage and the project team. For example, the consultant team tends to have a chaotic structure at the concept stage. Design and documentation is a more mechanistic process which then leads to the construction stage which involves heavy monitoring and a lot of bureaucracy. On the other hand, the contractor is likely to operate in an organic mode at the construction stage.

Relationship contracts are usually long-term and develop and change over time (Cheung & Rowlinson, 2007). Relationship management is a system that provides collaborative environments and frameworks for all project participants to adapt their behaviour to project objectives and allows for engagement of the supply chain. Relational approaches are particularly suited to the Australian culture, where open communications and direct confrontation are accepted and indeed preferred (Cheung, 2006a); such attitudes form a sound basis for relational approaches to be successful. This research seeks to explore the impact of values and attitudes on the success of the relationship management approach and its effect on supply chain sustainability.

Key concepts for a successful relational contracting approach have been reported in recent studies (e.g. Cheung, 2006b; Dainty, *et al.*, 2001; Price, Bryman, & Dainty, 2004; Walker & Hampson, 2003). These studies identified empowerment, motivation, commitment,

organisation structuring and culture as being significant in the implementation of a sound relational contracting approach to projects. Relational contracting approaches have received strong interest in the construction industry and the efficacy of relationship management in the client and contractor groups has been well documented. However, little research has been done in the supply chain context and this research addresses this.

Studies suggest that relational approaches, such as partnering, alliances, framework agreements and relationship management, provide positive contributions to social, environmental and economic sustainability and help to satisfy client and stakeholder interests (Blau, 1963; MacNeil, 1978, 1985; Rousseau & Parks, 1993). In other words, relational contracts provide the means to achieve sustainable, on-going relationships in long and complex contracts by an adjustment process of a more thoroughly transaction specific, on-going, administrative kind (Kumaraswamy & Matthews, 2000). The essence of relationship management is also found in collaborative procurement. Collaborative procurement aims at engaging parties at all project stages; competitive bidding is no longer the only selection criterion for contractors and design consultants, as well as suppliers (Hughes, *et al.*, 2006). Also, some reliance is placed on the deliberate development of long-term working relationships which requires trust building. Another characteristic of collaborative procurement is the number of partners is limited. This is particularly crucial in countries such as the UK and Hong Kong, where multi-level subcontracting is a common practice.

The common aim of all relational contracts is to recognise and for strive mutual benefits and win-win scenarios between project parties in a long-term basis (Rowlinson & Cheung, 2003). Thus, relationship management places strong emphasis on collaborative relationships in the supply chain, proactive problem solving and open and honest communication between project parties; in other words, more collaborative working arrangements and sustainable practices. It is clear that relational contracting is predicated on a broader view of the procurement approach and requires clearly focussed contract strategies and strategic management; it implicitly incorporates supply chain engagement, essential if the performance indicators of best value, community benefit and innovation are to be achieved. One of the main differences between relational contracts and traditional hard-dollar contracts is the problem solving mode where performance problems in relational contracts are solved in a more collaborative manner amongst project team members and senior management, without recourse to claims and litigation (Bresnen & Marshall, 2000a; Cheung, 2006b). In some cases, contractors would absorb extra costs in order to maintain good relationships with the client and increase the chances of gaining future business (Bresnen & Marshall, 2000a). After all, a partnering relationship between organisations is based on trust, dedication to common goals and an understanding of each other's expectations and values (Construction Industry Institute, 1991).

PERFORMANCE EFFECTIVENESS

The determinants of project performance effectiveness differ across firm types (Phua, 2004) and are closely tied to project motive and need (Walker & Nogeste, 2008). The standard project performance measures such as budget, schedule and technical specification should not be given the highest priority automatically and would not be homogeneous across all firms and projects either (Phua, 2004; Shenhar, *et al.*, 2001; Walker & Nogeste, 2008). The original Shenhar, Dvir, Levy and Maltz (2001) instrument consists of 14 questions, which are used to measure dimensions of performance success: project efficiency (2 items), impact on customer (6

items), business success (2 items) and preparing for the future (3 items). The instrument also includes a fourteenth measure which assesses the overall project success. Five new items were added to the scale. All items were scored with 7 point Likert-type scale against its degree of importance and success on the project. The performance effectiveness dimensions according to the timeframe of expected results are:

- Project efficiency – short term time frame
- Impact on customer – medium term time frame
- Business success – long term time frame
- Prepare for the future – future time frame

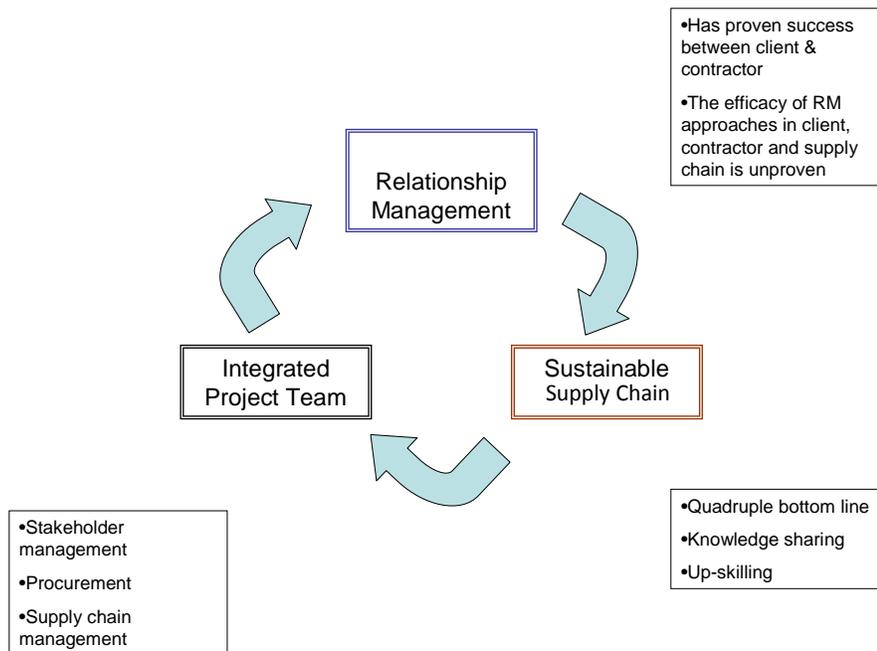


Figure 2: Determinants of Supply Chain Sustainability

RESEARCH AIMS AND OBJECTIVES

The aim of this research was to explore the association between relational contracting structures and processes and supply chain sustainability in the construction industry. The underlying principles which frame this research are relationship management, performance effectiveness, project team integration (reflected in procurement form), empowerment through *inter alia*, communication, motivation, commitment, organisational structure and culture. The objective of this research was to investigate the perception of relationship management from a contractor’s viewpoint and the impact of moving relational contracting down the value chain; thereby empowering and developing a sustainable supply chain. The sustainability of the supply chain was measured by gauging perceptions of achievement of the four levels of performance effectiveness, which illustrate long term as well as short term performance and the potential for improvement. The research adopted a triangulated approach in which quantitative data were collected by questionnaire, interviews were conducted to explore and enrich the quantitative data and case studies were undertaken in order to illustrate and validate the findings.

RESEARCH APPROACH

The data collection process was two-fold: (1) questionnaire survey and interviews were conducted face-to-face with contracting professionals; and (2) case studies. The purpose of the questionnaire survey was to capture contractors' perceptions of the relationship management process and the engagement of the supply chain and other stakeholders. The qualitative approaches, interviews and case studies, were conducted to assist in providing a deeper understanding as well as explaining findings of the quantitative study. The qualitative approaches also gave the opportunity to critique and validate the research findings.

Phase 1: Questionnaire Survey and Interviews

Face-to-face questionnaire survey was carried out in Queensland Australia with Department of Transport and Main Roads (DTMR) prequalified construction contractors in June 2008 to January 2009. Contracting construction professionals at various levels (from director to engineer levels) were invited to participate in a face-to-face questionnaire survey and were contacted through the researcher's existing industry contacts initially. Professionals were contacted by phone and were given the overview of the research project and the level of commitment required from them. To ensure consistency in the data collected, the author administered each questionnaire individually. The second phase consisted of in-depth case studies. Qualitative approaches seek to gain insights and to understand people's perceptions of 'the world', as individuals and as groups (Fellows & Liu, 1997). Qualitative research study helps to explore the dynamic relationships among project performance and organisational issues. The purpose of phase two study is two-fold. It provides further evidence for the reliability and validity of phase one results and the research mode through subjective analyses of real life cases; and describes patterns of change and establishes the direction and magnitude of causal relationships (Menard, 2002), making up for any perceived weaknesses in a purely cross-sectional study.

Scale Development

A group of professionals (n=100) were invited to assess a list of 18 specific performance effectiveness items (see Table 1), on a 7 point Likert-type scale. The list of measures was developed based on Shenhar *et al.*'s instrument (2001). The list also includes a 19th item which measures respondent's assessment of the overall project success. The correlation matrix of the 18 measures indicates that a considerable number of correlations exceed 0.3. Bartlett test of sphericity is significant ($p < 0.001$) and KMO measure of sampling adequacy is far greater than 0.6, indicating the matrix is suitable for factoring.

Table 1: Performance Effectiveness – Factor Analysis Results

Success Measure	Factor 1	Factor 2	Factor 3	Factor 4
Meeting schedule goal	.349			
Meeting cost goal	.616			
Meeting operational performance	.546			
Meeting technical performance	.596			
Meeting functional performance	.636			
Meeting technical specifications	.454			
Fulfilling customer needs		.603		
Solving a customer’s problem		.837		
Customer (and stakeholders) satisfaction			.601	
Customer’s use of the project product			.546	
Meeting intangible needs			.760	
Meeting unarticulated needs			.653	
Achieving commercial success	.646			
Gaining increased market share				.790
Developing a new technology			.565	
Generating positive reputation			.461	
New market penetration				.686
Generating future job opportunities				.608
Eigenvalue	1.49	0.82	6.08	1.11
Variance percentage explained	8.28	4.56	33.8	6.19

Note: Factors with Eigenvalues greater than 1 were rotated using a varimax solution

The measures that load highly on factor 1 seem to all relate to meeting fundamental project requirements such as meeting schedule goal, cost goal, operational performance, functional performance, technical performance, technical specifications and achieving commercial success. Therefore, this dimension was titled *Project Efficiency*. The second dimension has the medium-term goal of customer focus and includes only two measures: fulfilling customer need and solving a customer’s problem and was titled *Impact on Customer*. The third dimension includes the measures of customer satisfaction, customer’s use of the project product, meeting intangible needs, meeting unarticulated needs, generating positive reputation and new technology development, and was titled *Business Success*. And finally the fourth dimension includes measures of creation of a large market share, new market creation and future job opportunities generation. Since this dimension is clearly related to the future, it was titled

Prepared for the Future. The emergent performance effectiveness dimensions are presented in Table 2.

Table 2: Emergent Performance Effectiveness Dimensions and Measures

Performance Effectiveness Dimensions	Measures
L1 – Project Efficiency (Factor 1)	<ul style="list-style-type: none"> • Meeting schedule goal • Meeting cost goal • Meeting operational performance • Meeting technical performance • Meeting functional performance • Meeting technical specifications • Achieving commercial success
L2 – Impact on Customer (Factor 2)	<ul style="list-style-type: none"> • Fulfilling customer need • Solving customer's problem
L3 – Business Success (Factor 3)	<ul style="list-style-type: none"> • Customer satisfaction • Customer's use of the project product • Meeting intangible needs • Meeting unarticulated needs • Developing a new technology • Generating positive reputation
L4 – Prepare for the Future (Factor 4)	<ul style="list-style-type: none"> • Gaining increased market share • New market penetration • Generating future job opportunities

PERFORMANCE EFFECTIVENESS DIMENSIONS (SUCCESS) – BY PROCUREMENT FORM

Descriptive statistics were used to examine the degree of success respondents assigned to each of the dimensions, for each procurement form and analysis of variance results, as shown in Table 3. Because both variances and sample sizes differ, the Welch statistic is more powerful than the standard F or Brown-Forsythe statistics. Results suggested there are significant differences in the mean performance effectiveness success levels 1, 2 and 4 between at least two of the seven procurement forms.

Table 3: Performance Effectiveness Dimensions between Procurement Forms - Robust Test of Equality of Means (Success)

		Statistics ^a	df1	df2	Sig.
L1 - Project Efficiency	Welch	16.319	6	23.314	.000
	Brown-Forsythe	10.085	6	54.982	.000
L2 - Impact on Customer	Welch	4.621	6	21.209	.004
	Brown-Forsythe	3.831	6	29.826	.006
L3 - Business Success	Welch	2.403	6	25.096	.057
	Brown-Forsythe	1.726	6	64.151	.129
L4 - Prepare for the Future	Welch	5.371	6	22.994	.001
	Brown-Forsythe	4.803	6	33.980	.001

^a Asymptotically F distributed.

Findings (see Table 4) suggest there are significant differences in the levels of performance effectiveness amongst different procurement strategies. Projects with strong relationship management components (Alliance and Early Contractor Involvement in this case), performed significantly better on the *Project Efficiency*, *Impact on Customer* and *Prepare for the Future* dimensions than projects without relationship management (Design and Construct). This is significant in that a strong relationship management emphasis in the two procurement forms was seen to lead to a culture of empowerment down the supply chain and materialised in an attitude of “the big” mentoring “the small” partners and so, over time, enabling competence development down the supply chain i.e. supply chain sustainability. Thus, in the longer term, relational contracting and relationship management strategies can lead to supply chain sustainability and industry development. The converse can be seen in the outcomes of the traditional, first past the post competitive tendering approaches to procurement strategy.

Table 4: Performance Effectiveness Dimensions by Procurement Form (Success)

Performance Effectiveness Dimension	Procurement Form [^] (# of cases)							ANOVA (Welch)	
	Design & Construct (4)	Minor Works (9)	Road Performance Contract (10)	Road Construction Contract (10)	Road Construction Contract (RM) (26)	Early Contractor Involvement (10)	Alliance (29 ^a)	df1, df2	F
Project Efficiency									
Mean	4.95	5.63	6.14	5.83	5.48	6.60	6.26	6, 23.31	16.32**
S.D.	.37	.40	.59	.76	.79	.25	.49		
Impact on Customer									
Mean	5.38	6.11	6.10	6.25	5.79	6.44	6.50	6, 21.21	4.62*
S.D.	.85	.70	.74	.63	.59	.60	.43		
Business Success									
Mean	4.92	5.37	5.30	5.43	5.15	5.54	5.58	6, 25.10	2.40
S.D.	.28	.51	.80	.60	.75	.50	.68		
Prepare for the Future									
Mean	4.21	4.17	4.13	5.40	4.75	5.29	5.66	6, 22.99	5.37**
S.D.	.57	1.55	1.53	.62	.98	.50	.77		

Note: ^a 2 participants did not respond to this part of the question. ** $p < 0.001$, * $p < 0.01$

CONCLUSIONS

Performance effectiveness

Measures are found to load differently for the four performance effectiveness dimensions when compared with Shenhar *et al.*'s (2001) original instrument with contracting professionals. For example, in Shenhar *et al.*'s original scale, 'achieving commercial success' should fall under *Business Success*, but instead it loads highly on level 1 performance effectiveness – *Project Efficiency*. The motive and need between contracting organisations and client organisations or other project stakeholders can be quite different. As Walker and Nogeste (2008) point out, project success is closely tied to motive and need, hence the different loading of measures in each performance effectiveness dimension.

Findings suggest there are significant differences on the levels of performance effectiveness amongst different procurement strategies. Projects with strong relationship management components (Alliance and ECI in this case), performed significantly better at *Project Efficiency*, *Impact on Customer* and *Prepare for the Future* than projects without relationship management (Design and Construct). This again reflects the results in the perceived relationship effectiveness dimension.

Professionals were very much aware of the need for future business opportunity, yet most professionals placed very little attention on using their projects as a tool to penetrate a new market. As previously mentioned, most professionals identified DTMR as their major client and the target market. As such, professionals indicated no desire to expand the company market. It appears that professionals have disregarded the opportunity to joint-force with other contractor in the form of joint venture to bid for major infrastructure projects.

Not surprisingly, Specialist/State Own organisation group is one of the groups which performed least well at level 4 performance effectiveness – *Prepare of the Future*, since an amount of work is guaranteed using RPC. RPC works are usually awarded based on a sole-invitee arrangement and are found to perform least well at *Prepare for the Future*, yielding similar results.

Relationship Management

The majority of professionals have had a degree of exposure to relationship management, even though they might not have direct involvement on the project. The following issues on relationship management structure and process have emerged:

Participating Organisations

Up until now, the main relationship management participating organisations are client, consultant and principal contractor. Only on very rare occasions are selected subcontractors included in the relationship management process and participate in project workshops or regular meetings. It is uncommon to have suppliers and subcontractors involved in any informal relationship management process. Although the number of sub-alliance cases is on the rise, alliance participating organisations are mainly client, contractor and designer only.

Participating Members

There is no defined protocol on who should participate in the relationship management process. It is up to the Client's Principal and the Contractor's Project Manager to decide whether he/she wishes to nominate staff at different levels such as project engineer, site engineer and foreman; as well as any major subcontractor/supplier to participate in relationship management

workshops and monthly relationship management meetings. The number of participants in relationship management meetings varied between 2-3 people to over 20 participants. When professionals spoke of their relationship management experiences, comments were generally very positive including more open risk and opportunity assessments; and initial workshops which assisted in team forming so the team understand the roles and responsibilities of each other. A strong linkage is observed between project relationship and individual behaviour: *'it's usually the relationships on the one-on-one that breakdown'* and *'it's not always a contractual reason why relationships go sour'*. Some professionals at site levels also raised concerns of not being included in the relationship management scoring/evaluation process, which leads on to the third issue:.

Relationship Management Process

As part of the DTMR requirement, contractor performance assessment which incorporates some relationship management components, must take place for each project. The contractor performance review takes place on all projects, no matter which procurement form was applied. Each project party representative must agree on the final score. However, this review can be carried out either progressively as part of the monthly relationship management meeting or as a one-off end-of-project process. Mixed reviews are received – some professionals found the one-off process is 'enough', yet the majority indicated the project team performance and relationship management review would have been more beneficial if it was carried out regularly throughout the project. Principles and benefits of relationship management are embedded in professionals' mind subconsciously. However, when the review process is carried out at the end of the project, only a handful of participants are involved: the Principal Contractor's Project Manager, the Client's Principal and sometimes the Consultant (who acts as the Client's representative). This again limits professionals' opportunity for exposure to relationship management principles. Instead of managing the project team's relationship effectiveness, relationship is reviewed as part of the project wrap-up process, which completely defeats the purpose and principles of relationship management.

The issue on who should participate in the monthly relationship management process and scoring is one of the discussions which surfaced from time to time. The importance of relationship management in projects is widely accepted, but it was argued that the scoring which has direct impact on the overall contractor's performance assessment should be done by senior managers who have substantial hands-on job experience rather than by the whole project team.

The dilemma over who should participate in the relationship management process and who should be involved in contractor performance assessment may be overcome by separating the two processes, each involving different management levels. Through a formal relationship management process such as workshops and monthly meetings, project participants were exposed to issues emerging from different levels, allowing the big picture to be seen. Project participants became more proactive, collaborative and cooperative in solving problems and exchanging ideas. After all, the objectives of relationship management and contractor performance assessment are quite different; the former focuses on open communication and establish a collaborative and cooperative project team culture, whereas the latter focuses on contractor performance evaluation which forms part of the reporting system. Hence, the two processes should not be combined as one; otherwise the project parties enter the monthly relationship management meeting with different goals in mind. In various case studies, over five minutes were spent on negotiating the final 'compromised score' on most assessment items, instead of focusing on issues and problem solving. Monthly relationship management meetings

should be separated with contractor performance assessment which may be held less frequent, such as yearly or at the end of the project.

Overview

It has been shown from the research that the degree of match and mismatch between organisational culture and project organisational structuring has an impact on staff's perceptions of effectiveness. A sustainable supply chain depends on convergence – that is the match between organisational structuring, culture and long term relationship management orientation. The culture/orientation/structure model developed from three separate strands of management thought has proved to be a powerful tool for analysing collaboration in supply chains and explaining how and why some supply chains are sustainable, and others are not.

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