Partnering in the construction industry -an inter-project perspective

Florence Crespin-Mazet[1]

Malena Ingemansson[2]

Åse Linné[3]

Abstract

Traditionally the construction industry is known for primarily using classical type of contracting based on single transactions and price. However, partnering, i.e. alliance agreements and co-development, has during the last decades become an increasingly applied type of business model and project marketing strategy. As shown by Crespin-Mazet and Ghauri (2007), this type of agreement is appealing to the customer mainly in risky projects i.e. characterized by high uncertainty, complexity and in cases where it in some regard will have great impact on the customer's overall activities. Such projects represent multileveled risk and therefore the customer finds it advantageous to share the risk with a partner. However, while partnering (both as a concept and as practice) represents a closer type of relationship between business actors compared to traditional contracting, it is often only studied in individual projects and thus mostly understood from an intra-project perspective. Hence, when considering the issue of partner identification, most research has focused on identifying the type of customers willing to engage into partnering agreements with the main contractor (Crespin-Mazet & Portier, 2010) and little research has focused on the impact of the rest of project network (including technical consultants, suppliers, financial providers etc.) in the successful development of such projects.

In this paper we investigate a highly complex construction project in terms of representing a unique type of health care facility in the Nordic countries, commissioned by a newly formed and exceptional organisation representing seven county councils in Sweden. Although fulfilling all the above criteria of a risky project, the case also illustrates that the actors involved in the partnering agreement have a history (and future!) of interacting, and that this leads to particular ways of relating to each other in the focal partnering project. Therefore we propose that in order to understand why, how and with whom partnering agreements are applied the studied temporal and organizational context needs to include several projects, and thus an *inter*-project perspective should be considered.

[1] *E.M.LYON, Mercadine, 23 avenue Guy de Collongue, 69 130 Ecully, France, crespin@em-lyon.com*

[2] ***Corresponding author:*** *Uppsala University, Centre for Science and Technology Studies, Kyrkogårdsgatan 10, 752 20 Uppsala, +4618-471 56 05, malena.ingemansson@sts.uu.se*

[3] *Uppsala University, Centre for Science and Technology Studies, Kyrkogårdsgatan 10, 752 20 Uppsala, ase.linne@sts.uu.se*

Introduction

For a number of reasons the construction industry poses a particularly interesting example to study and better understand the dynamics of business relationships. Compared to other businesses, it is highly fragmented mainly in regard to two aspects: there are a great number of actors involved in carrying out the production process, which relates to a high degree of specialization, and basically all activities are organized in separate and time-bound projects. It has been observed that one of the consequences of the industry's project-based character is that the business actors struggle with forming long-term relationships and therefore to a large degree use classical type of contracting based on single transactions and price (Thompson et al. 1998; Sai On et al., 2003). However, partnering, i.e. alliance agreements and co-development, has during the last decades become an increasingly applied type of business model and project marketing strategy. As shown by Crespin-Mazet and Ghauri (2007), this type of agreement is appealing to the customer mainly in risky projects i.e. characterized by high uncertainty, complexity and in cases where it, in some regard, will have great impact on the customer's overall activities. Such projects represent multileveled risk and therefore the customer finds it advantageous to share the risk with a partner. However, while partnering (both as a concept and as practice) represents a closer type of relationship between business actors compared to traditional contracting, it is often only studied in individual projects and thus mostly understood from an intra-project perspective. Also, when considering the issue of partner identification, most research has focused on identifying the type of customers willing to engage into partnering agreements with the main contractor (Crespin-Mazet & Portier, 2010) and little research has focused on the impact on the rest of the project network (including technical consultants, suppliers etc.) or the significance of related projects in the successful development of these individual projects (Bygballe et al. 2010). As a consequence there is little understanding of why partnering is initiated and how it evolves as part of a network of business relationships both within single and across several projects. The purpose of this paper is to call attention to this need and to suggest a framework for how to cover both dyadic and network level of relationships, and intra- and inter-project settings in relation to partnering. We do this by the use of a case study of the development of a partnering agreement involving a focal partnering project related to three other projects (both non-partnering and partnering). The research question posed in this paper is *how is the implementation of partnering related to networks of relationships and to inter-project issues?*

Theory/Literature review

Partnering: origin and definition

In the construction industry, the concept of partnering has firstly been introduced in the middle of the 1980s in the USA. In Europe, it mostly originated in the United-Kingdom in the early 1990s. At this time, an increasing number of actors stemming from governmental and professional institutions (NEDO, 1988; Latham, 1994; HM Government, 1995; The Institution of Civil Engineers, 1996) and also from academia (Sai On et al., 2003; Bresnen & Marshall, 2000a; Barlow & Jashapara, 1998; Thompson & Sanders, 1998; Crane et al., 1997) started

questioning the predominance of adversarial relationships between the various parties involved in the construction supply chain. The procurement of projects on a one-off basis was shown to give little regard to future needs or supply development. The fragmented structure of the industry was criticized for generating individualism and self-seeking interest with little shared learning or synergy between parties. According to Cain (2004), the potential savings obtained from supply chain integration and a focus on unnecessary costs could be estimated at around 30%. Beyond increased productivity and reduced costs, partnering was also presented as an opportunity to reduce project times, improve quality and improve customer satisfaction and stability (Bresnen & Marshall, 2000a). The adoption of partnering and more collaborative relationships between clients, contractors, sub-contractors and suppliers was then seen as a way to overcome the industry's performance problems and to be more innovative (Barlow & Jashapara, 1998).

Sometimes called partnering (Bresnen & Marshall, 2000a; Cain, 2004; Sai-On et al., 2003) or co-development (Crespin-Mazet & Ghauri, 2007), these approaches are presented as an alternative coordination mode (Dubois & Gadde, 2000) to the sequential development process and are based on better process integration and supply chain management (Saad et al., 2002; Beach et al., 2005). The objectives of partnering are to promote the use of collaborative, more open and less hierarchical relationships between actors in projects (Alderman & Ivory, 2007).

The literature review of partnering in construction enables to identify various definitions and interpretations of the concept (Barlow and Jashapara, 1998; Saad et al., 2002, Nyström, 2005). The definition of partnering proposed by the Construction Industry Institute (1991) seems the most widely adopted (Bygballe et al., 2010; Hong et al., 2012) and refers to a long-term commitment between two or more organizations (without 'regard to organizational boundaries') in which shared understanding, common goals and trust develop for the benefits of improving construction.

A consensus can also be found on the key elements and principles of partnering (Hong et al., 2012): common goals (Bennet and Jayes, 1998), team building based on trust and respect, development of well structured yet open and informal communication flows (Kadefors, 2004), commitment, equity, responsiveness to problems, continuous evaluation and joint problem resolution (Cook & Hancher 1990; Construction Industry Institute 1991; Ng et al. 2002; Chan et al. 2002; Uher 1994; Davis Langdon & Seah Consultancy 2006).

Depending on the authors, research articles on partnering focus more on its behavioral principles or on the set of tools and techniques required to successfully conduct a partnering project (Bresnen & Marshall, 2000a). Concerning the contractual aspects, partnering is often presented as one form of relational contracting (Mc Neil, 1985) together with alliancing, public-private partnership or joint venture arrangements (Rahman & Kumaraswamy, 2004; Chan et al. 2009). The emphasis placed on contractual aspects is deemed to generate trust among the parties and is associated to the specificities of the construction industry whereby trust seems to rely more on formal agreements ("system-based trust") than on interpersonal relationships (Wong & Cheung, 2004).

Over years, partnering seems to have found an echo in managerial practice and is becoming widely applied within the construction industries of the United States, the United Kingdom, Australia, and Hong Kong (Hong et al., 2012). In contrast, it still remains in its infancy in other

countries such as East-Asia, Africa (Hong et al., 2012) and several European countries such as Sweden, Norway and France where partnering projects are frequently recorded but fail at being adopted on a larger scale (Crespin & Portier, 2010). Phua (2006) underlines that despite the popularity of partnering; there is no evidence in industry proving that it is the dominant choice of procurement or management method.

While numerous case studies found in the literature illustrate the superior performance of partnered projects over other contractual forms (Larson, 1995), some authors also emphasize the problems found in achieving the expected benefits of partnering (Bresnen & Marshall, 2000a; Cheng et al., 2000; Chan et al., 2003, Nyström 2008). They note a discrepancy between the tangible benefits of project partnering as highlighted in research documents and firstly, the lack of adoption of partnering in reality (Hong et al., 2012: page 90) and secondly, the failure at realizing partnering benefits at a strategic level i.e. across several projects (Gadde & Dubois, 2010).

As developed in the next section, the focus of the literature on the project and related intra-project issues is identified as one potential explanation for this lack of performance.

Partnering: a dominantly intra-project perspective

A focus on contractor-client relationships

The bulk of the literature on partnering focuses on the relationships between the client and the contractor while neglecting the importance of cooperating with other actors involved in the project network such as suppliers, sub-contractors or consultants (Dainty et al., 2001; Bygballe et al., 2010; Hong et al., 2012). As stated by Hong et al. (2012: page 90), "*a general perception exists that partnering does not extend down to the supply chain, excluding some project participants from it*". This means that most contractors having signed partnering agreements with clients did not have the same type of arrangements with their suppliers or sub-contractors (Bresnen & Marshall, 2000b). The evoked reason is that many suppliers perceive partnering as a contractor's bullying practice to transfer their risks upstream in the supply chain with a negative impact on their margin (Packham et al., 2003).

A focus on project partnering

In the construction industry, the notion of partnering often refers to a single project transaction and therefore may convey a different meaning than the traditional vision of partnership based on repeat long term relational exchanges and relationship continuity (Möller & Wilson, 1995; Gadde & Hakansson, 2001). This has led some authors to introduce a distinction between two types of partnering in construction: *project partnering and strategic partnering* depending on the number of projects for which the relationships are established (Cheng et al. 2001; Davis Langdon & Seah Consultancy, 2006). In project partnering, the scope or duration of the relationship is a single project (Construction Industry Institute 1991; Walker et al. 2002; Manley et al., 2007) while strategic partnering is based on long-term business arrangements and commitment across several projects (Construction Industry Institute 1991; Bennett & Jayes, 1998; Chan et al. 2009). Some authors consider project partnering as a first step towards strategic partnering (Cheng et al., 2000)

but recent research seems to contradict this view. Gadde and Dubois (2010: 254) note: "*prevailing supply arrangements established to handle the particular conditions in the construction industry makes it unlikely for partnering to reach outside the individual project*".

In their review of existing literature, Bygballe, Jahre and Swärd (2010: 239) stress the strong predominance of contributions on *project partnering* highlighting the benefits of partnering for individual projects. For them, this short term focus may explain the important emphasis placed on formal mechanisms to facilitate and "engineer" relationships in research contributions. Hence, most articles focus on the formal tools and contractual aspects of partnering (such as workshops, or communication procedures) in spite of the recognition of informal aspects such as cultural and social aspects. This conveys an "instrumental view of partnering" with less attention devoted to the informal and evolutionary aspects of partnering i.e. how relationships develop over time.

Project partnering: the need for an inter-project perspective

The review has shown that the bulk of the partnering literature adopts a short-term, project perspective and focuses on how to best engineer partnering between a contractor and a customer. In sum, it mostly concentrates on *intra-project* issues with less consideration or attention to inter-project issues. As summarized by Bygballe et al (2010): "*None of the papers deal with partnering in a strategic, multi-actor and purely evolutionary sense*".

This restricted short-term and dyadic vision seems however more and more challenged as it is deemed to restrict the performance and adoption of partnering on a wider scale and also fails at grasping the factors that foster or hinder the successful development of partnering projects at a strategic level. Firstly, several authors stress the interest of collaboration with other actors in the supply chain and to extend project partnering more holistically (Bresnen & Marshall 2000a; Sze et al. 2003). For example, the extension of partnering to sub-contractors and suppliers has been shown to positively impact project quality (Kubal, 1996). Based on the Industrial Network Theory –INA-, some authors also suggest that the involvement of other parties outside the dyad is important to enhance learning and change as "*product and process innovations often come from suppliers, architects and consultants and from the collaboration between them*" (Bygballe et al., 2010: 244).

Secondly, an increasing number of contributions suggest the importance of adopting a dynamic perspective on partnering i.e. better understanding how relationships evolve over time and the connections between these relationships beyond the scope of a single project. Gadde and Dubois (2010: 257) acknowledge that "*buyers and suppliers in construction in most cases have been involved in business with each other*" even though they may not be tied by any formal commitment or continuous relationships. Kaluarachchi and Jones (2007: 1053) studied a strategic partnering initiative covering 12 housing development projects between social landlords forming "a *complex team network"* and showed the importance of understanding the connections between relationships.

Eriksson and Nilsson (2008) illustrate that previous experiences might have had a positive influence on the development of a partnering project between a contractor and a client without

the existence of any formal strategic partnering agreement. Finally, Castro et al. (2009) who empirically studied the antecedents of construction project coalitions in the Spanish construction industry, also concluded that "*previous social and economic relations can generate the necessary information and trust for the selection of whichever partner is considered the most suitable for the development of the joint project*" (page 819). For them, firms are more likely to form associations with other firms when they have previously worked together on similar projects and have previously established ties of cooperation. They conclude: "*In a nutshell, the decision over the partner firm in the formation of alliances is strongly determined by the social networks in which the firms are embedded*" (page 819). Previous cooperation and informal ties between parties are thus recognized as influencing the development of partnering and other forms of relational contracting.

To grasp the duality of analysis between the dynamics of interaction between actors both at the project level and at the strategic level (i.e. across projects), Dubois and Gadde (2002a) introduce a distinction between the *temporary network* (the project network) and the *permanent network*. They show that in the construction industry, most adaptations occur at the level of the temporary network (to adjust the standardized inputs to local and site specific conditions) whereas the permanent network is generally characterized by lack of adaptations and limited interaction between actors (standardized exchange; search for independence). This is considered as problematic as according to INA theory, the adaptations required in a partnering project among the construction partners might hinder adaptations in other projects (Bygballe et al., 2010) and hence, make it difficult to attain some of the benefits that may be gained from closer collaboration at a strategic level. To solve this issue, Dubois and Gadde (2002a) suggest that tightening the couplings in the permanent network (establishing long-term relationships across different projects) and loosening the couplings in the temporary project network could enhance performance across temporary networks rather than hinder it.

Based on this understanding, Bygballe et al. (2010) have analyzed how the theoretical perspectives developed by the Supply Chain Management -SCM- literature and the Industrial Network Approach -INA- can help enrich the partnering concept. They came to the conclusions that "*the long-term orientation involving actors beyond the dyad, as proposed in SCM and INA, and the focus on social and informal evolution of relationships in INA can provide valuable insights into the substance and function of relationships in construction and can form an important basis for further development of the partnering concept*" (page 246).

This literature review hence highlights several research gaps and avenues for future research projects which could help us enrich our understanding of partnering and contribute to an increased efficiency of such agreements. Based on two recent, extensive and rigorous literature reviews of partnering (Bygballe et al., 2010; Hong et al., 2012), these research gaps can be summarized as follows:

- A need to better understand the impact of previous cooperation ties between actors -formal or informal- on the development of partnering projects
- A need to enlarge the scope of partnering studies beyond the contractor-client relationships to include the point of view of other actors involved in the construction supply chain (architects, consultants, suppliers, subcontractors etc.)

- A need to study the dynamics of partnering processes including the long-term effects of partnering on the broader network of companies and vice versa. This calls for a better understanding of the interplay between project partnering and strategic partnering.

The literature thus calls for in-depth process studies, enabling to understand the dynamics of the process (Bygballe et al., 2010). This proposition for further research has been an inspiration for this paper and in the following section we account for the method that has guided us in analyzing an in-depth case study of a partnering construction project involving a network of actors collaborating across several projects.

Method

Based on an industrial network perspective, that data collection was designed to capture the relationships of the central actors in the focal construction project from a multiple actor perspective. The central and studied actors were the client (also property manager and contractor) (Akademiska Hus), the construction company (NCC Construction), the user organisation (Municipal Alliance for Advanced Radiotherapy -KAS), the planning consultant (Sweco), main subcontractors (Bravida -ventilation), material suppliers (UPB - the frame) as well as the supplier of the medical technology (IBA - cyclotron).

In total 20 interviews were carried out between 2012 and 2014 (see Appendix 1). The purpose was to investigate the business relationships of the focal project in relation to a set of other related projects. The approach was exploratory in the sense that at the outset it was unknown whether the quite unique construction project of the Skandion clinic would have any relation to earlier, parallel or future planned projects in terms of relationships of the involved actors. The research findings from the case study indicated that such business relationships actually existed and that there were some interesting implications in regard to *how* (Yin, 2003) and *why* (Eisenhardt, 1989) they had evolved in particular ways. This shaped the further investigation to also include these related projects in terms of the involved actors and the characteristics of their relationships.

The fact that the focal project was based on a partnering agreement between the contractor and the client (NCC and Akademiska Hus) steered the analysis of the data material towards learning about the particular circumstances through which this partnering agreement had evolved *over time and across projects*, and how it *related to other actors and relationships in the related projects*. To perform the analysis we used literature on partnering in construction in regard to the specific aspect of how partnering relates to single projects (i.e. project partnering) and to several projects (i.e. strategic partnering). By using the results of the exploratory case study based on an industrial network perspective and analysing it with regard to the partnering literature, we propose to discuss and contribute to the partnering literature in mainly three ways. By providing further empirical insight into the initiation and development of one particular partnering agreement we firstly want to discuss the conditions of *initialising* such agreements in terms of why and how they are initiated in the first place. A second and highly related issue, by analysing the agreement as part of not only one but several interrelated business relationships we want to discuss the wider context of partnering agreements as part of *relationship networks*. Thirdly, by analysing the evolution of the agreement across several projects we want to discuss partnering agreements from an *inter-project*

perspective and thus how such agreements evolve across and relate to the conditions of different projects. More specifically, for our analysis and discussion of these aspects of partnering agreements we have used three specific dimensions of relationships introduced by Bygballe et al. (2010); *relationship duration*, *relationship partners*, and *relationship development*. From an INA perspective relationship duration refers to the development and maintenance of long-term relationships for the sake of continuity across projects, relationship partners refers to the interconnections between several actors and their respective relationships and thus the importance of assuring benefits for all parties involved, and relationship development refers to the informal character of relationships which cannot be captured by studying only formal contractual agreements. We have thus adopted the view that it is these conditions of the relationship(s) that in turn signifies the initiation and evolution (i.e. inter-project) of partnering agreements.

The methodology of this paper can be described as that of *systematic combining* (Dubois & Gadde, 2002b) in which further empirical insights are combined with existing theory, data analysis and additional theory with the purpose of developing or refining theory. In our case the empirical data from the case study called for a further review and analysis from the perspective of partnering, which in turn brought further insights into the meaning of the data and its contribution to the partnering literature. As stated we wish to contribute to the partnering literature in the three ways proposed above (initiation, relationship networks, inter-project). Also, even if we do not propose to refine or modify the INA, by using the inter-organisational features of the construction industry (e.g. highly fragmented and project-based) to study and discuss the particular ways in which these actors form both formal and informal relationships, the basic conditions for why and how business relationships matter in different types of industrial contexts is highlighted.

The case: the Skandion clinic as a 'unique' construction project

The Skandion clinic in Uppsala, Sweden, is the first clinic in the Nordic countries to provide and perform cancer treatment through proton radiation. This is a more precise form of radiation therapy resulting in less side-effects on surrounding organs compared to traditional radiation. In being able to perform proton therapy the actual radiation equipment, the *cyclotron*, is crucial. Protons are large and thus create demands on the radiation equipment used: the cyclotron needs to generate enough power and energy to accelerate the protons into a radiation beam to be directed into the tumor. As a result the proton equipment uses 1.5 megawatt, equivalent to electricity used by 2000 houses. In order to generate enough power, the radiation equipment is heavy and weighs around 200 tons, and thus the equipment puts special requirements on the construction of the clinic. Besides being heavy, the radiation equipment also generates radioactive material and the construction process is therefore directed by the need of creating a radioactive safe building both in relation to the internal and external environments. In order to keep the building safe, the radiation part of the clinic needs to have thick walls and ceilings (around 4 meters width), a large efficient ventilation system, an effective cooling system along with a gas sprinkler system among other things. The need for large quantities of energy along with effective ventilation, cooling and gas systems affects the construction in such a way that that the thick walls need to be filled with large quantities of canalizations in the walls. These canalizations complicate the construction process further as they increase the likelihood of splices in the

concrete. All in all, the construction of a proton therapy clinic such as the Skandion clinic is concentrated around the radiation equipment and the construction process is both difficult and uncertain. Although the construction is heavy with its equipment, thick walls and thick ceilings, it looks like a "swiss cheese" in cross section due to the large quantities of canalizations throughout the clinic. The Skandion clinic is costly and estimated to around 1.2 billion SEK, where the cyclotron represents around 500 million SEK and the actual construction represents around 750 million SEK. The Skandion clinic consists of three parts; the main radiation clinic where examination of treatment will take place, an administrative part with offices and a patient hotel, where patients will stay during the treatment. Managing, constructing and owning a clinic referred to as "a small nuclear power plant in the center of Uppsala" is demanding and a unique project for the main actors involved, and especially in relation to its owner. In the following sections, we describe the construction process of the Skandion clinic from the perspectives of the owner/property manager, Akademiska Hus.

How have Akademiska Hus handled, coordinated and managed such a unique construction project as the Skandion clinic? How have Akademiska Hus minimized the risk and uncertainty of the unique project?

A delayed construction process

The origin of the Skandion clinic can be traced to a national investigation in 2002 pointing to the need for Sweden to establish proton therapy as a future cancer treatment method. *Kommunförbundet Avancerad Strålbehandling (KAS)* (translates into Municipal Alliance for Advanced Radiotherapy) was established in 2006 and appointed to establish and run a new proton therapy clinic, the Skandion clinic. The clinic was decided to be based on the cooperation between seven county councils, a unique cooperation which had never been done before in Swedish healthcare. Despite the fact that seven county councils will run the Skandion clinic together through KAS, the intention is that patients from all over Sweden can be treated at the clinic.

After the establishment of KAS, this organization, with only two employees, started the preparations for purchasing the core of clinic, the radiation equipment. However this process was delayed several years, partly due to awaiting an upgrade of radiation technology among radiation equipment suppliers, and partly due to problems with the public procurement process. As a consequence the actual construction of the new clinic was delayed. In the early spring 2010, KAS issued a contractor inquiry concerning the construction and management of the clinic. The public property management company, *Akademiska Hus*, won the bid as part of a partnering agreement with the construction company, *NCC Construction*. It was not until March 2011 that KAS contracted with the Belgium supplier, *IBA*, to supply the radiation equipment for the new clinic.

A partnering agreement to realize a unique construction project

The owner of the Skandion clinic, Akademiska Hus, was already in 2008 approached by KAS for the construction of the clinic. At that time Akademiska Hus appointed Sweco, a consultant firm with special expertise in planning construction projects, for coordination of the planning of the project. However the contract inquiry was delayed and not realized until 2010. Due to early

interaction with KAS, Akademiska Hus realized the complexity of the Skandion clinic along with its uniqueness. Akademiska Hus is the second largest property company in Sweden and the company focuses on managing buildings related to higher education and research such as lecture halls, classrooms, laboratories, and administration offices, thus the Skandion clinic was a new type of building for Akademiska Hus.

When KAS finally issued the contractor inquiry, Akademiska Hus saw the need for a partnering agreement with a construction company to be able to manage the construction of a unique building outside its core business. Thus Akademiska Hus approached NCC Construction, a construction company that Akademiska Hus had worked with for 20 years. NCC is the construction company that Akademiska Hus has used the most in the Uppsala region and according to the Construction Manager at Akademiska Hus: "*Akademiska Hus and NCC can easily work together*". Moreover just before KAS issued the inquiry, NCC had lost a partnering bid with Akademiska Hus, the Veterinary and Animal Science Center (VHC), the first pure partnering project that Akademiska Hus engaged in. Due to the size (1.5 billion SEK) and complexity of VHC with a mix of laboratories, veterinary clinic including stables, Akademiska Hus decided to engage in partnering with a construction company. Although it was almost a tie NCC lost the contract and instead Skanska was appointed the construction of VHC in partnering with Akademiska Hus. The Construction Manager of Akademiska Hus pointed out that partnering agreement is labor-intensive since: "…*without interaction, there is no cooperation*" and as a result the construction project needs to be at a volume of at least 150-200 million SEK in order to be cost-efficient. Thus high cost in combination with high uncertainty of a construction project affected the choice to engage in partnering agreement both in the case of VHC and in the Skandion clinic. Although there is a high cost of engaging in partnering, due to the increased interaction and need for transparency, the advantage of partnering is that it creates flexibility during the construction process, for instance it makes it possible to change the building documents during the production. Thus, if other solutions are more suitable, it is possible to change the building documents developed and produced by the planning organization in cooperation with the contractor.

The construction process taking off - the establishment of a planning organization

After Akademiska Hus was assigned the construction and management of the Skandion clinic Akademiska Hus appointed LINK Arkitektur to supply the design drawings of the new clinic. However it was not possible to start the planning in full-scale until the user of the clinic, KAS, decided what radiation equipment to use since the building is dependent on the specific radiation equipment used. When KAS finally decided to use IBA equipment, the planning of the clinic started and a larger planning organization was established. The main aim of the planning organization was to develop and produce building documents, which NCC and its assigned entrepreneurs would use for the actual set up and production of the clinic. However due to the complexity of the building along with a tight time-schedule, the production of the drawings and the actual physical production of the clinic needed to be handled in parallel. As a consequence the building was divided into separate parts (work packages), where production of building documents of the foundation constituted the first part. After the planning organization (Sweco) developed the building documents of the foundation, it was supplied to the NCC production

team for actual production, thus the planning and production of the clinic was a stepwise process. The planning organization was set up and decided by Akademiska Hus. The planning organization was headed by a planning coordinator from the consultancy firm Sweco. Akademiska Hus already had an established relationship with Sweco dating back more than 15 years.

In the Skandion clinic project, the construction company was invited to join the planning organization due to the partnering agreement between Akademiska Hus and NCC. Thanks to the presence of representatives from the NCC production team, the building documents could be developed also from a 'production perspective' and thus the production of the clinic could be facilitated. The planning organization also consisted of technical planning consultants with expertise in 3D installation drawings (Inkcord, ProjektEL, PQR) along with a technical constructor (VSP) - all technical consultants had worked with Akademiska Hus before. Link Arkitektur was also part of the planning organization.

The planning organization had to relate to the design drawings of Link Arkitektur but more importantly to the user's requirements – KAS -, along with those of the radiation equipment supplier, IBA. KAS specified the whole clinic, in terms of types and number of rooms including details of all rooms such as size, sockets, use etc. KAS mainly had experience of cancer treatment and emphasized the need for an efficient patient flow[4] and mainly affected the construction of the actual radiation part of the clinic. In developing the building documents, the planning organization needed to relate especially to the equipment supplied by IBA. The planning of the radiation part of the clinic was dependent on a specific document that IBA supplied, the Integrated Building Document (IBD). The document consisted of more than 100 written pages along with around 40 drawings that describe the treatment rooms in detail, down to nuts and bolts. As a supplier, IBA needed to respect the strict regulations of the Swedish Radiation Authority (SSM): the equipment had to be approved by SSM for installation. Thus, IBA needed the contractor to follow the IBD document to set up a radiation 'secure' facility, and a building where the radiation equipment would work as anticipated. The planning organization needed to interpret the IBD to be able to produce building documents for the radiation part of the clinic.[5] As a way of understanding the radiation equipment in use and as a way to see the IBD in practice, Sweco, NCC, KAS and Link Arkitektur visited other IBA-facilities both in the US and Europe. IBA needed to approve the building documents related to the Skandion clinic including all changes of the IBD.

In handling a complex construction process such as the Skandion clinic with parallel planning and production along with high requirements from IBA and KAS, Akademiska Hus introduced the use of Building Integrated Modelling (BIM) for the Skandion clinic in cooperation with Sweco, NCC and Link Arkitektur. All of them had worked with BIM-models before, however never in the large scale represented by the Skandion clinic. The whole construction project is

[4] In creating an efficient patient flow KAS required to include three types of rooms in the radiation part of the clinic where the "expensive" time in the treatment rooms would be limited and thus all location of patient would happen in the preparation room while the examination would be located in the examination room. In order to facilitate the patient flow, the whole clinic needed to be located in the same floor.

[5] However the IBD document forms generic guidelines that can be adjusted along with the development and planning of individual projects, thus there are room for some local adjustments and changes between different IBA-facilities.

BIM-planned and it can be used to coordinate all the drawings supplied by technical consultants. The planning organization could use the BIM-model to visualize parts of the building in several dimensions along with installation clashes. The ambition was to make the process of developing building documents as efficient as possible to be able to discover problematic issues at an early stage and thus, facilitate the actual production of the new clinic.

The challenging task to coordinate procurement and physical production

Since Akademiska Hus realized the difficulties in constructing the Skandion clinic at an early stage, the company initiated partnering agreement with an experienced construction company, NCC. The construction company had been used for several other Akademiska Hus projects and the company had technical expertise in producing buildings within Akademiska Hus' main business area, higher-education buildings. Prior to the Skandion clinic, Akademiska Hus and NCC had cooperated in two other large construction projects in Uppsala; Blåsenhus, between 2007-2009 and Biocentrum, between 2009-2011, both projects were of similar size, around 20 000 square meters, and cost, around 500 million SEK. The two prior projects to the Skandion clinic are considered large projects in Uppsala but the projects are not complex in relation to construction or use[6], which have resulted in a classical contract form of both projects. As a consequence, Akademiska Hus was in charge of developing and producing the building documents (in cooperation with Sweco) that directed the actual production of the buildings handled by the NCC's production team. For these projects, Akademiska Hus solely decided which suppliers and entrepreneurs NCC would use for the production. For instance in Blåsenhus, the first of the two projects, Akademiska Hus appointed a new Latvian prefab supplier, UPB, to supply the frame of the building. While the key installation companies for the two projects; Bravida for ventilation and plumbing and Salléns for electricity, were local companies with experience from large-scale construction projects including both Akademiska Hus and NCC. Bravida is the largest supplier of technical installation services in Scandinavia and has local units in 150 locations in Sweden, Norway and Denmark, of which 90 are in Sweden. Sallén is a leading company for electricity installations in the local region of Mälardalen. For both projects NCC provided an organization including the same Project Manager, the same Project Engineer and some same key foremen. In both Blåsenhus and Biocentrum, there has been cooperation within existing agreements and contract forms, even though the projects were not formal partnering projects between Akademiska Hus and NCC. For instance, NCC has suggested changes of some solutions which both parties have benefitted from, NCCs production process was facilitated at the same time as it reduced the costs for the projects. Here the Project Manager at NCC is mentioned as an important individual in communicating, suggesting and implementing changes. When Akademiska Hus entered the partnering agreement with NCC for the construction of the Skandion clinic, it was possible to once again use the same consultancy firm (Sweco) and some of the same subcontractors as the previous projects, Blåsenhus and Biocentrum.

NCC was responsible for the actual physical production of the Skandion clinic, but the partnering agreement between Akademiska Hus and NCC, and thus a shared responsibility of the project,

[6] The buildings consisted mainly of lecture halls, seminar rooms and offices.

was very significant in the purchasing of materials in the production phase of the construction process. In co-evaluating the procurement of both materials and subcontractors, central purchasing agreements belonging to both Akademiska Hus and NCC respectively have been used. In their opinion, thanks to cooperative purchasing processes, subcontractors and suppliers with suitable prices, high quality and high delivery punctuality could be used. Setting up the installations that the planning organization developed was a challenging task, and it was therefore important to find suitable installation companies to realize the building documents in practice. In this case the installation companies could not only be evaluated on lowest price but also on the performance of their organization. Hence, key individuals of the installation team, for instance the supervisors' and main project leaders' experiences were important determinants in the final selection. Akademiska Hus and NCC decided to use the same installation companies as before in both Blåsenhus and Biocentrum. Bravida was to handle ventilation and plumbing while Salléns would do the electricity. Since these companies had already worked for several Akademiska Hus projects, they were well aware of the technical requirements from Akademiska Hus in relation to the products used for the installations. Akademiska Hus requirements are very much related to the costs of owning and maintaining the unique building (total cost of ownership approach). Since Akademiska Hus has economic calculations spanning more than 50 years, this demanded for instance a ventilation system with high-quality and long life-span with the possibility to find large scale spare parts, but also just-in-time deliveries.

In handling the construction process of the Skandion clinic NCC has been in charge of coordinating the procurement of different materials, however the procurement is dependent on the supply of building documents and the overall production plan. Due to the Skandion clinic's complexity in terms of large quantities of input materials, such as large-scale supplies of canalization, an elaborate way of coordination of procurement in relation to production has been required. For planning production and especially when to purchase what NCC used, the Akademiska Hus initiated the BIM software (Building Integrated Modelling). NCC introduced a new way of planning for the production in relation to involved companies and time. NCC divided the Skandion clinic in six zones; all these zones are analyzed with the BIM software. For the production, BIM has mainly been used as a planning method: for instance to calculate quantities, to investigate installation crashes etc. By using different production zones, it was possible to keep track on what floor to build and when, and to connect production to time planning on a weekly basis. In order to handle the coordination of procurement, NCC needed to use the production planning and then to count backwards in order to decide when to order what.

To facilitate the production of the Skandion clinic, Akademiska Hus introduced a new type of meeting, so called NAV-meetings (referring to a meeting for the "core actors"). The intention behind the meetings was to increase the interaction between the planning organization and the production team and facilitate the partnering-related work. A NAV-meeting consisted of representatives from Akademiska Hus, the planning coordinator (Sweco), IBAs project leader and the production team from NCC. Thanks to these regular meetings, changes of the building documents and specific solutions were solved as a cooperative process between the companies. When needed, other companies involved in production such as installation companies and suppliers were invited to join the meetings. This new type of meeting not only enhanced interaction between planning and production but also has been important in relation to IBA

requirements and changes of the building documents along with the IBD related to the Skandion clinic.

A unique construction project resulting in a new partnering agreement

In late 2011, during the production of the Skandion clinic, Akademiska Hus wanted to realize two new projects in partnering with construction companies; the University Administration Building, (Uadmin) belonging to Uppsala University, along with Ullshus belonging to the Swedish University of Agricultural Sciences (SLU). Both projects were expected to be costly and complicated. Uadmin displayed uncertainty concerning the time since large public opposition concerning the location could be expected. Moreover the façade would create difficulties since it required test fitting. Ullshus on the other hand demanded an integration of large quantities of wood in the building due to the 'wood profile' of SLU. In order to make the construction inquiry process more efficient, Akademiska Hus sent out one construction inquiry related to both projects: construction companies were encouraged to make proposals concerning both projects, Uadmin and Ullshus. The tenders were not only evaluated in terms of price but foremost in terms of project organization. As a consequence, the construction companies needed to suggest a suitable project organization for both projects and the construction company that was ranked as number one was free to choose which project to pursue. NCC was ranked as number one and decided to choose Uadmin, while Peab was ranked second and got the remaining project, Ullshus. For the Uadmin project, NCC presented a similar project organization as in the previous projects of Blåsenhus, Biocentrum and the Skandion clinic. For instance, the project leader along with project engineers and some foremen remained the same. Due to the partnering agreement, Akademiska Hus together with NCC decided to also use the same planning coordinator, Sweco, as in the Skandion clinic and Blåsenhus. Similarly, the installation companies, Bravida and Salléns, were the same as Blåsenhus, Biocentrum and the Skandion clinic. Moreover the Latvian frame supplier would once again supply the frame. The agreement is that in this project Akademiska Hus and NCC will have a partnering agreement but Sweco and the installation companies will also be included in the early planning meetings and all other meetings involved in carrying out the partnering agreement (workshops etc.). Hence the project organization from the Skandion clinic will once more be used but in a new construction project and this time several actors are informally involved in the execution of the partnering agreement.

Discussion

The central relationship in the construction project of the Skandion clinic, as well as in this study, is the one between the construction company NCC and the contractor and client Akademiska Hus. In fact, it is not a very traditional type of relationship between contractor and client as it is actually Akademiska Hus which develops and wins the bid making them the owner of the project, i.e. the contractor. However, although it has some implications for the incentives of Akademiska Hus to act in certain ways, for the sake of understanding the relationship as a partnering agreement in relation to the partnering literature, it can be treated as a "normal" partnering agreement between contractor and client. This discussion is focused on how this relationship is initialized and evolves into a formal partnering agreement as well as how it relates to other informal relationships across several projects. This is done by using the three

relationship dimensions of relationship duration, relationships partners and relationship development.

The relationship between Akademiska Hus and NCC in Uppsala dates back 20 years which means that they have been working together across a great number of projects. It is obvious that although several of the projects involve public procurement methods, NCC is a preferred partner of Akademiska Hus. This is expressed by Akademiska Hus in terms of NCC being one of those few companies having the capacity and resources to execute these types of large volume projects. This means that the company size of NCC matters but also that they have the capability to use their resources in an efficient way, which Akademiska Hus clearly benefit from. It is also beneficial for NCC to work with a client that has great knowledge of these types of projects; being the second largest property owner in Sweden with a focus on higher education and research, Akademiska Hus represents a highly knowledgeable and influential client. Combining these resources over time has clearly turned out to be beneficial for both Akademiska Hus and NCC. Another long-term relationship in the Skandion project is that of Akademiska Hus and the local unit of the consultancy firm Sweco in Uppsala. This relationship dates back about 15 years. Also the relationships between Akademiska Hus and Bravida and Sallén dates back a long time and involve several projects. The projects which are in focus of this study are two projects which precede the construction of the Skandion and one that follows. In all these four projects these five actors (NCC, Akademiska Hus, Sweco, Bravida and Sallén) collaborate. Also, this "core organization", consisting of not only particular companies but also re-occurring individuals, has been used for the bidding of several projects as a way to strengthen the bid. It is thus not just the relationship between the construction company and the contractor which transcends the boundaries of these projects but a number of other, interrelated relationships. This suggests several interesting things in relation to the three relationship dimensions of duration, partners and development.

In relation to *duration* it means that there is a strategic and thus long-term dimension of the relationships in these projects; rather than basing their collaboration on "best price" these actors are working together from a strategic standpoint as there are both short-term and long-term benefits to be made from doing so. In relation to *partners*, it is clear that these relationships are interrelated in the sense that the function of one relationship in the individual project depends on one or several of the other relationships. For instance, the relationship between Akademiska Hus and NCC actually depends on their relationships with the other actors, perhaps most importantly with Sweco as this is a central actor in the planning organization. The importance of this actor is evident through its inclusion in partnering type of meetings already in the Skandion project (the NAV-meetings). The interdependence between the relationships seems functional from the companies' point of view as it appears as all these parties are finding benefits from working together in this core organization across projects. In this regard these actors appear to constitute a type of strategic and thus 'permanent' network, which according to Dubois and Gadde (2002a) induces a number of strategic benefits such as opportunities of innovation and increased efficiency. In relation to *development* there is a clear evolution across time and projects of not only the relationship between Akademiska Hus and NCC but also with the three other actors and thus across the interrelated business relationships. While Akademiska Hus and NCC have been working together in projects for about 20 years, until the Skandion project, formally none of the

others were partnering projects. The construction of the Skandion clinic thus initiated a formal partnering agreement between these two parties and it did so in an early stage; Akademiska Hus included NCC as a partnering company already in the bid as a condition for executing the project. This means that compared to the other projects Skandion represented a different kind of construction, and as has been indicated, a highly complex and risky project. It was this complexity, uncertainty and thus high level of risk, which motivated Akademiska Hus to engage in a partnering agreement with NCC. However, it was not just the features of the project which encouraged partnering with this particular construction company; the initiation of the partnering agreement was related to an informal relationship in which trust had developed over a long period of time and a large quantity of projects. This means that, just as indicated by Eriksson and Nilsson (2008), the informal relationship of working closely and quite collaboratively in earlier projects, in spite of classical contracting, *developed* into a formal partnering agreement in this particular project. This was a way to share the risk, but also enabled an even closer collaboration throughout the construction process in terms of for instance purchasing, decision making and integrating planning and production. Also, although the planned project of the administration building (Uadmin) is not nearly as complex or risky as the Skandion clinic, Akademiska Hus and NCC will continue working through a partnering agreement. The dyad of Akademiska Hus and NCC, and the evolution of this relationship, is also closely interrelated to the development of the other relationships in the core organization appearing across the four investigated projects. As the partnering agreement is initiated the planning coordinator Sweco is also incorporated in partnering-type of meetings (NAV), and in the subsequent project of Uadmin, Sweco, Bravida and Sallén will all be part of the meetings and activities related to the partnering agreement between Akademiska Hus and NCC. The ambition is to include all these actors as early on in the planning process as possible and form a collaborating group throughout the construction process. These interrelated relationships are thus evolving across the projects as both formal and informal partnering arises throughout a network of actors.

The case illustrates the need to understand partnering not just as part of single relationships or dyads but as part of a *network of relationships*. Also, as there are clearly interrelated relationships transcending the temporary project network, and thus represent a 'permanent' network, it also illustrates the need to understand partnering from an *inter-project* perspective. Therefore we suggest a framework that allows for the analysis of partnering agreements from the perspective of four dimensions of partnering covering two levels of relationships -dyadic and network, and two project settings - the single project (intra-project) and several projects (inter-project) (See figure 1). The first dimension is the *dyadic relationship* in the *intra-project setting*. In this dimension focus is set on the two parties closing the formal partnering agreement and how it is related to the conditions of the specific project. The second dimension is the *dyadic relationship* in the *inter-project setting*. This dimension concerns the development of the single relationship across projects and how this development relates to the initiation and/or evolution of partnering. The third dimension is the *network of relationships* in the *intra-project setting*. Here focus is set on the interrelated business relationships (formal and informal) related to the partnering agreement and how it is connected to the conditions of the single project. The fourth dimension is the *network of relationships* in the *inter-project setting*. This dimension is the most complex in terms of intending to capture the network structure which the partnering agreement is part of and how it evolves

across projects. According to Bygballe et al. (2010) this is also the "missing" dimension of the partnering literature which mostly focuses on single relationships within single projects.

		Relationship level	
		Dyad	**Network**
Project setting	**Intra-project**	How the partnering agreement relates to two parties within the single project	How the partnering agreement relates to several interrelated relationships within the single project
	Inter-project	How the partnering agreement relates to an evolving relationship across several projects	How the partnering agreement relates to several interrelated and evolving relationships across several projects

Figure 1. *Four inter-organizational dimension of partnering.*

REFERENCES

Alderman, N., Ivory C. (2007), "Partnering in major contracts: Paradox and metaphor", International Journal of Project Management, 25 (4), 386.

Barlow J. and Jashapara A. (1998), "Organisational learning and inter-firm partnering in the UK construction industry", *The Learning Organization*, 5(2), 86-100.

Beach, R., Webster, M., Campbell, K.M. (2005), "An evaluation of partnership development in the construction industry", International Journal of Project Management 23, 611–621.

Bennet, J. and Jayes, S. (1995), Trusting the Team: the Best Practice Guide to Partnering in construction, University of Reading.

Bennett, J., and Jayes, S. (1998). The seven pillars of partnering: A guide to second generation partnering, Thomas Telford, London.

Bresnen, M., Marshall, N., (2000a). "Partnering in construction: a critical review of issues, problems and dilemmas", Construction Management and Economics, 18, 229–237.

Bresnen, M., Marshall, N. (2000b), "Building partnerships: case studies of client- contractor collaboration in the UK construction industry", Construction Management and Economics 18, 819–832.

Bygballe L.E.,Jahre M., and Swärd A. (2010), Partnering relationships in construction: A literature review Journal of Purchasing & Supply Management, 16, 239–253.

Cain, T. C., 2004. Profitable Partnering for lean Construction, Oxford: Blackwell Publishing.

Castro I., Galan J.L., and Casanueva C. et al. (2009), Antecedents of construction project coalitions: a study of the Spanish construction industry, Construction Management and Economics, September, 27, 809–822

Chan, A. P. C., Chan, D. W. M., and Ho, K. S. K. (2002), "An analysis of project partnering in Hong Kong." Research Monograph, Dept. of Building and Real Estate, Hong Kong Polytechnic Univ.

Chan, A. P. C., Chan, D. W. M., and Ho, K. S. K. (2003). "Partnering in construction: Critical study of problems for implementation.", Journal of Management Engineering, 19(3), 126–135.

Chan, A. P. C., Chan, D. W. M., and Yeung, J. F. Y. (2009), "Relational contracting for construction excellence—principles, practices and case studies." Spon Press, Oxon, England.

Cheng, E.W.L., Li, H., Love, P.E.D. (2000), Establishment of critical success factors for construction partnering. Journal of Management in Engineering 16 (2), 84–92.

Construction Industry Institute (CII) (1991), In Search of Partnering Excellence. CII Special Publication, Construction Industry Institute, Austin, Texas

Cheng, E. W. L., and Li, H. (2001). "Development of a conceptual model of construction partnering." Eng., Constr., Archit. Manage., 8(4), 292–303.

Cook, E. L., and Hancher, D. E. (1990), "Partnering: Contracting for the future." Journal of Management in Engineering, 6(4), 431–446.

Crane, T.G., Felder, J.P., Thompson, P.J., Thompson, M.G. and Sanders, S.R. (1997), "Partnering process model", Journal of Management in Engineering, 13(3), 57-63.

Crespin-Mazet, F., Ghauri, P. (2007), "Co-development as a marketing strategy in the construction industry", Industrial Marketing Management, 36 (2), 158-172.

Crespin-Mazet F., Portier P. (2010), The reluctance of construction purchasers towards project partnering, Journal of Purchasing & Supply Management, Special Issue "Purchasing and supply management in the construction industry", 16, 230-238.

Dainty, A. R. J., Briscoe, G. H., and Millett, S. J. (2001). "Subcontractor perspectives on supply chain alliances." Construction Management and Economics, 19 (8), 841–848.

Davis Langdon & Seah Consultancy. (2006). "Partnering and contracts— Dichotomy of cultures."Executive summaries for the practitioner, 6(2), 1–8.

Dubois, A., Gadde, L.E. (2000), "Supply strategy and network effects – purchasing behaviour in the construction industry", European Journal of Purchasing and Supply Management, 6, 207-215.

Dubois, A., Gadde, L-E. (2002a), « The construction industry as a loosely coupled system: implications for productivity and innovation", Construction Management and Economics, 20, 621–631.

Dubois, A., Gadde, L.-E., (2002b), Systematic Combining: An Abductive Approach to Case Research, *Journal of Business Research*, Vol. 55, pp. 553-560

Eisenhardt, K. M., 1989, Building Theories from Case Study Research, *Academy of Management Review*, Oct 89, Vol. 14, Issue 4, pp. 532-550.

Gadde, L.E., and Dubois, A. (2010), Partnering in the construction industry – Problems and opportunities, Journal of Purchasing & Supply Management, 16, 254-263.

Gadde, L.E., Hakansson, H. (2001), Supply Network Strategies. Chichester: John Wiley

HM Government (1995), Setting New Standards: A Strategy for Government Procurement, HMSO, London.

Hong Y., Chan D.W.M., ASCE M., Chan A.P.C., and Yeung J.F.Y. (2012), "Critical Analysis of Partnering Research Trend in Construction Journals", Journal of Management in Engineering , 82-95

Kadefors, A. (2004), "Trust in project relationships- inside the black box", International Journal of Project Management, 22, 175-182.

Kaluarachchi, Y., Jones, K., 2007. Monitoring of a strategic partnering process: the amphion process. Construction Management and Economics 25, 1053–1061.

Kubal, M.T., 1996. The future of engineered quality. Journal of Management in Engineering 12 (5), 45–52.

Larson, E. (1995). "Project partnering: Results of study of 280 construction projects.", Journal of Management in Engineering, 11(2), 30–35.

Latham, M., 1994. Constructing the Team, London: HMSO.

Li, H., Cheng, E. W. L., and Love, P. E. D. (2000), "Partnering research in construction", Engineering., Construction, Architecture Management, 7(1), 76–92.

McNeil, I. (1985), Relational contract: what we do and do not know, Wisconsin Law Review, 483-525.

Möller, K. E., Wilson, D.T., (1995), Business Marketing: An Interaction and Network Perspective. Kluwer, Boston, MA

NEDO (1988), Faster Building to Commerce. The Business Round Table, London.

Ng, S. T., Rose, T. M., Mak, M., and Chen, S. E. (2002). "Problematic issues associated with project partnering—The contractor perspective", International Journal of Project Management, 20(6), 437–449.

Nyström,J. (2005), "The definition of partnering as a Wittgenstein family—resemblance concept", Construction Management and Economics, 23, 473–481.

Packham, G., Brychan, T., Miller, C., (2003), Partnering in the house building sector: a subcontractor's view. International Journal of Project Management 21 (5), 327–333.

Phua, F. T. T. (2006). "When is construction partnering likely to happen? An empirical examination of the role of institutional norms", Construction Management and Economics, 24(6), 615–624.

Rahman, M. M., and Kumaraswamy, M. M. (2004). "Contracting relationships trends and transitions", Journal of Management in Engineering, 20(4), 147–161.

Saad, M., Jones, M., James, P. (2002), "A review of the progress towards the adoption of supply chain management (SCM) relationships in construction", European Journal of Purchasing and Supply Management 8, 173–183.

Sai-On, C., Thomas S.T. Ng, Shek-Pui, W., Henry, C.H. (2003), "Behavioural Aspects In Construction Partnering", International Journal of Project Management, 21, 333-343.

Sze, E., Kumaraswamy, M., Wong, T., and Yeung, N. (2003), "Weak links in 'partnering' supply chain?" Second Int. Conf. on Construction in the 21st Century, Sustainability and Innovation in Management and Technology, Hong Kong Polytechnic Univ., Hong Kong.

The Institution of Civil Engineers (1996), Whither Civil Engineers?, Thomas Telford, London.

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

Uher, T. (1994), Partnering: Who benefits? Australian Project Manager, 21–43.

Walker, D. H. T., Hampson, K. D., and Peters, R.J. (2002). "Project alliancing vs project partnering: A case study of the Australian national museum project." Supply Chain Management International Journal, 7(2), 83–91.

Wong, P.S.P., Cheung, S.O.C. (2004), Trust in construction partnering: views from parties of the partnering dance. International Journal of Project Management, 22 (6), 437–446.

Yin, R.K., 2003, *Case study research: Design and methods*, Third Edition, Sage Publications, Thousand Oaks, CA.

Appendix 1: Interviews

Number	Organization	Position	Date
1	Akademiska Hus and NCC	Project Leader Project Manager	20121010
2	Sweco	Planning Coordinator	20121102
3	NCC	Project Engineer	20121102
4	KAS	Chief Physist	20121104
5	Akademiska Hus	Project Leader	20121121
6	IBA	Project Leader	20121121
7	NCC	Site Manager	20121122
8	Bravida	Project Leader ventilation	20121204
9	NCC	Project Manager	20130419
10	Akademiska Hus	Construction Manager	20131013
11	Akademiska Hus	Project Leader	20131016
12	Akademiska Hus	Project Leader	20131022
13	Link Arkitektur	Architect	20131025
14	Art	Art Consultant	23131025
15	Sweco	Planning Coordinator	20131029
16	KAS	Director	20131030
17	NCC	Site Manager	20121108
18	Akademiska Hus	Project Leader	20131108
19	IBA	Project Leader	20131114
20	Link Arkitektur	BIM Coordinator	20131127