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ORGANIZING COLLABORATION IN CONSTRUCTION PROJECTS – FORMAL MODELS MEETING PRACTITIONER PERSPECTIVES

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Abstract
There is a call for new project management approaches that are able to deal with increased flexibility and put people aspects more in focus. In construction projects, formal models for relationship management are increasingly being used. Based on a case study of a Swedish hospital partnering project, this paper discusses how project managers approach this new challenge of integrating systems for relationship management with core project processes, and if the partnering systems are effective in supporting collaboration and knowledge integration in a multiparty partnering environment. The findings indicate that partnering processes influence project processes in a favourable way, but that project managers also rely strongly on their personal experience in managing collaborative processes. The practices they introduce are often successful, but also tend to be patchy and related to collaboration problems in traditional contracts. The formal partnering processes, on the other hand, seem to be important in providing a basic structure for collaboration and to communicate collaborative intents, but are too general and infrequent to address more specific and pressing problems of process design and organization. Bringing in professional behavioural knowledge may be needed to achieve a more consistent and adequate relationship management that makes use of both formal partnering processes and core project processes.

Keywords: Partering, collaboration, knowledge integration,

INTRODUCTION

In many countries, the construction industry is criticized for being adversarial and inefficient (Latham, 1994; Egan, 1998; Byggkommissionen, 2002; PSIB, 2003). Resulting from dissatisfaction with the cost increases, delays and conflicts associated with the traditional methods, there is an international trend to develop contracting and management models which both make better use of project competences and allow for a greater flexibility in decision-making. Removing barriers of distrust that hinder collaborative problem-solving is believed to create opportunities for knowledge integration, learning and improvement. A key goal in these models is therefore to develop more collaborative relationships between the numerous specialist firms that participate in a construction project.

In the discipline of project management, there is and has been a strong emphasis on skills and techniques related to project planning and control. However, there is growing concern that when uncertainty is high, traditional techniques-based project management may not be sufficient and, if too rigorously applied, can impede the fulfillment of fundamental project goals. Thus, there is a call for more knowledge and new strategies for managing uncertainty and flexibility in cases when this is desired or necessary (Williams, 1999; Dvir and Lechler, 2004; Olsson, 2006; Pollack, 2007). That project managers focus more on establishing an environment that facilitates collaboration and knowledge exchange between highly skilled

individuals is seen as a key element (Fernie et al., 2003; Sense, 2008). A recent survey of management practices and procurement methods in 15 major European infrastructure projects (Hertogh et al., 2008) found that the "hard" aspects of project management (risk analysis, cost control, contracts) were generally more professionally managed than the relationships with both external and internal stakeholders.

Some project managers learn through practice how to create good working relationships and motivate project participants. Thus, also within a traditional regime, many projects are successful with few conflicts and trust-based relations between the principal parties. Partnering relationships differ from such informal collaboration by the emphasis on structure and formalization of relationship management and interaction. Typical key components are workshops for teambuilding and training of collaboration techniques, joint risk management and value management sessions, systems for periodic assessments of relational performance as well as conflict resolution, and a new role of partnering facilitator (see e.g Anvuur and Kumaraswamy, 2007). Consequently, project managers in partnering projects need to more consciously incorporate relational considerations and behavioural knowledge in their planning and execution of project activities and processes. This is especially so in more complex projects, where more parties are involved and the goals are more ambitious regarding knowledge integration and joint learning. Further, the integration of disciplines is likely to call for changes in established ways of working, such as roles, task sequencing and decision processes.

Against this background, this research project examines more in depth how new goals of collaboration and formal partnering mechanisms influence and interact with the more traditional and technically focused project management roles and routines. How do project managers and other actors approach these new ideas of formal relationship management and knowledge integration? How do project processes and aspects tend to be affected by partnering arrangements? Which are the implications for project management and future developments in partnering? These questions are addressed by an interview-based case study of a large Swedish partnering project in the hospital sector.

DEVELOPMENT OF COLLABORATIVE PRACTICE IN SWEDEN

In Sweden, it is only the in the last five years or so years that explicit and formal partnering has become more widespread. Although partnering has not been supported or explicitly encouraged by any official policy initiatives or industry change programs as has been the case in the UK, Denmark and the Netherlands, there has been a growing use of partnering arrangements. The Swedish construction contractor NCC has brought their partnering model from their Danish subsidiary, and the Swedish Construction Clients' Federation has organized courses in partnering for all actors, often using consultants from the UK. However, there are still few partnering guidelines in Swedish and few experienced partnering consultants. A survey of the practices and experiences of 39 partnering clients (Andersson and Johansson, 2008) showed that nearly all of them had used workshops with teambuilding practices and continuous evaluations of participants' views of the working relationships. Systems for conflict resolution, partnering facilitators and target cost contracts were also very common. Another recent survey of NCC partnering projects (Appelgren and Hellsing, 2009), indicated that when clients use partnering for the first time, the collaboration primarily involves the client and the building contractor. In their second project, however, clients tend to include also consultants and sub-contractors in a more formal way. In the survey by

Andersson and Johansson (2008), consultants and subcontractors were formal partners in around 50% of the projects. However, it was still unusual that other parties except the building contractor were involved in a gainshare-painshare arrangement. Thus, formalization is increasing, but experiences of organizing collaboration and knowledge integration in a larger group of actors are still scarce.

KNOWLEDGE INTEGRATION AND RELATIONSHIP MANAGEMENT

In contingency theory (Thompson, 1967; Galbraith, 1973), the need for communication and coordination is seen as the main determinant of organizational design. Available means of coordination are managerial hierarchy, plans, standardization (of routines, outputs or roles) and mutual adjustment. Different coordinating mechanisms are more or less costly, but they may not be used interchangeably in all contexts. Thus, standardization of rules and outputs is cheap, but sequentially interdependent tasks require planning. Hierarchy may handle many unique and exceptional situations, but is inefficient when the knowledge needed is held by subordinate experts only. Then, mutual adjustment between individuals, which is the most resource-demanding coordination mechanism, is needed.

One reason why mutual adjustment is resource-demanding is that different specialists belong to distinct communities of practice (Wenger, 1998), each with their own culture and terminology. Knowledge integration is not trivial even in the absence of goal conflict (Dougherty, 1992) and integrating tacit knowledge of different individuals requires direct personal interaction (Grant,1996). The more complex tasks, the more important are personal and communication-intensive forms of integration. Social processes, as opposed to routines and systems, are seen as particularly important in project settings with temporary relationships (Bresnen et al., 2003; Sense, 2008).

So how does coordination differ between traditional construction and partnering projects? Construction projects are temporary and unique organizations, consisting of a large number of specialized firms. The coordination needs are immense, but are (apart from the usual project planning and control systems) to a great extent resolved by a high and partly formalized industry level institutionalization of processes and technical components (Kadefors, 1995). A limited number of procurement routes are defined in standard contracts, further acting to standardize roles, responsibilities and risks of different parties. Companies are designed to fit into specific “slots” in the project organizations and building process, and individuals and firms to a considerable extent perform similar tasks in all projects (Koch and Bendixen, 2005). The same types of meetings with similar agendas are held in most projects, both during design and construction. In this way, the need for mutual adjustment in the form of project level communication and negotiation between parties is reduced, and new participants who join a project are expected to quickly start to produce at their full capacity.

In a partnering project, these existing roles, interaction patterns and communication arenas will have to be partly modified, and new practices added. This transition to more collaborative relationships implies that more resources are assigned to coordination by mutual adjustment, potentially enabling a higher level of knowledge integration. Ideally, then, all participants with key knowledge should be able to collaborate and exchange all necessary information face-to-face. However, efficient groups cannot comprise too many members, and needs for knowledge integration can therefore be hard to meet in practice. In effect, total group performance is achieved in interplay between the work done by individuals

on their own, according to their own routines, and group activities such as formalized project meetings and ad hoc problem-solving (Enberg et al., 2006). Thus, achieving an adequate balance between individual and group activity, as well as a balance between width and depth in partner involvement, should be core issues in partnering project management.

Other aspects to consider are trust and control, for example in the form of detailed contracts and formalized control systems. Depending on the circumstances, such control may counteract or complement trust (Klein Woolthuis et al., 2005). In construction, traditional contracts are generally perceived as sources of distrust, entailing conflicts and close supervision (Kadefors, 2004), but in partnering projects the pricing system is often shifted from fixed price to cost-plus or target cost schemes. However, formal contracts and systems also reinforce trust by their influence on communication and learning (Poppo and Zenger, 2002; Mahama, 2006; Vlaar et al., 2006, 2007). By forcing parties to scrutinize potential problems and formulate responses, contracting processes, just as other forms of knowledge codification, can support mutual understanding (Vlaar et al., 2006, 2007; Zollo and Winter, 2002). Organizational systems that are primarily designed for other purposes also interact with trust production (Madhok, 2006). Thus, performance measurement can bring about new arenas for communication and provide input to discussion, and a meeting that is organized to solve problems and enable coordination will inevitably lead to the development of personal relationships between participants. Thus, relationship quality is – in a positive or negative way – influenced by all communication and interaction in a project, not only by specific partnering activities.

Finally, there are some general social norms that are associated with positive relationships, trust and collaboration. Important in all types of exchange relationships is the norm of reciprocity (Gouldner, 1960; Berg et al., 1995). This norm is reflected in perceptions of fairness, in a preference for equal shares, fair processes and respectful treatment (Folger and Cropanzano, 1998).

METHODOLOGY

The study reported in this paper is a part of a larger research project focusing on collaborative contracting as an emerging practice. The project involves several case studies and the criteria for selection are that consultants and sub-contractors should be involved in the collaboration and that there are ambitions for closer collaboration between a wider range of participants. Most cases that meet these criteria have a contract sum of more than 10MEUR and a complex technology or social setting.

The project wss a new hospital building. Interviews were carried out during late stages of construction and shortly after the completion of the project with the client project manager, the user representative, the design manager, the building contractor, three architects, the mechanical engineer, one subcontractor and the partnering facilitator. Interviews lasted between one and three hours. Detailed notes were taken and transcribed within a day or two and the transcription was subsequently sent to the respondents for checking. The interviews were semi-structured and the interview guideline comprised questions about project history and development, partnering experience of the company and individual, project processes and organization, perceived differences to general practice, and personal views and experiences relating to collaboration and knowledge integration. With the client and the building contractor follow-up interviews were made, and with several other respondents comments to

transcriptions were clarified by phone conversations. The case study focused primarily on the design stage, where complexity and novelty of processes are highest.

THE HOSPITAL PROJECT

Background and choice of partnering

The new hospital building comprises with wards for various specialties, surgery and some additional functions. The building is 20.000 m2 with a total cost of around 45 MEUR. The client, a public county council, had the goal to achieve low total operating costs over the lifecycle of the building (life-cycle costs, or LCC). This included construction costs, costs for technical operation and maintenance of the building (LCC Building) and costs for hospital core business operations (LCC Hospital). The client project manager was convinced that by increasing costs for pre-design and design and improving the quality and flexibility of the building, both LCC Building and LCC Hospital would decrease significantly, thus saving very much money for the county council in a longer perspective.

To address LCC Hospital, a conceptual design contest for architects was organized. The chosen design envisaged single rooms operated by small care teams. Larger care units are less costly if construction and direct operating costs are considered, but were turned down because of higher risk for infections that delay patient recovery. In the next step, technical consultants were procured based on their competence, also with a special focus on LCC, and the design team developed design to achieve the lowest total operating costs. This way, low costs for heating, lighting, ventilation and cooling were not achieved by reducing window area, since patients recover more quickly in rooms with a view, but by better windows and by using daylight to reduce needs for lighting. Possible future changes in hospital operations were also analysed in order to arrive at an optimal level of flexibility and generality.

Another important project goal was that when the building would be completed, it should have up to date technology and be suited to the user requirement at the time of moving in. The process from start to completion for this type of building takes at the very least five years and often much longer. Using traditional project delivery models, requirements guiding design are formulated early in the process. Then, design is carried out and drawings and specifications form the basis of a procurement contest, resulting in a fixed price contract. Change orders after the contract is signed are expensive. In medical care, however, technological development is rapid and affects facilities in many ways. Political decisions may also change requirements from one day to another.

In this project, the client chose a partnering approach for the construction phase for two reasons: to include construction and cost estimation competence in the LCC analysis, and to introduce more flexibility and enable decisions to be taken later in the process.

Partner selection and contracts

Before commencing the detailed design, contractors were procured, also in quality-based selection. The group of companies involved in the project comprised a mixture of small and large actors. The architect, structural engineer and mechanical engineer were leading consultancy firms. The building contractor was one of the largest in Sweden, while several (nominated) sub-contractors were local firms. Very few of the individuals involved had participated in partnering projects before, although the larger companies had previous

experience of this kind of projects. The building contractor, however, had partnering competence in house, as well as a system for managing partnering projects.

Each consultant had a cost-reimbursable contract with a guaranteed maximum price for their work during the detailed design and construction phases. For the contractors, a target cost arrangement with a gainshare/painshare mechanism was set up, and the consultants would also receive a bonus if the construction cost ended up below the target cost. On top of this, there was a bonus system based on the client's evaluation of the collaboration (partners evaluated as a group) and their performance in reaching quality goals and doing LCC analyses (partners evaluated individually).

Works contracts were used for the contractors. This was very important to the client, who was convinced that the contractor would get a too strong influence in a design-build environment, and that it then would be difficult to prioritize long term performance and quality before construction costs.

Partnering model and processes

After the contractors had been procured, a start-up partnering workshop was held. About 30 people representing the partners participated: the client, the architect, the structural engineer, the electrical engineer, the mechanical engineer, the building contractor, the ventilation contractor, the piping and plumbing contractor and the electrical contractor. A partnering facilitator from the building contractor led the workshop. Joint goals were formulated in a partnering declaration and an action plan for how to reach each goal was developed.

Every 6 months, there were follow-up partnering workshops. Before each one of these, a questionnaire was sent out to all participants, asking them how they perceived the working climate. The results from the questionnaires were discussed at the workshops. 4-5 times during the project, consultants and contractors were evaluated by the client as a basis for judging compliance with the soft bonus criteria. These evaluations led to discussions about problems and needs and possibilities for improvement.

The design process

There was no joint project office at the hospital and the consultants worked at their respective offices. The project was not considered large enough to require the continuous presence of many consultants, and much of the design was done before the contractors were procured.

The client appointed an external consultant to manage the detailed design process. He had no previous experience from partnering projects, but had managed projects with high integration between design and construction in industrial settings. When deciding the structure of meetings and participants, he used a model from one of these. Although the explicit partnering system was supplied and administered by the building contractor, their partnering facilitator was not involved in planning such other project activities. Design meetings involved both consultants and contractors, and there was a whole day meeting every fourth meetings were organized to enable both week. The meetings combined large and small group to enable both overview and specialized discussions. The first two hours there was a design meeting where the whole group, about 20 people, was present. Then, the participants split up in three technical subgroups: building, mechanical (heating, ventilation, sanitation) and electricity. These included the consultant, the contractor and one client "quality leader", who also led the meetings. At the end of the day, the whole group assembled again. The technical

subgroups, the contractor group and the consultant group also met separately in between, on other Tuesdays.

The design manager was concerned that all meetings should be meaningful for all parties. Also, contractors are not used to contribute to design and he considered "bringing the contractors' knowledge to the drawing table" to be one of the most important challenges in the project. Splitting up the group, then, was a way both to reduce the time spent passively listening to other parties' problems and to create an environment where also sub-contractors would feel compelled to actively contribute to decision-making. Also important for meeting style was that the client project manager expressed a strong belief that decisions should be reached in consensus in order to increase initiative and commitment among participants. This implied that he very seldom intervened to make explicit decisions.

At the beginning of each design meeting, half an hour was spent on discussing two of the 17 partnering goals defined in partnering declaration and further developed in the action plan. Some of the goals concerned attitudes and behaviour (for example: putting the project first, sharing competence, joint responsibility for problem-solving) and others were more technical (work with LCC analyses, low energy consumption, a good environment for the patients, high flexibility, etc). Before each meeting, all participants had been instructed to prepare and think about the implications and meanings of a specific goal, and at the start of the meeting two of them were randomly selected to present their thoughts. According to interviewees, many participants initially considered these general discussions as being a waste of time, but successively discovered that they were of great help in preventing disagreements. The parties could refer to the mutual goals when they felt that somebody was acting too much in their own self-interest. Especially patient-related goals were influential.

Apart from the new structure and action plan discussions, the meeting agenda was rather traditional. Thus, building issues were always discussed before issues related to the building services systems. The design manager and client quality leaders had also decided the agenda of the technical group meetings beforehand. As a consequence, other participants had only a limited influence on which aspects should be brought up. One reason for controlling the meeting agenda was that the design manager saw a risk that some participants (mainly consultants) became to dominant while others (sub-contractors) would remain passive. The design manager stressed that the parties had to be equally strong to achieve a good collaboration, and it was therefore necessary to encourage some and hold back others.

Experiences and relational aspects

The project was perceived as successful by all participants, and especially the client and the architect were pleased. All parties expressed that the relational climate had been much better than in a traditional project and that the partnering relationship in combination with the cost transparency has allowed for more informed decisions. Quality, investment costs and maintenance cost have all been considered and more alternative solutions investigated. Due to the advanced LCC assessments, the estimated energy consumption is among the lowest in Sweden for this type of building. Several examples of over-design, where consultants play safe and choose excessively high quality and expensive design, have been eliminated. Many changes improving the usability of the building have been made during the construction process, some of them only months before completion. The quality of details is perceived as significantly higher than normal for hospital facilities. The target cost has only been adjusted marginally, and there was a gain to share since the costs were about 5% below the target cost.

However, despite that the participants generally saw the partnering model as preferable to traditional contracting there were also criticism and disappointment with certain aspects. The most problematic part, then, was the early phase with the joint design process. The design team had been working closely during the design process, and had made joint study visits to other hospitals. After the contract had been signed, the contractors had to be introduced to the project and relationships between the new partners established. The client representatives and design consultants thought that the building contractor behaved in a rather traditional way in the beginning, but already during the start-up workshop they saw a change in attitude. The role of the contractors in the design process was to identify and propose more cost-efficient solutions. However, the focus was on lifecycle costs and not construction costs. This was a new perspective for most contractors which also required some mathematical skills to understand. In the beginning, the building contractor often suggested cheaper alternatives of lower quality. However, as the proposals repeatedly met resistance from others, often with reference to the partnering goals and action plan, the contractor managers began to change focus. At the end of the project, the other participants perceived the contractor as a committed to delivering value for money for the hospital and the contractor employees were highly enthusiastic about this role.

Thus, attitude problems relating to costs and quality were not so important and did not take long time to overcome. However, the building contractors were strongly focused on the construction phase, and early in the project they suggested that it would be better to start construction earlier than the client had initially planned. Thereby, said the contractors, there would be more time in the important and usually messy later stages, an argument that the client accepted. This decision, however, had significant impact on the design process, since the design team had to start with the foundation details instead of systematically reviewing the design together with the contractors. As a result, the design process became disorganized and significantly delayed.

There was also some confusion regarding the relative influence of various partners in the design process. Due to the high energy requirements, the mechanical engineer had a more central role than normal. He was in charge of the LCC calculations for the heating, ventilation, lighting and AC systems, giving him a strong position also in traditional contractor domains of cost estimation. However, he found the participative but still hierarchical design process frustrating, since there was seldom time to resolve the issues that he perceived as most pressing. Also, he did not intervene with other parties' work as much as he would have from a purely technical point of view, since he thought that it would have threatened relationships.

The client's belief in consensus engendered mixed views in the partner group. This strategy was appreciated, but it also led to confusion as to when a decision was actually made. As the client did not make explicit decisions and the meeting minutes just said that questions were discussed, not decided, the same question tended to come up again and again. Despite that one of the partnering goals was to establish a clear decision process, this problem persisted more or less during the whole project.

An important purpose of the partnering questionnaires and follow-up workshops was to assess performance, especially in terms of working climate, to improve and fine-tune processes. However, these measures were only partially successful in this respect. Workshop participants were too many and questions too general to efficiently address more specific issues. Also, follow-up workshops were not held often enough to address problems when

they arose. The client found the bonus discussions to be more useful, much because they felt that is was easier to bring up problems in partner performance when there was a formal system. Still, the system was one-sided, since there was no similar opportunity for the others to bring up problems in the client organization.

DISCUSSION AND CONCLUSIONS

The focus of this paper is how partnering processes interact with other project processes in partnering projects, and how project managers approach this new challenge. The partnering model chosen in the hospital project with workshops, questionnaires for assessing performance, target cost contracts and quality bonuses was quite typical for recent ambitious Swedish partnering projects described by Andersson and Johansson (2008). The ambitions regarding knowledge integration were however higher due to a focus on life-cycle costs. The project was considered to be very successful by most all participants.

So which were the effects of the formal partnering system? The workshops, especially the start-up workshop, were seen as being of considerable importance for building relations and commitment in early stages. Further, that the action plan for reaching partnering goals was discussed in the beginning of every design meeting contributed to the establishment of shared interpretations of joint project goals and to the parties understanding of each other's situation (Mahama, 2006). The bonus system had secondary effects in providing a context for discussing improvement needs which were probably more important than the direct financial incentives.

However, explicit partnering processes only accounted for a smaller part of the total project communication, and the influence of the toolbox and partnering facilitator on core project processes was small. In deciding the organization of design meetings the client management team used their own personal experiences and beliefs regarding which prerequisites are essential for successful collaboration. A primary concern, then, was to ensure active participation and commitment from all parties by smaller groups, active support and consensus decisions. Thus, norms of equality and reciprocity gained strong influence on decisions about relationship design. To a great extent, project management succeeded in motivating participants to collaborate towards shared project goals. When it came to organizing knowledge integration experiences were more mixed. This aspect seemed to be less in focus; for example the decision to start construction activities earlier than previewed was made without considering the likely impact on design collaboration and on the schedule for design document delivery. There was some ambiguity in this, since the client wanted to give the design team a stronger position than it would have had in a design-build contract but still tended to prioritize contractor involvement and unreflectively accept contractor propositions. One way of understanding this is that the relationships to the design team were already established, while the contractors were new to the project and their commitment needed to be ensured. Further, following rules of reciprocity, this entitled the client to turn down some other, clearly unwanted proposals from the contractor. In effect, that the contractor's attitude changed over time might be partly attributed to this early client concession, although it may also be interpreted as a preoccupation with traditional problems at the expense of solving new ones.

Although committed project managers and members are essential to successful collaboration, so is an ability to make tradeoffs between relational and operational goals and challenge

expectations that may arise when a partnering label is put on a project. Especially in planning early phases of a project, before relationships are established, it is important to consider how relationship development can be reconciled with both knowledge integration and disagreement. Formal partnering tools and processes are too general to be truly helpful in this respect, and have to be adapted and complemented to a specific context. Professional behavioural knowledge may be needed to achieve a more consistent and adequate relationship management, combining formal partnering processes and core project processes.

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