DEVELOPMENTS IN CONSTRUCTION SUPPLY CHAIN MANAGEMENT AND PRIME CONTRACTING

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ABSTRACT: The research focused upon supply chain management in the UK construction industry, examining the growing trend for contractors and clients to embark on strategic relationships aimed at improving efficiency, effectiveness and risk management. Whilst such strategic relationships between the primary supply chain members can provide a number of benefits for both client and contractor organisations alike, it is suggested that supply chain management is a relatively new concept for the construction industry. A review of the key literature provides the basis for the development of a conceptual model of the *Partnering* relationship. The central features of this model are examined through a case-based empirical approach involving two major contracting organisations and a blue-chip client.. Conclusions are drawn about the implications of supply chain management within the construction sector including the development from '*Partnering*' to the lead supply chain manager role associated with 'Prime Contracting.'

Keywords - Construction, *Partnering*, , Prime Contracting, Supply Chain Management.

1. INTRODUCTION

The construction industry has, like other parts of the UK economy, witnessed major developments aimed at improving profitability and performance. These developments have occurred in particular phases, for example the emphasis on sales and marketing in the 1980's followed by human resource management and organisational design in the early 1990's, this latter phase resulting in downsizing, delayering and re-engineering. Since the mid 1990's, mainly due to the publication of the Latham Report (1994), the construction industry has experienced increasing interest in the subject of *Partnering*. The Latham Report acted as a catalyst for greater attention on supply chain management and *partnering* between the client and the main contractor. Although this relationship is the principal focus of this present research, it is also recognised that successful client and main contractor relationships will result in greater emphasis on ensuring effectiveness and efficiency across all dimensions of the total supply chain, both horizontally and vertically. From its inception an aim of *partnering* was to reduce or eliminate adversarial relationships, replacing these with long-term relationships based on mutual trust and mutual benefit. The premise underlying this aim was that important but complementary opportunities exist between the two companies which could only be realised through developing a robust and permanent relationship. Although powerful barriers may obscure the opportunities and often preclude their realisation, it is argued (Latham, 1994) that the development of appropriate structures, processes and training ought to overcome these barriers, enabling the benefits of p*artnering* to be achieved. Research has cited many examples from the USA which have resulted in cost savings from both one-off project *partnering* and from long-term strategic *partnering* arrangements (e.g. Bennett and Jayes, 1995). In addition to reducing costs and conflict there is evidence that *partnering* can also *"improve service quality, deliver better designs, make construction safer, meet earlier completion deadlines and provide everyone involved with increased profits"* (Construction Industry Board, 1997a, p.5).

Previous research suggests that the most important benefits identified by those engaged in *partnering* are not directly related to the 'hard' project cost factor; instead they cover a number of 'softer' factors including enhanced team-working, identifying mutual objectives, reduced risk and more efficient problem solving, all of which may indirectly influence project cost. Davidson and Trinick (1997: p.6-7) suggest that the benefits of *partnering* are *"improved productivity, efficiency, quality, safety, research solutions, innovative design work to speed up the design and construction process, reducing overhead and project costs, and improving profitability. Above all, the change to a non-adversarial culture will improve relations and subsequently reduce disputes, claims and litigation."* The literature also demonstrates that establishing a *partnering* relationship is not a simple operation. For example, the UK Government sponsored report (Egan, 1998: p.24) stated that *"[t]here is already some evidence that [partnering] is more demanding than conventional tendering, requiring recognition of interdependence between clients and constructors, open relationships, effective measurement of performance and an ongoing commitment to improvement."*

1.2 UK Construction industry

Construction involves assembling materials and components designed and produced by a multitude of suppliers, working in a diversity of disciplines, technologies and services, in order to create the "built environment." Associated tasks include the planning, regulation, design, manufacture, construction, maintenance and eventual decommissioning of buildings and other structures. The scale, complexity and intricacy of individual projects varies enormously, ranging from work undertaken by "jobbing builders", to multi-billion pound schemes such as power station construction or one-off projects exemplified by the Channel Tunnel. Other differentiating features of construction are the temporary nature of the activity, mainly carried out at the client's premises and often requiring special arrangements to enable the client organisation to conduct its business as normal. These characteristics generate a number of problems such as low and discontinuous demand, poor productivity, low profitability and a fragmented industry structure. Added to this the construction industry is renowned for its adversarial approach [e.g. Simon (1944), Emmerson (1962) and Banwell (1964)], and the amount of time and money spent on litigation. Since the early 1990's the industry has reduced and deskilled its workforce, largely abandoned apprentice and other training schemes and continued its conflict-ridden competitive tendering culture. This has sustained the adversarial working relationships throughout its supply chain. The Government initiated industry review conducted by Sir Michael Latham (1994) recommended changes for the industry with the specific intention of moving the culture away from the traditional adversarial client / supplier relationship. Subsequent development by Egan (1998: p.10) identified a number of areas that the industry needed to address and concluded that *"too many clients are undiscriminating and still equate price with cost, selecting designers and constructors almost exclusively on the basis of tendered price…..[partnering] envisages a very different role for the construction supply chain……the supply chain is critical to driving innovation and to sustaining incremental and sustained improvement in performance."*

Over the last ten years interest and support (Latham, 1994; CIB, 1997b; Critchlow, 1998) for *partnering* and supply chain management within the construction industry has steadily increased. However, the term "*partnering*" itself can, and often does, mean different things to different people (Cousins, 1995). Davidson and Trinick (1997, p.6) believe the term "*partnering*" has

perhaps been used *"too loosely and as a consequence it is in danger of becoming debased."* The most quoted and probably now universally accepted definition is that from the National Economic Development Council (NEDC, 1991) which states that *"partnering is a long term commitment between two or more organisations for the purpose of achieving specific business objectives by maximising the effectiveness of each participant's resources. The relationship is based upon trust, dedication to common goals and an understanding of each other's individual expectations and values."*

The principle barriers inhibiting the adoption of *partnering* fall into three groups: corporate culture, the traditional client-contractor roles and the time required to develop the necessary relationships. Managers having experienced the more traditional business relations and corporate culture can find *partnering* relationships threatening to their company and their personal *modus operandi*. Such managers may become uncomfortable with the idea of *partnering* because of their unwillingness to relinquish control and reluctance to share company information which they consider to be of a confidential nature. Secondly, the traditional industry roles and relationships between client and contractor have in the past led to a more adversarial climate generating significant perceptual hurdles to the successful implementation of *partnering*. The third barrier to *partnering* concerns the time and effort required to develop a *partnering* relationship. Finding the right partner(s) and developing an effective *partnering* agreement and relationship requires a significant investment of senior management time and effort, as both organisations must assess how each other functions and will need to change under the *partnering* agreement.

Latham (1994) and Egan (1998) both sought to make operational the concept of *partnering* with the former identifying three crucial activities:

- agreeing mutual objectives,
- creating a process to deal swiftly with problem resolution and
- gaining a commitment to continuous improvement.

It is widely accepted that the absence of any one of these would not be considered to be *partnering* in the spirit of the NEDC definition, though the relationship may still possess some 'friendly' qualities. This looser relationship may improve collaboration through a less adversarial approach, but would lack the supporting operational framework required to set the boundaries of the relationship. A *partnering* framework would provide visibility to the project participants, formalise the agreed expectations surrounding mutual objectives, establish problem resolution mechanisms and ensure all parties have a commitment to continuous improvement. Indeed in both recognising the lessons from other industries and the unique nature of the construction industry, the Construction Industry Board (1997a, p.5) advises that *partnering "empowers people and encourages them to work together but without rigorous management (measurement, benchmarking, goals) this can lead to "cosy" relationships (even fraud), reduced exposure to raw market forces and overlong carrying of non-performers."* Outside of the UK, the Australian Construction Industry Development Agency (1993) viewed *partnering* as a management strategy offering a new way of working for owners, consultants, contractors and subcontractors where all agree from the outset to a formal structure, focusing on creative co-operation and avoiding adversarial confrontation. The Agency (1993, p.11) added that *"partnering establishes a moral charter among the project team members which binds each party to act in the best interests of the project and the project team members. The main aim is to meet the project objectives by working together rather than by confrontation."*

2. RESEARCH METHODOLOGY

The dichotomy, evident in the literature, between the reported benefits and challenges of *partnering* suggests the need to examine if such relationships are indeed realising their claimed potential. This study was designed to identify and evaluate the critical success factors for *partnering* arrangements within the UK construction industry. The key research objectives were identified as being:

- To identify and analyse construction industry collaborative relationships with particular focus on supply chain *partnering* arrangements.
- To outline the factors of critical importance in establishing these relationships for the UK construction industry.
- To develop an understanding of how *partnering* relationships can be initiated and developed within the construction industry and other industries.
- To formulate and validate a model for partnership management within the construction industry.

Attention was directed towards the infrastructure and non-residential building sector with a particular focus on projects where the main contractor engaged more directly with the client. It was considered that the scope of this type of project in terms of complexity, physical size, financial scale and construction timescales were most appropriate to the application of *partnering*. Apart from providing the opportunity to assess most of the possible dimensions of the relationship between the client and the end user, this sample provided greater potential for the development of a strategic relationship than other construction sectors such as 'housing.' In many respects the research study itself was exploratory, seeking not only to understand how *partnering* was operating but equally why the partners had chosen to evolve the *partnering* relationship in a particular manner.

The research comprised a number of stages:

- Formulation of a preliminary model based on the literature within the supply chain management field in general and the construction industry more specifically. This model sought to encapsulate the key parameters within the *partnering* approach.
- Evaluating and refining this preliminary model through in-depth discussions with industry experts, key managers and practitioners from both contractors and clients.
- Empirical evaluation of the model involving the development of three in-depth case studies. A series of questionnaires and interviews were conducted with relevant senior managers in two major contractors and a 'blue chip' client.
- Information gained from the empirical research was used to further refine and position the key dimensions of *partnering* relationships within an integrated supply chain model.
- Dissemination and wider consultation within the construction industry (i.e. different sectors and contractor-client partnerships) to validate the robustness of the model.

Two models were evolved as part of the research process, though in essence they are inter-related and simply provide differing perspectives of *partnering.* The first model, *Model of Construction Partnering Components,* represents the portfolio of components necessary to ensure effective adoption of the partnering process within the construction sector. The second model, the *Partnership Model*, is designed to focus on the phase after the initial selection of the partners, addressing the management processes that the contractor and client need to successfully engage if the partnership is to achieve ongoing success. These two models are explained in the following section.

3. CONCEPTUAL MODEL OF *PARTNERING*

The literature suggested a number of key components for this first model (Figure 1). The structure of the model itself may be viewed as analogous to the construction of a building. Those components represented below the ground level are the foundation components necessary to support the *partnering* relationship for duration of the project and potentially beyond if considering strategic *partnering* arrangements. It is suggested that the absence of sufficiently robust foundations would constrain the success of the *partnering* relationship and the achievement of the potential benefits from the outset.

3.1 Foundation Level Components

Examining the foundation or 'below ground' components suggests these are pre-requisites to successful *partnering*. The main groups of components include:

- *Legal implications*
  Whilst not a main feature of this study the legal implications of *partnering* (e.g. changes to contractual relationship) need to be recognised and considered by companies in advance.
- *Relationship commitment*
  Companies engaged in the *partnering* process need to work diligently towards developing the relationship to its full potential (Bennett and Jayes, 1995). Simply making a longer-term commitment to work together is not sufficient, even though this may mean fewer risks and increased profit margins. Realising the full potential in terms of risk reduction and joint profit margins requires a more immediate and lasting commitment by both organisations to developing a robust relationship.

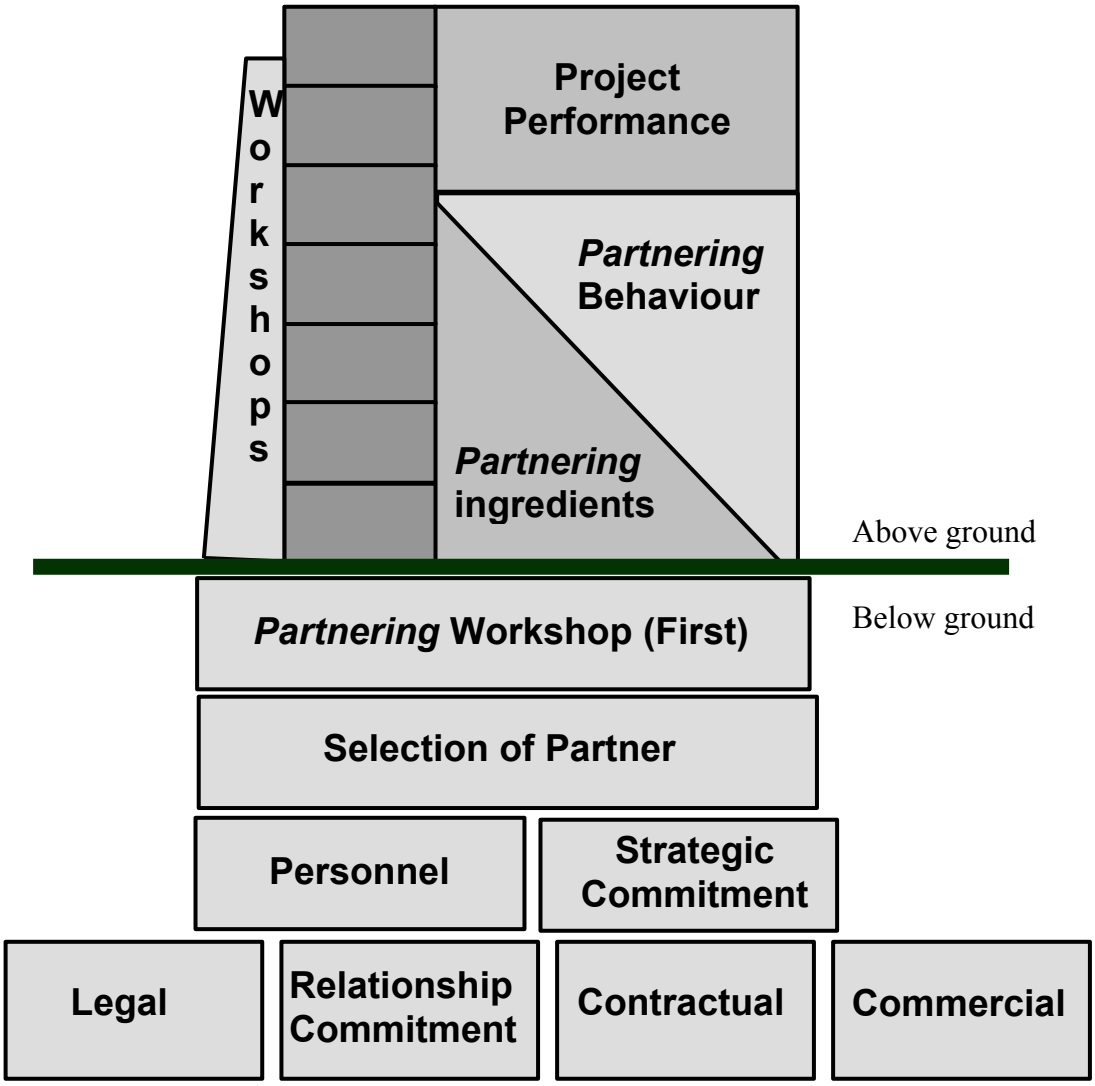

Figure 1: Model of Construction Partnering Components

- *Contractual*
  Reducing the likelihood and consequences of adversarial situations is one of the factors which attract commercial organisations to *partnering*. The resolution of disputes is therefore an important issue and viewed as one of the cornerstones of *partnering* (Latham, 1994; Bennet and Jayes, 1995).
- *Commercial*
  Performance incentives incorporating rewards and penalties are considered an essential component of any *partnering* arrangement. Egan (1998, p.45) supports the use of incentives noting that *"an essential aspect of partnering is the opportunity for participants to share in the rewards of improved performance."* The more common incentives which may be shared between the contractor and client include maximum value for money, improved quality and safety, timely completion, reduction in fixed overheads and shortened learning curves.

- *Personnel*
  The personnel involved in the partnership must be the right quality, in terms of technical skills, experience and attitude. They should also possess a genuine commitment towards the *partnering* approach and philosophy. This requirement applies as much to the senior management as to the technical management involved in the more operational aspects of project management.
- *Strategic Commitment*
  Commitment to developing a strategic relationship by the senior management of both the client and contractor organisations is an essential requirement.
- *Selection of Partner*
  Many partnerships originate through the competitive tendering process and most successful partnerships have developed from existing relationships. Cousins (1992) emphasises that the partnership philosophy should revert from merely looking at price and delivery, concentrating on other attributes such as culture, level of technology, production flexibility, commercial awareness, innovation and ease of communication.
- *Initial Partnering Workshop*
  Following selection of the contractor initiating the first *partnering* workshop provides the opportunity for all participants in the *partnering* arrangement to understand how the relationship will work and what each party expects of the other.

3.2 Above Ground Components

Having prepared the foundation components the *partnering* organisations may then develop a further set of components, the 'above ground' components illustrated in Figure 1.

- *Partnering Ingredients*
  Three crucial ingredients have been identified (Latham, 1994; Bennett and Jayes, 1995; Construction Industry Board, 1997a) as necessary for successful *partnering* by construction companies, namely: establishment of mutual objectives; development of a process for problem resolution; and an all party commitment to continuous improvement.
- *Partnering Behaviour*
  Agreement on the behavioural attributes (e.g. commitment, trust and mutual advantage) is necessary to support and engender success in *partnering*. Critchlow (1998) emphasised the need for a commitment to a long-term relationship through use of these attributes to achieve an amicable '*partnering* relationship'. Any successful relationship including *partnering* relationships must embrace trust both between the organisations and the individual team members. A natural expectation for the partners involved would be mutual advantage and greater opportunities than would be available in traditional business relationships (e.g. elimination of competitive tendering requirements).
- *Project Performance*
  Enhanced project performance or outcomes are predicted if the partners embrace all of the components, both 'below' and 'above' ground. Prior to the commencement of the project, the client organisation is primarily in control of the foundation components. However, after the first workshop the relationship ought to become more of a bilateral, or multilateral, relationship in which client and contractors have more equal influence on the overall project development and performance.

3.3 Development of the partnership model

The initial representation of the partnership model (Figure 1) was designed to highlight the key components necessary to initiate a successful *partnering* relationship. The focus of the second iteration of the model (Figure 2) relates to the phase following the establishment of the partnership, addressing issues likely to be encountered in the implementation and management of the process. Many of the key contributors in this field (e.g. Bennett and Jayes, 1995, 1998; CIB, 1997a; CIDA, 1993) concentrate on issues surrounding the establishment of the partnership and fail to fully address the issues involved in implementing and sustaining the *partnering* relationship. . This subsequent stage may be of particular interest to those companies considering adopting a *partnering* strategy and has greatest relevance to the field of Supply Chain Management. The important requirements are an understanding of what is expected of each partner organisation, the potential competitive advantage and the supply chain management benefits from the use of a joint commitment to continuous improvement.

The components in the model are grouped under four primary headings: Project Management, Total Quality Management; Supplier Chain Management and Human Resource Issues (see Figure 2, adapted from Hays and Wheelwright, 1989). Each of these headings is represented by a quadrant in the figure and the main components associated with each are shown and briefly discussed in relation to their contribution towards the success of any *partnering* relationship.

- ***Project Management***
  Organisational structures and processes in relation to clearly defined roles and responsibilities and communication channels are important issues to be resolved at the outset. The project manager, as part of the contractor's team, remains primarily responsible for delivering the project against the requirements of specification, time and budget and in achieving client satisfaction. Establishing effective structures, processes and relationships should enable a less adversarial approach providing benefits in terms of addressing issues of cost, work flow, flexibility and the funding of additional project requirements.

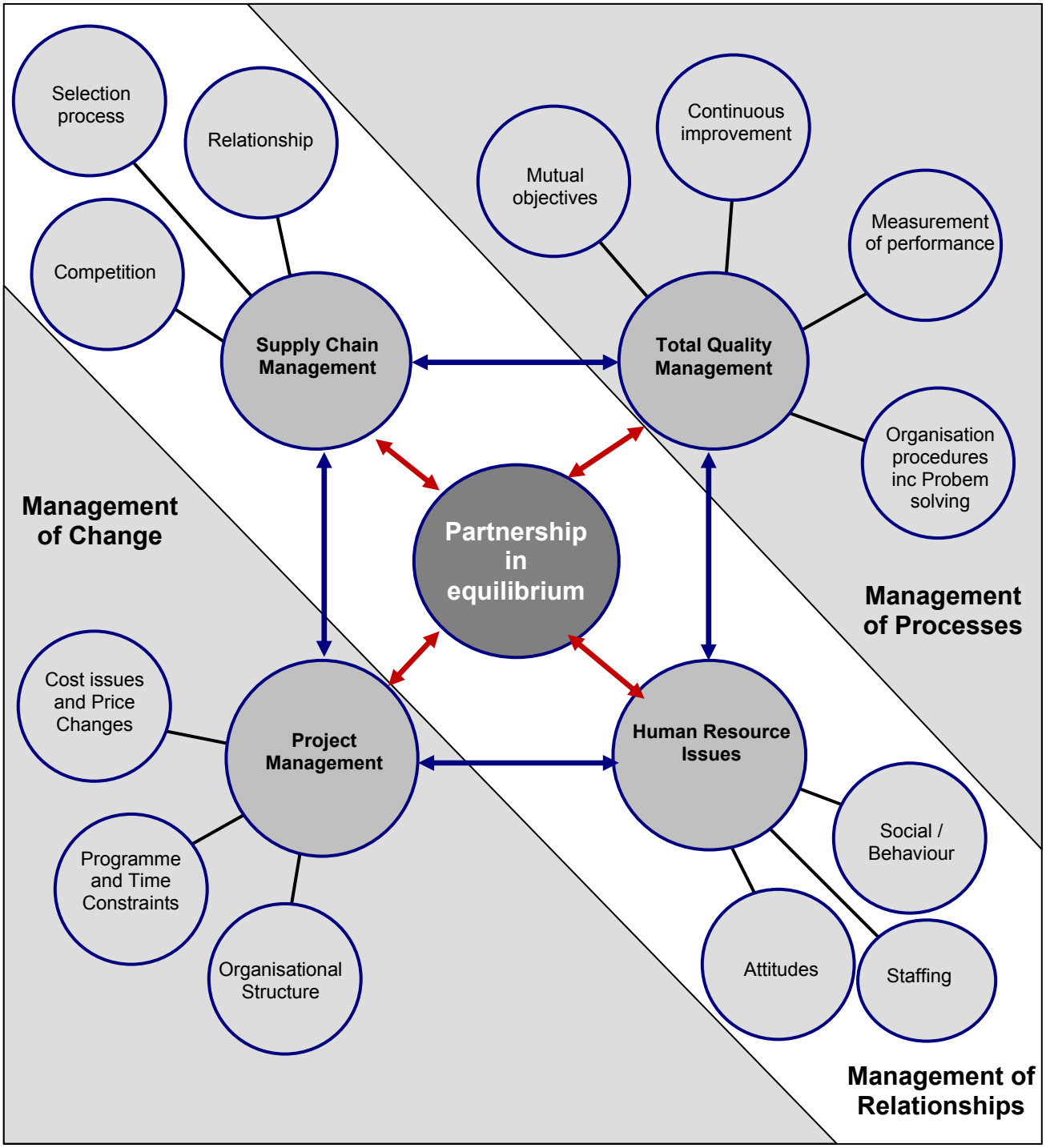

Figure 2. Partnership Model

- ***Human Resource Management***
  The emphasis on relationships within the partnership suggests the need for effective Human Resource strategies and policies, designed to inculcate the appropriate attitudes and behavioural traits amongst those employees directly involved. Selection and training of the key senior staff involved may be critical to the eventual success of the *partnering* relationship. These requirements apply to both contractor and client organisations and there may be merit in hosting joint staff development programmes. .
- ***Total Quality Management***
  Partnering and Total Quality Management may be viewed as highly complementary philosophies. Bennet and Jayes, (1995, p.14) suggest that *"partnering is now being increasingly seen as essential to the implementation of Total Quality Management (TQM)."* They illustrate also specific examples from the construction industry relating to the establishment of mutual objectives, the shared commitment towards continuous improvement and the need for mutually agreed measures of performance. The requirement for agreed procedures for problem solving was discussed previously under the project management heading.
- ***Supply Chain Management***
  The characteristics of the evolution towards strategic *partnering* relationships in the construction sector has been noted previously (e.g. the move away from selection on lowest tender price to one of life cycle costs and value for money). Important features of Supply Chain Management involve the initial selection of partners in the chain, building and developing effective relationships and agreeing arrangements for the nature of competition both within the partnership and with other suppliers/customers. In the case of the construction sector it is important that relationships are forged not only between the customer and the first tier main contractor but also between the second tier subcontractor and prime contractor. Evidence from the manufacturing sector suggests that maximum benefit is gained by early and full involvement of all the key partners in the supply chain. This has yet to occur in the construction sector, although there is some evidence that large first tier prime contractors have already instituted limited framework and supplier management processes.

The other important, though implicit, feature of the Partnership Model is the dynamic interaction of the components within each of these main headings and with components in other groups. For example, staff selection and inculcating appropriate attitudes (i.e. Human Resource Issue components) will influence relationship development (i.e. a Supply Chain Management component) and effectiveness of continuous improvement (i.e. a Total Quality Management component). However, tensions between the various components are likely to arise at different times during the partnership. For example, project management imperatives seeking to expedite particular tasks may conflict with Total Quality Management objectives, practices and procedures. The integration and aggregation of all of the components, combined with effective Change Management, Relationship Management and Process Management should lead to an effective, robust and enduring partnership.

4. RESEARCH FINDINGS

The relatively recent introduction of *partnering* as a concept within the UK construction sector, the reluctance of the sector to adopt new project management practices and the fact that the larger organisations (contractors and clients) were the most likely to adopt *partnering*, posed a number of constraints on the field research. It was evident that a more in-depth exploratory approach targeted at those organisations who had already undertaken the *partnering* approach, or were in the process of doing so, would produce the most useful information on the benefits, costs and issue realised. Dealing with organisations not yet adopting the *partnering* approach would yield somewhat hypothetical responses which may yield little or no insights into the key management processes and issues. The initial model derived from the literature and key studies in the sector (e.g. Latham, 1994) was refined (Figure 2) through preliminary discussions with academic and industry representatives. Subsequently, two case studies were selected for investigation, focusing on the contractor and client perspectives. The cases involved the main contractor only in one *partnering* arrangement and the main contractor and the client organisation in the second arrangement. The three organisations involved all had prior experience in *partnering* and the evidence drawn related to the prior and current experiences of the managers interviewed. Different collaborative relationships were identified and discussions with senior managers in the organisations revealed a number of factors seen as important to the success of their *partnering* relationship. The richness of the insights provided by the in-depth observation of the processes, issues and behaviour including the explanations for such behaviour, provided a valuable contribution to understanding *partnering* and the associated supply chain management processes.

The research indicated a general awareness of *partnering* and supply chain management concepts within the construction sector as a whole though evidence of full scale adoption was limited. This limited commitment to the adoption of *partnering* contrasts with the advice provided to organisations within the sector. Although there are many examples of contractors and clients embarking on project and strategic *partnering* relationships, their commitment to the three key themes of mutual objectives, problem resolution and continuous improvement is mainly limited to establishing the objectives at the first workshop. The need for senior level management commitment and the presence of strategic champions within both organisations was viewed as essential to maintaining the momentum and gaining maximum benefits. This lent support to the 'Strategic commitment' component in the model (Figure 1).

The empirical research evidence based on the case studies suggested that the critical success factors for a successful *partnering* relationship in the UK construction industry may be summarised as:

- The individual components in the model (Figure 1) and their inter-relationship have an important contribution to make to the successful outcome of a *partnering* relationship and project. The foundation components are primarily items for initial consideration by the client organisation, though they may consider modifying these for the benefit of the project.
- Selection of the *partnering* organisation is an important task which should be undertaken in the light of the *partnering* philosophy. The case study organisations expressed some caution concerning the amount of *partnering* work in total that contractors will consider undertaking. Effective *partnering* demands a significant and intensive amount of senior management time, a scarce resource that may not be available for every contract. Such a constraint may apply equally to contractors and client organisations. In addition to the demands on management

time, partner selection may also encounter constraints in terms of the suitable candidates to engage in the process. On the one hand, the client may wish to select a contractor with prior *partnering* experience, quality standards, a good safety record, a track record of project performance, good quality resources and a sound financial standing. On the other hand, contractors with experience of *partnering* will themselves be looking to enter a relationship with an 'educated client'. This focus on the prior experience of the potential partners may do little to widen the engagement of more organisations, contractors and clients, in the process and hence restrict the adoption and choice of partners available. As clients try to select the 'best in class' contractors with which to partner they will look at their experience of undertaking projects on a *partnering* basis. However, the literature (e.g. NEDC, 1991, Latham, 1994 and CIB, 1997a) advises that such claims need to be treated with some caution because of the difficulty in determining the genuine level of commitment to *partnering* (i.e. contractors may employ their commitment to the *partnering* concept purely as a 'marketing tool').

- Professional facilitation of workshops, ideally at project commencement, is a view fully endorsed by both the contractors and client organisations. The evidence from the research supported the view that the initial workshops, featured in the first model (figure 1), were important in developing mutual understanding of each member's roles and responsibilities. The results also indicated little evidence of the use of subsequent workshops during the period of the construction project. It was recognised that an ongoing programme of workshops would play an important part in keeping all parties committed to the *partnering* relationship through active communication, resolution of problems and the introduction of any new staff (client and contractor alike) to support the project objectives.
- All those interviewed concluded that the management style displayed by bothl parties needs to be non-adversarial in nature and one which creates an open forum for communication. Such a change to the previous management style may require changes in behaviour, an issue actively being addressed by the case study companies through appropriate training and development. The *'Partnering Ingredients'* and *'Partnering Behaviour'* components of the first model (Figure 1) were acknowledged by the client and construction companies investigated as being important features of the *partnering* process.
- Supply Chain Management is now being seen by the industry as offering a positive contribution to the construction process. As discussed earlier, the construction industry has been slow to engage with developments in Supply Chain Management and the associated changes in relationships. Arguably, *partnering* is a key component of developing the supply chain and increasing recognition needs to be given to engaging more of the participants into the *partnering* process itself.
- The evidence confirmed the components within Total Quality Management as important, supporting the contention that continuous improvement and performance measurement contribute to enhancing the effectiveness of the *partnering* supply chain. The case study organisations sought to set targets and measure performance to enable the process of achieving continuous improvements. There was widespread support for the other TQM components of problem resolution and establishing mutual objectives.
- Project Management generated the most unanimity of agreement among those interviewed. Representatives of both contractor and client organisations viewed this as the key factor in achieving *partnering* success. Within this factor, the key component was viewed as the effective management of the relationship between the contractor and the client organisation.

5. CONCLUSIONS AND RECOMMENDATIONS

Evidence from this and other studies suggests that many clients and contractors believe that there are benefits which *partnering* can offer in terms of cost savings, reduced timescales, improved productivity and better working relationships through the elimination of the previous adversarial behaviour. Both clients and contractors recognise the need to change the nature of their relationships. However, there is less clarity on how best to achieve this. It is recommended that clients and contractors would benefit from more detailed and practical guidance following the award of the contract. This guidance could provide practical assistance to those organisations engaging in a *partnering* relationship for the first time. Equally, those with prior experience may benefit from a different level of support and guidance as this will often involve new staff engaging in the process for the first time. It is suggested that the main quadrants of the second model (Figure 2) would provide a suitable framework for such guidance, covering Project Management, Supply Chain Management, Total Quality Management, Human Resource Management and their constituent components. Emphasis should be placed on the importance of a continuing series of workshops as the evidence suggests the need for an ongoing interchange to sustain and develop the relationship into a strategic partnership stretching beyond the immediate project.

The evolution from *partnering* to Prime Contracting may be viewed as a natural development for those organisations with the necessary understanding and experience. Other organisations would probably find such a move fraught with problems and risks, presenting a notable degree of challenge. The components of *Partnering Management* represented in the model (Figure 2) can be developed further to contribute towards a model for 'Prime Contracting'. It is recommended that this would provide a suitable starting point for further research especially as major clients currently view this as their preferred future procurement route. There is further support for this view of the future trend, as evidenced by the commitment of the UK Government's major capital spending departments (e.g. Ministry of Defence, Defence Estates Organization and the Department of Transport) which have expressed a preference for infrastructure projects to be undertaken on a Prime Contractor approach.

There are a number of areas where further research could extend the boundaries of this study; one such opportunity could include undertaking an international comparison of construction industries to determine if cultural differences influence the use and success of *partnering* in the global construction industry. Another area for further research suggested by the client organisation comments concerns the balance of the four quadrants of the model (Figure 2) with respect to different types of project characteristics in term of duration, scale, value, complexity etc. In light of one of the above conclusions a third area to warrant further research, would be to identify and examine the consequences to the construction industry on its move to *partnering* and prime contracting arrangements. In particular this could examine if such a change in the industry is likely to have any significant impact on the number and size of UK construction companies and whether such a move will prompt irreversible change through the formation of either specialist companies or through large company amalgamation.

6. REFERENCES

Australian Construction Industry Development Agency, 1993, *Partnering - a strategy for excellence A guide for the Building and Construction industry*, Commonwealth of Australia and Master Builders Inc, Australia, 1993.

Banwell, H.,1964, *Placing and Management of Building and Civil Engineering Work*, HMSO, London, 1964.

Bennett, J. and Jayes, S., 1995, *Trusting the Team - The Best Practice Guide to Partnering in Construction* , Thomas Telford Publishing, UK, 1995.

Bennett, J. and Jayes, S., 1998*, The Seven Pillars of Partnering A Guide to Second Generation Partnering,* Thomas Telford Publishing, UK, 1998.

Construction Industry Board, 1997a, *Partnering in the Team,* Construction Industry Board Working Group 12 Thomas Telford Publishing, UK, 1997

Construction Industry Board, 1997b, *Selecting Consultants for the Team,* Construction Industry Board Working Group 4,Thomas Telford Publishing,UK,1997

Cousins, P., 1992, *Choosing the right partner*, Purchasing and Supply Management, March 1992, pp 21-23.

Cousins, P., 1995, *Strategic Procurement Management in the 1990's : Concepts and Cases*, Chartered Institute of Purchasing and Supply, Lamming, R. and Cox, A. (Eds.), UK, 1995.
Critchlow, J.,1998, *Making Partnering Work in the Construction Industry*, Chandos Publishing (Oxford) Limited, UK, 1998.

Davidson, P. and Trinick, A., 1997, *Partnering and Collaboration* Facilities Management, Volume 4, No 5, 1997, pp 6-8.

Egan, J.,1998, *Rethinking Construction,* The Report of the Construction Task Force to the Deputy Prime Minister, on the scope for improving the quality and efficiency of UK construction, Department of the Environment, Transport and Regions, UK, July 1998.

Emmerson, H., 1962, *Survey of Problems Before the Construction Industries*, HMSO, London, 1962.

Hays, R.and Wheelright, S.,1989, *Strategic supply management - A blueprint for revitalizing the manufacturer-supplier partnership,* American Management Association, New York,Bhote,K.R (Ed), 1989.

Lamming, R. and Cox, A. (Eds).,1995, *Strategic Procurement: Management in the 1990's Concepts and Cases* , Chartered Institute of Purchasing & Supply, UK, 1995.

Latham, Sir Michael, 1994, *Construction the Team: Joint Review of Procurement and Contractual Arrangements in the United Kingdom Construction Industry* Final Report HMSO, London, 1994.

National Economic Development Council, 1991, *Partnering - Contracting without conflict* NEDC, London, 1991.

Simon, Sir Ernest,1944, The Placing and Management of Building Contracts, HMSO, London,1944.