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Partnering: definition, theory and evaluation

Johan Nyström

Academic dissertation

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Abstract

The concept of partnering in the construction industry stands for a collaborative way of working. Examples of partnering projects can be found on every continent. As suggested in the title this thesis makes contributions to three areas of partnering research: the definition of partnering, the theory behind partnering and how to evaluate the effects of the concept.

The thesis consists of six papers with the following main results. A new definition of the concept is provided with the partnering flower in the first paper. This definition model is a concrete, flexible and structured way to define partnering. It forces people to concretise and pinpoint which components they include in partnering in a specific setting. The second paper uses contract theory to understand how partnering can be justified from an efficiency perspective. Partnering can either be seen as something that neutralises opportunism when there is an incomplete contract or something that reduces transaction costs for renegotiation of complete contracts when new information arises. Paper 3 is an empirical study of attitudes towards partnering in the Swedish construction industry, which complements the preceding studies. Among the results can be mentioned that support for the definition of partnering presented in paper 1 is found and that most respondents do not see partnering just as a new fad - a result that is consistent from 2004 to 2006. With the theory and the definition settled, it remains to evaluate the effects of partnering. This is done in two steps. The first step (in paper 4) is through reviewing earlier evaluations and providing suggestions on how the assessments can be improved. One of these suggestions is applied in paper 5, with a quasi-experimental evaluation of partnering comparing ten partnering projects to ten similar non-partnering projects. With improved data, mainly based on site meeting minutes, and a more well-founded method, no support can be found for the strong positive outcome of partnering reported in earlier evaluations. The final paper makes a contribution to economic contract theory by questioning one of the essential assumptions in this literature, the distinction between observable and verifiable characteristics. This aspect surfaced during the study of partnering contracts and contract theory.

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Johan Nyström

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Building and Real Estate Economics
School of Architecture and the Built Environment
Royal Institute of Technology

Royal Institute of Technology (KTH)
School of Architecture and the Built Environment
Building and Real Estate Economics
SE-100 44 Stockholm

Tryckt av Tryck & Media, Universitetsservice US-AB, Stockholm

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Partnering: definition, theory and evaluation – summary and concluding analysis

Partnering: definition, theory and evaluation – summary and concluding analysis

1. Introduction

The concept of partnering in the construction industry stands for a collaborative way of working. Examples of partnering projects can be found on every continent.[1] As suggested in the title this thesis makes contributions to three areas of partnering research: the definition of partnering, the theory behind partnering and how to evaluate the effects of the concept.

The first paper in the thesis provides a definition of partnering in the construction industry; this is followed, in paper 2, by a theory that shows how partnering can be efficiency enhancing. Paper 3 is an empirical study of attitudes towards partnering in the Swedish construction industry, which complements the preceding studies. When the theory and definition are settled, it remains to evaluate the effects of partnering. This is done in two steps. The first step (in paper 4) is through reviewing earlier evaluations and providing suggestions on how the assessments can be improved. These suggestions are applied in paper 5, which is a quasi-experimental evaluation of partnering based on ten partnering projects and ten comparable non-partnering projects. The final paper (co-written with Hans Lind) makes a theoretical contribution to the economic research of contracts by scrutinising one of the essential assumptions in this literature. This aspect surfaced during the study of partnering contracts and contract theory. To sum up, the thesis consists of the following six papers:

Paper 1: *The definition of partnering as a Wittgenstein family-resemblance concept*
Paper 2: *Theoretical foundations of partnering*
Paper 3: *Partnering attitudes in the Swedish construction industry*
Paper 4: *The naivety of partnering assessments*
Paper 5: *A quasi-experimental evaluation of partnering – 558 site meeting minutes from 10 comparable projects*
Paper 6: *"Observable" and "verifiable": Can these be the basic concepts in incomplete contract theory?* (co-author Hans Lind)

The thesis follows a natural structure of defining, theorising and evaluating the concept of partnering. This structure will also be followed in the succeeding summary with some additional reflections on partnering and the thesis as a whole. The next section will give a short background description of the dissertation work.

2. Background information

This doctoral project has been financed by the Swedish National Road Administration (SRA), the Swedish National Rail Administration (Banverket) and SBUF[2] through CDU[3]. The topic and the title *Client–contractor cooperation in infrastructure*

[1] E.g. see Peña-Mora and Harpoth (2001) for the Tren Urbano Project in South America and Ngowi (2007) for African projects. Asian, Australian, European and North American projects are frequent in the literature.
[2] SBUF is the construction industry's organisation for research and development in Sweden.
[3] A centre for research on maintenance.

operation and maintenance management was specified before assigning a doctoral student, but not the design of how the project should be carried out.

A reference group was assigned to the project consisting of representatives from the financing organisations with practical partnering experience. Meetings have been held twice a year throughout the project, giving the author useful criticism, ideas and guidance. In February 2005 a licentiate thesis was published which included earlier versions of papers 1–3 (Nyström, 2005a).

The basic approach in this thesis can be derived from economic theory, which explains many of the choices made throughout the text. However, some deviations from mainstream economic assumptions and methods have been made where appropriate. The assumption of utility maximisation is relaxed in paper 2 and broadened with the introduction of the concept of reciprocity. Paper 5 adapts a quasi-experimental method to the evaluation of partnering, which was judged to be the most suitable method, given the specific circumstances. This thesis could be described as applied contract theory.

3. Definition: The partnering flower revisited

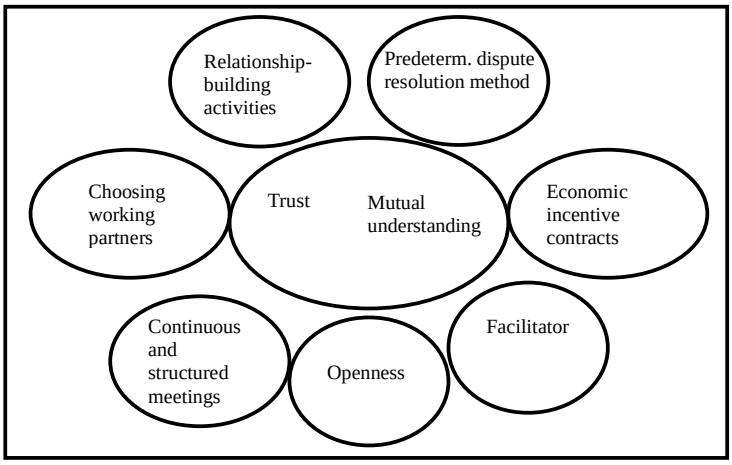
Naturally, the first topic at hand was to define the concept of partnering. Going through the literature numerous definitions of the concept were found. This can be explained by the fact that partnering projects differ from each other. Two contributions to the debate about the definition of partnering in the construction sector are made in the paper.[4] The first is a distinction between *general prerequisites*, *components* and *goals* when discussing the multifaceted concept of partnering.

To understand what is specific about partnering the focus should be on the components, which are identified through a literature review. This review concluded that there are two necessary components in partnering, trust and mutual understanding, and that a number of different components can be added in various combinations to form a specific variant of partnering. Paper 3 supports this result of the review, with trust and mutual understanding being the prominent components of partnering, according to Swedish project managers.

[4] Published in Construction Management Economics, 23(5), 473-481.

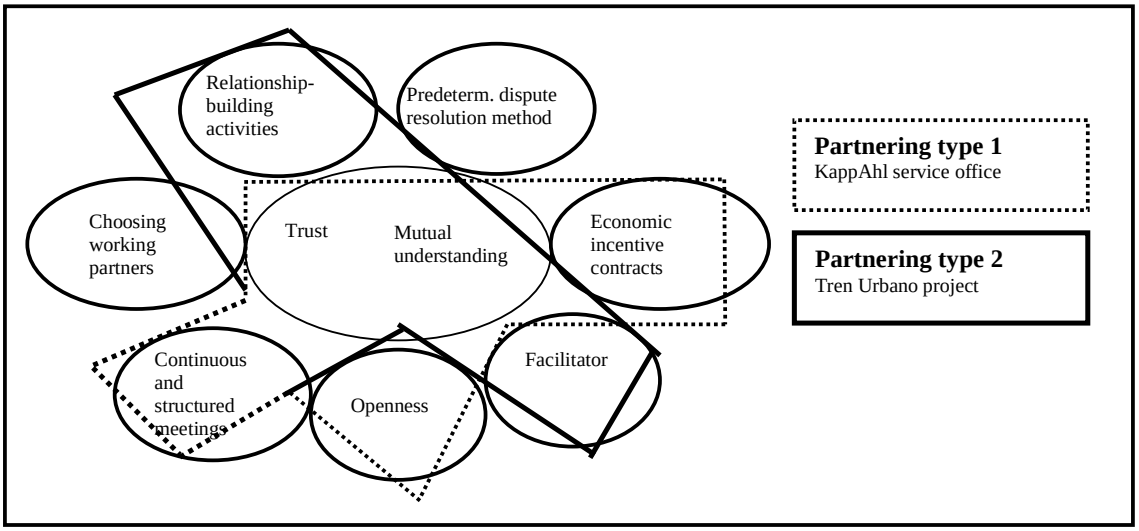
The second contribution is to apply Ludwig Wittgenstein's idea of family resemblance to the partnering concept. His idea is that a complex concept can be understood as a network of overlapping similarities. Appling this to the literature review provides a new method of defining the vague and multi-faceted concept of partnering in a flexible and structured way. The idea is that partnering can be described as a "flower", with necessary components in the centre and a set of the non-necessary components that are the petals of the flower, as seen in figure 1.

Figure 1. The partnering flower



The structure described above enables a practical application of the somewhat vague concept of family resemblance. Different designs of partnering projects can be captured within the same structure. Figure 2 indicates how two geographically separated variants of partnering projects can be captured within the same structure.

Figure 2. The applied partnering flower

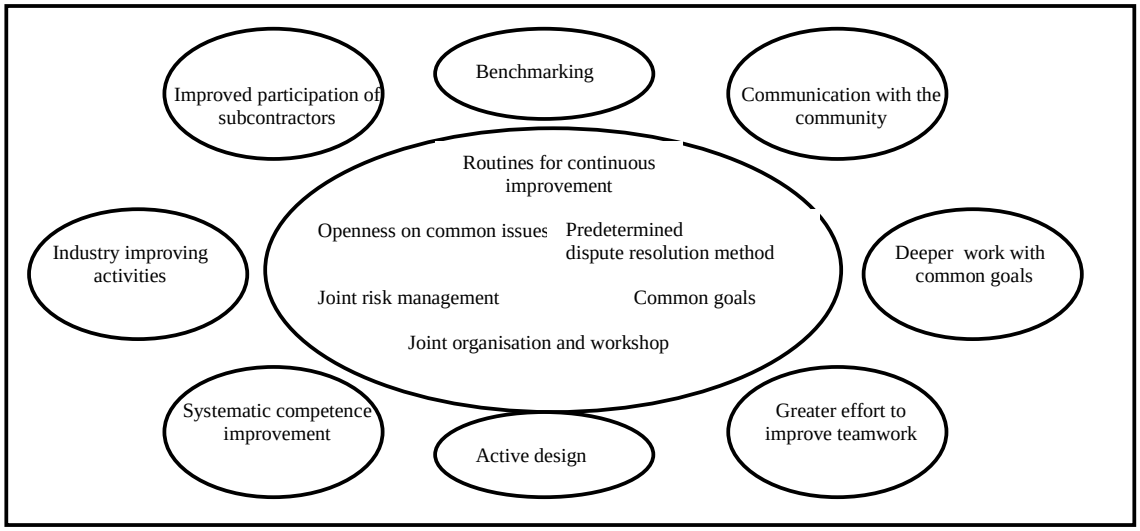


This approach, presented in Nyström (2005b), has recently been used by Yeung et al. (2007) to define alliance contracts.

Despite this interest in the initial version of the partnering flower, some shortcomings have arisen after publication. The flexibility of capturing different variants and forcing people to concretise what components they include in partnering still holds, but some of the components are too vague. Practitioners have pointed out that it can be difficult to decide whether e.g. trust and openness are present, and it is therefore difficult to define partnering in this way since the terms are somewhat lacking in precision.

A report aimed at practitioners, building on the same flexible structure, has provided more concrete components. FIA is an initiative on the part of the SRA and Banverket to gather clients and contractors in the construction industry with the intention of improving the sector. One task force was assigned to work out practical guidelines for partnering.[5] The working group consisted of nine people representing clients, contractors and consultants.[6] Six compulsory and eleven optional components for partnering were described. The report did not use the flower setting but made a distinction between compulsory and optional components in order to keep the idea of a flexible definition. Hence using the components in FIA's model, as in figure 3, makes the partnering flower more concrete and applicable.

Figure 3. FIA´s partnering flower



The FIA partnering flower is a concrete, flexible and structured way to define partnering. It forces participants to concretise and pinpoint which components they include in partnering in a specific setting.

4. Theory: How partnering can be efficiency enhancing

Since the partnering relationship concerns an economic transaction between two parties a natural way to approach the concept was through contract theory.

Coase (1937) posed the question of what determines the boundaries of the firm, a question that could not be answered by the neoclassical theory where the firm was

[5] The term "extended collaboration" (author's translation) was used instead of partnering.
[6] The author of this thesis was also involved.

seen as a "black box" transforming inputs to outputs. Transaction costs came up as an explanation as to why certain things are organised within a firm and certain things are bought on the market. This explanation presupposed a theory of incomplete contracts. Contracts are incomplete in the sense that they cannot be completely *enforced*, cannot include all *contingencies* and are costly to *write*.[7]

Accepting this view entails that contracts can be understood as more or less complete on a continuous scale. The motive for making a contract less complete is to avoid transaction costs ex ante, i.e., writing costs, but it leads to ex post bargaining costs and risks for opportunistic behaviour. Hence, there is a trade-off between the risk of opportunism and having to spend resources on making the contracts more complete. The use of incomplete contracts creates an incentive to reduce the risk of opportunism, e.g. through some sort of trust, repeated interaction or, in the extreme case, vertical integration (Grossman and Hart, 1986). A more incomplete contract based on trust and repeated interaction is usually referred to as a relational contract. The relational contract is, in comparison to what Gibbons (2005) calls *formal contracts*, based upon outcomes that only can be verified ex post by a third party, e.g. a court, and not specified ex ante. It is a more incomplete contract, which disregards the task of specifying contingencies and instead focuses on developing a framework for handling new information as it comes up during the contract period. There are two different explanations for what stops the parties from deviating from the implicit contract and cheating on each other, either through repeated interaction, or trust, or a mixture of the two. Repeated interaction is often modelled in a game theory setting.

Going through the literature, it was found that a relational contract and partnering have a lot in common. In a construction project the incomplete relational contract could be exemplified by an initial contract not specifying more than the intention of building a certain type of house. The contract would then be filled in step by step during the project. Partnering could then be seen as a way to protect both parties against cheating by the other party, through a mixture of trust and repeated interaction. This way of defining partnering, somewhat simplified, coincides with the view of one of the leading Swedish construction firms, NCC (NCC, 2007). NCC has pushed partnering issues further in Sweden and makes a case for early involvement of the contractor in the project. The company argues that, in order to use the full capacity of partnering, the contractor needs to be involved in the design phase. Early involvement entails relatively incomplete contracts where, as argued above, partnering enhances efficiency by protecting both parties from opportunism through trust/repeated interaction and avoiding initial writing costs.

When studying SRA´s and Banverket's partnering contracts for maintenance this type of situation was not found. Paradoxically, the contracts were relatively complete, specifying in detail how the work was to be done. Since a complete contract reduces the risk of being exploited by an opportunistic counterpart, investing in a partnering arrangement should not be called for when the parties have a (relatively) complete contract. Why would anyone choose a costly partnering arrangement to neutralise

[7] A central underlying assumption in formal incomplete contract theory (e.g. Hart and Moore, 1999) is that information is observable by both parties but non-verifiable by a third party, e.g. a court. This assumption is scrutinised in paper 5 and it is concluded that this assumption should be questioned and that the degree of verifiability is endogenous and depends on ex ante decisions by the contracting parties.

opportunism when the risk is reduced to a minimum by a complete contract? The second paper in the dissertation investigates what could be a logical explanation for this.

Three things need to be clarified in order to explain this phenomenon, partnering and complete contracts. The first is that it is realistic to assume that new information arises during a construction project, and that this new information leads to the possibility of pareto-sanctioned improvements through renegotiations. The second point consists in assuming that the client is risk-averse. If not, an incomplete contract would have been chosen and new information would be handled as the contract period progresses. With a risk-averse client and new information arising during the project, partnering could be justified as a reciprocity-enhancing activity, making it easier to renegotiate the complete contract. Reciprocity is then the third aspect and this is a topic that has been much discussed in economic theory recently. The idea is that human beings should not just be assumed to care exclusively about themselves.

The central argument in the paper is that introducing partnering in a contract will raise the probability of the parties acting in accordance with reciprocity. This facilitates renegotiations because the client and the contractor have a good relationship based on trust, a reputation mechanism and/or reciprocity. Stylised examples from maintenance contracts in Sweden will, based on the above reasoning, show how partnering can be efficiency-enhancing within a complete contract by lowering the transaction costs for renegotiations of various aspects of the complete contract. Three types of new information are used in the examples: technological improvements, changed demands and information about costs for the agreed measures and/or functions.

Paper 2 concludes that there are two different types of partnering, depicted in figure 4: one with incomplete contracts and one with complete contracts, and that the justification for partnering differs between the two cases.

Figure 4. Two types of partnering

In the first case partnering can be seen as a relational contract with the aim of neutralising opportunism and thereby reducing the risk in an incomplete contract. The second and more innovative interpretation of partnering is to focus on the use of partnering in combination with a (relatively) complete contract, which has been observed in the Swedish construction industry. Partnering can then be justified as a way to facilitate renegotiations when new information arrives during the project and the client is risk-averse. Investing in a procedure to enhance trust and reciprocity can

be efficiency enhancing because it will reduce the cost for, and increase the probability of, carrying out pareto-sanctioned renegotiations.

5. Evaluation: method and results

The licentiate thesis provided a definition and a theory of the partnering concept. The main remaining work was to make an evaluation of the effects of partnering in Sweden. This work was initiated by reviewing earlier evaluations and working out a method for improving the evaluations.

5.1 How should partnering be evaluated?

Construction management literature often argues that gains are to be made by using partnering in terms of quality, cost and duration (e.g. Bennett and Jayes, 1998). Voices have, however, been raised for approaching partnering from a more critical perspective (Green, 1999; Bresnen and Marshall, 2000) i.e., to look at both the advantages and disadvantages when investigating the concept. The fourth paper investigates how partnering should be evaluated in scientific way.

It begins by setting out three conditions that a good evaluation should fulfil. In order to assess the effects of partnering in a valid way, the evaluation needs to

(i) be based on project facts and not personal perceptions,
(ii) make a comparative analysis, including both partnering and non-partnering projects and
(iii) control for other variables that can affect cost and quality in order to extract the unique effect of partnering.

These conditions are then applied to earlier partnering evaluations, where three types of studies can be distinguished: surveys, case studies and comparative studies with a large number of observations. Partnering shows, according to the reviewed studies, most potential for improving communication and the relationship between parties. However, none of the reviewed papers fulfil all three conditions formulated above, so there are shortcomings in the evaluations. Instead it is suggested that either regression analysis or a quasi-experimental approach, with project data, should be used to evaluate partnering, as these methods are based on comparisons and control for other affecting variables when measuring the effect of partnering.

From an economics perspective an argument is made for focusing evaluations on the variables that create value, i.e., cost and quality. However, these variables are often hard to measure and, in practice, various indicators related to cost and quality can provide useful data. Suggested indicators are time (delays), contract flexibility, amount of additional work and number of disputes.

5.2 An example: the quasi-experimental evaluation of partnering

Paper 5 sets out to apply the principles suggested in paper 4 in a quasi-experimental evaluation of partnering. This method strives to match partnering projects with non-partnering projects that are as similar as possible in the relevant variables in order to isolate the effect of partnering on the outcomes of the project (Rossi, 1989). In comparison to a regular experiment, this method relies on matching instead of random sampling when constructing the treatment and control groups (Vedung, 1998).

20 publicly procured Swedish projects are studied. Matching has been done according to type of project, type of specifications, type of contracts, organisational size and geographical proximity. Partnering is defined as a project where partnering (or partnership/collaboration) or something similar is mentioned in the tendering documents. The analysed material consists of 558 site meeting minutes, but tendering documents, contracts, economic outcomes, different forms of outcome reports, e.g. final inspections and revisions, external project reports and customer satisfaction surveys were also studied. The strategy when going through the data was to focus on the outcome variables defined in paper 4: cost, quality, and the indicators time, contract flexibility and disputes.

Table 1 summarizes the outcome for the investigated variables in each match.

Table 1. Summary of evaluations per match

	Overall	Quality	Lowest cost	Contract flexibility	Avoidance of disputes	Time*
Match 1	Partnering	No difference	Partnering	Partnering	No difference	-
Match 2	Partnering	No difference	Partnering	No difference	No difference	-
Match 3	Non partnering	No difference	-	Non-partnering	Non-partnering	-
Match 4	Partnering	Partnering	-	No difference	Partnering	-
Match 5	Non partnering	No difference	-	No difference	Non-partnering	-
Match 6	Partnering	Partnering	-	No difference	Partnering	-
Match 7	Non partnering	No difference	-	Non-partnering	Non-partnering	-
Match 8	Partnering	Partnering	-	Partnering	Partnering	-
Match 9	Non partnering	Non-partnering	Non-partnering	Partnering	No difference	No difference
Match 10	No difference	No difference	No difference	No difference	No difference	Partnering

* not applicable for maintenance
- indicates no data available

Comparison of the projects concluded in favour of the partnering project in five out of the ten matches, if the overall evaluation of the projects is used. Table 2 depicts the same data per variable.

Table 2. Summary of evaluations per variable

	Number of projects in favour of partnering	Number of projects in favour of non-partnering	Number of matches with no difference between the projects
Overall	5	4	1
Quality	3	1	6
Lowest cost	2	1	1
Contract flexibility	3	2	5
Avoidance of disputes	3	3	4
Time	1	0	1

No general trend can be seen in the outcome variables.

A distinction can be made among the matches, however, based on how partnering is interpreted and implemented in the specific project. Identifying partnering projects from what is stated in the tendering documents avoids the problem of only focusing on successful partnering projects, but it entails the potential dilemma of evaluating "partnering projects" carried out without the usual partnering components. A solution

to this problem is to use the partnering flower from paper 1 to ascertain that the "partnering" projects evaluated really included partnering components. In order to be classified as a "real" partnering project, a project should then at least include common goals. Examining the partnering project in the matches above, it can be concluded that although five projects mentioned partnering in the tendering documents they did not really include the central partnering components in the actual work. Matches 1, 2, 3, 8 and 9 included common goals at least and can, given these criteria, be considered as partnering projects as seen in table 3.

Table 3. Number of matches with no difference between the projects

	Number of projects in favour of partnering	Number of projects in favour of non-partnering	Number of matches with no difference between the projects
Overall	3	2	0
Quality	1	1	3
Lowest cost	2	1	0
Contract flexibility	3	1	1
Avoidance of disputes	1	1	3
Time	0	0	1

Even with the focus on this more homogenous group of "real" partnering projects, no overall trends in the outcome can be seen in the material. The partnering projects did however show some indication in favour of the economic outcome for the two SNR projects but not to a significant extent.

One insight is how hard it was to compare economic outcome in a meaningful way and how important it is to avoid just relying on reported figures. This was due to different reporting of costs, and lack of detail. The economic comparisons included, were either very clearly structured for both projects or the analysis was assisted by people involved in the projects.

6. Partnering and intangible effects

The thesis has provided a definition, a theory and an evaluation of partnering, which will be put into a broader perspective here.

6.1 The relationship between theory and evaluation

The absence of general positive effects of partnering does not necessarily exclude that partnering can create value. There are two ways of explaining the discrepancy between the theory in paper 2 and the evaluation in paper 5, which saves the theory from rejection. The theory suggests that partnering lowers transaction costs in order to improve the probability for efficiency improving renegotiations. Cost for renegotiations and additional work was, in most projects, not included in the evaluation due to unavailable data. It might be that the partnering projects were superior in this respect.

Another explanation can be found in seeing partnering as a sign of change in the problematic construction industry (see below). Then it might also be the case that non-partnering projects have been affected by this general will of improving. If all projects shape up, the effect of partnering would be hard to identify.

It should also be remembered that the final evaluation of the "real" partnering projects only included a small number of projects, for the simple reason that it turned out that there were only a few such projects that fulfilled the conditions.

6.2 Discussion of the evaluation result

A review of partnering evaluations in paper 4 showed that the most frequent outcomes of partnering were improving communication, improving the relationship between parties and better quality. These effects in favour of partnering could also be found in some of the matches analyzed, but not to a systematic and general extent.

Paper 4 argues, from an economist's point of view, that cost and quality are the variables that create value. To this can be added the comments on the absence of tangible effects of partnering in Gransberg et al. (1999) and Beach et al. (2005). Another related concern is the way in which earlier studies have been conducted by providing mostly anecdotal evidence (Bresnen and Marshall, 2000; Bresnen, 2007). The evaluation in paper 5 has tried to fulfil the demands of these critics and pushed the frontier for partnering evaluations forward. The lack of a common systematic and general trend in the evaluation casts a shadow over the earlier evaluations, due to the fact that this study was conducted with better data and with an improved method, even if the number of observations is small. Intangible effects, like more fun at the workplace, a more attractive profession, an improved picture of the construction industry, etc was deliberately neglected in favour of more tangible effects.

However, a reasonable question is whether partnering has its greatest impact concerning cost and quality and other tangible effects. Partnering in the UK and Sweden emerged as a reaction to critical governmental reviews of the construction industry. An appealing idea is that partnering could be seen as something that is intended to improve the general perception of a construction industry, a declaration of a will to change. Both the clients and the contractors in the UK and Sweden have had a common interest in achieving this, in order to e.g. attract a qualified younger generation to the sector. Partnering is likely to disappear as a specific term in time and many of its elements will be included in "traditional projects" and become the natural way of working.

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Partnering: definition, teori och utvärdering (Swedish summary)

Partnering: definition, teori och utvärdering

1. Inledning

Partnering är ett arbetssätt som baseras på samverkan mellan primärt beställare och utförare i byggbranschen. Begreppet återfinns på alla världens kontinenter.[1] Föreliggande avhandling lämnar, som framgår av namnet, tre huvudsakliga bidrag till partneringdebatten.

Den första artikeln definierar begreppet partnering på ett flexibelt men strukturerat sätt och följs av en teori kring varför partnering kan vara effektivitetshöjande. Skrift nummer 3 baseras på en enkät till 30 svenska beställare och entreprenörer med erfarenhet av partnering. Studien kartlägger upphandlingsfasen och attityder till begreppet. Tidigare versioner av dessa tre uppsatser ingick i licentiatavhandlingen (Nyström, 2005a). Den viktigaste delen av arbetet efter "licen" var att utvärdera effekterna av partnering. Arbetet inleddes med att kartlägga tidigare utvärderingar av begreppet och analysera vad som kunde förbättras när det gällde utvärderingsmetoden. Förslag till förbättrade metoder presenteras varav ett av dessa genomförs i avhandlingens det femte uppsats, där 10 partneringprojekt jämförs med 10 icke-partneringprojekt i en sk. kvasiexperimentell studie. Metoden syftar till att med en icke slumpmässig metod matcha så lika projekt som möjligt för att jämföra utfallen. Den sista artikeln är skriven tillsammans med Hans Lind och ifrågasätter ett grundläggande antagande inom nationalekonomisk kontraktsteori; att ofullständiga kontrakt kan förklaras med att det finns situationer som är observerbara för de kontrakterande partnerna (läs beställare och entreprenör) men inte verifierbara för en tredje part (läs domstol). De följande sex uppsatserna ingår alltså i avhandlingen:

Uppsats 1: *The definition of partnering as a Wittgenstein family-resemblance concept*
Uppsats 2: *Theoretical foundations of partnering*
Uppsats 3: *Partnering attitudes in the Swedish construction industry*
Uppsats 4: *The naivety of partnering assessments*
Uppsats 5: *A quasi-experimental evaluation of partnering - 558 site meeting minutes from 10 comparable projects*
Uppsats 6: *"Observable" and "verifiable": Can these be the basic concepts in incomplete contract theory? (skriven tillsammans med Hans Lind)*

Sammanfattningen följer i princip avhandlingens naturliga struktur av definition, teori och utvärdering. Vissa utökade diskussioner kring definitionen av partnering och dess roll inkluderas också samt en avslutning kring bidraget i avhandlingen. Nästa avsnitt ger först en bakgrundsbild till avhandlingsarbetet.

2. Bakgrund

Detta projekt heter *Samverkan mellan beställare och utförare i drift och underhålls entreprenader* och ingår i CDUs (Centrum för Drift och Underhåll) tema för upphandling. Finansieringen kommer från Vägverket, Banverket och SBUF (Svenska Byggbranschens Utvecklingsfond). Till projektet har knutits en referensgrupp

[1] Tex Peña-Mora och Harpoth (2001) för ett projekt i Sydamerika och Ngowi (2007) för Afrika. Asien, Australien, Europa och Nordamerika är vanligt förekommande i litteraturen.

bestående av Hardy Wikström (Vägverket), Birgitta Törne (Banverket), Björn Granqvist (Skanska), Leif Byström (Vägverket), Lena Bergin Juhl (Vägverket), Carola Alzén (Banverket) samt Hans Kvarnlöf (Vägverket). Referensgruppen har bistått med många intressanta diskussioner och viktiga synpunkter. I handledargruppen ingick Hans Lind (KTH) (huvudhandledare), Seth Jonsson (LiTH) och Ulf Olsson (LuTH). Styrgruppen har inkluderat handledarena samt Hans Cedermark (CDU) och Håkan Westerlund (CDU).

Den grundläggande teorin för avhandlingen är nationalekonomisk, vilket kan förklara många av de val som är gjorda. En återkommande kritik mot denna skola är dess förenklingar i form av antaganden om människors och företags beteende. När det har bedömts lämpligt har dock avsteg gjorts från traditionell nationalekonomisk teori och metod för att anpassas till en mer rättvisande bild av de situationer som avhandlingen behandlar. Utvärderingen är gjord med en kvasiexperimentell metod, vilken lämpade sig bäst givet de data som fanns tillgängliga. Avhandlingen skulle kunna beskrivas som applicerad kontraktsteori.

3. Den uppdaterade partneringblomman

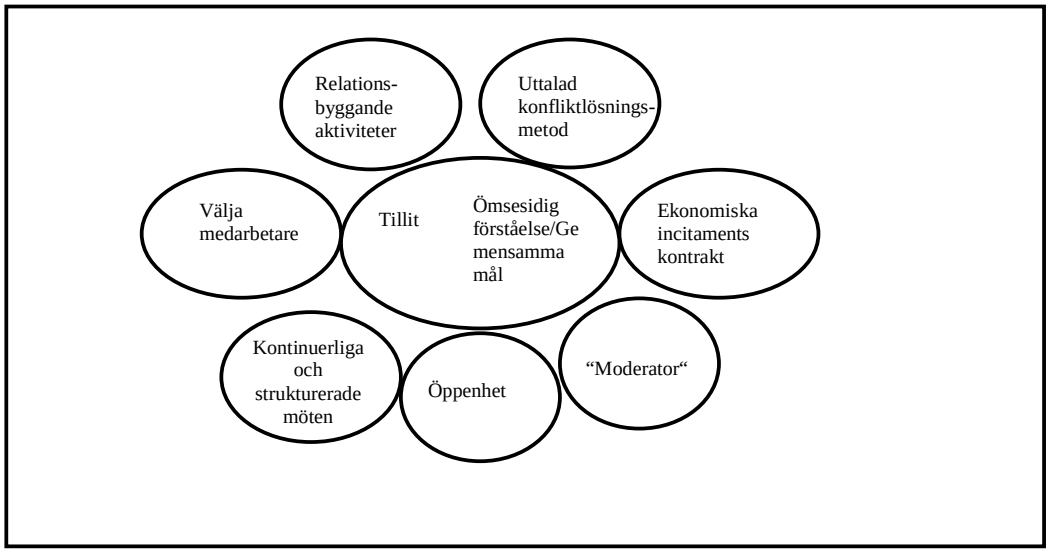
Det var naturligt att inleda avhandlingsarbetet med att definiera begreppet partnering. En genomgång av litteraturen i ämnet resulterade i en uppsjö av definitioner, vilket kan förklaras av att varje partneringprojekt är unikt i sig. Den första artikeln lämnar två bidrag till debatten kring definitionen av partnering. Först görs en uppdelning i generella förutsättningar, komponenter och mål med partnering. För att förstå begreppet argumenteras för att komponenterna är de intressanta. Dessa togs fram genom en litteraturgenomgång som resulterade i följande tabell 1, där X betyder att den aktuella komponenten inkluderats i den definition som presenterats i artikeln.

Tabell 1. Kategorisering av Partnering litteraturen

Artiklar/Komponenter	Tillit	Ömsesidig förståelse/ gemensamma mål	Ekonomiska incitaments kontrakt	Relationsbyggande aktiviteter	Kontinuerliga och strukturerade möten	Moderator	Välja medarbetare	Uttalad konfliktlösnings metod	Öppenhet
Barlow 2000	X	X	X			X			
Cheng et al. 2000	X	X			X	X		X	
Crane et al. 1999	X	X					X		
Kadefors 2002	X	X	X	X	X	X	X	X	X
Kemi 2001	X	X	X	X		X			
Koraltan och Dikbas 2002	X	X			X			X	
Kwan and Ofori 2001	X	X							
Larson 1995	X	X		X	X			X	X
Naoum 2003	X	X	X					X	
Ng et al. 2002	X	X				X		X	X
Packham et al. 2003	X	X	X	X	X				
Rhodin 2002	X	X		X	X	X		X	
Thompson och Sanders 1998	X	X	X	X				X	X
	13	**13**	**6**	**6**	**6**	**6**	**2**	**8**	**4**

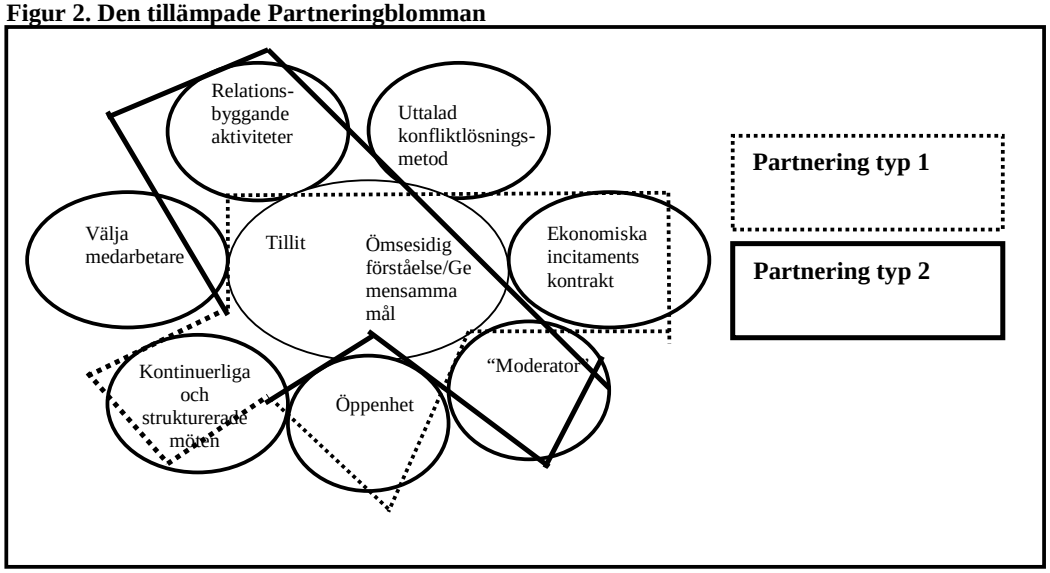
För att gå vidare med detta resultat applicerades tankegångar från den tyske filosofen Ludwig Wittgenstein. Han menade att komplexa begrepp inte går att definiera på ett traditionellt sett med nödvändiga och tillräckliga villkor utan bör ses som nätverk av överlappande likheter. Detta betraktelsesätt kom att kallas "Familjelikhet" - ungefär som medlemmar i en familj liknar varandra. Det behöver inte finnas något som alla har gemensamt, men för par av familjemedlemmar finns ett antal likheter. Genom att applicera detta synsätt på tabell 1 kan den sk partneringblomman skapas, se figur 1. Tanken bakom denna är att det finns två saker som, enligt litteraturstudien, "måste" höra till ett partneringprojekt, "Tillit" och "Ömsesidig förståelse/gemensamma mål". Utöver dessa kan partneringprojekt utformas på många sätt genom att kombinera olika varianter av de resterande komponenterna.

Figur 1. Partneringblomman



Detta utgör ett flexibelt men samtidigt strukturerat sätt att fånga olika varianter av partnering. Två exempel kan ses i figur 2 som visar hur konkreta partneringprojekt kan beskrivas med hjälp av partneringblomman.

Figur 2. Den tillämpade Partneringblomman

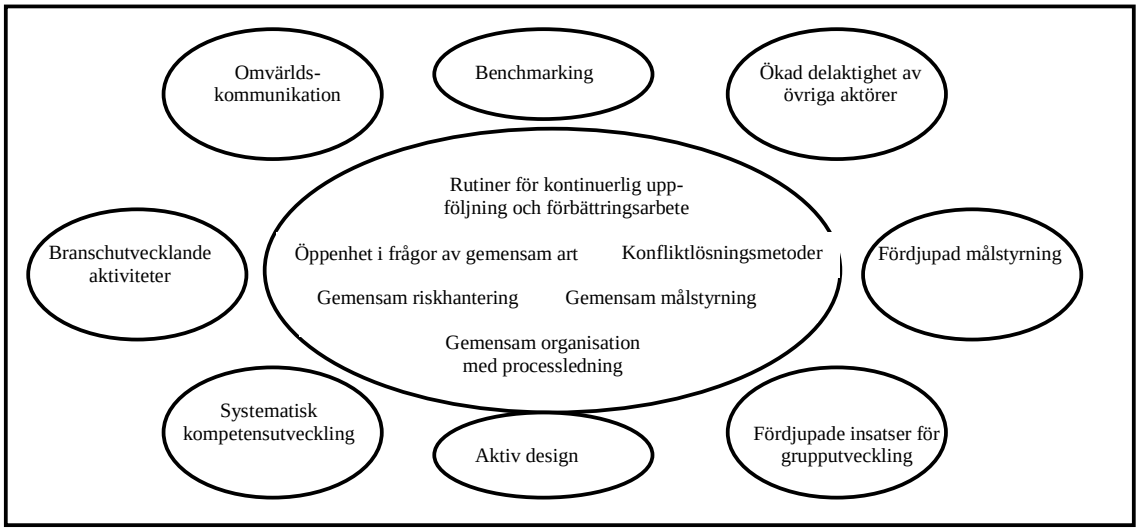


Definitionsmodellen är publicerad i tidskriften Construction Management and Economics (Nyström, 2005b) och har senare uppmärksammats av forskare i Hong Kong (Yeung et al., 2007), som har använt sig av modellen för att definiera allianser i byggsektorn.

Vissa svårigheter med modellen har dock uppmärksammats efter publicering. Definitionens flexibilitet och struktur håller fortfarande, men praktiker har påpekat svårigheter med att klargöra huruvida komponenter som tillit och öppenhet ingår. De är alltför vaga för att vara användbara när partnering ska definieras i praktiken.

Assistans för att konkretisera komponenterna har kommit från Vägverkets och Banverkets gemensamma ansträngningar att förnya anläggningsbranschen med FIA.[2] En arbetsgrupp med representanter från beställare, entreprenörer och konsulter fick i uppdrag att ta fram riktlinjer för att upphandla och arbeta i *Utökad Samverkan*.[3] I likhet med partneringblomman togs en flexibel men strukturerad modell fram men med mer konkreta komponenter. Dessa framställs dock i nivåer, men med obligatoriska och valbara moment. FIA:s komponenter återges i följande figur 3.

Figur 3. FIA:s Partneringblomma



FIA:s partneringblomma utgör ett konkret, flexibelt men samtidigt strukturerat sätt att definiera partnering. Den tvingar folk att precisera vilka komponenter de inkluderar i sin version av partnering och bidrar till bättre kommunikation om vad som kan vara lämpligt att inkludera i ett specifikt projekt.

4. Teori: Hur kan partnering vara effektivitetshöjande

År 1937 skrev Ronald Coase en artikel som fokuserade på varför vissa saker sköttes inom företag medan andra sköttes genom köp och försäljningar på en marknad. Ska produktionen ligga inom företaget eller ska den köpas in? Vad bestämde "företagets storlek"? Denna frågeställning kunde inte besvaras av den då rådande neoklassiska

[2] www.fiasverige.se
[3] Utökad Samverkan skiljer sig inte från vad som kallas partnering i denna avhandling.

skolan som endast betraktade företag som en vinstmaximerande "svart låda", där värde skapades genom förädling av insatsvaror till slutprodukter. Transaktionskostnader kom upp som en förklaring till varför företag väljer att producera saker internt eller köpa från marknaden. Denna förklaring innebar också en teori om inkompletta kontrakt, där kontrakt inte kan vara helt kompletta just pga transaktionskostnader. Mer konkret kan inga kontrakt vara kompletta pga att språket är ofullständigt, alla eventualiteter inte kan förutses och att det är kostsamt att skriva kontrakt.[4]

Accepteras denna bild så kan kontrakt beskrivas på en kontinuerlig skala med mer eller mindre fullständiga kontrakt. Motivet att göra kontrakten mindre kompletta är att det blir billigare att skriva dem ex ante (innan kontraktet skrivs), dock följer då problemet med förhandlingar ex post (efter kontraktet skrivs) och risken för opportunistiskt beteende, dvs att den starkare partnern utnyttjar detta i förhandlingen. Med ett komplett kontrakt skyddar sig båda parterna från opportunism, men det är dyrare att initialt skriva ett sådant kontrakt och det är mindre anpassningsbart under projektets genomförande. Valet av till vilken grad ett kontrakt ska vara komplett kan alltså ses som en trade-off mellan risken för opportunism och kostnader för att göra kontraktet komplett.

Det inkompletta kontraktet skapar motiv till att försöka reducera risken för opportunism och detta kan göras med någon form av tillit, upprepad interaktion eller i slutändan vertikal integration, dvs att verksamheterna integreras i samma organisation (Grossman och Hart, 1986). Fenomenet "relational contracting" har uppmärksammats inom denna litteratur och innebär att företag etablerar långsiktiga samarbeten utan att särskilt mycket av villkoren är reglerade i ett skriftligt kontrakt. Detta kan betraktas som ett inkomplett kontrakt med en mix av tillit och återupprepad interaktion mellan partnerna för att motverka opportunism. Upprepad interaktion är en spelteoretisk term som syftar till att ens beteende idag har inverkan på framtiden, t ex missköter sig en entreprenör i projekt 1 kommer denne att uteslutas i ett framtida projekt 2.

I en genomgång av litteraturen påträffades många beröringspunkter mellan partnering och "relational contracting". Ett inkomplett kontrakt i byggsektorn kan exemplifieras av ett relativt ospecificerat förfrågningsunderlag med intentionen att bygga ett hus med ett "vitt papper" som beskrivning av huset. Denna syn på konceptet sammanfaller, något förenklat, med NCC:s beskrivning av partnering. För att använda partnering till dess fulla potential bör entreprenören komma in tidigt i processen hävdar Sveriges drivande partneringentreprenör. Tidiga skeenden medför att kontrakten är relativt ofullständiga, där partnering kan motiveras som ett sätt att motverka risken för opportunism och samtidigt undvika transaktionskostnader för att skriva detaljerade kontrakt.

Denna bild av kontrakt och partnering hittades dock inte när Vägverkets och Banverkets drift- och underhållskontrakt började studeras. Här påträffades istället partnering tillsammans med relativt kompletta kontrakt, något som vid första

[4] I formell kontraktsteori används ett antagande om att vissa situationer är observerbara för de kontrakterande partnerna (läs beställare och entreprenör) men inte verifierbara för en tredje part (läs domstol) för att modellera inkompletta kontrakt. I det sjätte pappret ifrågasätts detta antagande och det förs fram ett argument om att verifierbarhet är ett endogent val som beror på hur detaljerat parterna vill skriva kontraktet och utforma olika former av kontrollprocesser.

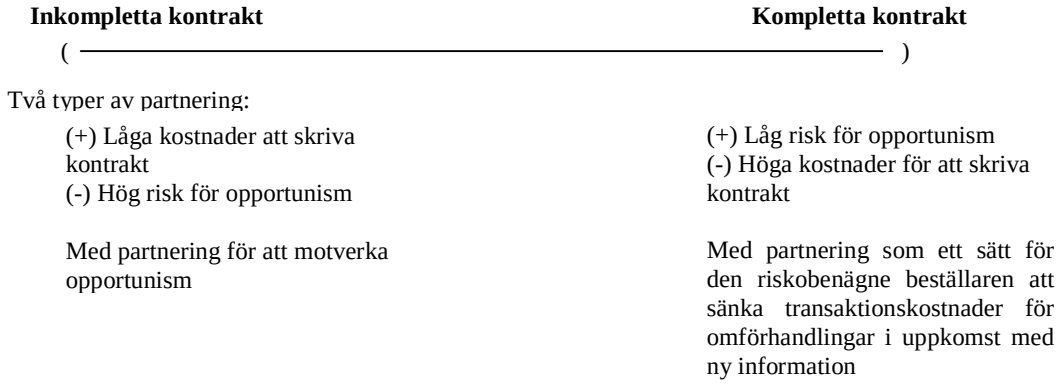
anblicken uppfattades paradoxalt. Kontrakten specificerade i hög grad vad entreprenören skulle göra. Då risken för opportunism är liten/obefintlig i relativt kompletta kontrakt borde det vara obefogat att investera i kostsamma partneringarrangemang som workshops etc. Den andra uppsatsen i avhandlingen ställer sig frågan om det finns förhållanden som gör att partnering kan vara motiverat även med ett komplett kontrakt.

För att gå vidare med den frågan måste tre omständigheter klargöras. Först antas det att ny information kommer fram under kontraktets löptid som gör det motiverat med omförhandlingar. Att det uppkommer information som ej var tillgänglig ex ante kan uppfattas som ett realistiskt antagande för de flesta större bygg- och underhållsprojekt. För det andra antas att beställaren inte är beredd att ta stora risker (är "risk averse"). Om så icke är fallet finns det inget motiv att välja ett komplett kontrakt före det inkompletta. Den som är beredd att ta risker kan förväntas välja det billigare men mer riskfyllda alternativet, dvs det ofullständiga kontraktet, för att behandla ny information. I en situation med ett komplett kontrakt och med en beställare som både vill minska risken och som vill kunna ta in ny information, så kan partnering motiveras som ett sätt att bygga upp en reciprocitet mellan parterna som underlättar den omförhandling som motiveras av den nya informationen. Reciprocitet är alltså den tredje byggstenen som på senare år har uppmärksammats i bl a nationalekonomisk experimentell forskning. Reciprocitet innebär att människor inte uteslutande tänker på sig själva utan också är beredda att lita på, samt ta hänsyn till den andre partens intresse, om man tror att den andra parten gör detsamma.

Tesen är alltså att partnering kan öka sannolikheten att partnerna agerar i överensstämmelse med reciprocitet. Detta underlättar i sin tur omförhandlingar som motiveras av ny information genom att partnerna litar på varandra och inte behöver kontrollera allt som sägs, dvs transaktionskostnaderna för omförhandlingar sänks med hjälp av partnering. Med hjälp av stiliserade exempel från Vägverkets drift- och underhållskontrakt förklaras detta mer ingående i den andra artikeln i avhandlingen.

I denna artikel urskiljs alltså två typer av partnering som beskrivs i figur 4. Den första i kombination med inkompletta kontrakt ("relational contracting") och den andra i kombination med kompletta kontrakt.

Figur 4. Två typer av partnering



Partnering kan i kombination med ett inkomplett kontrakt betraktas som ett sätt att motverka opportunism, i likhet med teorin om "relational contracting". Den nya och mer innovativa tolkningen i denna skrift är, utifrån Vägverkets och Banverkets tillämpning av konceptet, att se partnering som något som även kan förekomma tillsammans med ett komplett kontrakt. Partnering kan då motiveras genom att det underlättar omförhandlingar av kontrakten och ökar sannolikheten för paretosanktionerade omförhandlingar. En version av denna teori återfinns även i Nyström (2006).

5. Uppfattningar om partnering: Resultat från enkätstudien

Den tredje uppsatsen bygger på en enkätundersökning ställd till projektledare både hos beställare och entreprenörer i 18 partneringprojekt som genomförts under senare år eller som ännu pågår. Projekten skulle vara upphandlade enligt Lagen om Offentlig Upphandling och omnämna partnering/partnerskap/samverkan/win-win eller liknade i förfrågningsunderlaget.

Enkäten som skickades ut våren 2004 bestod av tre delar där den första utgjordes av faktafrågor om respondenten och projektet, den andra om upphandlingsfasen och den tredje och sista om respondentens syn på partnering. Den sista delen skickades ut ännu en gång under hösten 2006 för att undersöka om uppfattningarna kring partnering hade förändrats. Av de totalt 36 utskickade enkäterna (18+18) erhölls svar från 30 och i tolv av dessa projekt från både entreprenör och beställare.

5.1 Respondenter och projekt

80 % av dem som svarade var mellan 40 och 60 år. 90 % var män. En majoritet hade arbetat tillsammans med den andra parten tidigare och nästan alla ansåg sig ha god kunskap om den andra parten. Hälften ansåg sig ha liten erfarenhet av partnering medan övriga inte hade någon erfarenhet alls innan det aktuella projektet startade.

En knapp majoritet av de aktuella projekten ansågs mer komplicerade än genomsnittet.

I huvudsak hade det inkommit så många anbud som beställaren förväntat sig och det var en jämn spridning när det gäller relationen mellan anbud och budget. En klar majoritet ansåg att spridningen i anbuden i partneringkontraktet inte var större än för ett vanligt kontrakt.

5.2 Upphandlingsprocessen och förfrågningsunderlaget

I 11 av 18 projekt var det fastlagt att det skulle vara partnering. De övriga sju hade partnering angivet som en möjlighet. Partnering beskrevs i regel relativt översiktligt i förfrågningsunderlaget. I de flesta fallen var det inget särskilt informationsmöte om vad partnering innebar.

Den vanligaste ersättningsformen var riktkostnad med incitament på eventuell avvikelse. I regel angavs inte om beställaren skulle använda ett eventuellt överskott till ytterligare beställningar eller inte. Förutom incitament knutna till riktkostnaden fanns inget särskilt bonussystem. Mjuka parametrar användes i alla upphandlingar utom en.

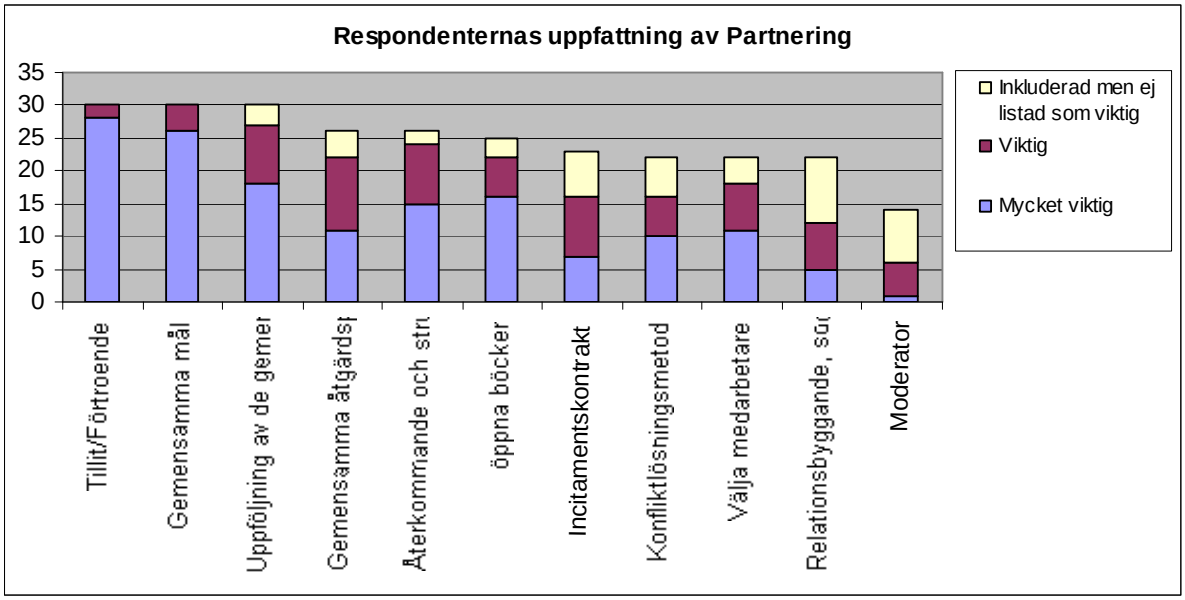
Respondenterna fick i enkätens sista del (se nedan) ta ställning till några påståenden om upphandlingsfasen och de allra flesta höll inte med om påståendena om att det blir fler anbud med partnering eller att anbuden blir högre när partnering är inkluderat.

5.3 Hur uppfattades partnering?

I denna del av enkäten fick respondenterna svara på ett antal frågor om vad som ansågs kännetecknа partneringprojekt och ta ställning till ett antal påståenden om partnering.

De två faktorer som de flesta ansåg kännetecknа partneringprojekt var "Tillit/förtroende" och "Gemensamma mål" (se figur 5 nedan). Andra faktorer som nämndes relativt ofta var "Återkommande och strukturerade möten", "Uppföljning av de gemensamma målen" och "Gemensam åtgärdsplan". "Öppna böcker" och "Incitamentskontrakt" kom därefter. Ingen större skillnad kan ses om svaren från 2004 och 2006 jämförs. De största förändringarna, dock ej signifikant säkerställda, var att "konfliktlösningsmetoder" uppfattades som mindre viktiga och "Uppföljning av de gemensamma målen" gavs mer vikt än tidigare.

Figur 5. Respondenternas uppfattning av Partnering



Resultatet från enkäten ligger i linje med Partneringblomman som presenterades i uppsats 1. Både teoretiker och praktiker kan utifrån det studerade materialet ses som eniga om att "Tillit" och "Gemensamma mål" hör till partnering. Övriga komponenter finns det mer delade meningar om de behöver ingå eller inte.

När det gällde påståenden om partnering var det en klar majoritet som höll med om att partnering underlättar kvalitetsförbättringar, att hålla budgeten, att undvika konflikter samt att lösa konflikter. Det ansågs även mer sannolikt att förbättringar av produktionsmetoderna kunde uppkomma i partneringprojekt. Även för påståendet om att partnering är här för att stanna, och att det är ett roligare sätt att jobba, fanns ett stort stöd bland de svarande. En övervägande del höll inte med om att partnering minskade affärsmässigheten.

En klar majoritet av entreprenörerna ansåg generellt att risken var mindre i partneringprojekt. Det bör understrykas att de som besvarade enkäten arbetade med partneringprojekt så deras positiva inställning är kanske inte så förvånande.

5.4 Skillnader mellan olika grupper

I den tredje uppsatsens sista del analyseras skillnader mellan olika grupper. Finns det skillnader i svaren mellan beställare och utförare, mellan yngre och äldre, mellan olika typer av projekt samt över tiden? Några resultat i denna del följer.

Beställare - utförare

I det stora hela var svaren relativt lika mellan de både grupperna. Störst var enigheten om att partnering gjorde det lättare att lösa konflikter, att partnering är här för att stanna och att affärsmässigheten inte minskade.

Yngre - äldre

Med tanke på den höga genomsnittsåldern som besvarat enkäten så har "yngre" här definierats som icke fyllda 50 år. Skillnaderna i svar var även här relativt små. De punkter där störst skillnader kunde observeras var att de yngre i något högre grad instämde i påståendet att partnering gjorde det lättare att lösa konflikter och att de äldre i något högre grad höll med om påståendet att partnering var en modefluga. Dock bör det tilläggas att det var ett fåtal av de äldre höll med om det sistnämnda.

Underhållsprojekt - nybyggnad

Inte heller på denna punkt var det några stora skillnader. Det kunde noteras att bland nybyggnadsprojekten var det en större andel som helt höll med om påstående att partnering är ett roligare sätt att arbeta.

2004 – 2006

Inga större skillnader hittades här heller. Den största skillnaden sågs i påståendet huruvida antalen anbud blir fler när partnering är inkluderat, dvs respondenternas uppfattning om det är populärare att lämna anbud i partnering entreprenader. Svaren från 2006 var mer positivt inställda.

6. Utvärdering: metod och resultat

Licentiatavhandlingen innehöll således en definition och en teori samt en empirisk attitydstudie rörande partnering. Det som återstod var att utvärdera effekterna av att introducera partnering i ett projekt.

6.1 Hur ska partnering utvärderas?

I konsultrapporter och den internationella byggmanagementlitteraturen hävdas ofta att partnering ger fördelar i form av högre kvalitet, lägre kostnad och kortare byggtid (tex Bennett och Jayes, 1998). Röster har dock höjts för att granska partnering ur ett mer kritiskt perspektiv, dvs att systematiskt titta både på nackdelar och fördelar (Green, 1999; Bresnen och Marshall, 2000). Den fjärde uppsatsen tar fasta på denna kritik och undersöker hur utvärderingar av partnering kan förbättras. Initialt ställs tre kriterier upp som innebär att goda utvärderingar måste:

i) baseras på projektfakta och inte på vad olika personer tycker
ii) inkludera en jämförande analys

iii) kontrollera för andra påverkande variabler på ett systematiskt sätt för att isolera den unika effekten av partnering.

Utifrån dessa kriterier analyseras tidigare genomförda utvärderingar som kan kategoriseras in i tre olika typer, enkätstudier, fallstudier och kvantitativa jämförande studier. Slutsatsen är att ingen av de totalt 15 studierna som analyseras uppfyller alla ovanstående kriterier för goda utvärderingar. Istället för de metoder som använts tidigare föreslås en statistisk regressionsanalys eller en kvasiexperimentell studie. Om dessa baseras på projektfakta har de potential att uppfylla alla kriterier ovan.

Utifrån ett nationalekonomiskt perspektiv skapas värde av höjd kvalitet och/eller sänkt kostnad, vilka är de intressanta variablerna när partnering ska utvärderas. Dessa storheter är dock svåra att mäta och erhålla data om i byggsektorn, vilket öppnar för att använda olika indikatorer relaterade till dessa i utvärderingen. Sådana indikatorer är tid (förseningar), kontraktsflexibilitet (anpassning till ny information), mängden tilläggsarbete samt hur många allvarliga konflikter det varit under projektets gång.

6.2 En kvasiexperimentell utvärdering av partnering

Den femte uppsatsen knyter an till förslagen från ovanstående studie och syftar till att utvärdera offentligt upphandlade partneringprojekt i den svenska byggsektorn med hjälp av en kvasiexperimentell metod. Metoden strävar efter att para ihop partneringprojekt med så lika icke-partneringprojekt som möjligt på alla relevanta variabler. Skillnader i resultatet mellan de matchade "tvilling"-projekten bör därmed kunna förklaras av partnering, då allt annat (teoretiskt sett) gällande de två projekten är lika.

Studien inkluderar 10 partneringprojekt som matchats med 10 liknande icke-partneringprojekt. Samtliga projekt är offentligt upphandlade enligt LOU och matchningen har skett på variablerna typ av projekt, entreprenadform, ersättningsform, den utförande organisationens storlek och geografisk närhet mellan projekten. Partneringprojekt definierades i urvalsskedet som projekt där partnering/partnerskap/samverkan/win-win eller liknande är omnämnt i förfrågningsunderlaget.

För dessa totalt 20 projekt har sedan olika typer av material studerats och analyserats. Materialet består främst av 558 byggmötesprotokoll, med förfrågningsunderlag, kontrakt, ekonomiskt utfall, revisioner och stickprov. Även andra typer av rapporter har använts. Strategin i analysen var att fokusera på indikatorerna från ovannämnda studie, dvs tid, kontraktsflexibilitet och konflikter. För varje matchande par har en sammanfattande bedömning gjorts av vilket projekt som varit bäst i just den dimensionen. Tabell 2 visar utfallet.

Tabell 2. Sammanfattande utfall per matchning

	Totalt	**Kvalitet**	**Lägsta kostnad**	**Kontakts flexibilitet**	**Att undvika konflikter**	**Tid***
Match 1	Partnering	Igen skillnad	Partnering	Partnering	Igen skillnad	-
Match 2	Partnering	Igen skillnad	Partnering	Igen skillnad	Igen skillnad	-
Match 3	Icke-partnering	Igen skillnad	-	Icke-partnering	Icke-partnering	-
Match 4	Partnering	Partnering	-	Igen skillnad	Partnering	-
Match 5	Icke-partnering	Igen skillnad	-	Igen skillnad	Icke-partnering	-
Match 6	Partnering	Partnering	-	Igen skillnad	Partnering	-
Match 7	Icke-partnering	Igen skillnad	-	Icke-partnering	Icke-partnering	-
Match 8	Partnering	Partnering	-	Partnering	Partnering	
Match 9	Icke-partnering	Icke-partnering	Icke-partnering	Partnering	Igen skillnad	Ingen skillnad
Match 10	Igen skillnad	Igen skillnad	Igen skillnad	Igen skillnad	Igen skillnad	Partnering

* inte applicerbart för drift och underhåll
- indikerar att data inte finns tillgänglig

Den jämförande analysen talar för partnering i fem av de tio matchningarna, så ingen trend kan utrönas när det gäller jämförelsen mellan de båda typerna av projekt. Tabell 3 beskriver samma utfall men nu grupperat efter respektive variabel.

Tabell 3. Sammanfattande utfall per variabel

	Antal projekt med fördel partnering	**Antal projekt med fördel icke-partnering**	**Antal matchningar utan skillnad i resultat**
Totalt	5	4	1
Kvalitet	3	1	6
Lägsta kostnad	2	1	1
Kontraktsflexibilitet	3	2	5
Att undvika konflikter	3	3	4
Tid	1	0	1

Genom att definiera partnering utifrån observerbara fakta ex ante så följer att negativa utfall inte kan "viftas bort" med formuleringen "men detta inte var ett riktigt partneringprojekt". Problem kan dock uppstå i att projektet som klassificerats som ett partneringprojekt utifrån upphandlingsdokumenten faktiskt inte innefattade vanliga partnering komponenter enligt blomman (se ovan). Ett snävare urval av partneringprojekt gjordes därför utifrån den information som framkom vid genomgången av dokumenten. För att då bli klassificerad som ett "riktigt" partneringprojekt så måste projektet åtminstone inkludera gemensamma mål. Observera att denna utrensning inte är baserad på utfallet, utan på de komponenterna som faktiskt ingick. Genom denna avgränsning framkom det att projekten 1, 2, 3, 8 och 9 kunde ses som "riktiga" partneringprojekt, se tabell 4.

Tabell 4. Sammanfattande utfall per variabel, enbart matchning med "riktiga" partneringprojekt

	Antal projekt med fördel partnering	Antal projekt med fördel icke-partnering	Antal matchningar utan skillnad i resultat
Totalt	3	2	0
Kvalitet	1	1	3
Lägsta kostnad	2	1	0
Kontraktsflexibilitet	3	1	1
Att undvika konflikter	1	1	3
Tid	0	0	1

Trots denna snävare avgränsning av partneringprojekt kunde fortfarande ingen trend ses när det gäller utfallet i stort. Nämnas kan att de två Vägverksprojekten med partnering visade på lägre kostnad, vilket dock inte kan generaliseras på två observationer.

7. ”Mjuka effekter” av partnering

Detta avsnitt syftar till att sätta in avhandlingens resultat och partnering i ett större sammanhang.

7.1 Relationen mellan teori och utvärderingen

Frånvaron av stora effekter i utvärderingen för variabler som kostnad och kvalitet innebär inte att konceptet partnering kan avfärdas med hänvisning till att det inte skapar värde. Det finns två möjliga förklaringar till att teorin från uppsats två inte helt återspeglas i utvärderingen. Teorin indikerar att partnering sänker kostnaderna för omförhandlingar när ny information ger upphov till sådana. Kostnader för omförhandlingar och tilläggsarbete saknades i de flesta studerade projekt. Det finns därför en möjlighet att partnering var bättre i denna aspekt. Resultaten för de "riktiga" partneringprojekten ger visst stöd för detta.

En annan förklaring kan ligga i att partnering kan betraktas som en allmän reaktion för förändring i en problemtyngd byggbransch (se mer ingående om detta nedan). Finns det en allmän uppfattning i branschen om att alla måste skärpa till sig så bör det även påverka icke-partneringprojekten i positiv riktning. I en sådan situation är det svårt att hitta effekter av partnering, även om det var en viktig del av en bredare förändringsprocess.

7.2 Diskussion om utvärderingsresultatet

Genomgången av tidigare utvärderingar av partnering i den fjärde uppsatsen visade på att konceptet hade störst potential när det gäller kommunikation, relationen mellan parterna och kvalitet. Dessa effekter kan även återfinnas i några av de jämförande matchningarna i uppsats fem, men inte i en generell och systematisk utsträckning.

Ur ett nationalekonomiskt perspektiv hävdas det i den fjärde uppsatsen att kostnad och kvalitet är de viktiga variablerna att mäta vid utvärderingar. Gransberg et al. (1999) och Beach et al. (2005) poängterar bristen på dessa variabler i utvärderingarna. Vidare kritiserar Bresnen och Marshall (2000) och Bresnen (2007) de presenterade utvärderingar för att enbart lägga fram anekdotartade bevis. Utvärderingen i uppsats 5 försöker tillfredställa dessa uppmaningar om mer stringenta utvärderingar. Studien har flyttat forskningsfronten framåt både gällande metod och ingående data i partneringutvärderingar. Resultatet, bristen på tydliga och stora trender, lägger en

skugga över tidigare utvärderingar som med sämre metoder och sämre data odelat ställt sig positiva till partnering. Mjuka parametrar som roligare på jobbet, mer attraktivt yrke och en förbättrad bild av byggsektorn har medvetet exkluderats i studien utifrån ovanstående kritik.

En rimlig fråga är huruvida partnering kanske har sin stora fördel just när det gäller dessa mjuka parametrar och att det inte primärt syftar till att sänka kostnader och höja kvaliteten, trots att detta ofta hörs i den allmänna debatten. Partnering kom fram i Storbritannien och Sverige efter kritiska statliga rapporter om byggindustrin. En rimlig tolkning kan då vara att se partnering som del i ett krafttag att förändra byggsektorn i syfte att förbättra den allmänna uppfattningen om branschen. Detta skulle ligga i både beställarnas och entreprenörernas intresse för att t ex. locka nya kompetenta personer till branschen. Det är troligt att partnering kommer att försvinna som ett specifikt och avgränsat begrepp genom att komponenter från partnering införlivas som det vanliga sättet att arbeta.

8. Avhandlingens bidrag

Avhandlingen har givit tre konkreta bidrag som visat sig både vara av intresse för praktiker såväl som för akademiker.

Det första är ett flexibelt men samtidigt strukturerat sätt att definiera partnering, där olika varianter av begreppet kan fångas inom samma modell. Berörda personer tvingas peka på vilka komponenter de inkluderar i sin version av partnering. Komponenterna har även konkretiseras i senare varianter av modellen vilket ytterligare underlättar användandet.

Det andra bidraget är att sätta in partnering i ett kontraktteoretiskt sammanhang. Uppdelningen mellan partnering i kombination med inkompletta kontrakt samt partnering i kombination med kompletta kontrakt är ny och ger två olika utgångspunkter för att förstå vilka fördelar partnering kan ha ur ett effektivitetsperspektiv.

Det tredje bidraget är analysen av hur utvärderingar av partnering kan förbättras samt försöket att på ett mer stringent sätt praktiskt utvärdera partnering med hjälp av en kvasiexperimentell metod. Resultatet av den genomförda studien ger inte stöd för tidigare påståenden om stora kvantitativa fördelar med partnering. Detta föranleder frågan om partnering mest ska ses som en del av en bredare förnyelse av branschen där ändrad image är en viktig del.

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Paper 1: The definition of partnering as a Wittgenstein family-resemblance concept

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The definition of partnering as a Wittgenstein family-resemblance concept

JOHAN NYSTRÖM*

KTH – Royal Institute of Technology, Department of Infrastructure, Division of Building and Real Estate Economics, SE-100 44 Stockholm, Sweden

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This article on partnering and family-resemblance makes two contributions to the debate about the definition of partnering in construction. The first is a distinction between *general prerequisites*, *components* and *goals* when discussing the concept. In order to understand what is specific about partnering the focus should be on the components, which are identified through a literature review. The second contribution is to apply Ludwig Wittgenstein's idea of family-resemblance to the partnering concept. His idea is that a complex concept can be understood as a network of overlapping similarities. From the literature review it is concluded that there are two necessary components in partnering – *trust* and *mutual understanding* – and that a number of different components can be added to form a specific variant of partnering. This provides a new method to define the vague and multifaceted concept of partnering in a flexible and structured way.

Keywords: Components, construction, definition, family-resemblance, general prerequisites, goals, partnering, Wittgenstein

Introduction

Although many articles have discussed the characteristics of partnering, there is no consensus about the meaning of the concept. Partnering can be characterised, as a complex and complicated concept where it has been hard to reach an agreement about a standard type of definition. An explanation for the numerous partnering definitions is that the concept is yet to mature (Li *et al.*, 2000). If that were the case a definition of partnering – stating the necessary and sufficient conditions – will eventually arise. The first step towards a clearer conception of partnering is probably to realize that such a definition does not exist for this multifaceted concept.

Still there is a need for a common perception of partnering, as discussions without a mutual starting point often will be cross-purposed and ineffective. Examples of this are: (1) when different partnering projects are evaluated (given the same measurement of success) what do the evaluators include in the partnering concept, do they refer to the same concept or (2) when two people have different opinions about the potential with partnering, are they really talking about the same thing, do they include the same components?

The aim of this article is to present a new method to define partnering. As in earlier studies (see, e.g. Crowley and Karim, 1995; Matthews *et al.*, 1996; Tyler and Matthews, 1996; Black *et al.*, 2000; Cheng and Li, 2001; Cheung *et al.*, 2003) the critical success factors of the concept will be determined from reviewed literature. However, the first new step is a distinction between *general prerequisites*, *components* and *goals* of partnering. This distinction will make it clear that when searching for the essence of the concept, focus should be on the *components*. The second step is to apply the philosopher Wittgenstein's idea of family-resemblance when defining the relation between these components and partnering. This approach will generate a method to define different partnering versions within the same structure.

Partnering has been portrayed as both the saviour in the unhealthy construction industry and as another

* E-mail: johan.nystrom@infra.kth.se

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trendy term to describe 'common sense' business relations. This paper does not set out to assess the strength or weakness of partnering, but only to discuss how partnering can be defined. The approach presented is applicable for both project-based and strategic partnering because the literature from which the study is based handles both.

The study begins with emphasizing the distinction between the general prerequisites, components and goals of partnering. Wittgenstein's idea of family-resemblance will then be introduced and followed by a short presentation of important components mentioned in the partnering literature. The idea of family-resemblance will be used to find a structure among the components. Two examples of how the method can be used and concluding comments on how this approach can be useful will bring the paper to a close.

General prerequisites, components and goals

Sorting out the key factors of partnering for the purpose of understanding the concept has been a popular subject in research. This is also initially conducted here, where the factors in figure 1 are taken from the partnering literature. A closer look at these factors leads to the conclusion that they can be divided into three groups, presented in Figure 1.

The general prerequisites are factors, which in no sense are unique for partnering. *Top management support* (Barlow *et al.*, 1997; Black *et al.*, 2000; Cheng *et al.*, 2000; Cheng and Li, 2001) and *Adequate resources* (Black *et al.*, 2000; Cheng *et al.*, 2000; Cheng and Li, 2001) are probably required in all types of construction projects. Studying these factors does not add to our knowledge about partnering as they are so general.

All things considered, the goals of partnering are of course the most interesting thing, the results that we are striving for. In getting there it could be helpful to clarify what partnering consists of, which is not done by studying the outcome. *Continuous development* (Thompson and Sanders, 1998; Crane *et al.*, 1999; Barlow, 2000; Black *et al.*, 2000; Cheng *et al.*, 2000; Cheng and Li, 2001; Kemi, 2001; Kadefors, 2002; Rhodin, 2002; Naoum, 2003) should be seen as a desirable outcome of partnering, a goal. Partnering projects might fail and not lead to continuous development, but we would still call it a partnering project if it had a selection the characteristics mentioned under 'components' above.

Hence, this paper takes general prerequisites and goals as given and focuses on the components in trying to define partnering.

Wittgenstein's method of definition

The numerous definitions of partnering indicate how difficult it is to give a concise explanation of the concept. There seems to be no agreement about which specific components should be included and therefore the concept appear hopelessly vague. The German philosopher Ludwig Wittgenstein would disagree, and argue that complicated concepts cannot be defined in the traditional way by stating necessary and sufficient conditions. There might not be a single or a small number of features, which are common for all variants of a term and therefore it cannot be defined in the traditional way. Instead he argued that there are complex networks of overlapping similarities among the things that fall under a complex concept. His classical example is the term 'game'. There are a large

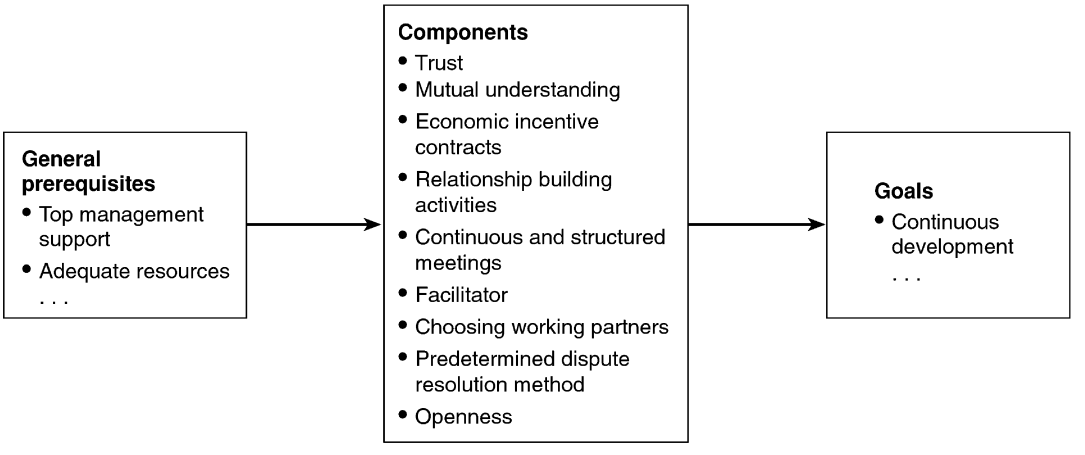

Figure 1 Distinction of partnering factors

number of activities characterized as games but he argues that a single, common feature for all of them is missing. Ball games such as tennis and football have rules to follow, but there are no rules when a boy just throws a ball in the air. Some elements of the ball games, such as rules and competitiveness, remains and some fall off, such as hard physical work and the ball, when the thought goes to board games. Wittgenstein argues that there is just a complex network of overlapping features without any common characteristic that covers all types of games. This approach to understand a concept came to be called *family-resemblance*, because it resembles the type of similarity that can be found within a family. The daughter in a family could have the 'same' nose as her father, while the father and the son have the 'same' ears, but there is no characteristic common to all members of the family, still there is a bond between them (this description is based on Kenny, 1975 and Murphy, 1991).

Approaching a concept in this manner deviates from the usual way of defining a word. The Wittgenstein method is more flexible since it does not restrict the meaning of a concept to a small number of simple characteristics. Therefore it might be preferable to use this method for understanding complicated concepts that might be looked upon as vague.

A presentation of the partnering components

The Wittgenstein approach could appear to be a little unstructured, as it does not say much about how one should identify the components that is to be included in the network of overlapping features. The strategy here is to start by looking at how often various components are mentioned in descriptions of partnering and then apply the family-resemblance approach to the result of this quantitative study.

Components relevant for understanding partnering have been identified from the leading construction management journals (see Wing, 1997). Articles were chosen on the premise that they generally discussed the concept and not just a specific part of partnering. The procedure led to a selection of nine articles in journals ranked by Wing, and to broaden the review another four writings that also deal with partnering in a general way were added. The added writings are two licentiate theses and one research report by prominent and influential researchers of partnering in Sweden. These three writings can be considered the most serious attempts to generally review partnering, which have come out of the Swedish research community. Another often-quoted article from a journal not ranked by Wing was also included. Hence, 13 well-reputed research reports and articles from scientific journals about partnering in construction, found mainly through cross-references, constitute the empirical base of the study. Although consultant- and best practice-reports most probably have had a major influence on the application of partnering, they were judged not to be included as many reports are referred to in the selected articles (an alternative method to find the components would have been to study actual partnering projects).

Nine components have been crystallized from the analysed material. The writers do not always use the same terms in describing a feature, but from the reasoning it has been possible to see what was intended. The analysis of the 13 reports and articles led to the result presented in Table 1. An X in Table 1 indicates that the author has mentioned this component as an important part of the partnering concept.

According to the reviewed literature, *trust* and *mutual understanding* are the most important components [compare with Tyler and Matthews (1996), who in Table 2 have identified the common elements in 20 reviewed partnering papers]. The following section will briefly present all components that constitute the 'partnering family' in the way that they are usually portrayed in the literature. Then it will be shown how the family-resemblance concept can be applied.

Trust

Various scholars have tried to label different types of trust in business relations, e.g. deterrence-, calculus-, relational- and institution-based trust (Rousseau *et al.*, 1998). Another example is the distinction between contractual-, competence- and goodwill-trust (Sako, 1992). A distinction can also be made between interpersonal trust and interorganizational trust (see Kadefors, 2004, for a latter type). There are complex relationships between all the above-mentioned types of trust, which will not be discussed further here.

What can be stated about trust is that it seems to be desirable in all kinds of business relationships because of its negative correlation with transactions costs (Williamson, 1975). It is judged to be especially important in partnering as such contracts usually are portrayed as less complete or implies continuous renegotiation. Trust can arise in several different ways. Three alternatives have been mentioned in the literature; it can pre-exist the relationship based on reputation (1), appear spontaneously (2) or develop over time from repeated interactions (3) (Lazar, 2000). The usual argument is that it takes time to develop trust, but that might not always be true. Alternatives (1) and (2) do not require repeated interactions and can exist even in a

Table 1 Categorizing the partnering literature

Papers/ Components	Trust	Mutual understanding	Economic incentive contracts	Relationship building activities	Continuous and structured meetings	Facilitator	Choosing working partners	Predeterm. dispute resolution method	Open-ness
Barlow 2000	X	X	X			X			
Cheng *et al.* 2000	X	X			X	X		X	
Crane *et al.* 1999	X	X					X		
Kadefors 2002	X	X	X	X	X	X	X	X	X
Kemi 2001	X	X	X	X		X			
Koraltan and Dikbas 2002	X	X			X			X	
Kwan and Ofori 2001	X	X							
Larson 1995	X	X		X	X			X	X
Naoum 2003	X	X	X					X	
Ng *et al.* 2002	X	X				X		X	X
Packham *et al.* 2003	X	X	X	X	X				
Rhodin 2002	X	X		X	X	X		X	
Thompson and Sanders 1998	X	X	X	X				X	X
	13	13	6	6	6	6	2	8	4

single construction project. The client and the contractor might be known as honourable actors on the market (1) and/or project managers from the two parties can find themselves on the same 'wavelength' immediately (2). How trust over time (3) develops can be explained in a game-theory setting (Axelrod, 1984). A general construction-partnering scenario is assumed to fit the circumstances of a repeated prisoner's dilemma game (Friedland, 1990; Cheung *et al.*, 2003). The essence of this approach is that trust develops through reciprocal co-operative strategies from both parties (Lazar 1997, 2000; Cheung *et al.*, 2003).

Table 2 Key elements of partnering

Elements of partnering	Number of authors
Goals and Objectives	14
Trust	14
Problem Resolution	13
Commitment	12
Continuous Evaluation	7
Group Working / Teams	7
Equity	6
Shared Risk	3
Win-Win Philosophy	3
Collaboration / Co-operation	2

Mutual understanding, 'common goals'

A realistic assumption is that firms aim at maximizing their own profits, at least in a longer perspective. This entails an inherent conflict between the client's and the contractor's goals, e.g. as higher revenue for the contractor means higher cost for the client (Himes, 1995; Kanaji and Wong, 1998; Hamza *et al.*, 1999; Pinnel, 1999; Naoum, 2003). The partnering literature often describes scenarios where win–win solutions are achieved. There is a belief that the individual goal will fulfil a common goal, and this is described as the thought behind partnering (Crowley and Karim, 1995; Kadefors, 2002). With the above starting point a 'common goal' is impossible. What the authors must intend is that in partnering there is a mutual understanding and respect of each other's interests. This understanding and respect makes it easier to reach a compromise in a situation where you realize that the other party's marginal benefit is much higher then your marginal loss – and that it might be the other way around next time. In a functioning partnering relationship the long-term consequence of these compromises is higher profits to both parties.

Even if companies are profit maximizing and therefore have different economical goals, there can still exist common goals in other respects such as, for example, safety, respect, pleasant working environment, etc. These can facilitate the understanding of each other's

interests and are considered as an important part of partnering. The subordinated goals are usually outlined in a partnering charter.

Economic incentive contracts

Generally there are three types of contracts in construction: the fixed-price, the cost-plus contract and the cost-sharing contract. These entail different incentives for a rational contractor, with the former focusing on cutting costs and the next on quality. The cost-sharing contract can be placed in between these two concerning incentives. A deviation from a predetermined target cost is shared by a percentage factor between both parties. This is said to encourage the contractor to consider both quality and cost (Scherer, 1964). Monetary incentives can also be given to other important issues, e.g. project duration, quality, safety, technical development, co-operation and less utilization of resources. In these cases the contractor receives a bonus if a predetermined level is exceeded (or underachieved in the case of duration and utilization).

The above reasoning gives the impression that incentives are preferable in all contracts, but it is not necessarily so. There might be conflicts between economic goals and other goals, as has been shown in experimental economics where contracts without economical incentives can yield better outcomes in certain situations (Fehr and Gächter, 2002). Other sources for motivation than money are often underestimated (Bresnen and Marshall, 2000). Non-financial incentives such as personal development, influence, appreciation, a feeling of meaningful assignments, etc. can also improve efforts. In fact, it has been stressed that intrinsic rewards such as the above-mentioned result in better outcomes then financial rewards (Bresnen and Marshall, 2000; Kadefors, 2002). These intrinsic incentives to work harder are often portrayed as one of the advantages of partnering.

Relationship building activities

The partnering group, with key personnel in the project from both parties and subcontractors, are recommended to meet as soon as possible for the purpose of strengthening the team spirit and getting to know each other (Cheng *et al.*, 2000; Humphreys *et al.*, 2003). It is generally stressed that the first meeting should preferably be held at a neutral location and have the nature of a social event. Teamwork education could also take place during the meeting. Returning from the event, the hopefully well-knitted partnering group can start drafting the subordinated goals in a partnering charter.

Continuous and structured meetings

A common view is that goals should be followed-up continuously if they are to serve any purpose. This is recommended to be carried out by the partnering group, who also constitutes a forum for problem solving and for ideas of improvements from all levels in both organizations. It can be of importance that the group has mandate to take decisions quickly and thereby obtain a flexible organization (Crowley and Karim, 1995).

Facilitator

An external facilitator's role can be described as an impartial discussion leader, who sees to it that both parties have their views heard in a balanced way. His task is also to manage the meeting in such a way that the discussion focuses on the relevant issues and does not become stuck on trivial, unconstructive matters. This governance of the meetings is said to be especially important at the beginning of the relationship (Baden Hellard, 1995). It is considered a positive characteristic if the facilitator has experience of partnering and can function as an introducer to the concept on the initial meetings (Stephenson, 1996; Kadefors, 2002; Rhodin, 2002).

Choosing working partners

Because partnering is thought to entail a closer relationship between client and contractor, it is more dependent upon good personal interaction. Therefore, it is of great importance that the people working together get along (Kadefors, 2002). A successful outcome will be easier to achieve with the participants having an initial positive attitude towards each other and the partnering concept (Crane *et al.*, 1999). To get the 'right people' in the partnering group, both parties can handpick the suitable staff. If the relationship between representatives for the two parties were not to work, it is recommended to have a predetermined way of how to exchange people in the group.

Predetermined dispute resolution method

Expensive litigation in the American construction industry during the 1980s were common, and some argue that the partnering concept originated to avoid

the high cost of these litigations (Larson, 1995; Gransberg *et al.*, 1999; Stephenson, 1996).

The predetermined dispute resolution method for partnering is generally supported in the literature (Naoum, 2003). Problems usually arise in constructions projects and these can be resolved in two ways, either productively or destructively (Mohr and Spekman, 1994). Settling a disagreement in court or with an internally designed dispute resolution board can only result in one winner, which characterizes a destructive solution. The other way of settling a dispute is to discuss the matter, preferably between the people where the problem arose, usually at the operational level (Bennett and Jayes, 1995). Entering a partnering relationship is an implicit promise from both parties that they will try to do that in a positive spirit, which hopefully will lead to productive solutions when problems arise.

Openness

It is argued that a well-functioning partnering relationship entails sharing information between the parties. The knowledge about each other's dilemmas will hopefully facilitate the understanding and make it easier to compromise (Thompson and Sanders, 1998). The information-sharing also provides a better possibility to contribute with improvements. Open books seem to be a factor where openness is particularly called for (Bennett and Jayes, 1998; Kadefors, 2002).

This can be interpreted as a paradox when the partnering relationship is claimed to have a higher degree of trust, which theoretically should be negatively correlated with the importance of open books. Contractors can see this financial monitoring as a lack of trust from the client, which does not initiate a healthy partnering relationship (Humphreys *et al.*, 2003). At the same time it can be argued that open books are vital at the beginning of a business relationship as a signal of good will from the contractor when trust does not yet exist.

Analysing partnering as a family-resemblance concept

The partnering flower

Looking at the result presented in Table 1 it can be seen that there are actually two features mentioned in all the reviewed partnering literature: trust and mutual understanding. These could be interpreted as necessary, but not sufficient, conditions for partnering. This means that a slight change/widening must be made of the family-resemblance theory in order to use it as a method to define partnering. Instead of simply having a network of overlapping similarities, there are two common features and beside that an overlapping network of similarities. The resulting analysis of the partnering concept can be described as a 'flower', where the centre contains the two common components to all partnering designs. The rest of the components mentioned in the literature can be seen as petals. Something is then to be called partnering if, first, it contains the two centre components and secondly, some of the petals, but there is no specific petal or set of petals that they must contain. Adding different sets leads to different variants of partnering. The flower as an entirety can be seen as the base for describing the whole 'family' of all partnering variants (Figure 2).

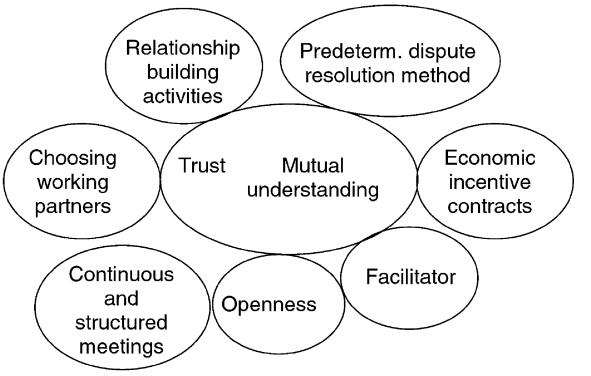

Figure 2 Partnering flower

Application

The structure described above enables a practical application of the somewhat vague concept of family-resemblance. Different designs of partnering projects can be captured within the same structure, which is shown by the following two examples:

The first example is taken from Kadefors (2002), who described KappAhls' service office. The client was KF Real Estate and the contractor was NCC. Besides trust and mutual understanding this partnering relationship included:

- Incentive contracts
- Continuous and structured meetings
- Open books

The variant of partnering is illustrated by the set of components within the dotted line in Figure 3.

The second example is an infrastructure project, the Tren Urbano project in Puerto Rico, taken from Peña-Mora and Harpoth (2001). The client was the Puerto Rico Highway and Transportation Authority and

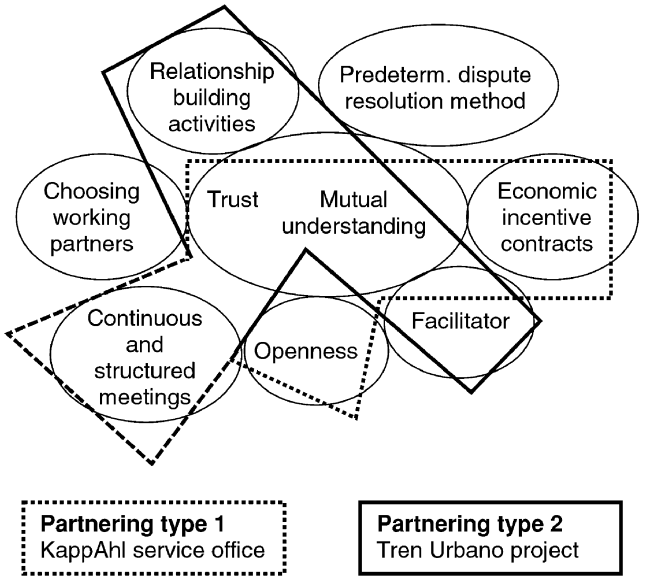

Figure 3 The applied partnering flower

Siemens Transit Team was the contractor. Again, besides trust and mutual understanding this partnering relationship included:

- Facilitator
- Continuous and structured meetings
- Relationship building activities

This variant of partnering is illustrated by the set of components within the full line in Figure 3. The figure indicates that even though both projects 'obviously' are partnering projects they are put together by different sets of 'partnering petals'.

Conclusions

Two contributions have been made in this paper. First, it is necessary to distinguish between general prerequisites, components and goals when partnering is analysed. It is concluded that the specific components are the interesting factors when understanding what is unique about partnering. The second contribution consists of seeing partnering as a complex concept and that such concepts are difficult to define in the standard way by giving necessary and sufficient conditions. Instead, an approach developed by the philosopher Wittgenstein is introduced, where a concept is understood by looking for a network of overlapping similarities. This is applied to the partnering literature, where it was found that two components were always included in the descriptions, trust and mutual understanding. Besides these two, there was an overlapping network of the other components.

The two contributions provide a method to define partnering, which can be of use to both the research community and to practitioners. The partnering flower facilitates further research in assessing partnering as more precise hypotheses can be formulated, e.g. where effects are related to specific variants of partnering and not to partnering in general. Different combinations of the partnering 'petals' can be tested and evaluated. Further research can also look closer at how each specific component can be designed and at the relation between the petals on a more theoretical level: are certain components more closely linked? Are certain components more difficult to combine?

Practitioners may find the partnering flower useful in the procurement phase of a construction project, both as a description of the concept, if that is needed, and as a common starting point for discussions between the client and the contractor on how to frame a specific partnering project, i.e. which 'petals' to include (there has already been interest shown in Swedish public procurement of construction projects for using the flower as a way to present partnering in the contract documents).

Acknowledgements

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Paper 2: Theoretical foundations of partnering

Theoretical foundations of partnering

Johan Nyström

Stockholm 2007

Building and Real Estate Economics
School of Architecture and the Built Environment
Royal Institute of Technology

Theoretical foundations of partnering[*]

Abstract

A theory of partnering in the construction industry from an efficiency perspective is absent. Some conceptualisations of partnering have been made but they are lacking in precision. Based on empirical observations and contract theory, the existence of partnering can be theoretically justified as efficiency enhancing in two ways. The first way of understanding partnering covers the case where it is used in combination with an incomplete contract. Similar to a relational contract, partnering can then be seen as something that neutralises opportunism. The second and more innovative interpretation is based on paradoxical observations of partnering and complete contracts from the Swedish construction industry. Partnering is in this case interpreted as something that incorporate reciprocity, which facilitate renegotiations of complete contracts when new information arrives. Hence, partnering lowers transaction costs and enhances the probability of pareto-sanctioned renegotiations.

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1. Introduction

The U.S. Army Corps of Engineers used structured partnering to avoid litigation in the 1980s (Gransberg et al. 1999). Since then at least three governmental initiatives have been taken in Europe to endorse partnering as a way of improving problematic construction industries. Both the Latham report (1994) and the Egan report (1998) have, in a powerful way, promoted partnering in the UK. Similar schemes have been introduced in Denmark by By- og Boligministeriet (1998) and in Sweden it has been promoted in several governmental reports (SOU 2000:44; SOU 2002:115). The concept has also been a frequent topic in construction managerial journals in recent years (see Naoum 2003 for an overview). Most of this work is done with an optimistic view about the consequences of partnering, adding to the growing consultancy literature on the subject, which by nature is even more optimistic. Without much empirical or theoretical substance the literature indicates that partnering will improve performance within the construction industry in terms of quality, cost and duration (e.g. Bennett and Jayes, 1998). One important question is then whether partnering should primarily be seen as a new fad or, if partnering can be given a theoretical explanation, from an efficiency perspective. The aim of this article is to approach partnering from the perspective of economic theory in order to find logical explanations for the advantages of using partnering in construction projects.

In the theoretical literature partnering has usually been seen as a part of an incomplete relational contract and as a way of neutralising the risk of opportunism. An empirical study of partnering in Swedish maintenance contracts (see Nyström, 2005a) has, however, shown that partnering is also used in combination with relatively complete contracts, when the risk for opportunistic behaviour is rather small. A new theoretical explanation of partnering must therefore be found that can explain the combination of partnering and (relatively) complete contracts. The hypothesis developed in this article is that new information and changes in circumstances create a need to reduce the cost of renegotiations during the contract period. Partnering, which fosters reciprocity, can then be seen as a way of facilitating renegotiations for risk-averse clients.

This paper then argues that there are two different types of settings in which partnering is used from the perspective of contract theory. One is to reduce opportunism in the standard incomplete relational contract and the second one is to reduce the cost of renegotiations in relatively complete contracts.

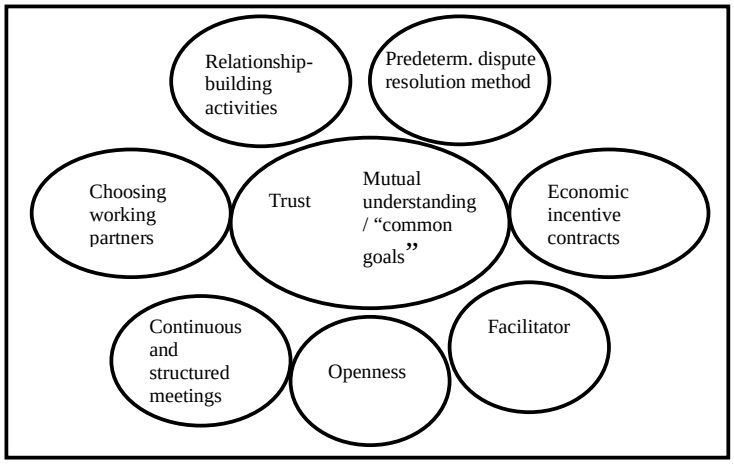
The paper begins by introducing the concept of partnering. Section 3 gives the straightforward interpretation of partnering as a relational contract. To the above view, a further explanation of partnering used in a complete contract is added, based on observations in the Swedish construction industry. Section 5 illustrates partnering and complete contracts in a game theory setting and section 6 concludes.

2. Classic partnering in the construction industry

Partnering has been portrayed as both the saviour of an ailing construction industry and as another trendy term to describe “common sense” business relations. There are numerous definitions of partnering and, despite the fact that they point in a similar direction, there is no consensus of how the concept should be defined precisely. For this multifaceted concept a general definition, given necessary and sufficient

conditions, is problematic, but a common starting point for discussing partnering is still needed. A possible solution is offered in figure 1, which presents a flexible but structured definition based on Ludwig Wittgenstein's idea of family resemblance (Nyström, 2005b). The idea is that the concept is defined in terms of a series of overlapping similarities.

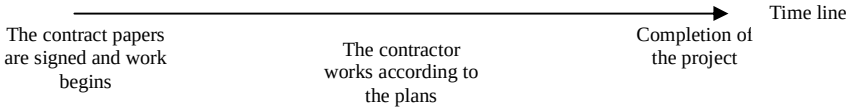
Figure 1. The partnering flower



The "partnering flower" presented in figure 1 is based on a review of the theoretical partnering literature, where it was found that all the authors consider trust and mutual understanding/"common goals" as important components of partnering. The result has since been supported by an empirical study of 18 partnering projects in Sweden, where all the respondents also included trust and common goals as the most important components in partnering (Nyström, 2005b). Other commonly mentioned components in partnering are economic incentive contracts, relationship-building activities, continuous and structured meetings, facilitators, choice of working partners, predetermined dispute resolution methods and openness. According to the partnering flower, a partnering project always includes trust and common goals and some of the additional components (the petals of the flower). This enables different variants of partnering to be captured within the same structure.

The main difference between a traditional construction project and a partnering project can be illustrated in a process model. In order to provide an understanding of partnering, a starting point is taken in a simplified model (model 1 below) of a theoretical construction project without partnering.

Model 1. The theoretical construction project

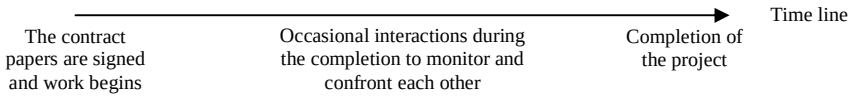


In this ideal world the contractor is appointed through competitive tendering, the contract is signed and the work starts. The project develops according to the tendering

documents[1] and the contractor gets paid according to the payment plan in the contract. After completion, the project is inspected and if everything is done according to the tendering documents the final part of the payment is made.

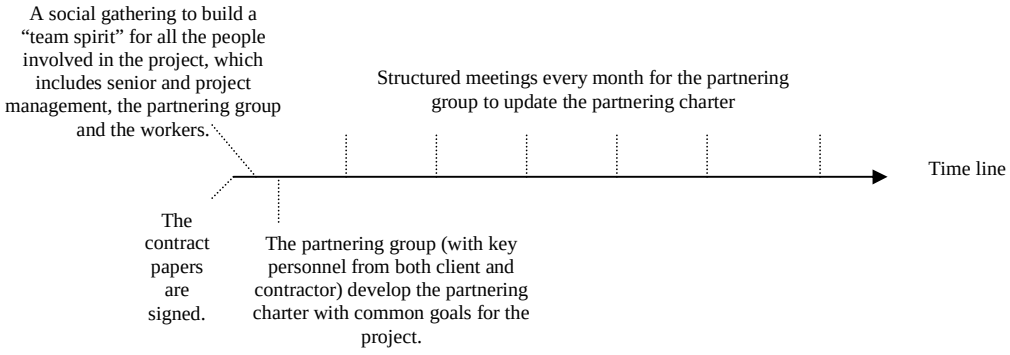
However, the above model is not a good description of reality, as things do not usually run this smoothly. Disagreements often arise related to, e.g., lack of clarity in the tendering documents and these disagreements need to be settled. The parties have to interact with each other. Moreover, the parties also check up on each other for the purpose of monitoring: the contractor wants to make sure that his payment arrives on time and the client wants to know that the project develops according to what has been ordered. A suspicious atmosphere often characterises many of these interactions, as each party is afraid of being cheated by the other. The following description, model 2, is therefore a more realistic description of a construction project.

Model 2. The more realistic construction project



The partnering procedure, within a process model setting, differs from a regular project in the way that it incorporates more positive interaction between client and contractor. Partnering is often characterised as proactive, whereas regular construction projects are reactive concerning problems that might arise. A typical partnering process is described in model 3.

Model 3. The construction project with partnering



The purpose of all these interactions can be seen as providing a way for the client and the contractor to create a situation where they can work together towards common project goals. Trust is also incorporated in this process, accompanied by some additional components from the partnering flower. This process can be assumed to entail higher initial transaction costs for a partnering project in comparison to a traditional project, and the fundamental question can be seen as asking what the gains are from making this initial investment.

[1] The tendering documents are the documents that the contract is procured on, also known as the contract specifications, contract, procurement, or enquiry documents.

There have been some attempts to conceptualise partnering in models, e.g., Crowley and Karim (1995) and Cheng and Li (2001). Crowley and Karim use an organisation theory approach and make a good point in seeing the partnering group as a new organisation. Cheng and Li develop a process model supported by an empirical survey. However, both papers are somewhat lacking in precision concerning the gains that partnering leads to.

Partnering, as used in the construction industry and construction managerial journals, has, to my knowledge, not yet been analysed from an efficiency perspective within a contract, theoretical, or transaction costs setting, and the basic purpose of this paper is to present such an analysis.

3. Partnering and relational contracting

Coase (1937) posed the question of what determines the boundaries of the firm, a question that could not be answered by the neoclassic theory, where the firm was seen as a "black box" transforming inputs to outputs. Transaction costs came up as an explanation, which presupposed a theory of incomplete contracts. Contracts are incomplete in the sense that they cannot be completely *enforced*, cannot include all *contingencies* and are costly to *write*. Accepting this view entails that contracts can be understood as more or less complete contracts on a continuous scale, i.e., the set of contracts is bounded but open. Where to draw the line between complete and incomplete on this scale is neither obvious nor relevant in this paper. It is only assumed that contracts can be compared and ranked as more or less complete – no absolute scale is needed.[2]

The motive for making a contract less complete is to avoid transaction costs ex ante, i.e., writing costs, but it can lead to ex post bargaining, i.e., a hold-up problem. This trade-off was formalised by Grossman and Hart (1986) and can be represented by an incomplete contract, one that does not entail large costs for identifying and writing contingencies, versus negotiation over (quasi) surplus ex post since the contingencies are not regulated. This is the situation that is often referred to as the hold-up problem, where the party making relationship- specific investments ex ante finds itself in a vulnerable position ex post and risks being exploited by the other party. Williamson (1975) called the exploitative behaviour opportunism, *self-interest-seeking with guile*. Even if no investments are made ex ante, the problem of opportunism is always present with incomplete contracts due to asymmetric information and gaps in the contract. If, for example, the contractor has superior information on a non-regulated aspect, there is a risk that the client will be cheated.

[2] This view is similar to that of Saussier (2000).

Hence, a trade-off is apparent between the risk for opportunism and having to spend resources on making the contract more complete. In a construction project the client always makes the first move, which means the client faces the problem of designing the contract. This choice can be outlined by the following figure.

Figure 2. The client's trade-off choice

The use of incomplete contracts creates an incentive to reduce the risk of opportunism, e.g. through some sort of trust, repeated interaction or, in the extreme case, vertical integration (Grossman and Hart, 1986). A more incomplete contract based on trust and repeated interaction is usually referred to as a relational contract (Macaulay, 1963; Macneil, 1978). The relational contract, in comparison with what Gibbons (2005) calls *formal contracts*, is based upon outcomes that can only be verified ex post by a third party, e.g. a court, and not specified ex ante. In a construction project, this could be exemplified by both parties starting with an unspecified contract not consisting of more than, for example, that a house should be built. The contract will then be filled in during the project.

The relational contract is a more incomplete contract, which disregards the task of specifying contingencies and instead focuses on developing a framework for handling information as it arises during the contract period. What hinders the parties from deviating and cheating can be explained in two different ways, or a mix of the two, either by repeated interaction or by trust. Repeated interaction is often modelled in a game theory setting. The conclusion is that both parties realise that there are surpluses to make over a long time period by not cheating each other during the current contract (see e.g. Kreps, 1990). Trust is the other way of explaining why the parties do not take advantage of each other in an incomplete contract. Both parties trust that the opposite party will not act opportunistically for ethical reasons. In reality there is probably a mixture of moral and economic motives that keeps the contract together.

A straightforward interpretation of partnering in the construction industry is to see the concept as a relational contract, which includes the ingredients of trust and repeated interaction. This comparison has also been made by Chueng et al. (2006).

Economic theory suggests that more incomplete contracts have lower transaction costs but entail opportunism, and that partnering (as a relational contract) would be called for as something that reduces the risk of opportunism. This way to understand partnering is described in figure 3. The choice is between (relatively) incomplete contracts with partnering and (relatively) complete contracts where partnering is not needed.

Figure 3. The client's trade-off choice with partnering

4. Partnering and complete contracts

4.1 Introduction

Neither of the two cases described above was, however, found when studying partnering contracts in the Swedish construction industry. The Swedish National Road Administration (SRA) and the Swedish National Rail Administration (Banverket) have contracted out road and rail maintenance for a number of years. Experience of public tendering has been collected and developed into standardised tendering documents. Analysing these shows that partnering has been tendered with roughly the same type of tendering documents as non-partnering projects, i.e., relatively complete contracts, or at least not more incomplete contracts than in non-partnering maintenance contracts.[3]

This observation can be further strengthened with reference to the principle of transparency, which applies to all public clients due to EU directives. The motive for the principle is that fair and objective evaluations of the bids can be made (NOU, 2002). This does not exclude incomplete contracts, but it is easier for the client to justify why he chose contractor X over contractor Y based on price instead of more subjective parameters. Thus, choosing the lowest price reduces the client's risk of having the evaluation reviewed. The contractors often applaud the more complete and specific specifications in the tendering document because it facilitates their estimates of what it would cost them to do the job and, therefore, of what is a reasonable bid.

[3] For example, The road maintenance contracts in Sorsele and Arvika 2003, also rail maintenance Harparandabanan 2003 and Trunkline, part 124, 141 and 143 2004.

Studying the publicly procured partnering projects, it was found that these contracts were rather complete, but still included partnering. This is, given the reasoning above, contradictory since opportunism is lower/non-existent with complete contracts and therefore there should not be any need for investing in a partnering arrangement. The two situations where partnering is used are described in figure 4.

Figure 4. The client's trade-off choice, including partnering with a complete contract

The efficiency aspect of partnering with incomplete contracts, as explained above, is rather straightforward, but introducing partnering with a complete contract seems uncalled for. Why would anyone choose a complete contract with a costly partnering arrangement to neutralise opportunism when the risk is reduced to a minimum by a complete contract? This combination looks like an unnecessary double protection, using both completeness and partnering.

The rest of the paper focuses on the right side of figure 4 in order to find an explanation for this phenomenon, partnering and complete contracts. Under what circumstances could this combination be an efficient solution? In order to go forward with this question three things need clarification.

4.2 New information – the complex construction industry

It has been said that complexity in the contracting situation adds to the justification of incompleteness (Segal, 1999). Complexity has been discussed in a number of articles and has been defined in somewhat different ways. Segal (1999) defines complexity as *the number of potentially relevant future trade opportunities*, which means that complexity rises with the number of possible trades in the future. Casadesus-Masanell and Al-Najjar (2001) have another way of defining complexity, not by focusing on the number of contingencies but the *number of independent pieces of information* within every contingency. The explanation for why complexity adds to the justification for incompleteness is that complexity makes the complete contract even more expensive because of the growing number of relevant contingencies to regulate (Segal, 1999) and/or because it requires more writing within each contingency (Casadesus-Masanell and Al-Najjar, 2001).

Adopting Segal's (1999) definition of complexity entails accepting that if a lot of new information arrives ex post then this makes the contracting situation more complex. This is relevant in construction projects, which have a long duration and where there are many unexpected circumstances in comparison to other contracts. Bajari et al. (2006) state that the ex ante design most often does not coincide with what is delivered ex post. The authors estimate the cost for renegotiation of the ex ante contract to be ten percent of the initial amount in the contract. Brousseau (1994) says

that, due to the high level of uncertainty in the construction industry, more incomplete contracts are used frequently as a way to attain flexibility. The idea behind this type of flexibility is that filling in an incomplete contract as the project progresses is easier than renegotiating it. So when the number of *potentially relevant future trade opportunities* rise, it will be too expensive to foresee and regulate them ex ante.

Just adding new information to the scenario does not, however, offer explanations for the use of both partnering and complete contracts. Instead it would be an incentive to make the contract more incomplete.

4.3 The risk-averse client

In order to justify the combination of partnering and complete contracts it must be assumed that the client is risk-averse. A risk-loving client would never choose a complete contract with partnering, as this can be seen as a double protection against opportunism by using both completeness in the contract and partnering. They would prefer to handle new information by means of an incomplete contract, as that would reduce the initial cost.

4.4 Reciprocity

Reciprocity is a topic that has been much discussed in economic theory recently. In contradiction to the traditional *homo economicus* assumption, the concept of reciprocity means that human beings do not exclusively care about themselves.

There are two ways to explain reciprocity within economics: by *(i)* "social preferences" or *(ii)* intention-based reciprocity (Fehr and Schmidt, 2001; Dufwenberg and Kirchsteiger, 2004). The first type of theory focuses on changing the traditional utility functions, so that distributions over outcomes for both the person herself and others matter. Intention-based reciprocity, on the other hand, is usually handled in a game theory setting by assuming that people always play a lead–follow strategy based on intentions, i.e., they always repay a kind action with a kind action and the other way around concerning cruel actions.

The existence of reciprocity has been shown over and over again by experimental studies (see e.g. Davis and Holt, 1993). It is assumed here that introducing partnering into a contract will raise the probability of the parties acting in accordance with reciprocity. Reciprocity is, of course, not exclusive to partnering, but the probability of attaining such behaviour is assumed to improve with partnering. An explanation for this is the initial social gatherings and team building activities (see model 3 above), which can be seen as a way to build up reciprocity between the firms and the people involved. Regular and recurrent structured meetings, focused on how to improve the project and solve problems together can also be seen as a way of strengthening reciprocity.

4.5 The role of partnering in the complete contract

Combining the assumptions of complexity, risk-aversion and reciprocity creates a setting where a risk-averse client encourages more reciprocal behaviour between the parties in order to handle new information by a more flexible way of renegotiating the contract. Partnering has been pictured as *"a way of signalling an intention of techniques and approaches to improve relationships"* (Alderman and Ivory, 2007, p.7). Entering into a partnering contract would, using economic terminology, be a

way of signalling that the parties are prepared to renegotiate the complete contract. Mentioning partnering in the tendering documents for a complete contract could then be interpreted as a desire on the part of the client for more flexibility in order to lower the cost of renegotiations when there is a need to adapt to new circumstances. Easier renegotiations are possible because the client and the contractor have a good relationship based on trust, a reputation mechanism and/or reciprocity. The exact mixture of the last three components is not obvious, but the assumption is that partnering improves the possibility for more flexible and cheaper renegotiations.

Hence, partnering and complete contracts can be justified when the situation is such that new information can be expected to arrive during the project, when the client is risk-averse and when reciprocity can lower the transaction costs for renegotiations.

The following section will, in a game theory setting and with stylised examples from maintenance contracts in Sweden, show what kind of new information is needed to explain how partnering can be efficiency enhancing, i.e., how it can lower transaction costs for negotiations.

5. How partnering as part of a relatively complete contract can increase efficiency: examples from maintenance contracts

The underlying and most realistic assumption in this section is that new information arises during the contract period since these projects are rather long, usually about five years, and concern complex contract situations.

New information is defined as information not available ex ante, i.e., it is not regulated in the contract and can be seen as an external factor that might influence the contract. The types of new information that will be exemplified in this paper are:

1. Technological improvements
2. Changed demand
3. Information about costs for the agreed measures and/or functions

The first kind is new information, which initially benefits both parties whereas the second and the third type are initially only beneficial to one party and necessitates redistribution of surplus to achieve pareto-efficiency.

Coase (1960) showed that a pareto-efficient point will always be found if there are no transaction costs (the Coase theorem). Examples in this section will show how possible pareto-sanctioned improvements due to new information are easier to realise through partnering, lowering the costs for renegotiation.

5.1 Technological improvements

Let us start off with a simple example: assume that a publicly owned research centre develops a new snowplough. This innovation is made available to every actor on the market, both clients and contractors. The new snowplough revolutionizes the industry, as it is both cheaper and delivers better quality. Assume further that the contract specifies what kind of snowplough the contractor should use (a prescriptive contract in contrast to a performance contract) so that renegotiation is needed before introducing the new snowplough. It would be in both parties' interest to adopt the new snowplough, given that transaction costs are not too high. Transaction costs can

here be exemplified by the cost for renegotiations about ways to monitor the snowplough and perhaps how the payments should be adjusted, etc. There would be no incentive for any party to adopt the new snowplough if the costs of changing the contract exceed the surplus generated by the snowplough. Partnering can be seen as a way to reduce these transaction costs since it is not necessary to monitor each other strictly in a trusting environment – not every penny needs to be counted nor every proposal questioned. The parties know and trust each other, which make these renegotiations smoother, i.e., lower transaction costs for the renegotiations. The probability of reaching pareto-efficient solutions increases by introducing partnering as a way to reduce transaction costs for renegotiations.

However, just like the Coase theorem, this new allocation does not say anything about the distribution over the surplus. Even though renegotiations are pareto-sanctioned, they might be refused by some party due to an unfair distribution of surplus, e.g. if the contractor will gain a bigger surplus from the new snowplough than the client. Experimental evidence has shown that such renegotiations might not take place, even though they are pareto-sanctioned (Fehr and Schmidt, 2001). This problem grows with the existence of noisy observables, where parties are prevented from assessing each other's gain from the new snowplough. Both parties have incentives to signal a lower surplus in order for renegotiations to take place.

Partnering is often seen as a closer relationship between client and contractor entailing openness, which can smooth the issue of noisy observables. This will make both parties less suspicious of the other party's signal, which will facilitate renegotiation. An example of this is that the client gets access to the contractor's books, i.e., the "openness" component (see figure 1).

5.2 Changed demand and information about costs for the agreed measures and/or functions

Given the complete contract, there are often situations where the client wants to change what was initially ordered. Assume that there have been reports of fatal car accidents due to poor maintenance of crash barriers. This new information has led to public pressure to improve the barriers, which puts pressure on the client to act. The client would then like to renegotiate, within the budget restriction, a higher standard in a performance contract, or more checks on the barriers in a prescriptive contract. Such a change would lead to a surplus of e.g. (5) for the client but a negative outcome of (-2) for the contractor. The positive figure represents the client's, i.e., the public's, value for avoiding fatal accidents, which require more effort from the contractor, represented by the negative figure. Given these circumstances, the contractor would like to stick with the initial contract. However, there are pareto-improvements to be found if allowing for redistribution of surplus and ending up in e.g. (1.5; 1.5).

Partnering can be seen as a way to smooth this progress towards finding the most efficient solution. As mentioned above, partnering facilitates solving the problem with "noise in the observables", i.e., asymmetric information, with a more open way of working. Both parties can together evaluate the surpluses and the client does not have to fear that the contractor is demanding excessive compensation for changing the contract. Theoretically, the parties can end up in (1.5; 1.5) by a monetary transfer.

A less costly solution than monetary transfers, interpreting partnering as a form of reciprocity, is that the contractor agrees to the (5; -2) proposition, i.e., the contractor agrees to better functional levels or more checks on the barriers without compensation. This could, in normal circumstances[4], with asymmetric information lead to the contractor slacking on some other assignments to compensate for this loss. (see Holmstrom and Milgrom, 1991 on multitasking) However, seeing partnering as something that incorporates reciprocal thinking the contractor knows that it is very likely that he will be repaid later, given that new information will arise and where renegotiations will be to his advantage. Since the contractor "played nice" in this case he will be repaid with the same behaviour later.

An example of such information, where renegotiation can be to the advantage of the contractor, is when it is realised, for example, that clearing the ditches is more expensive than anticipated because of some unexpected characteristics of the ditches. This is an example of new information about costs for the initially agreed-upon measures for clearing the ditches. Assume that the initial contract specifies that this should be done every year. A reduction to doing this every second year would result in a quality reduction of (-1) for the client and a cost-saving benefit of (4) for the contractor.[5] Given the prior arrangement concerning the crash barriers, and/or expectations about such situations in the future, the client would, according to reciprocity, agree to this renegotiation of the contract.

Following the same line of reasoning, partnering can also facilitate pareto-sanctioned renegotiations where they would otherwise be held back because of unfair distribution of gain (see the snowplough example above). Given that new information comes with an equal probability of both parties receiving a surplus, both parties are willing to renegotiate with partnering.

6. Conclusion

Two theoretical explanations have been provided for how partnering can enhance efficiency in the construction industry. Firstly, partnering can be seen as part of a relational contract with the aim of neutralising opportunism and thereby reduce the risk in an incomplete contract. The reduction in opportunism is then based on a mix of trust and repeated interaction. This is a standard result in applied economic theory and has been presented before by Cheung et al. (2006) although not as precise.

The second and more innovative interpretation of partnering is to focus on the use of partnering in combination with a (relatively) complete contract, which existence has been discovered in the Swedish construction industry. Partnering can then be justified as a way to facilitate renegotiations when new information arrives during the project and the client is risk-averse. Investing in a procedure to enhance trust and reciprocity can be efficiency enhancing because it will reduce the cost for and increase the probability of carrying out pareto-sanctioned renegotiations.

[4] The contractor would not renegotiate under normal circumstances, the example is used for illustrative purposes only.

[5] This is a real example from the maintenance project in Arvika with fictional figures in the text.

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Paper 3: Partnering attitudes in the Swedish construction industry

Partnering attitudes in the Swedish construction industry

Johan Nyström

Stockholm 2007

Building and Real Estate Economics
School of Architecture and the Built Environment
Royal Institute of Technology

Partnering attitudes in the public Swedish construction industry[*]

Abstract

This paper has the purpose of empirically mapping out the procurement phase with partnering and investigating the perception of partnering among Swedish project managers that have been working with partnering. The results are compared between different age groups, type of projects and whether the respondent is a client or contractor. There is also a comparison over time and the "partnering flower" (Nyström, 2005) is tested empirically. Data were collected through a questionnaire in 2004 and 2006 and focus on 18 Swedish partnering projects from the construction industry, procured with competitive tendering under the Public Procurement Act. The results show that most projects used incentive contracts with target costs and included soft parameters in the bid evaluation. Concerning the perception of partnering, the concept is viewed to have most potential in achieving cost reductions. There was also a large consensus among the respondents that partnering did not deteriorate the businesslike relationships, that it was a more fun way of working, and that the concept has a future in the construction industry. A few major differences could be observed between the different groups. The clients were more sceptical to seeing themselves as winners of partnering, in comparison to the contractors perception on the same subject. Concerning partnering being a more fun way of working the respondents from maintenance projects were not as positive as the respondents from the other types of projects (new-investment and re-investment). It could also be seen that the younger respondents were more positive than the older concerning partnering being a way to resolve disputes and not seeing the concept just as a fad. Support for the partnering flower could be found in the material since all respondents considered trust and common goals important components of partnering. In order to make a comparison over time, when the actors had gained more experience, a second questionnaire was sent out to the same respondents in 2006, but no big changes in the views could be found.

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1. Introduction

Most empirical partnering studies are conducted with questionnaires (Black et al., 2000; Haksever et al., 2001; Chan et al., 2003; Beach et al., 2005 and Fortune and Setiawan, 2005). The questionnaires are suited for mapping out opinions and attitudes concerning critical success factors or outcomes. This paper adds to this literature in three ways. Firstly, it collects information about the procurement process when partnering is included in order to see if there are any special characteristics in the procurement phase. Secondly, the paper sets out to test certain issues concerning the general perception of partnering and see if the perception differs between age groups, type of projects or whether the respondent is a client or a contractor. A new feature is that the answers were followed-up two years later to see if any opinions had changed over time with more experience of partnering. Thirdly, the partnering flower presented in Nyström (2005) is "tested" among practitioners.

The paper starts in section 2 with a description of the method. In section 3 the results from the questionnaire are presented. Section 4 investigates differences between groups and over time concerning the answers with a non-parametric rank test. This section also includes the empirical test of the partnering flower, followed by the conclusion in section 5.

2. Method

The material examined was collected in 2004 with a follow-up on part 3 (see below) in 2006.

2.1 Selection of projects

18 partnering projects were examined through a questionnaire and the projects consisted of ten maintenance, six new-investment and two reinvestment projects. The study started by finding the current population of projects (up to summer 2004) fulfilling the criteria of being procured under the act on public procurement[1] in competition and with partnering/partnership/collaboration or suchlike mentioned in the tendering documents.[2] This law oblige the public client to choose the lowest bid or the economically most advantageous tender.

The projects were mainly found through contacting well-informed persons associated with partnering. These persons were found from word-of-mouth, articles, conferences etc and included people at the Swedish National Road Administration (SRA), the Swedish National Rail Administration (Banverket), different municipalities and the larger construction companies in Sweden. Some of the suggested partnering projects were excluded because of not fulfilling the established criteria. The method cannot exclude that projects were missed, but the risk is reduced because of the rather small size of the Swedish construction industry.

[1] The Act (SFS 1992:1528) on Public Procurement

[2] The tendering documents are the documents that the contract is procured on, also known as the contract specifications, contract-, procurement- or enquiry documents.

2.2 The questionnaire

The questionnaire consisted of the following three parts,

Part (1) facts about the respondent and the project,
Part (2) the procurement process and the contract documents, and
Part (3) the respondents' perception of partnering.

In order to serve the three purposes mentioned above, the questionnaire design differed somewhat between client and contractor. This differentiation was made to adapt the questions according to what the respondent could be expected to have knowledge about. The client version had 42 questions and the contractor version had 41 questions, where 36 questions were common for both respondents. The contractor version had five open questions, eleven semi-open questions with the opportunity to express themselves freely under the alternative "others" and 25 closed questions. In comparison, the client had three open, 15 semi-open and 24 closed questions.[3]

Part 3 included statements about partnering, which the respondents were to take a stand on. There was also an additional part where the respondents had the opportunity to express themselves freely on partnering. The follow-up questionnaire from 2006 included part 3 only.

2.3 The respondents

It was not obvious who was the most suitable person to answer the questionnaire within each organisation. Optimally, the person should be familiar with both the procurement stage and the day-to-day work in the project. Although the title "project manager" has different meaning in different organisations, this position was initially asked for when contacting the organisations. However, the questionnaire was not tied to the title and the aim was to find the most suitable person to answer the questions. This searching process was conducted over the telephone. Usually a respondent was found from one part of the project and this person then referred to his counterpart in the other organisation. The same persons were included in the follow-up survey.

2.4 Interpretation

There is always a risk of misinterpretation in a questionnaire. In order to reduce this risk the questionnaire was reviewed and tested by a number of people familiar with procurement process and partnering before it was sent out. However clearness is not always possible when dealing with complex issues. When a risk of misinterpretation has been found afterwards, by the author or by the respondent, it will be commented on in the presentation of the results.

3. Results

This section will present the result from the questionnaire on both project level, consisting of totally 18 observations, and individual level, consisting of totally 30 observations. The presentation will follow the questionnaire structure and conclude with the separated questions for clients and contactors. It will be indicated when the answers from client and contractor within the same project differ on fact-based questions.

[3] See appendix 6 the client questionnaire.

The follow-up questionnaire included 27 respondents and is presented in section 4.2 and 4.6.

3.1 Response rate

The survey was conducted through 36 postal questionnaires to both clients and contractors with 30 replies after a number of reminders per e-mail and/or phone, which gives a response rate of 83 %. In twelve of the 18 projects, answers were received from both client and contractor. The remaining six projects only had one respondent, summing up to 17 contractors and 13 clients.

In the autumn of 2006 part 3 of the questionnaire was posted to the same respondents again. 35 questionnaires were sent out with a response rate of 77 %.

These response rates must be considered good so there are reasons to believe that the results give a reasonably correct picture.

The rest of section 3 will only present the results regarding the main questionnaire from 2004.

3.2 Part 1, Facts about the respondent and the project

Out of the 30 respondents, three were women. The ages of the respondents were distributed as shown in table 1.

Table 1. Age of respondents

Age	
<25	0
25-30	1
31-40	4
41-50	11
51-60	11
60<	3

The clients in this survey consist of Swedish National Road Association (SRA), the Swedish National Rail Association (Banverket), Municipalities and Governmental owned housing-companies (GOH-C).

The contract fees were between 166 million SEK and 10 million SEK. One project with a county council was also included but no answer was received. The client respondents were distributed among the types of projects in the following way.

Table 2. Type of project and clients

	SRA	**Banverket**	**Municipalities**	**G O H-C**	**Total**
Maintenance	2	2	6	0	10
New- investment	3	0	0	3	6
Re-investment	0	1	0	1	2

Partnering has been described as most beneficial in complex projects (Barlow, 2000). The respondents were asked to determine the complexity of their project in

comparison to other projects of the same type (see table 2 for types). As can be seen in table 3, many respondents interpreted their project as more complex than a regular one.

Table 3. Complexity of the project

Degree of complexity	
More complex	13
Average	11
Less complex	2
No opinion	4

Knowledge about the other party *before* implementation of the contract was investigated by the following two questions.

Table 4. Experience of the other party

Has your organisation worked with the other party earlier	
Yes	11
No	4
Different opinion between client and contractor	3

Table 5. Knowledge of the opposite party

Do both parties have a good knowledge about each other's organisations and the people within it	
Yes	16
No	0
Different opinion between client and contractor	2

The result showed that in most cases the organisations have worked together previously and have good overall knowledge about each other.

The Swedish construction industry has, generally, three types of specifications for projects, design and build-, prescriptive and performance contracts. These specifications regulate the responsibility in the projects. In the design and build type, one contractor has the responsibility for both planning and delivering. This type of specification is often supported by so-called ABT[4] conditions. ABT and also AB[5] is a set of specialised conditions for the Swedish construction industry, accepted and developed by both clients and contractors. With the prescriptive type of specification, the client has responsibility for planning and the contractor for the work. AB often supports this type of specification. With the performance specifications, the client has formulated functional claims for the object that the contractor shall deliver but is free

[4] General conditions of contract for building, civil engineering and installation work performed on a package deal basis. Translation taken from The Construction Contracts Committee.
[5] General conditions of contract for building, civil engineering and installation work. Translation taken from The Construction Contracts Committee.

to choose the method for delivering the functions. These projects are usually supported by ABT conditions. The specifications differ somewhat in meaning depending on project type and therefore the result will be presented according to project type in table 6. Most of the projects in this study used the design and build type of specifications.

Table 6. Type of specification

Type of specifications	Maintenance	New-investment	Re-investment	Total
Design and build	3	5	1	9
Prescriptive	1	1	1	3
Performance	3	0	0	3
Other	0	0	0	0
Different opinions between client and contractor	3	0	0	3

It should also be noticed that projects often are a mixture of these specifications, e.g. pure performance contracts only exists theoretically since all functions do not have proper measurements. The three performance projects above can be interpreted as having a higher degree of functional claims in their specifications than the usual projects.

Concerning the condition documents most of the contracts used ABT 94, this result is presented on type of project level for the same reason as above.

Table 7. Type of conditions

Type of conditions	Maintenance	New-investment	Re-investment	Total
AB 92	2	1	1	4
ABT 94	4	5	1	10
ABFF 99	2	0	0	2
Other	2	0	1	3

It is not obvious how the introduction of partnering will affect the number of bids. The clients were asked for their opinions and as can be seen in table 8, they did at least not expect fewer bids.

Table 8. Tenders

Statement to clients	More	Approximately the same number	Fewer
How many tenders/bids did you expect	6	7	0

Another interesting issue is how the introduction of partnering affects how high the bids are. An indication can be found by comparing the accepted bid with the clients' own budgets. No real trend could be seen from the answers, presented in table 9.

Table 9. Bid in comparison to budget

Statement to clients	Higher	Approximately equal	Lower	No answer
What was the level of the accepted bid in comparison to your own budget	5	3	4	1

Since partnering is a relatively new concept in the Swedish construction industry it might entail some uncertainty when leaving bids, i.e., it may be harder for the contactors to calculate a contract document when partnering is included (Olsson, 2003). From this indication there are reasons to believe that partnering would entail a wider distribution among the received bids. From the clients perspective no such support could be found.

Table 10. Distribution of bids

Statement to clients	Yes	No
Was the distribution of bids wider in comparison to a contract without partnering	4	9

3.3 Part 2, The procurement process and the contract documents

The clients were asked about their motives for introducing partnering, with the answering alternatives taken from the literature and the general debate on partnering. On this multivariable question the 13 clients answered in the following way. The respondents could mark several alternatives.

Table 11. The clients' motives for partnering

Motives for partnering	
Get more out of the project for the same amount of money	10
Make way for a better collaboration environment	10
Secure quality	9
Learn from the contractors	8
Save money	7
Flexibility	6
Avoid/prevent disputes	6
Become more well-informed about the contractor	3
Other	3
Get a better contact with the contractor's contractors.	1
None, decided from above in the organisation	0

In the tendering documents partnering can be presented as *a possible way* or as *the only way* of carrying out the project. The result shows that in the majority of the studied projects, partnering was described as the only alternative.

Table 12. Partnering settled or a possibility

Was partnering settled as the way of working or was it described as a possible way of working in the contract documents	
Settled	11
As a possibility	7

In the cases where the concept was presented as a possibility, it was further asked what would make either of the parts reject partnering. No support could be found for the hypotheses that this was related to experience.

Table 13. Rejection of partnering

Reasons for rejecting partnering	
My organisation does not have enough experience	0
The opposite organisation does not have enough experience	2
Responsible persons with the opposite organisations are not suitable for partnering	3
Other	5

One of the projects rejected the possibility of partnering after the procurement phase. The two observations from this project answered "Other" reasons than given alternatives in table 13, commenting that this decision was taken at a higher level in the client organisation.

There are examples of partnering projects that have not been working well. A question is whether was handled in the contract documents with a clause for annulling partnering? However, most of the projects did not comment on this in the tendering documents.

Table 14. Annulment of partnering

Did the contract documents include an opportunity to annul the partnering collaboration and continue the projects without partnering	
Yes	4
No	7
Different opinion between client and contractor	4
No answer	3

One question concerned how detailed partnering was described in the contract documents.

Table 15. Description of partnering in the tendering documents

How was partnering described in the contract documents	
Very detailed	4
Rather detailed	6
Overall description	11
Only mentioned, for constructor to describe	6
No description, only mentioned	3

This is a subjective question, as the term ”detailed“ was not defined. The result indicates that the clients usually described the concept in a rather general way. An interesting observation was that in only 3 out of the total 18 projects did the client and contractor agree about how detailed partnering was described.

In table 16, it is shown that only three projects were clear on that an information meeting about partnering would be undertaken.

Table 16. Information meeting

Was there an information meeting about partnering	
Yes	3
No	8
Different opinion between client and contractor	3
No answer	4

An incentive contract included a target cost, where a deviation from this target is shared by the client and the contractor by predetermined percentage factor. The theoretical justification for this type of contract is to give the contractor an incentive to consider both cost and quality (Scherer, 1964). From table 17 it can be seen that even though target cost contracts dominated, partnering was also used with fixed price contracts.

Table 17. Type of contract

Type of contract	
Cost plus	0
Fixed-price with adjusting quantities	2
Fixed-price without adjusting quantities	3
Target cost with incentives	13

The tendering documents were clear under which circumstances the target cost should be raised in nine of the 13 projects with incentive contracts.

Table 18. Raise target cost

Was it evident what circumstances would raise the target cost	
Yes	9
No	2
Different opinion between client and contractor	2

Since this survey is dealing with public clients, it is interesting to see how a possible reduction in costs below target price will be spent. In two of the projects, the contractor knew how the client would spend their share of an eventual surplus as seen above.

Table 19. Client spending of surplus

Was it clear how a possible surplus would be spent by the client	
Yes	2
No	9
Different opinion between client and contractor	2

The partnering contract can also include other monetary incentives than target costs, e.g. related to project duration, quality, safety, technical development, cooperation and reduced utilisation of resources. Five projects included such economical incentives/bonuses besides incentives on target cost.

Table 20. Incentives/bonuses

Was there any economical incentives/bonuses (besides incentives on target cost)	
No	13
Yes, consisting of	5
Time	1
Security	0
Other	4

A clear majority of projects in this study used soft parameters when evaluating the bids, i.e., factors such as management, qualification/experience, quality, environmental aspects etc.

Table 21. Soft parameters

Were soft parameters included in the evaluation of the bids	
Yes	17
No	1

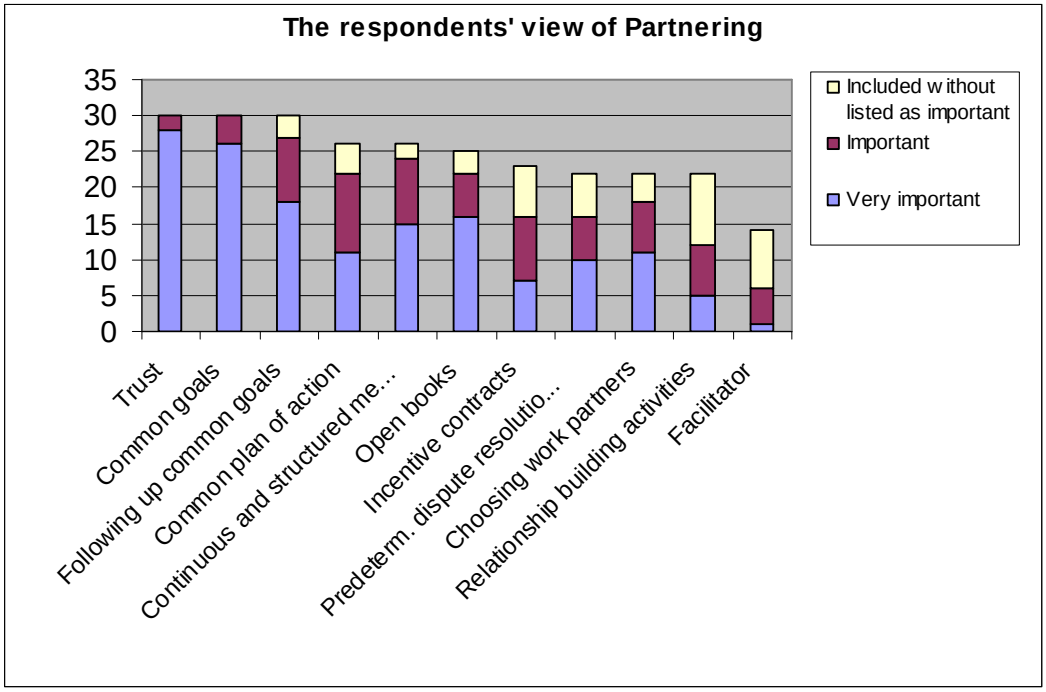
The weight of the soft parameters compared to the price differed from 3 to 95 percent, with a mean value of 28 percent.

3.4 Part 3, The respondents' perception of partnering

Partnering is a multifaceted concept, and it has numerous definitions. To test the respondents' view of partnering, a number of components were listed. The components were taken from the literature (Nyström, 2005) and the general debate about partnering. The respondents were then asked about what components they included in partnering and also asked to grade the level of importance of the components.

The result presented in figure 1 shows that all respondents included trust, common goals and following up common goals as important or very important components.

Figure 1. The respondents' view of partnering



The respondents' experiences of partnering were generally small as can be seen in table 22.

Table 22. The respondents experience of partnering

The respondents' experiences of partnering	
None	13
Small	12
Vast	5

In section 3 of the questionnaire a number of statements about partnering were also put forward to the respondents.[6] The statements were based on what is often said about partnering.

[6] See appendix 1 for graphical representation of all the answers.

Two statements concerned the number and the level of bids when partnering is included. Most of the respondents disagreed with both statements.

Table 23. Statements about partnering and bids

Statements		Disagree	Agree partially	Totally agree	No opinion
A	The number of bids will be higher with partnering in comparison with traditional projects[7]	15	7	1	7
B	The bids will be higher with partnering in comparison with traditional projects	14	7	2	7

Some questions were asked concerning the respondents' beliefs about the effects, which are presented in table 24. The most evident result is that the respondents believed that it is *easier to achieve cost reductions* with partnering in comparison to projects without partnering (D). There was also an overwhelming consensus that it is easier to *avoid disputes* between client and contractor with partnering in comparison with traditional projects (F). It can be noted that the transaction costs of partnering did not seem to be lower (I), and this is further discussed in Nyström (2007).

Table 24. Statements about the effects of partnering

Statements		Disagree	Agree partially	Totally agree	No opinion
C	It is easier to achieve prescribed quality with partnering in comparison with traditional projects	1	11	17	1
D	It is easier to achieve cost reductions with partnering in comparison with traditional projects	0	8	22	0
E	It is easier to achieve time reductions with partnering in comparison with traditional projects	3	9	11	7
F	It is easier to avoid disputes between client and contractor with partnering in comparison with traditional projects	1	11	18	0
G	It is easier to resolve disputes between client and contractor with partnering in comparison with traditional projects	1	13	16	0
H	It is more likely for production improvement to arise with partnering in comparison with traditional projects	2	7	19	2
I	More time/resources for meetings and discussions are used in partnering projects in comparison with traditional projects	3	14	13	0

[7] Traditional projects are projects without partnering.

No support could be found for the statement that partnering deteriorate the businesslike relationship.

Table 25. Statements about partnering and businesslike behaviour

Statements		Disagree	Agree partially	Totally agree	No opinion
J	Partnering deteriorate the businesslike relationship between client and contractor	18	11	0	1

Both clients and contractors, respectively, have been described as winners in partnering projects. Most of the respondents disagreed to both statements, K and L. Noticeable is also that a large number of respondents had no opinion about this.

Table 26. Statements about the relative winner from partnering

Statements		Disagree	Agree partially	Totally agree	No opinion
K	The client has relatively more to win with partnering than the contractor	12	5	4	9
L	The contractor has relatively more to win with partnering than the client	15	5	1	9

The answers, presented in table 27, indicate that the respondents had a positive attitude towards partnering and thought that this way of working will remain in the future.

Table 27. Statements about partnering

Statements		Disagree	Agree partially	Totally agree	No opinion
M	Partnering, or suchlike business relationship, are here to stay	0	6	23	1
N	Partnering is a more fun way of working	0	11	16	3
O	Partnering is not more than a new fad, for a way of working that has been done for ages	19	5	4	2

Most concurrence in the answers from this part of the questionnaire was that the respondents agreed

- that it is easier to obtain cost reductions with partnering (D),
- that partnering as an organisational form is here to stay (M) and
- that partnering is a more fun way of working (N).
- that partnering would not worsen the businesslike relationship (J).

It should, however, be remembered that the respondents were all involved in partnering projects which might bias the answer.

Questions only to the clients

One of the statements was only put forward to the clients, and this concerned the workload with the tendering documents when partnering is included. The answers differed considerably among the clients.

Table 28. More work with the tendering documents when partnering is included

Statement to clients	**Disagree**	**Agree partially**	**Totally agree**	**No opinion**
More work is required with developing the tendering documents with partnering in comparison with traditional projects	4	4	3	2

Questions only to the contractors

Three statements and one question were specific for the questionnaire to the contractors. The first statement concerned risk-taking and partnering. As can be seen in table 29 the majority of the contractors leaned towards perceiving partnering as a project form that reduces risk, something that is further discussed in Nyström (2007).

Table 29. Risk and partnering

Question to contractors	**Larger**	**No difference**	**Smaller**	**No answer**
Does partnering entail a larger or smaller risk-taking for your firm in comparison to a contract without partnering	2	4	8	3

One statement focused on the interest in partnering projects, and most of the contractors indicated that they would be more interested in partnering projects compared to traditional projects as seen in table 30.

Table 30. Interest for partnering projects

Statement to contractors	**Disagree**	**Agree partially**	**Totally agree**	**No opinion**
Out of two identical projects, my company would be more interested of working in the project that included partnering.	1	5	11	0

Concerning the distribution of bids, there was little support for the statement that partnering makes the distribution wider.

Table 31. Distribution of bids

Statement to contractors	**Disagree**	**Agree partially**	**Totally agree**	**No opinion**
The distribution among bids is wider if partnering is included in comparison to a contract without partnering	5	3	1	8

The risk and distribution of bids can, among other aspects, be related to the possibility for the contractor to calculate the probable cost for carrying out the task described in the tendering documents. However, the answers concerning calculation

for a project with partnering differed considerably among the contractors as seen in table 32.

Table 32. Possibility to calculate with partnering

Statement to contractors	Disagree	Agree partially	Totally agree	No opinion
A contract document, which includes partnering is harder to calculate	4	7	3	3

3.5 Conclusion about the procurement phase and the perception of partnering

The data collected from the questionnaire have now been presented. It can be concluded that most of the partnering projects, but not all, had incentive contracts and that all but one included soft parameters when evaluating the bids. Not surprisingly in a small market like Sweden, the actors had good knowledge about each other. The description of partnering in the tendering documents was most often not detailed. Little support could be found for statements that partnering increases the level of the bids, which is consistent with the contractors' answers that partnering do not entail higher risks. However, five of the clients answered that their accepted bid was higher than budgeted.

From the result concerning the type of specifications (see table 6) it can be concluded that partnering is a way of working and not a new type of specification. This conclusion can be drawn since partnering obviously is undertaken with different types of contract specifications and regulations. However, the questions remains on which type of specifications and regulations works best with partnering and whether partnering needs a unique regulation. These important questions lie outside the scope of this paper.

Getting more out of the project for the same amount of money and *A better collaborative environment* were the two highest ranked motives for partnering according to the clients. Noticeable is that the ranking of the motive of avoiding conflicts was relatively low, considering that this is often mentioned in the literature as the initial purpose of partnering. A possible explanation for this might be that the Swedish construction industry has been characterised as having a relatively low degree of conflicts (Kadefors, 2002).

The respondents viewed trust, common goals and following up common goals as the most important components in partnering.

Concerning the statements about partnering, there were most agreement on that partnering improves the possibility of cost reductions, does not deteriorate the businesslike relationship and that it is a way of working that is here to stay. It can also be concluded that partnering is seen as a more fun way of working. The widest distribution of responses was found on the question whether the client have more to win by the introduction of partnering.

4. Do the attitudes differ between subgroups?

The analysis below will investigate whether any interesting relations can be found between the answers on selected questions and background factors like the type of project, age of respondent, whether the respondent is a client or a contractor and if the attitudes towards partnering have changed over time. The partnering flower will also be tested empirically.

4.1 Statistical method

The printed alternatives for the respondents' views on the statements about partnering provided answers in the form of ordinal data. There are non-parametric statistical methods suitable for handling this kind of ranking material in order to draw inference about differences between samples. Non-parametric methods have the advantage of not having to assume any specific underlying distribution in order to draw conclusions and generalise. However, the focus in this study is not primarily to make statistical generalisations, and therefore a predetermined significance level was not determined. The methods below are primarily seen as good ways to determine the differences between the sub-samples in the material, nevertheless significance levels will be mentioned when used.

Comparisons of the attitudes to the statements are made for four cases: client vs. contractor, young vs. old, type of project and between answers in the 2004 and the 2006 questionnaire.

Two statistical tests are used, the Mann-Whitney U-test for the comparison of two populations and the Kruskal-Wallis H-test for comparing more than two populations, i.e., type of project. Both these methods are based on rank sums, which make it possible to test whether two independently drawn samples are drawn from the same population (Levin and Rubin, 1991). Hence, the null-hypothesis can be formulated in the following way:

H_0 = There is no difference between the groups (e.g. Client-contractor),

and the alternative hypothesis is then:

H_1 = There is a difference between the groups.

Even though both methods above are suited for a small number of observations, significant results must be handled carefully and no general conclusion about the selected aspects will be drawn in this paper. Concerning the methods it can be said that the Z- (Mann-Whitney) and H-values (Kruskal-Wallis) are positively correlated with differences between groups[8] and U-values are negatively correlated. High Z- and H- values and low U-value indicates that there is a clear difference between the groups.

The persons who answered with the alternative "No opinion" have been excluded from the statistical analysis, since these respondents do not add any information to the specific question.

[8] It should be noticed that the Mann-Whitney test gives both a negative and a positive value of Z.

4.2 Empirical test of the partnering flower

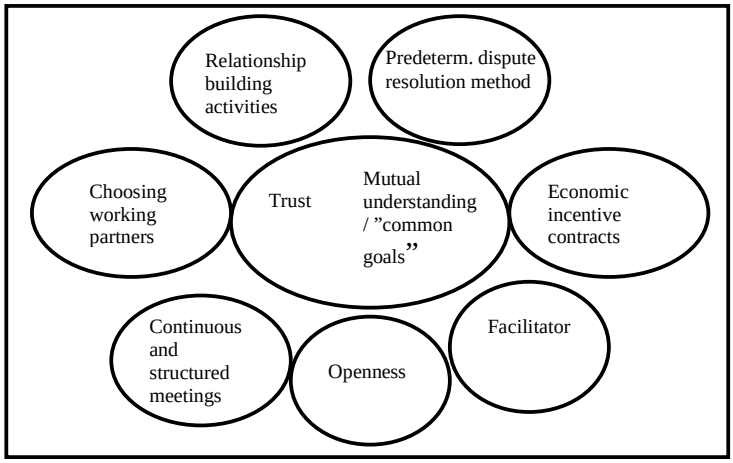
In Nyström (2005) there is a literature review of 13 articles about important components of partnering. Table 33 shows the result of this study, and it can be seen that all authors included trust and common goals as a component in partnering.

Table 33. Components of partnering from Nyström (2005)

Components	Number of authors
Trust	13
Common goals	13
Predeterm. dispute resolution method	8
Economic incentive contracts	6
Relationship building activities	6
Continuous and structured meetings	6
Facilitator	6
Open-books	4
Choosing work partners	2

Applying the philosopher Ludwig Wittgenstein's idea of family-resemblance to this result, the partnering flower was developed as seen in figure 2.

Figure 2. The partnering flower



According to this model, partnering always includes trust and common goals, accompanied by some additional components. However, the partnering flower can be criticised for only being based on the theoretical literature. Therefore, questions concerning the components of partnering were included in the questionnaire in order to get the practitioners' views. The respondents were asked which components they included in partnering and level of importance of the components. Table 34, present the results from both the first and the second questionnaire.[9]

Table 34. The respondents' view of partnering

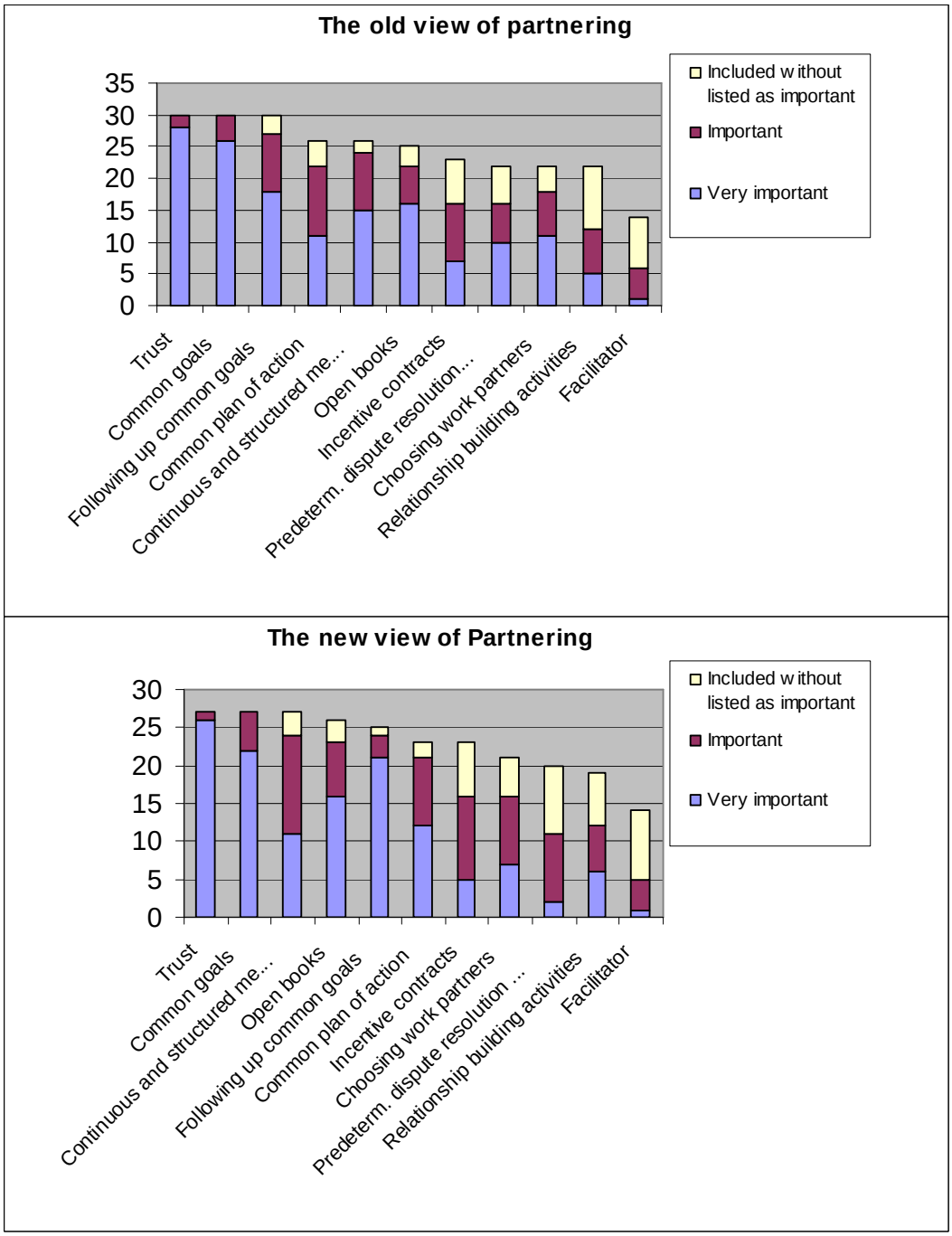
Components	2004 answers			2006 answers		
	Included without listed as important	Important	Very important	Included without listed as important	Important	Very important
Trust	0	2	28	0	1	26
Common goals	0	4	26	0	5	22
Following up common goals	3	9	18	1	3	21
Common plan of action	4	11	11	2	9	12
Continuous and structured meetings	2	9	15	3	13	11
Open books	3	6	16	3	7	16
Incentive contracts	7	9	7	7	11	5
Predetermined dispute resolution method	6	6	10	9	9	2
Choosing work partners	4	7	11	5	9	7
Relationship building activities	10	7	5	7	6	6
Facilitator	8	5	1	9	4	1

It can be seen that the view in Nyström (2005) and the respondents' view correspond to a large extent. Both practitioners and researchers, include trust and common goals as components in partnering. To conclude, this survey supports the view of partnering that is described with the partnering flower.

[9] See Figure 1 for a graphical representation of the 2004 answers.

Moreover, no major change in the perception of partnering can be seen over time in the analysed material. Although, there are some changes in the ranking in figure 3, no significant change is observed according to the Mann-Whitney test.[10] The main change concerned following up common goals, which was assigned more importance in the answers from 2006, and predetermined dispute resolution method, that was considered as less important in 2006.

Figure 3. View of partnering, 2004 vs. 2006



[10] 270 responses from 2004 and 252 responses from 2006, giving U1=33531.5 U2=34508.5 and Z=0.28

4.3 Client vs. contractor

Both theorists (e.g. Barlow, 2000) and practitioners (e.g. Burel, 2004) emphasise that partnering is especially useful in complex projects. Table 3 indicated that the majority of the respondents considered their project as more complex than the average projects of the same type. If this is due to the actual project, the partnering concept or the contract type cannot be determined here. Comparing the client's and the contractor's views on the complexity of the project, no important difference could be distinguished as seen in table 35.[11] Noticeable is, however, that only in 2 out of the 18 projects were there agreement between client and contractor about the complexity of the project.

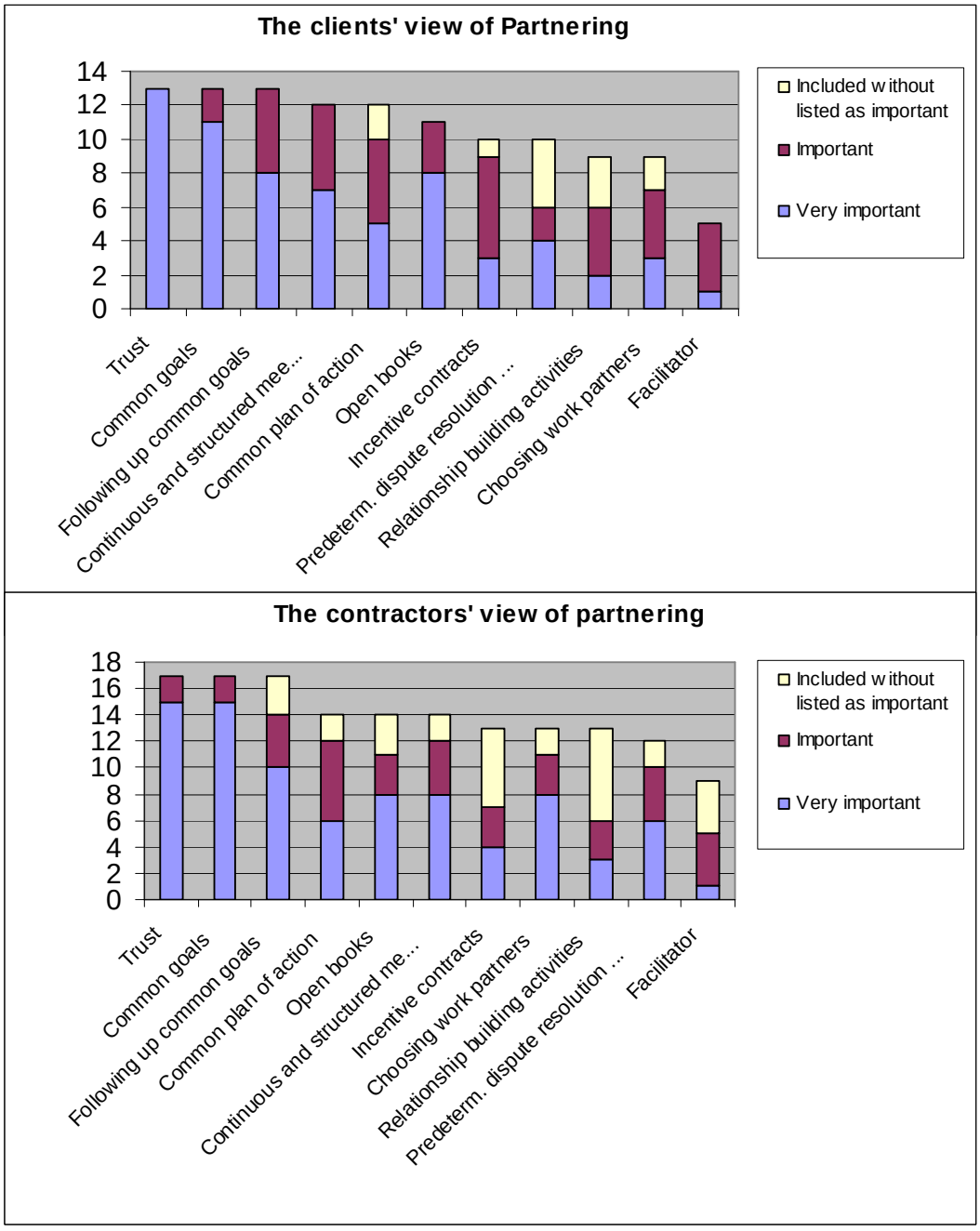
Table 35. Complexity, client vs. contractor

Complexity	More complex	Average	Less complex	No opinion
Contractors	9	6	1	1
Clients	4	5	1	3

[11] 16 Contractors (n_1) and 10 Clients (n_2) answered, giving U1=66.5 U2=93.5 and Z=0.71

Concerning what components to include in partnering and their importance, no important difference could be seen between the clients and the contractors, i.e., the two groups agreed to a large extent.[12] This can be seen in figure 4, where the ranking of the components differed a little in order, but not enough to give a significant difference according to the Mann-Whitney test.

Figure 4. View of partnering, client vs. contractor



[12] n_1=153 n_2=117, giving U_1=9127 U_2=8774 and Z= 0.27

The largest difference between the clients' and the contractors' view on the different statements was found for statement K (whether the client has relatively more to win), see appendix 2 for a diagram describing the views on all statements. The Mann-Whitney U-test indicates that in this case the null hypothesis could be rejected with 95 % certainty.[13]

Table 36. Statement K, client vs. contractor

Statement K The client has relatively more to win with partnering than the contractor	**Disagree**	**Agree partially**	**Totally agree**	**No opinion**
Clients	8	1	0	4
Contractors	4	4	4	5

No other statement than K showed any clear difference between the clients and the contractors answers. However, the Mann-Whitney U-test is also useful as a measurement of when the groups were in most agreement. Formally put, it indicates the statements where the answers were furthest away from being significantly different by showing small Z-values.

Given this criterion most agreement was found on the following statements:

> **G)** It is easier to resolve disputes between client and contractor with partnering in comparison with traditional projects.[14]
> 41% (7 respondents) of the contractors and 46% (7 respondents) of the clients agreed partially with the statement and 53% (9 respondents) and 54% (7 respondents) respectively totally agreed.
>
> **M)** Partnering, or suchlike business relationship, are here to stay.[15]
> 81% (13 respondents) of the contractors and 77% (10 respondents) of the clients totally agreed to this statement.
>
> **J)** Partnering deteriorate the businesslike relationship between client and contractor.[16]
> 65% (11 respondents) of the contractors and 58% (7 respondents) of the clients did not agree at all with the statement and 35% (6 respondents) and 42% (5 respondents) respectively agreed partially.

An interesting observation is that in six of the twelve fact-based questions (table 2, 4, 6, 7, 12, 14, 16-21) the answers differed between client and contractor within the same project. This is a rather high figure since all respondents are project managers, or in a similar position, with responsibility for the project. The respondents were advised to supplement information from colleagues if they did not know the answers by memory, but maybe this was not done.

[13] n_1=12 n_2=9, giving U_1=86 U_2=22 and Z= 2.27
[14] n_1=17 n_2=13, giving U_1=106.8 U_2=114.2 and Z=0.15
[15] n_1=17 n_2=13, giving U_1=108.5 U_2=99.5 and Z=0.20
[16] n_1=17 n_2=12, giving U_1=95.5 U_2=108.5 and Z=0.29

Concluding this section it can be stated that the opinions did not differ much between clients and contractors. This can of course be due to the lack of observations, but in any case the view of partnering was very much alike in the two groups, and comparing the answers concerning the statements, the clients and the contractors agreed to a large extent (see appendix 2)

4.4 Younger vs. Older

Partnering has been described as a way of attracting younger people to the somewhat aging construction industry. Therefore it is interesting to look for differences between the older and the younger respondents, with the hypothesis that the latter group is more positive. In this study all respondents over 50 are considered as older and they constitute 47 percent of the sample (14 respondents).

Concerning the views of the motives for partnering no important differences could be observed between younger and older clients[17], see appendix 3 for a figure with the answers to all statements.

Table 37. The clients' motives for partnering, younger vs. older

The clients motives for partnering	Younger	Older	Total
Get more out of the project for the same amount of money	6	4	10
Make way for a better collaboration environment	3	7	10
Secure quality	5	4	9
Learn from the contractors	4	4	8
Save money	3	4	7
Flexibility	3	3	6
Avoid/prevent disputes	2	4	6
Become more well-informed about the contractor	1	2	3
Other	2	1	3
Get a better contact with the contractor's contractors.	1	0	1
None, decided from above in the organisation	0	0	0

The biggest differences could be seen for statement G[18] and O[19], where the null-hypothesis, that the populations are identical, could be rejected with 93 % certainty in G and 91 % certainty in O. Hence, some support for the younger being more positive towards partnering could be found here.

Table 38. Statement G, younger vs. older

Statement G It is easier to resolve disputes between client and contractor with partnering in comparison with traditional projects	Disagree	Agree partially	Totally agree	No opinion
Younger	0	5	11	0
Older	1	8	5	0

[17] 30 Younger (n_1) and 33 Older (n_2) answered, giving U_1=536 U_2=454 and Z=0.56
[18] n_1=16 n_2=14, giving U_1=155.7 U_2=68.3 and Z=1.82
[19] n_1=16 n_2=12, giving U_1=59.1 U_2=132.9 and Z=1.71

Table 39. Statement O, younger vs. older

Statement O Partnering is not more than a new fad, for a way of working that has been done for ages	**Disagree**	**Agree partially**	**Totally agree**	**No opinion**
Younger	13	2	1	0
Older	6	3	3	2

Most agreement between the age groups was found for the following statements:

A) The number of bids will be higher with partnering in comparison with traditional projects.[20]
60% (9 respondents) of the younger and 67% (6 respondents) of the older totally agreed to this statement.

K) The client has relatively more to win with partnering than the contractor.[21]
55% (6 respondents) of the younger and 60% (6 respondents) of the older totally agreed to this statement.

J) Partnering deteriorates the businesslike relationship between client and contractor.[22]
60% (9 respondents) of the younger and 64% (9 respondents) of the older totally agreed with the statement and 40% (6 respondents) and 36% (5 respondents) respectively agreed partially.

M) Partnering, or suchlike business relationship, are here to stay.[23]
81% (13 respondents) of the younger and 77% (10 respondents) of the older totally agreed with this statement.

4.5 Type of projects

Since there are three types of projects in this survey, the Kruskal-Wallis H-test is used to look for differences between the groups. Concerning how the respondents perceived complexity no important difference could be found related to what type of project the respondent came from, as can be seen in table 40 and appendix 4.[24]

Table 40. Complexity, type of project

Complexity	**More complex**	**Average**	**Less complex**	**No opinion**
Maintenance	6	5	2	3
New- investment	4	5	0	1
Re-investment	3	1	0	0

[20] n_1=15 n_2=9, giving U_1=62 U_2=64 and Z=0.06
[21] n_1=11 n_2=10, giving U_1=52.5 U_2=57.5 and Z=0.18
[22] n_1=15 n_2=14, giving U_1=109.5 U_2=100.5 and Z=0.20
[23] n_1=16 n_2=13, giving U_1=108.5 U_2=99.5 and Z=0.20
[24] 13 Maintenance (n_1), 9 New-investment (n_2) and 4 Re-investment (n_3) answered, giving H=1.05

The clients' motives for partnering did not reveal any large differences between project types.[25]

Table 41. Motives, type of project

The clients motives for partnering	Maintenance	New-investment	Re-investment	Total
Get more out of the project for the same amount of money	6	3	1	10
Make way for a better collaboration environment	5	3	2	10
Secure quality	4	4	1	9
Learn from the contractors	3	3	2	8
Save money	3	4	0	7
Flexibility	4	1	1	6
Avoid/prevent disputes	2	3	1	6
Become more well-informed about the contractor	2	0	1	3
Other	1	1	1	3
Get a better contact with the contractor's contractors.	0	1	0	1
None, decided from above in the organisation	0	0	0	0

Statement N[26] presented in table 42 showed the largest difference between project types. According to the Kruskal-Wallis test, the null hypothesis that there is no difference in the answers between the respondents from different types of projects, could be rejected with 90 percents certainty.

Table 42. Statement N, type of project

Statement N Partnering is a more fun way of working	Disagree	Agree partially	Totally agree	No opinion
Maintenance	0	9	5	2
New- investment	0	1	8	1
Re-investment	0	1	3	0

However, it should be noticed that all except three respondents agreed to some extent with this statement. The difference lies in the relatively less enthusiastic opinions from the maintenance respondents.

Most agreement between the respondents from different types of projects could be found in statement:

> **J)** Partnering deteriorates the businesslike relationship between client and contractor.[27]
> 60% of the respondents from both maintenance and new-investment projects disagreed to this statement and the remaining 40% agreed partially. 75 % (3 respondents) of the re-investments projects also disagreed.

[25] n_1=30, n_2=23 and n_3=10 giving H=0.53
[26] n_1=14, n_2=9 and n_3=4 giving H=4.82
[27] n_1=15, n_2=10 and n_3=4 giving H=0.23

4.6 Responses 2004 vs 2006, have the opinions changed over time?

The largest difference between the 2004 and the 2006 answers concerned statement A[28] as can be seen in appendix 5 and table 43.

Table 43. Statement A, 2004 vs. 2006

Statement A The number of bids will be higher with partnering in comparison with traditional projects	**Disagree**	**Agree partially**	**Totally agree**	**No opinion**
Answers from 2004	15	7	1	7
Answers from 2006	7	10	4	6

Most consensus over time was found for the following statements:

N) Partnering is a more fun way of working.[29]
59% (16 respondents) from the old questionnaire totally agreed to this statement and 65 % (15 respondents) from the new version.

J) Partnering deteriorates the businesslike relationship between client and contractor.[30]
60% (18 and 16 respondents) from both the old and the new questionnaire disagreed with this statement. The rest (except one from the old survey) partially agreed and no one agreed.

K) The client has relatively more to win with partnering than the contractor.[31]
The distribution of answers did not change over time with most answers disagreeing to this statement, 57 % (12 respondents) of the old and 50% (10 respondents) of the new. 35% and 23%, respectively, agreed partially and the rest agreed totally.

4.7 Other observations

In the general debate about partnering, it has been said that this way of working in the construction industry is especially suited for women. A theoretical explanation for this statement is yet to be presented. This survey included three female respondents and their answers did not differ from the men's, but it of course only a small number of observations

5. Conclusion

Returning to the initial purposes of this paper, it can be stated that during the procurement phase most of the studied projects included soft variables when the bids were evaluated. Other clear results were that almost all projects have incentive contracts and that there was good knowledge about the opposite party before the current project started. No support could be found for the view that partnering lead to more risk for the contractor. This result is consistent with the indications that the

[28] n_1=23 n_2=21, giving U_1=155.5 U_2=327.5 and Z=2.02
[29] n_1=27 n_2=23, giving U_1=303.0 U_2= 318.0 and Z=0.15
[30] n_1=29 n_2=27, giving U_1=380.5 U_2=402.5 and Z=0.18
[31] n_1=21 n_2=20, giving U_1=201.5 U_2=218.5 and Z=0.22

contractors' ability to calculate the bid was not worsened when partnering was included in the contract. The respondents did not support the statement that bids will be higher with partnering, however in a third of the cases bids were higher than the budget according to the clients. More empirical data are needed to investigate the effect of partnering on the level and distribution of bids.

Looking at the perception of partnering, the concept seems to have most potential concerning cost reductions. There was also a large consensus that partnering will not deteriorate the businesslike relationship and that partnering, as a business relationship, is here to stay. Generally, it can be stated, that the perception of partnering did not depend much on age, type of project, whether the respondent was a client or contractor and it did not change between the questionnaire in 2004 and the one in 2006.

However, the highest sum of all the Z-values was found in the client-contractor comparison, which gives an indication that these responses differed more from each other compared to the differences for the other two groups.[32] The material showed that the clients were more sceptical to seeing themselves as winners compared to the contractors view on this issue. It could also been seen that the younger respondents were more positive to partnering when it concerned the possibilities for conflict resolution and partnering not just being a new fad. Finally the respondents from maintenance projects were not quite as convinced about partnering being a more fun way of working compared to the other respondents.

The collected data in this survey supported the theoretical partnering flower presented in Nyström (2005). Just like the result from the literature review, all of the respondents included trust and common goals as important components in partnering.

[32] A Z-value was computed between Maintenance and New-investment concerning type of project.

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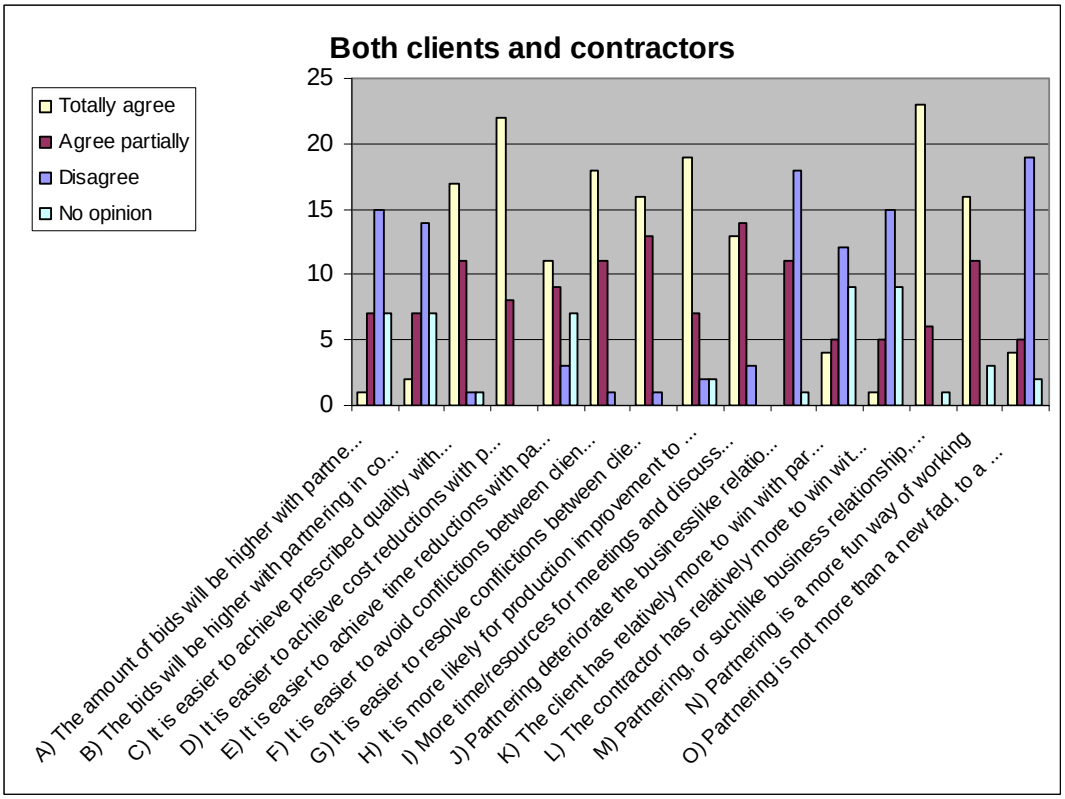
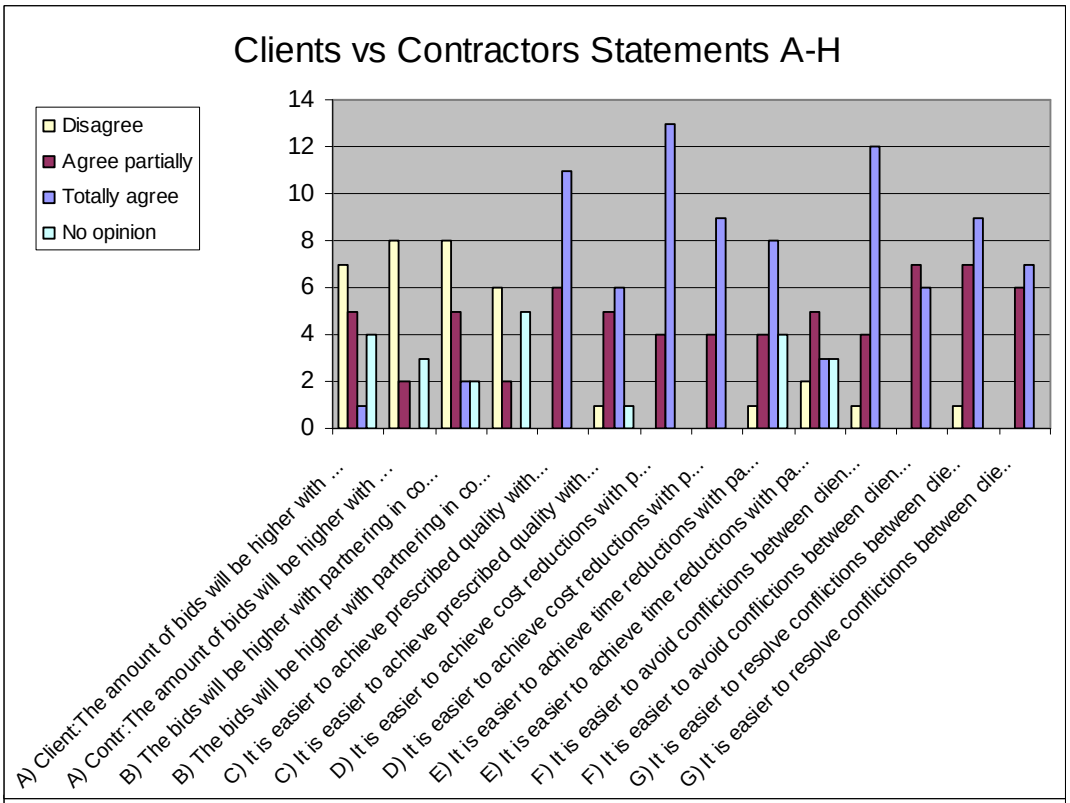
Appendix 1

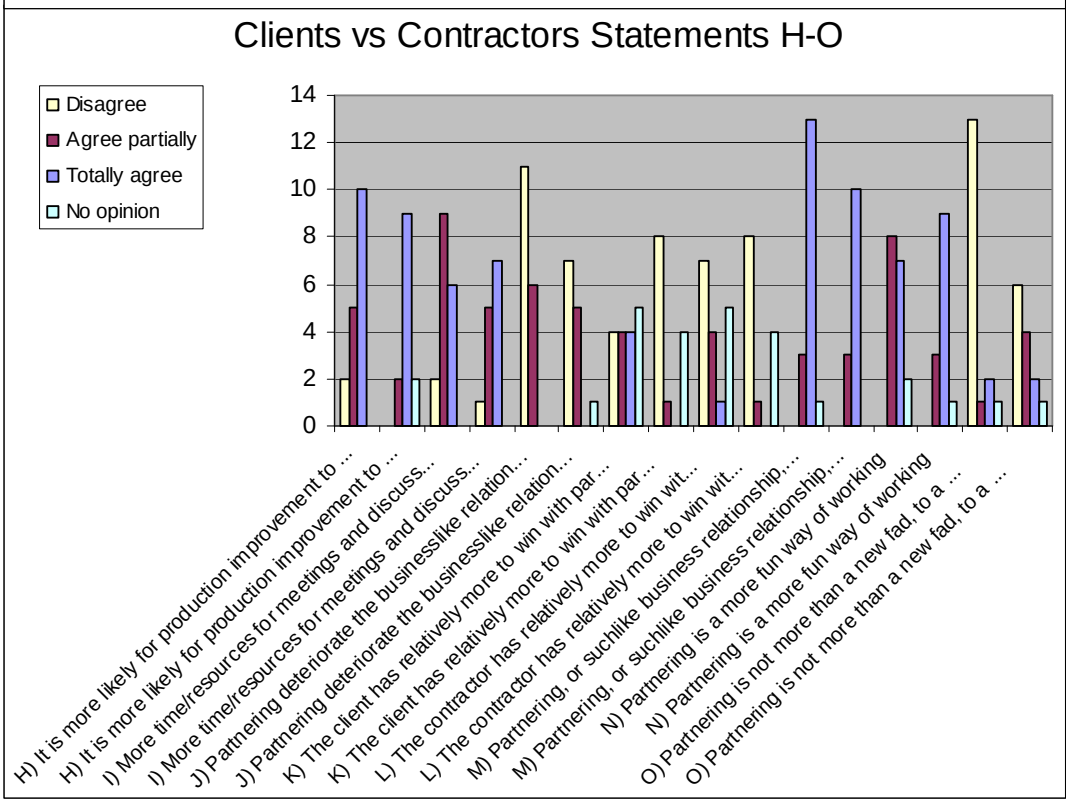
The statements in a graphical setting, see table 23-27.



Appendix 2

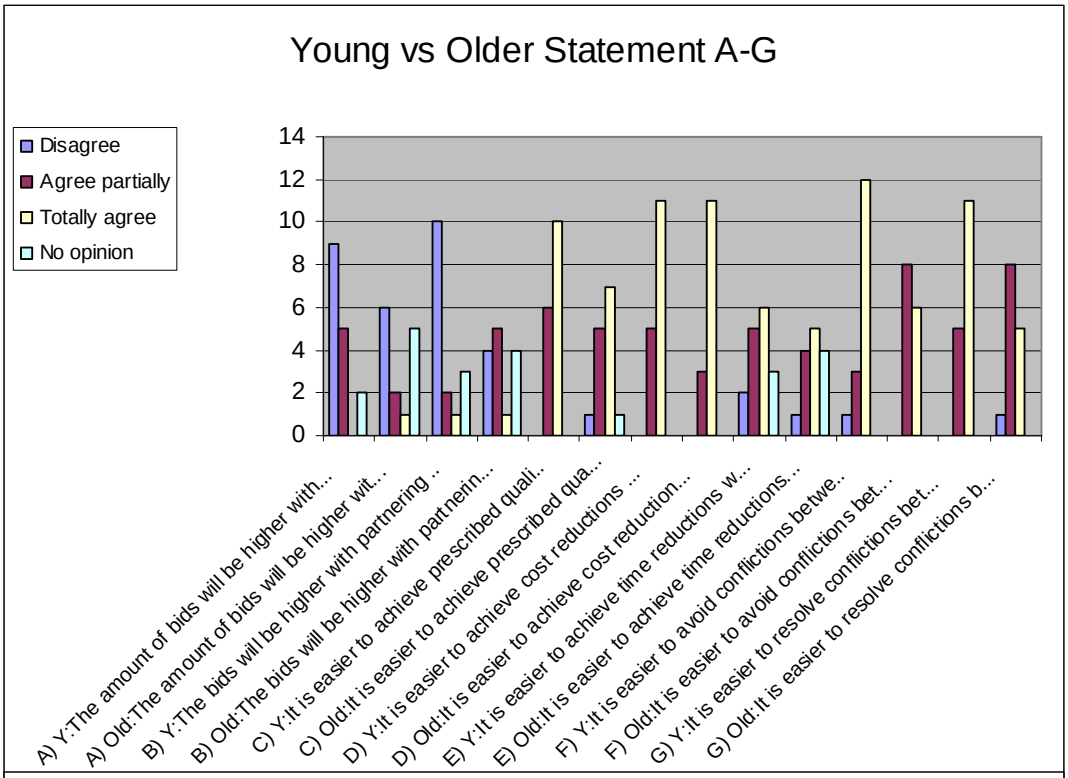
The statements in a graphical setting regarding affiliation, see section 4.3. Each statement is presented twice, with the answers from the client first.

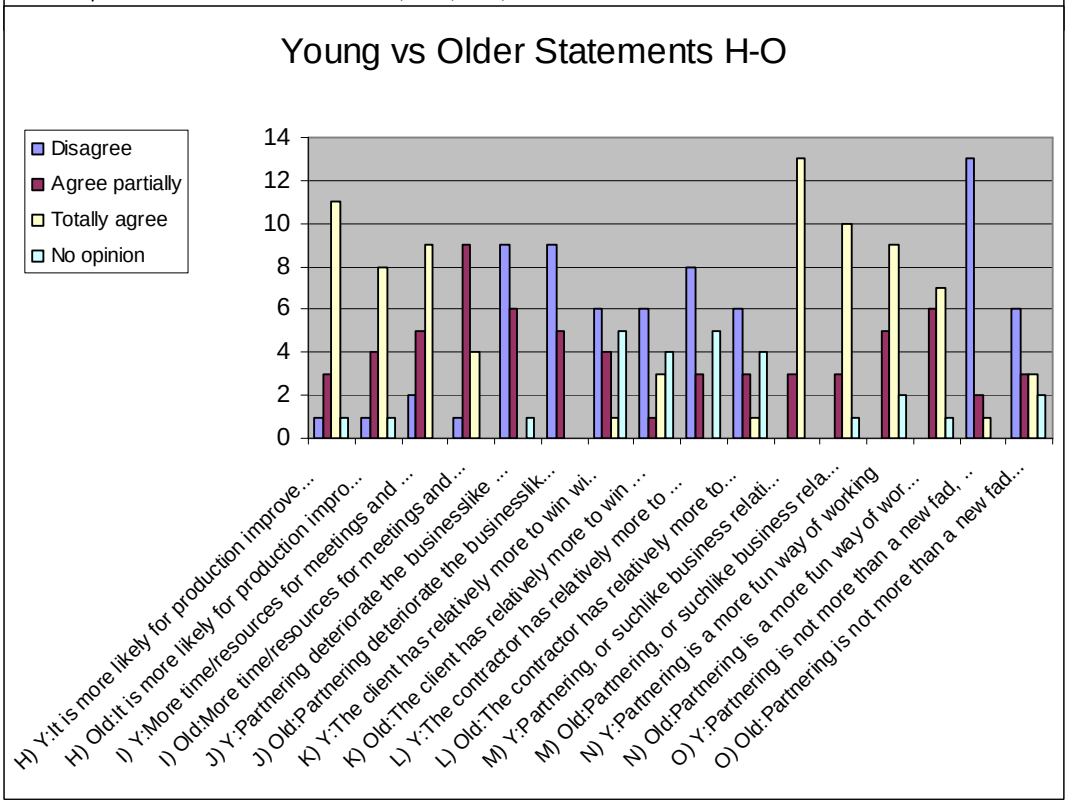




Appendix 3

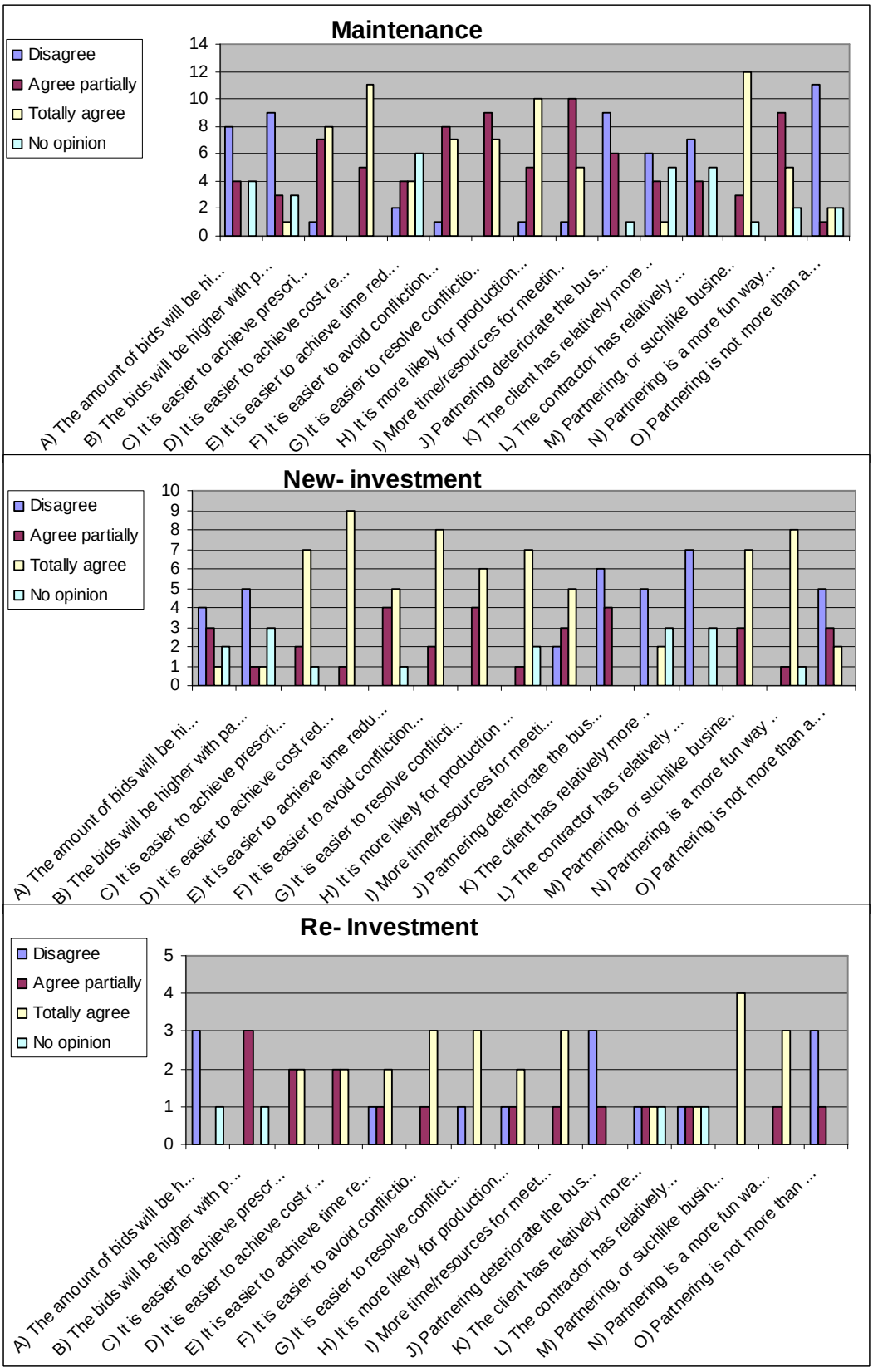
The statements in a graphical setting concerning age, see section 4.4. Each statement is presented twice, with the answers from the young (Y) respondents first.





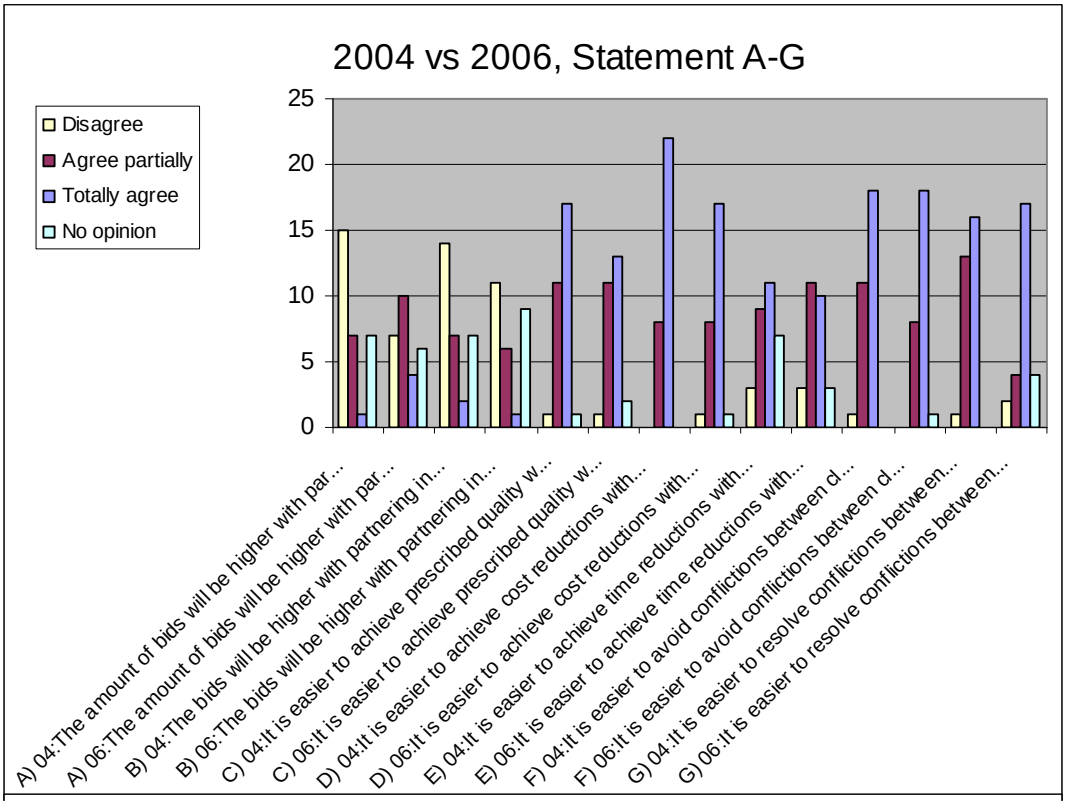
Appendix 4

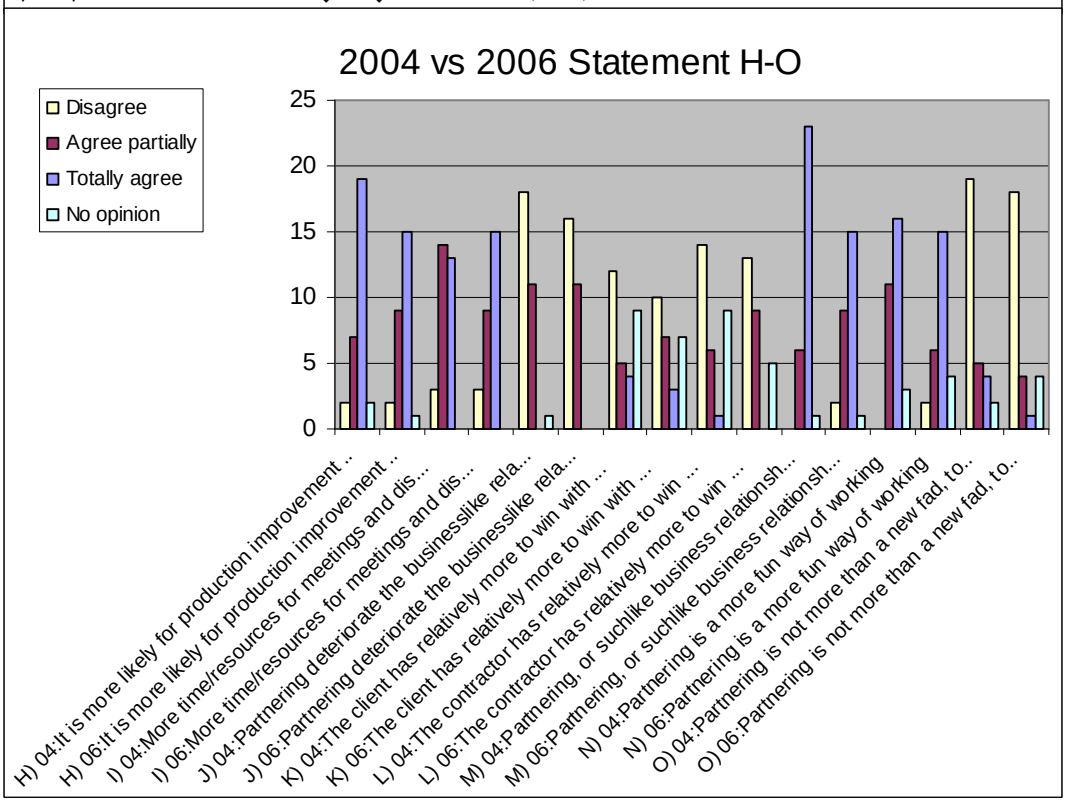
The statements in a graphical setting concerning type of project, see section 4.5.



Appendix 5

The statements in a graphical setting over time, see section 4.6. Each statement is presented twice, with the 2004 answers first.





Appendix 6

The client questionnaire

DEL 1. Allmänt

1.1 Vilken organisation företräder du

……

1.2 Vilken roll har du i projektet

……

1.3 Hur många år har du arbetat i branschen

……

1.4 Är du ☐ Man ☐ Kvinna

1.5 Hur gammal är du

☐ <25
☐ 26-30
☐ 31-40
☐ 41-50
☐ 51-60
☐ 61<

1.6 Av vilken typ är det aktuella projektet

☐ Nyinvestering
☐ Drift och Underhåll
☐ Reinvestering
☐ Annan

Kort beskrivning av projektet i ord

……

……

……

……

1.6 b) Jämfört med andra projekt av samma typ som angivet ovan, skulle du kategorisera det aktuella projektet som
☐ Mer komplext
☐ Genomsnittligt
☐ Mindre komplex
☐ Ingen uppfattning

1.7 Har din organisation arbetat ihop med den vinnande utföraren tidigare

☐ Ja ☐ Nej

Om Ja, hur många gånger

☐ 1-3
☐ 4-10
☐ 10<

1.8 Har beställare och utförare god kunskap om varandras organisationer och om personerna i respektive organisation

☐ Ja ☐ Nej ☐ Ingen uppfattning

1.9 Vilken entreprenadform upphandlas projektet som

☐ Totalentreprenad
☐ Utförandeentreprenad
☐ Funktionsentreprenad
☐ Annan

……..……

……

1.10 Regleras projektet av

☐ AB 92
☐ ABT 94
☐ Annan

……..……

……

1.11 Hur stor är den upphandlade anbudssumman

……..……

och vilken upphandlingsform gällde

Under tröskelvärde:
☐ Förenklad upphandling
☐ Urvalsupphandling

Över tröskelvärde:
☐ Öppen upphandling
☐ Selektiv upphandling
☐ Förhandlad upphandling

1.12 Ange de nollställda (dvs jämförbara) anbudssummorna enligt anbudsprotokollet

Anbud 1 ……

Anbud 2 ……

Anbud 3 ……

Anbud 4 ……

Anbud 5 ……

Fler

……..……

……

……..……

……

1.13 Hur många anbud hade Ni förväntat Er

☐ Fler
☐ Ungefär lika
☐ Färre

1.14 Hur låg det antagna anbudet i förhållande till Er ”skuggkalkyl”

☐ Högre
☐ Lägre
☐ Ungefär lika

1.15 Var det enligt din uppfattning större spridning på anbuden i jämförelse med traditionella projekt

☐ Ja ☐ Nej

DEL 2. Upphandlingen

Förfrågningsunderlaget

2.1 Vilka motiv fanns för Er organisation att inkludera partnering i projektet (flera svar är tänkbara)

- ☐ Spara pengar
- ☐ Säkerställa kvalitet
- ☐ Få mer insikt i utförarens organisation
- ☐ Bädda för ett bra samarbetsklimat mellan parterna
- ☐ Ta del av utförarens kunskaper
- ☐ Få mer utfört för samma peng
- ☐ Möjlighet att anpassa beställningen under projektets genomförande
- ☐ Undvika/förebygga konflikter mellan parterna under projekttiden
- ☐ Få bättre kontakt med underentreprenörerna
- ☐ Inga, var bestämt av högre instans
- ☐ Andra

……..……

……

……..……

……

2.2 Är det i förfrågningsunderlaget fastställt att projektet kommer genomföras som partnering eller föreslås partnering som ett möjligt sätt att genomföra projektet

- ☐ Fastställt
- ☐ Som en möjlighet

Om ”Som en möjlighet”, på vilka grunder skulle din organisation inte vilja genomföra projektet som partnering

- ☐ Min organisation saknar erfarenhet av partnering
- ☐ Utföraren saknar erfarenhet av partnering
- ☐ Personer som är ansvariga hos utföraren bedöms mindre lämpliga för partnering
- ☐ Andra

……..……

……

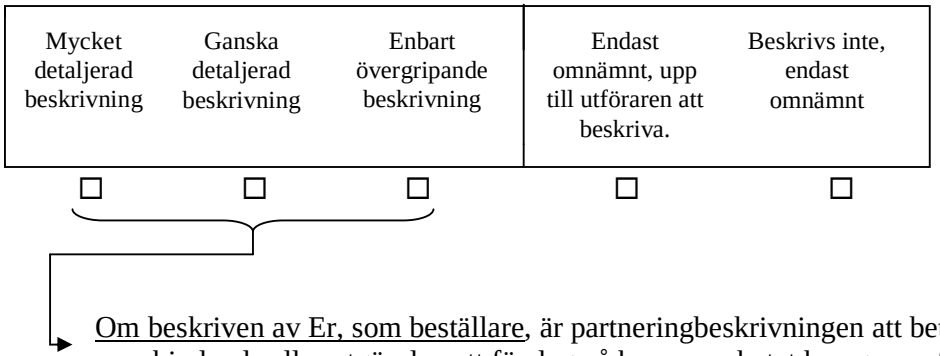
……..……

……

2.3 Finns det möjlighet att i avtalet häva partnering samarbetet efter en viss tid och genomföra projektet som ett traditionellt projekt utan partnering

☐ Ja ☐ Nej

2.4 Hur beskrivs partnering i förfrågningsunderlaget, sätt ett kryss i den ruta som bäst överensstämmer med beskrivningen enligt följande



<u>Om beskriven av Er, som beställare</u>, är partneringbeskrivningen att betrakta som bindande eller utgör den ett förslag på hur samarbetet kan genomföras

☐ Bindande
☐ Förslag

Fanns någon särskild inspirationskälla till beskrivningen av partnering (flera svar är tänkbara)

☐ Internt utvecklad modell
☐ Konsult
☐ Böcker/rapporter, exempel

……..……

……
☐ Annan

……..……

……

……..……

……

2.5 Erbjöds utförarna ett informationsmöte om partnering ☐ Ja ☐ Nej

Ersättningsform

2.6 Vilken ersättningsform tillämpas i projektet

☐ Löpande räkning
☐ Fastpris med mängdreglering
☐ Fastpris utan mängdreglering
☐ Riktkostnad och incitament med ersättning enligt löpanderäkning
☐ Annan

……..……

……

Om Riktkostnad och incitament med ersättning enligt löpanderäkning, hur ska eventuell besparing eller fördyring i förhållande till riktkostnaden fördelas

Procent, Beställare/Utförare …….

……..……

……

Framgår det ur förfrågningsunderlaget vilka omständigheter som föranleder ändring av riktkostnaden

☐ Nej
☐ Ja, vilka
☐ Ändrade systemkrav
☐ Ändrad funktion
☐ Tillägg eller avdrag av/från det beställda
☐ Fel i förfrågningsunderlaget
☐ Mängdförändringar
☐ Ändrad kvalitet
☐ Andra

……..……

……..

……

Framgår det ur förfrågningsunderlaget hur ett eventuellt underskridande av riktkostnaden hanteras från Er sida, dvs hur spenderas pengarna

☐ Ja ☐ Nej

om Ja, hur spenderas pengarna

……..……

……

2.7 Vilken är den vanligaste ersättningsformen vid liknade projekt som inte inkluderar partnering

☐ Löpande räkning
☐ Fastpris med mängdreglering
☐ Fastpris utan mängdreglering
☐ Riktkostnad och incitament med ersättning enligt löpanderäkning
☐ Annan

……..……

……

Om Riktkostnad och incitament med ersättning enligt löpanderäkning, hur ska eventuell besparing eller fördyring i förhållande till riktkostnaden fördelas

Procent, Beställare/Utförare ……..

……..……

……

2.8 Finns det i den aktuella upphandlingen ekonomiska incitament/bonusar (bortsett från eventuell riktkostnad och kostnadsdelning)

☐ Nej
☐ Ja, vilka
  ☐ Tidsbonusar, att projektet ska bli klart innan utsatt tid
  ☐ Säkerhetbonusar, att undvika olyckor
  ☐ Andra

……..……

……

……

Anbudsbedömning

2.9 Utöver grundkraven i LOU, inkluderas mjuka variabler i anbudsvärderingen
☐ Ja ☐ Nej

Om Ja, vilka mjuka variabler är inkluderade och hur stort värde (i procent) har de enligt anbudsvärderingsmodellen i förhållande till anbudssumman

		Ange värde i procent
☐ A	Genomförandeplan för partnering	…….
☐ B	Organisation och ledning	…….
☐ C	Kompetens/erfarenhet	…….
☐ D	Produktionsmetoder	…….
☐ E	Kvalitetssäkringssystem	…….
☐ F	Miljöcertifiering	…….
☐ G	Arbetsmiljö	…….
☐ H	Trafiksäkerhet	…….
☐ I	Referensobjekt	…….
☐ J	Riskbedömning och åtgärdsplan	…….
☐ K	Andra	

……

……

……

……

DEL 3. Partnering

3.1 Vilka av följande komponenter inkluderar du i partnering och därefter hur pass viktiga anser du att de utvalda är enligt den fem gradiga skalan. Sätt ett kryss för att indikera din uppfattning.

Komponenter	**Jag inkluderar följande komponenter i partnering**	**Mindre viktig (1)**	**(2)**	**(3)**	**(4)**	**Mycket viktig (5)**
Tillit/förtroende						
Gemensamma mål						
Incitamentskontrakt						
Moderator, objektiv mötesordförande						
Relationsbyggande, sociala träffar						
Återkommande och strukturerade möten						
Möjlighet att välja medarbetare i partneringgruppen						
Konfliktlösningsmetod						
Öppna böcker						
Uppföljning av de gemensamma målen						
Gemensam åtgärdsplan						
Andra komponenter som bör inkluderas (fyll i själv)						
_____						
_____						
_____						
_____						
_____						

3.2 Har du någon erfarenhet av partnering

- ☐ Ingen alls
- ☐ Liten (beskriv kort nedan)
- ☐ Stor (beskriv kort nedan)

……..……

……

……..……

……

……..……

……

Nedan gör vi ett antal påstående om partnering. Vi skulle vilja veta hur du, utifrån din situation, dina erfarenheter och bedömningar, ser på dessa påståenden. Sätt ett kryss i den ruta som bäst speglar din åsikt.

Påståenden	**Instämmer inte alls**	**Instämmer delvis**	**Instämmer helt**	**Ingen uppfattning**
3.3 Anbuden blir fler med partnering i jämförelse med traditionella projekt				
3.4 Anbuds priserna blir högre med partnering i jämförelse med traditionella projekt				
3.5 Det är lättare att uppnå föreskriven kvalitet om projektet genomförs med partnering i jämförelse med traditionella projekt				
3.6 Det är lättare att uppnå kostnadsbesparingar om projektet genomförs med partnering i jämförelse med traditionella projekt				
3.7 Det är lättare att uppnå tidsbesparingar om projektet genomförs med partnering i jämförelse med traditionella projekt				
3.8 Det är lättare att undvika konflikter mellan beställare och utförare om projektet genomförs med partnering i jämförelse med traditionella projekt				
3.9 Det är lättare att lösa konflikter mellan beställare och utförare om projektet genomförs med partnering i jämförelse med traditionella projekt				
3.10 Det är mer sannolikt att förbättringar av produktionsmetoderna i genomförandet uppkommer om projektet genomförs med partnering i jämförelse med traditionella projekt				

Påståenden	Instämmer inte alls	Instämmer delvis	Instämmer helt	Ingen uppfattning
3.11 Det krävs mer arbete med att ta fram förfrågningsunderlaget när projektet ska genomförs med partnering i jämförelse med traditionella projekt				
3.12 Det går åt mer tid/resuser för möten och diskussioner etc i genomförandet av ett projekt med partnering i jämförelse med traditionella projekt				
3.13 Partnering försämrar affärsmässigheten eftersom beställare och utförare ”vaggas” in i ett ”kompisförhållande”				
3.14 Beställaren har mer att vinna på partnering än utföraren				
3.15 Utföraren har mer att vinna på partnering än beställaren				
3.16 Partnering, eller liknande samarbetsformer, har kommit för att stanna				
3.17 Partnering är ett roligare sätt att arbeta				
3.18 Partnering är inte mer än ett modeord för projekt som annars genomförs med ”sunt bondförnuft”				

DEL 4. Övrigt

Något som bör tilläggas angående upphandling av partnering projekt.

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Paper 4: The naivety of partnering assessments

The naivety of partnering assessments

Johan Nyström

Stockholm 2007

Building and Real Estate Economics
School of Architecture and the Built Environment
Royal Institute of Technology

The naivety of partnering assessments[*]

Abstract
Construction managerial literature often argues that gains are to be made by using partnering in terms of reduced cost, reduced delays and/or increased quality. Voices have been raised to approach partnering in a more critical perspective, i.e., to look at both advantages and disadvantages when investigating the concept. This paper is an attempt to go in that direction. In order to assess the effects of partnering in a valid way, the evaluation needs to (i) be based on project facts and not personal perceptions, (ii) make a comparative analysis including both partnering and non-partnering projects and (iii) control for other variables that affect cost and quality in order to extract the unique effect of partnering. The existing partnering evaluations, divided into surveys, case studies and comparative studies with many observations, do not fulfil all three conditions. Instead partnering should be evaluated by a quasi-experiment or with a regression analysis and focus on quality and cost, the variables that creates value.

[*] I would like to thank Hans Lind and commentators at the Construction Management lunchtime seminar, University of Reading and at the division of Service management, Chalmers. I am very grateful for the financial support from SBUF, the Swedish National Road Administration, the Swedish National Rail Administration (Banverket) through CDU and The Åke and Greta Lisshed Foundation.

1. Introduction

The overwhelming part of the partnering literature has an optimistic tone. This can be explained to a large extent by the great number of consultancy reports with the purpose, at least partly, of selling the partnering concept. More scientific work has provided theoretical arguments in favour of partnering, accompanied by empirical papers that most often show positive results from introducing partnering. Voices have, however, been raised in favour of approaching partnering from a more critical perspective (Green, 1999; Bresnen and Marshall, 2000), i.e., looking at both advantages and disadvantages. This paper shares this perspective and discusses how partnering evaluations can be improved. Its contribution is to clarify the weaknesses in current partnering evaluations and provide suggestions on how evaluation problems can be handled in order to be able to draw more well-founded conclusions on the effects of partnering.

Three conditions for a good evaluation are stated in the following section. Section 3 proceeds to review the current partnering evaluations based on these conditions. The review concludes that evaluations of partnering need to be improved, and the following part of the paper suggests how this should be done. Section 4 describes two approaches, a quasi-experimental and a regression analysis approach, that fulfil the conditions for a good evaluation. Section 5 argues that cost and quality are the important variables to measure when evaluating partnering and concluding comments can be found in section 6.

2. How should partnering be assessed?

In order to extract the effects of partnering in a construction project, this paper formulates the following three conditions for a good evaluation.

1. Based on project facts

To find the effects of partnering, the analysed data have to be based on facts about the project, primarily cost and quality (see section 5 below). The project facts should be as objective as possible, but can include indicators of cost and quality. In order to qualify as a project fact, the indicator has to be supported by an explicit argument that relates it to cost and quality. Subjective declarations of the partnering effects, i.e., uncontrolled and not explicitly described data, cannot be considered as project facts and cannot provide the basis for a partnering assessment.

2. Comparative analysis

The outcome of partnering projects needs to be compared with non-partnering projects, if anything is to be said concerning the effects of partnering. It is easy to claim that this is done implicitly by a comparison with the general perception of the construction industry, but to fulfil this condition an explicit reference case is needed.

3. Control for other variables that might affect outcomes

Since construction is a complex area, with many variables that affect the outcome of a project, it is hard to extract the unique effect of partnering. It is therefore necessary to control explicitly for these other variables, i.e., include a ceteris paribus analysis. This can be done in several different ways, e.g., by multivariate statistical methods or by an analysis of matching pairs.

In order to say something about the effects of partnering, the above three conditions need to be satisfied.

3. What has been said and done

Chan et al. (2003) set out to review the benefits of partnering in general and did so by providing a summary of 29 partnering papers. Their paper presents a good overview of what is usually said about the benefits of partnering, with a closer relationship between the parties as the most prominent advantage.[1] However, a large part of the reviewed papers are theoretical papers with general discussion but with no empirical support. In contrast to Chan et al. (2003) this paper only reviews empirical papers about partnering.

The articles reviewed set out to assess the effects of partnering and are often referred to, or found, in the leading construction management journals (see Wing, 1997). None of the papers explicitly set out to make general claims about the effects of partnering. However, the articles are often referred to by consultancy reports and in the general debate when arguing for the positive effects of partnering.

The papers are analysed based on the above conditions and can be categorised into the following three groups.

3.1 Surveys

Surveys are convenient when wanting to gather information about people's opinions regarding a specific issue (Balnaves and Caputi, 2001). The studies in this group are often conducted by means of questionnaires, and many of the partnering assessments are done in this way. Black et al. (2000), Haksever et al. (2001), Chan et al. (2003), Beach et al. (2005) and Fortune and Setiawan (2005) are based on questionnaires administered to project managers, or people in equivalent positions, who are asked to choose between printed alternatives on the benefits of partnering. The questions are formulated in such a way that the focus is on what the respondents felt or thought were the benefits of partnering.

Because of the interviewees' actual involvement, there is an obvious risk of the respondent being biased in favour of partnering, and having an incentive to signal a better result than what was actually achieved. With the answers being based on personal perceptions there is considerable danger in giving a lot of weight to these results. These types of answers might be acceptable when wanting to map attitudes but cannot be considered as project facts.

Concerning the comparative perspective, questionnaires can be designed in a comparative way, explicitly making the respondent indicate the effects of partnering in comparison with non-partnering projects. Even if this is the case, it is still hard for respondents to recap old projects and give objective answers. In the same way it is hard to extract the unique effect of partnering from an intuitive comparison, even if the person (often the project manager) has been directly involved in the projects.

[1] Li et al. 2001 has a similar table.

Hence, none of the three conditions above are fulfilled in these survey studies and conclusions about the effects of partnering cannot be drawn from these studies.

3.2 Case studies

Case studies are recommended when wanting to gather in-depth knowledge about a specific case. The purpose of case studies is not to draw general empirical conclusions (Yin, 2003). Different benefits of partnering have been pointed out, based on case-study methods – see Ellison and Miller (1995), Barlow et al. (1997), Bresnen and Marshall, (2000), Vassie and Fuller (2003), Bayliss et al. (2004), Chan et al. (2005) and Emsley (2005). All these studies are combinations of interviews and questionnaires.

This approach to evaluating partnering fulfils the first and the third conditions stated above far better than the surveys. The researcher enhances understanding of the project through interviews and observations, often in combination with questionnaires. This strengthens the quality of the data.

The condition of controlling for other affecting variables is still hard to fulfil, but might be facilitated by an experienced interviewer being able to remind the respondent objectively about other affecting variables.

Most of these studies (except Vassie and Fuller, 2003) do not make any comparative analysis of non-partnering projects and fail to satisfy condition two above. Rossi and Wright (1977) see case studies without a control group to compare with as the weakest form of evaluation. Bresnen and Marshall (2000) include a comparative analysis, but it is based on a maximum variation concerning type and size, which does not fulfil the purpose of controlling for other variables.

Criticism has been raised concerning the fact that only positive outcomes of partnering have been reported and that there is a lack of objectivity in some of the case studies (Green, 1999; Bresnen and Marshall, 2000).

The conclusion is that none of the case studies fulfils all three conditions for a high quality assessment of partnering.

3.3 Comparative studies with many observations

In the scientific literature there are a few studies about partnering effects with a large number of observations. Larson (1995), Ruff et al. (1996) and Gransberg et al. (1999) are to a large extent based on questionnaires with 280, 60 and 400 observations, respectively. Despite the large number of observations, the studies suffer from the same problems as the surveys, in that they focus on the respondents' *perceptions* of the effects, and not on real effects based on project facts.

The three studies make a distinction between partnering and non-partnering projects, which satisfies condition two for a comparative analysis. However, none of the studies control for other affecting variables. For example, these studies can only say that the projects that included partnering had cost improvements of 5% in relation to the budget, but they cannot say that partnering cut costs by 5% because there could

have been other variables that caused this positive effect.[2] Hence, even the more quantitative papers do not satisfy conditions one and three.

There is also a large bulk of data on outcomes of partnering projects in benchmarking studies. Governmental initiatives in Great Britain (*Constructing Excellence)* and in Denmark, (*Byggeriets Evaluerings Center)* have been assigned to provide the construction industry with the ability to benchmark in order to improve performance. To the author's knowledge no studies have been made based on these databases that fulfil the above three conditions.

3.4 Summary

The papers about the effects of partnering are summarised in the following table 1, where an X indicates that the study fulfils the condition.

Table 1. Categorising papers on the effects of partnering

Author, Year	Based on project data	Comparative analysis	Control for other affecting variables	Improved outcome with partnering concerning:
Surveys				
Fortune and Setiawan, 2005				Project costs, Delivery times and Quality levels
Beach et al. 2005				Communication, Mutual Learning, Mutual Understanding
Chan et al. 2003				Improved relationship, Improved communication, More flexibility
Haksever et al. 2001	X			Co-operation, Team spirit, Confidence of success, Communication
Black et al. 2000				Fewer adversarial relationships, Increased customer satisfaction
Case studies				
Emsley, 2005				Time reduction, High quality, Good safety
Chan et al. 2005				Improved relationship, Communication, Better productivity, Fewer disputes
Bayliss et al. 2004				Communication, Commitment
Vassie and Fuller, 2003	X	X		Improved relationships, Improved communication, More responsive
Bresnen and Marshall, 2000	X	X		Time, cost, quality, design-construct integration
Ellison and Miller, 1995		X		Saved the projects
Comparative studies with many observations				
Gransberg et al. 1999	X	X		Cost growth, time growth, Improved project performance
Ruff et al. 1996	X	X		Budget and schedule
Larson, 1995		X		Controlling costs, Technical performance, Satisfying customers

[2] Note that this is just an example and that the authors did not state this in their papers.

Even though most of these studies indicate that partnering shows most potential in improving communication and the relationship between parties, these improvements still cannot be shown to be the benefits of partnering as there are serious shortcomings in the evaluations.

It is important to note that most of the authors use the phrase *"benefits of partnering"* and not *"effects of partnering"*. Using the former formulation it is assumed that partnering is beneficial, whereas the latter formulation allows for possible negative effects. It is vital when evaluating something to focus on both positive and negative effects. Based on this argument this paper deliberately uses the term *effects* and not the term *benefits* when talking about the outcome of partnering. This change can be interpreted as one aspect of putting into operation the request for a more critical approach to partnering in Green (1999) and Bresnen and Marshall (2000).

4. An improved assessment method

This section will present two approaches that fulfil the criteria formulated above and that are possible to apply in the construction industry in order to assess partnering. It is argued that the suggested methods improve the possibility of saying something well-founded about the effect of partnering.

As will be argued in section 5, cost and quality are the interesting variables to measure when evaluating partnering. The following subsections will use cost as an example of the dependent variable.

4.1 A quasi-experimental approach

The classical experiment starts with a set of people/objects and then randomly divides them into two groups/subsets. One of the groups gets some kind of treatment (the treatment group) but the other does not (the control group). Conclusions can be drawn about whether the treatment had an effect or not by comparing how the groups develop. This is, according to Rossi (1989) and Vedung (1998), the theoretically most rigorous way of doing an evaluation, according to evaluation theory.

Often when wanting to evaluate some social programme or policy, the evaluator does not have the privilege of ex ante drawing randomised samples to compare. Instead the treatment group is given from the perspective of the researcher, as it appears "naturally" in society. Under such circumstances Rossi (1989) and Vedung (1998) suggest that the quasi-experimental approach[3] can be a suitable method for evaluation. The task of the researcher is then to find as good a match as possible for the predetermined treatment group. This match should be as similar as possible in all relevant independent variables except the one you want to study.

In a study about the effects of environmental factors on children's development, a close case of an exact match is two identical twins that have been separated early, where one has lived in one environment and the other in another environment. The basic idea is to find a control group that is as identical as possible to the given treatment group in order to draw conclusions about the effect of the programme or policy. Hence, the prefix "quasi" comes from the fact that the experimental group and

[3] Or *natural experiment*, as it appears naturally.

the control group are not randomly chosen from the same population, i.e., it is not an experiment in its purest form, but the aim is to come as close as possible to the situation in a random experiment.

In order to evaluate the effect of partnering on costs in the construction industry, partnering projects (treatment group) must be found and then matched to as similar non-partnering projects (control group) as possible. The matching should be based on all relevant independent variables that might affect costs in order to control for them. Perfect matching is of course quite hard in the complex construction industry, but Shadish et al. (2002) suggest two ways of reducing the ever-present problem of differences in other respects. The matching process should start with a broad approach, and then narrow down the possible matches based on general knowledge. With only a few left, the focus should be on stable and reliable variables in order to come up with the best matches. It could, however, be argued that finding relevant independent variables should be prioritised before data availability. One should not settle for reliable and accessible data that are not explanatory, the primary focus should always be to find data on the important independent variables.

If the matching is done in a satisfactory way, the study would fulfil the condition of *control for other affecting* variables. As in the example with the identical twins, where difference between the siblings arises from the environment, it can be concluded in this case that the difference in outcome comes from partnering, since all other affecting variables are the same in both cases. Given that the study is based on reliable data, i.e., proper projects facts, this study would also satisfy the first condition, and it is obviously also a comparative analysis.

Hence, a proper quasi-experimental study on the effects of partnering satisfies all three conditions for a good evaluation.

4.2 A statistical approach – regression analysis

Another way of satisfying the three conditions, when studying the effects of partnering on costs, is to apply a more traditional statistical approach. Instead of finding a "completely" matching control group, differences between the partnering projects and other projects are accepted, and the strategy here is to control instead for the effects of the other factors by using statistical techniques. In its simplest form, a linear regression model that fulfils the classical linear model (CLM) assumptions allows frequentist statistical inferences to be drawn (see e.g. Wooldridge, 2003).

More concretely, a general model is constructed with variables explaining costs in a construction project. If data for all these variables are collected from a representative sample of "all" construction projects, estimates of how partnering affects costs are found by looking at the coefficient for the dummy variable for partnering in the regression equation. A result giving the effect of partnering, holding all other variables constant, is then found. This means that the analysis has *controlled for other affecting variables* and that the specific effect of partnering can be isolated. Just as in all empirical analysis, the regression analysis requires good data on all the relevant variables. As the material includes both partnering and non-partnering projects, the method also satisfies the condition of being a comparative study.

The effects of partnering have, to the author's knowledge, not yet been seriously analysed by a method like the one described above. The method requires a lot of data, and the data needed are not very accessible in the construction industry. Getting data on actual costs, quality, etc would require a lot of resources and this might explain the lack of statistical approaches for evaluating partnering.

Regression analysis usually sets out to draw general conclusions concerning a population by finding a sample and building a model that fulfils the CLM assumptions. This is, as argued above, very hard to accomplish in the construction industry. Still, the method can give a lot of information compared to the types of studies that have been carried out so far. The relevant question, in all empirical work, is how much this information adds to current knowledge, even if it is imperfect.

Given the current bulk of partnering evaluations, one can argue that the marginal benefit of a regression analysis should be greater than the marginal benefit of yet another survey or case study assessing partnering.

4.3 Which method to choose

Both methods above, if executed correctly, satisfy the stated conditions for good evaluations, so the next question is which one to choose in practice. An argument in favour of the quasi-experimental approach is that the regression analysis obtains biased estimators when relevant independent variables are omitted (Meyer, 1995). This problem is due to data unavailability or because the variable is not considered, but the complication does not disappear by changing the method. In order to make a ceteris paribus conclusion with the quasi-experimental approach, the control group has to be chosen based on the same variables which also need to be included in the regression model. If not, the effect of partnering could, for example, be biased if the costs in the control projects are influenced by a variable not included in the partnering projects. Hence the quasi-experiment faces the same problem, as the researcher needs to know the relevant variables and have data on them in order to make a good match.

A valid argument in favour of the quasi-experiment is that the problem of defining the functional form of the regression model disappears, whereas the regression analysis is a better way of handling large amounts of data. In reality none of the methods are perfect, which justifies their combined existence. Both approaches are needed in order to form a rational belief about the effects of partnering. Using Bayesian terminology, one should use all the available data and methods in order to update the prior. Triangulation (Denzin, 1970) and mixed methods (Creswell, 2003) have come up as a way to combine different approaches and data.

5. What should be measured in order to evaluate projects success?

5.1 Cost and quality as key variables

The above section has suggested two methods that can improve partnering evaluations, but the question remains as to what should be seen as the relevant outcome variables. This is usually answered by the definition of project success, which in most cases includes time, costs and quality (e.g. Gaddis, 1959; Barnes, 1988). These three measurements are also known as the *Iron Triangle* (Atkinson, 1999), which suggests that they are equally important. This section opposes this view

and aims to show that costs and quality are the most important variables and that time can be reduced to these two.

Basic economic theory describes value as

$$V = B\text{-}C, \quad (1)$$

where V is value, B is benefits and C is costs. This is further developed into the utility maximisation problem for the consumer

$$\text{Max } U = B - P, \quad (2)$$

and the profit maximisation problem for the company

$$\text{Max } \pi = P\text{-}C, \quad (3)$$

where π is profit and P is price.

Hence increasing benefits or decreasing costs creates value in e.g. a construction project. The interpretation of cost reductions is straightforward, but what constitutes an increase in benefits in not that obvious. Standard economic theory captures this using the utility functions of the households, which usually represent ordinal preferences over bundles of goods. Lancaster (1966) concretised the bundle of goods by expressing them as a set of characteristics. He assumes that consumers have preferences over characteristics, fulfilling the usual assumptions about preferences[4], in order to create well-behaved, concave utility functions over the characteristics. The characteristics of goods consist of everything that influences the customer's benefit from the good. In a housing project, this could be the visual experience of the kitchen, how soundproof the walls are, the surrounding area, the accessibility of public transport, etc. Adopting Lancaster's view enables us to express benefit in relation to quality features. A better kitchen, a more soundproof wall, a better surrounding area, better connections to public transport are directly connected to a higher benefit and thereby to a higher utility.

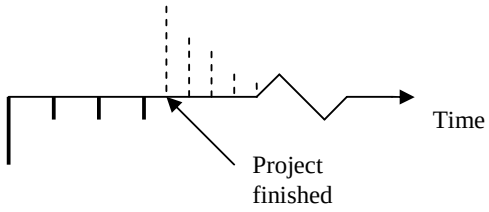
This paper assumes that the quality of a project consists of everything that influences the customer's utility, i.e., benefit.[5]

[4] Complete, reflexive, transitive, continuous, convex, and locally nonsatiated.

[5] In practice, sometimes higher quality refers to something that in the future leads to lower costs, e.g. for maintenance, but this is directly included in the costs here.

So, lowering cost or increasing some characteristic included in quality creates value, according to equation 1. However, not only the size of B and C but also timing affects value, as a discount factor has to be included in the calculation of benefits and costs. As argued in Gardiner and Stewart (2000), a road-building project is an investment and can be described by a standard cash-flow model, as in figure 1.

Figure 1. The cash-flow model of a road-building project conducted



A road-building project consists of costs (bold in figure 1) and net benefits related to quality (dotted in figure 1), which are discounted in order to get a net present value. Again, to increase value, according to equation 1, cost can be decreased or the quality characteristics of the road can be increased, i.e., a more even road surface, better safety, nicer rest areas, etc. Time is a variable that affects the net present value if benefits come earlier in relation to costs.[6] However, time is not interesting in itself, because it does not create any value if it does not affect the net present value of the costs and benefits. If, for example, one sub-contractor is five weeks ahead of schedule, but his colleague, working on an independent assignment, is following the schedule the first contractor's good work is unimportant.

Evaluating partnering from this perspective basically means asking the question whether partnering leads to a higher net present value than non-partnering projects. This can be caused by lower costs, higher quality, making the cost come later or the benefits sooner.

Time cannot be assigned the same importance as cost or quality, since it is only interesting if it affects either of these. Project success should be defined by cost and quality, with time as a dimension of these two.

Instead of subtracting time from project success, voices have been raised suggesting that the three measurements are not enough and that the Key Performance Indicators (KPI) schemes have to be added (see e.g. Atkinson, 1999; Crane et al., 1999; Dainty et al., 2003).

There is some truth in that statement and also that time is important, but not in the way that it is put forward in these articles. The improved schemes include KPIs like end-user satisfaction, participant satisfaction, personal development, information quality, etc., as important things to measure in order to evaluate whether the project is a success or not. It can, however, be questioned whether a project is successful if cost and quality are deficient, but participation satisfaction, personal development and

[6] $NPV = \sum_{i=1}^{n} \left(\frac{B_i}{(1+r)^i} \right) + B_0$, where r is the interest rate, n is the number of years and B represents net benefits per year.

information quality have gone through the roof in the participation survey. An argument could be made that cost and quality are not the most important aspects, however, projects that do not perform well in terms of cost and quality are not sustainable in the long run.

There is a point in using the extended KPIs as potential indicators of cost and quality. However, just like time, they are not interesting in themselves but information about KPI might be useful for understanding what happened in the project.

5.2 Measuring cost, quality and time

One important thing in measuring cost and quality is that the figures are comparable between the projects, i.e., that they include the same things. This means that the data need to be scrutinised carefully in order to evaluate whether the material is comparable. One has to get into the "nitty gritty" of the projects, and not just rely on reported figures.

Cost

Cost should be measured as the real cost of production, i.e., the sum of wages, materials, machinery, etc and additional work not included in the original contract. A distinction can be made between cost and price. Dealing with public clients representing taxpayers it might be suitable to use the final price, i.e., the final payment to the contractor, when comparing two projects.

The important thing is to define costs in the same way in all projects and relate costs to relevant variables, e.g., cost per kilometre of road, in order to make the figures comparable.

It should be stressed that the final payment from the client should represent the costs in a project and not the contract amount (contract price). Often the contracted price does not represent the "real" cost and it would be wrong to assume, especially with few observations, that the market is efficient. For example, if a contractor dumps the price in order to win the contract it could be the case that the final cost will be higher in this project than in a project with a slightly higher price. This problem grows when the project becomes more complex since the real cost is then harder to estimate. Bajari et al. (2006) have shown that additional costs in the construction industry are around ten percent of the initial contract amount on average. In reality the real costs are not available and the remaining alternative is to focus on what the client pays in the different projects.

Quality

Measuring quality is slightly harder than measuring costs, but there are some common perceptions of what constitutes adequate quality in a construction project. When measuring quality it is in practice necessary to use indicators like faults found in reviews, results from random inspections, etc.

A definition of quality often used in the construction industry sees it as the degree of conformity to requirements or specifications in the contract (e.g. Crosby, 1979). This definition does not say anything about the absolute level of quality, which should be the interesting measurement when comparing projects. It could be wrong to conclude in favour of one project compared to another concerning quality just because it

fulfilled the stated requirements, since the other project might have had a higher initial quality requirement for the same cost.

In comparison with measuring costs, small differences between projects can be hard to extract. The important thing is to compare projects with similar quality requirements and to use indicators to measure the quality level delivered.

Time

Again, it is important to be clear on how start and completion dates are defined in order to compare the projects. Defining time as meeting the schedule presupposes that a deviation always affects the net present value.

5.3 Complementary indicators

As it will be difficult to carry out the measurement of cost and quality, for reasons discussed above, various indicators of these can be used. The indicators should be seen as things to study in order to form an opinion on costs or quality in a project. It is suggested that contract flexibility, additional work and disputes are the type of indicators that are more observable and usually have an effect on cost and quality.

1. Contract flexibility

Since contracts cannot be complete and construction projects are complex, a realistic assumption is that new information will arise during a project. New information is defined as information not available ex ante, i.e., not regulated in the contract. The new information could then be seen as either endogenous, e.g. better solutions not thought of ex ante, or as exogenous, e.g. new circumstances that give rise to potential pareto-sanctioned improvements. In both types of new information a closer relationship between client and contractor is likely to lead to more flexibility as it facilitates finding the most efficient solution concerning both quality and cost (Nyström, 2007).

In order to assess the degree of contract flexibility in construction projects, e.g. concrete efficiency improvements, it is recommended to study what is discussed and decided at the project's site meetings.

2. Additional work

Additional work is often contractor-initiated because of shortcomings in the tendering documents. Such work is unexpected and therefore expensive for the client, who has a weak bargaining position in these situations. A large amount of additional work could also indicate further flaws in the contract. If the contractor is taking advantage of every opportunity for additional work, it could indicate that the initial bid was too low and that the contractor needs to make up for this, which also might have an effect on the quality. This is not always the case, but a further analysis of additional work might sometimes be justified in order to understand quality and cost better.

3. Disputes

It has been said that partnering emerged as a way to avoid expensive litigation (Larson, 1995). However, disputes do not have to end up in court and are to some degree present in every construction project (Pinnel, 1999). Studying disputes could, however, give further information about the climate in the projects, e.g. whether disputes are handled smoothly or if they delay the project.

5.4 Another aspect that creates value

This paper follows an economist's tradition of defining value in terms of quality and cost. However, there might be other dimensions in evaluating partnering. Partnering might be justified even if there are no significant *positive* effects on cost or quality. There might be effects in other dimensions. The Swedish construction industry is facing a situation where a lot of people are retiring, and partnering has been advocated as a way to attract young people into the industry (Kadefors, 2002; Gransberg et al. 1999). It has been argued that younger people have been sceptical about the construction industry because of the hostile atmosphere between different parties and the lack of open and constructive discussion between the parties.

Most of the partnering literature has argued, however, that partnering has an effect on cost and quality and, from an economic point of view, these are the crucial variables, which justifies focusing on these variables in an evaluation.

6. Conclusion

This paper has exposed weaknesses in the bulk of current partnering evaluations and provided suggestions for improved methods. Three criteria for good evaluations were formulated:

1. Based on project facts
2. Comparative analysis
3. Control for other variables that might affect outcomes

It was then argued that regression analysis and a quasi-experimental approach, based on project data, are more well-founded methods for evaluating partnering. Both have an explicitly comparative perspective and handle the problem of controlling for other independent variables when measuring the effect of partnering on cost and quality.

Looking at cost and quality is the most important thing since they create value, while time should be included if it affects the net present value of the project. More observable indicators are often required since comparable data on cost and quality can be hard to find. Examples of such indicators are contract flexibility, the amount of additional work and how many disputes there were.

It should also be acknowledged that partnering in a longer perspective might have some secondary effects besides on cost and quality. These effects are even more intangible and can be, for example, to improve the image of the sector and make the industry more attractive to young people. How to conduct a study to identify such effects has not been addressed in this paper.

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Paper 5: A quasi-experimental evaluation of partnering – 558 site-meeting minutes from 10 comparable projects

A quasi-experimental evaluation of partnering - 558 site meeting minutes from 10 comparable projects?

Johan Nyström

Stockholm 2007

Building and Real Estate Economics
School of Architecture and the Built Environment
Royal Institute of Technology

A quasi-experimental evaluation of partnering - 558 site meeting minutes from 10 comparable projects?[*]

Abstract

558 site-meeting minutes from 20 projects have been analysed to extract differences between partnering and non-partnering projects concerning cost and quality, where time delays, the amount of disputes, financial outcome and contract flexibility have been used as indicators. In order to find the unique effect of partnering and control for other affecting variables a quasi-experimental evaluation has been carried out. This approach strives to match partnering projects with identical non-partnering projects on every relevant variable except partnering. By trying to provide more tangible data and an improved structure, this study can be seen as reaction to the criticisms of earlier empirical evaluations. The paper has pushed the frontier for partnering evaluations forward concerning method and data. No systematic or general trends can be seen in the material. The result casts a shadow over the positive results from earlier evaluations and suggests that the main contribution of partnering might lie in its intangible effects. Partnering can be seen as something that is intended to improve the general perception of a construction industry, a declaration of a will to change.

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1. Introduction

The concept of partnering in the construction industry has, since the Latham report (1994), been a topic of discussion both in the business press and in academic circles. Evaluations of the use of partnering most often indicate good outcomes concerning cost, quality and time. The majority of these studies are made in a similar manner, and a number of authors have questioned the quality and neutrality of the evaluations (e.g. Green, 1999; Bresnen and Marshall, 2000; Bresnen, 2007).

In Nyström (2006) there is a systematic discussion about what should characterise a good evaluation of partnering and how the methods by which partnering is evaluated can be improved. The study concludes that there are some fundamental shortcomings in almost all partnering evaluations. Case studies are difficult to generalise, questionnaire results focusing only on partnering projects have a problem with the respondents' self-justification and there is in the evaluations a lack of a comparative analysis that is needed for drawing conclusions about the effects of partnering. The study does not dismiss case studies and questionnaire as scientific tools but makes an argument that the quasi-experiment is more suitable for evaluating partnering, because of the systematic comparative approach to control for other factors. Moreover, the marginal benefit of a quasi-experimental study of partnering should be high since, to the author's knowledge, only one similar study has been carried out before.[1]

This paper presents an evaluation of the effects of partnering in Swedish public construction works that fulfils the conditions for a good evaluation that is presented in (Nyström, 2006) by using a quasi-experimental approach. The contribution is not only an increase in knowledge of partnering's effect, but also on the methodological level about the feasibility of using a quasi-experimental approach.

The paper starts with a representation of the quasi-experimental approach and a general description of the data used in the evaluation. Section 4 clarifies how partnering is defined in this paper and describes on which grounds the projects was selected. The matches, the twin projects, are then presented in section 5 and the result from the analysis of the project data can be found in section 6. The analysis of the results is presented in section 7 and section 8 contains the final conclusions.

2. The quasi experiment

The classical experiment starts with a set of people/objects and then randomly divides them into two groups (subsets). One group gets some kind of treatment (experiment group) but the other group does not (control group). Conclusions about the effect of the treatment are drawn by comparing what happens in the experiment group and the control group. This is according to Rossi (1989) the most prominent way of doing evaluation. The random selection to the experiment and control groups is a way of controlling for differences between the groups that might affect what happens with the group. By controlling for these it can be more convincingly argued that an observed difference is related to the treatment.

[1] A similar study was conducted by Daigle and Touran (1998) but without explicit matching.

When wanting to evaluate some social programme or policy, the evaluator does usually not have the privilege of randomly administrating some kind of treatment. In this case it would be to randomly select in which projects partnering should be implemented and in which more traditional forms should be used. Instead the "treatment group" is given, as it appears "naturally" in society. For some reason partnering is introduced in some projects. Under these circumstances Rossi (1989) suggests that the quasi-experiment is suitable. The problem is then to find the best possible match to the predetermined treatment group, which should be as similar as possible in all relevant dimensions except the aspect that one wants to study.

The central difference between an experiment and a quasi-experiment is that the latter uses matching instead of random sampling when constructing the control and the treatment group (Vedung, 1998).

The partnering projects that is evaluated in this study were pre-determined, which means that a quasi-experimental design of the evaluation was needed in order to satisfy the conditions argued for in Nyström (2006).

3. Data collection

The list of partnering projects analysed in this study was taken from Nyström (2005a), in which the tendering stage of 18 partnering projects were studied. The number of partnering projects was extended to 22 through contacts with a number a people in the industry, and it is likely that most Swedish publicly procured partnering projects during recent years in the construction industry have been investigated. However, twelve of these projects had to be excluded for the following reasons. Three were not completed (3), in two cases it was not possible to find a similar non-partnering project (2) and in seven cases they could not provide enough data (7).

With 10 remaining partnering projects the process of finding comparable non-partnering projects started. This was done by contacting well-informed people, searching the Internet and going through literature, e.g. project lists from various clients. During the search procedure the managers of the partnering projects were not asked directly about possible matches, in order to reduce the risk of a biased selection. This was successfully avoided in all but two matches.

Tendering documents[2] for all projects were collected and studied concerning the matching variables (see below) in order to check that the partnering and the non-partnering projects were comparable.

Since the study includes several client organisations, the material available to analyse differed between the projects. The strategy was to focus on finding site-meeting minutes, which give a good picture of how the project progresses. Site-meeting minutes could also be seen as an easier way of getting representative data compared to interviews and questionnaires. Contracts, economical outcomes, different forms of outcome reports, e.g. final inspections and reviews, were also gathered. The data from the projects also includes, when available, external project reports, customer satisfaction surveys, and a transcribed interview done by another researcher. The

[2] The tendering documents are the documents that the contract is procured on, also known as the contract specifications, contracting-, procurement- or enquiry documents.

author had the opportunity to participate at site-meetings in three partnering projects. At three other partnering projects interviews with the client were carried out.

In summary, the data gathering focused on collecting site-meeting minutes, but used all interesting material that could be found. All parties involved were contacted and no energy was spared in order to get relevant information on each project.

4. Matching variables

4.1 The definition of partnering

A critical question in any evaluation of partnering is to identify what differentiates partnering projects from non-partnering projects. Many evaluations are problematic because they do not identify partnering projects on ex ante information. Identifying partnering ex post makes it possible for a partnering enthusiast to wave off negative results from the evaluation by arguing that the project studied were not "proper partnering". As the project was not a success it could not have been a real partnering project. To avoid this problem a partnering project in this study was defined as a project where partnering/partnership/collaboration or something similar is mentioned in the tendering documents.

Adopting this approach creates another problem of the partnering projects not being carried out differently than traditional projects, i.e., not incorporating partnering components. The conditions in the tendering might not have been followed. This will be controlled for when getting information about the projects and in the analysis the projects will be grouped in relation to the partnering flower (Nyström, 2005b).

Partnering is here seen as a "thing" rather than a discourse, which is too vague and imprecise in order to base the definition on ex ante information.

4.2 Variables

There are many variables and circumstances that affect the outcome of a construction project, which makes it hard to extract the specific effect of partnering. In order to do this other affecting variables need to be controlled for. The control variables were chosen before the search for a project match was started and the ambition was to find matches that were similar in the following respects. The following control variables were used.

4.2.1 Procured according to the Act on Public Procurement[3]

All clients in this study are publicly owned entities, which are the Swedish Road Administration (SRA), the Swedish Rail Administration (Banverket), municipalities and publicly owned housing companies. These entities are subject to the act of public procurement entailing that all projects in this study were publicly procured.

4.2.2 Type of project

Projects were first divided into maintenance and housing projects. The projects within the same match needed to be of the same type and involved in the same line of work. A deeper analysis concerning the type of work was also required since projects differed within these two broad categories. All of the matches also took into account

[3] The Act (SFS 1992:1528) on Public Procurement

size, measured both in physical size (e.g. length of roads, number of apartments etc) and in monetary terms.
Maintenance was divided into four subcategorises; rail-, road-, real estate- and water supply and sewerage maintenance. Traffic load was an important variable for the rail- and road projects.
Regarding housing projects the "twins" should involve the same type e.g. apartments or terrace housing etc.

4.2.3 Type of specifications

The Swedish construction industry has two kinds of generic conditions facilitating contracting. ABT[4] and AB[5] support design-and-build-contracts and prescriptive contracting, respectively. These conditions can be referred to in the contract, which means that a number of things are regulated automatically. These general contract specifications are developed and accepted by both clients and contractors organisations. ABFF is specifications especially developed for real estate maintenance.

In design-and-build type of contracting, the contractor has the responsibility for both designing and delivering, while with the prescriptive type of specification, the client has responsibility for design and the contractor for carrying out the work. This is important for the matching of housing projects since the prerequisites differ a lot between these types of specifications. However, the "design" stage is not as evident in maintenance projects, which means that the type of specification does not affect the prerequisites so much in practice.

Hence, the matching was based on having the same type of specifications especially concerning housing projects.

4.2.4 Type of contract

It is safe to say that monetary incentives are likely to have an effect on the outcome of a project. In general there are three different contract forms; cost-plus contracts-, fixed price contracts and contracts with incentives based on target costs (McAfee and McMillan, 1987). However, there is a tendency in the construction industry to misuse these terms. For example, it is not unusual that the tendering documents and the offer price are based on a list of quantities, which can be expressed in e.g. kilometres road that needs ditching or the number of signs that needs cleaning per year. These quantities are priced by the contractor and summed to a total price for the contract. Some of the quantities are usually adjustable, which means that the actual quantities can differ from the ones in the tendering document and what looks like a fixed price contract is not a fixed price in the full sense of the word, but primarily a fixed price list. The actual payment will depend on how the quantities are determined during the project time. This study will look into how the payment schemes were organised in each project in order to make the match.

[4] General conditions of contract for building, civil engineering and installation work performed on a package deal basis. Translation taken from The Construction Contracts Committee.
[5] General conditions of contract for building, civil engineering and installation work. Translation taken from The Construction Contracts Committee.

4.2.5 Contractor and client size

The contractor market in Sweden generally consists of four nationwide firms and a number of small regional ones. Contractor size implies different opportunities for the project managers e.g. because larger financial resources makes it possible to take more risk. This is why it is important to control for this variable. The size of the clients does also provide different opportunities, e.g. in terms of bargaining power, and all the matching project in this study had comparable client organisations.

4.2.6 Geographical closeness

Most types of empirical studies have the problem of controlling for all relevant variables. One way of facilitating this is to choose control variables that can cover a number of circumstances that otherwise would be hard to control for. Matching projects according to geographical closeness takes care of many general variables that might affect the outcome, for example weather conditions. Geographical closeness was interpreted as being in the same Swedish region.

4.3 Summary of the matching variables

The above variables could not be fulfilled in all matches, with contract type being the most serious problem. Most partnering projects used some version of a target cost contract, and it was hard to find traditional projects that used this type of contract. The traditional projects mostly used some version of a fixed price contract. This means the comparison in the end concerns partnering projects with target cost contracts and non-partnering projects with (mostly) fixed price contracts. It will not be possible to formally separate the role of partnering from the role of the target cost contract.

Two matches have a problem with the projects being geographically separated and in another project similar types of contractors could not be found, hence one national contractor and one regional.

In closure, it can be said that 10 matches were found where both twin projects were publicly procured according to the Swedish public procurement act, consisted of the same type of work, had the same type of specifications[6], were comparable in size and had the comparable clients and contractors. The matching had shortcomings, but the database provides an improved foundation to evaluate partnering compared to earlier evaluations.

[6] Except in one maintenance project

5. Matching projects

This section will give data on the twin projects concerning the matching variables described above and also provide some additional descriptive information. The differences in table's headings have to do with the heterogeneity of the database.

Match 1, Road maintenance

In 1992, the SRA separated their production unit and exposed it to private competition. Both contractors in this match belong to the SRA production unit, but they had to compete with private companies for the contracts. The projects are geographically adjacent and have the same project manager on the client side.

Table 1. Descriptive data of match 1

	Partnering project	Non-partnering project
Contract start	2003.09	2001.09
Contract duration	3+3	6
Type of specifications	ABT	ABT
Type of contactor	National	National
Type of contract	Target cost	Fixed price
Adjustable quantities of initial contract amount	31 %	73 %
Initial contract amount (SEK)	63 368 581	113 938 602
Number of bidders	5	3
Road length	790 km	620 km

The contract in the partnering project was 3 years long with an option for another three years, described as 3+3 in table 1. Payment was regulated by target cost with an incentive. A deviation from the target cost was split 50/50 between the client and the contractor. The non-partnering project had a fixed price, but 73 percent of the initial contract amount had adjustable quantities (see above). Winter maintenance constitutes around 50 percent of the contract sum and this was non-adjustable in the partnering contract, which explains the large difference in adjustable quantities.

Match 2, Road maintenance

Just like the above match, these projects are geographically adjacent and have the same contractor companies, and the local units formally belong to the same organisation.

Table 2. Descriptive data of match 2

	Partnering project	Non-partnering project
Contract start	2001.09	2000.09
Contract duration	3	4+2
Type of specifications	ABT	ABT
Type of contactor	National	National
Type of contract	Target cost	Fixed price
Road length	880 km	1248 km

The partnering project was procured in 2001, and was after one year renegotiated to a partnering project. Payment was structured in the same way as above but the client takes 70 percent of the risk. Winter maintenance in the non-partnering project had adjustable quantities, while this was non-adjustable in the partnering project. Exact figures on the amount of adjustable quantities could not be found. The adjustable

winter maintenance in the non-partnering project indicates a larger total amount of adjustable quantities.

Match 3, Rail maintenance

Banverket has the same type of arrangement as SRA, with a separated production unit competing on the market for maintenance contracts. The partnering contractor in this match belongs to Banverket, but in the non-partnering project the contractor is a private company. Both projects are geographically close and had comparable type and amount of traffic.

Table 3. Descriptive data of match 3

	Partnering project	Non-partnering project
Contract start	2003.05	2002.05
Contract duration	5+2	3+1
Type of specifications	AB	AB
Type of contactor	National	National
Type of contract	Target cost	Fixed price
Adjustable quantities of initial contract amount	30%	46%
Number of bidders	4	6
Initial contract amount	53 067 385	29 698 940
Rail length	205 km	120 km
Type of traffic	Mostly goods trains	Mostly goods trains
Evaluations of bids	60% price	50 % price

The partnering project had a target cost with an incentive to regulate payment. This incentive was also related to the partnering goals. If all goals were fulfilled, a deviation from the target cost would result in at 50/50 sharing. However, if the partnering goals were not fulfilled the percentage distribution would change, making it a 60/40 split in the client's favour. Ending up below the target cost would give the client 60 % of the cost reduction if the partnering goals were not fulfilled. Hence, monetary incentives were connected to the partnering goals.

Match 4, Rail maintenance

The matching variable of geographical closeness could not be satisfied in this case. More weight was put on finding a comparable project with respect to project type and amount of traffic. The partnering contractor was a private company and Banverket's production unit won the tendering for the non-partnering project.

Table 4. Descriptive data of match 4

	Partnering project	Non-partnering project
Contract start	2004.05	2004.04
Contract duration	5+2	3+2
Type of specifications	ABT	ABT
Type of contactor	National	National
Type of contract	Target cost	Fixed price
Adjustable quantities of initial contract amount	21%	28%
Number of bidders	5	4
Initial contract amount	111 621 030	74 163 100
Rail length	295 km	270 km
Type of traffic	Mostly goods trains	Mostly goods trains
Evaluations of bids	70% price	50 % price

The target cost arrangement was the same as in match 3, i.e., if the partnering goals were not met, the sharing factor was changed to 60/40 in favour of the client.

Match 5, Road maintenance

The projects are both located in the Stockholm region and handled the same kind of traffic. Park maintenance was also included in the partnering contract but this was only a small part of the contract.

Table 5. Descriptive data of match 5

	Partnering project	Non-partnering project
Contract start	2001.10	2002.07
Contract duration	5+2	3+2
Type of specifications	ABFF	AB
Type of contactor	National	Regional
Type of contract	Fixed price*	Fixed price***
Evaluations of bids	95 % price**	81 % price**
Road length	170 km	140 km

* with client sharing of savings below target price (see below)
** the soft parameters were transformed into a maximum fixed value in relation to the price. The percentage figure in table 5 is an approximated value.
*** 30 percent of the number of quantities in the bill of quantities is adjustable

A simplified description of the payment scheme in the partnering project can be illustrated by separating the parts concerning reinvestments and maintenance. The reinvestments in the roads were regulated by a fixed price and the maintenance was described as having a "target cost with incentives". A deviation below the target cost is shared 50/50, while the contractor takes the whole cost increase if the cost is above target. This is described as fixed price with client sharing of savings in table 5.

A renegotiation of the target cost was conducted each year based on eventual changes in relevant circumstances. The idea was that the investments would improve the status of the roads in a way that less acute maintenance was needed. Status improvement by the investments would constitute changed circumstances in comparison with the preceding year and the target cost would be lowered.

There was a difference concerning the type of specifications in this match. This problem is, as mentioned above, not so severe for maintenance and both projects were in reality based on performance contracting, which in both cases entailed contractual deviations from the general specifications.

Match 6, Municipal housing maintenance

The projects in this match are geographically separated, but are both situated in expanding regions in Sweden.

Table 6. Descriptive data of match 6

	Partnering project	Non-partnering project
Contract start	2001.10	2002.01
Contract duration	5+2	3+2
Type of specifications	ABFF	ABFF
Type of contactor	Regional	Regional
Type of contract	Fixed price*	Fixed price***
Number of bidders	5	7
Evaluations of bids	95 % price**	70 % price
Area in square metres	259 650	113 000

* with client sharing of savings below target price (see match 5)

** the soft parameters were transformed into a maximum fixed value, which was 95 % in relation to the winning bid**.**

*** with a part paid by cost plus arrangement

The fixed price arrangement in the partnering project was the same as in match 5, and both contracts were based on performance descriptions.

Match 7, Water supply and sewerage maintenance

The projects are both located in the suburbs of Stockholm and the contractor is the same for both projects.

Table 7. Descriptive data of match 7

	Partnering project	Non-partnering project
Contract start	2002.01	2004.05
Contract duration	9+2	3+2
Type of specifications	ABFF	AB
Type of contactor	Regional	Regional
Type of contract	Fixed price*	Cost plus
Initial contract amount	23 530 000	7 096 630

* with client sharing of savings below target price (see match 5)

The fixed price arrangement in the partnering project was the same as in match 5 and the non-partnering project was based on fixed prices, but all quantities were adjustable.

Match 8, Road maintenance

The municipalities in this match are geographically separated. Tendering and the day-to-day activities in the partnering project are not handled directly by the municipality but by a company that is owned by the municipality. The difference between the two client organisations is not important and does not interfere with this matching.

Table 8. Descriptive data of match 8

	Partnering project	Non-partnering project
Contract start	1999.06	2004.04
Contract duration	5+2	3+2
Type of specifications	ABT	AB
Type of contactor	National	National
Type of contract	Fixed price*	Cost plus
Initial contract amount (SEK)	11 072 380	20 572 740

* with client sharing of savings below target price (see below)

The tendering documents for the partnering project included five separate contracts, concerning maintenance of roads, water and sewerage, the harbour, parks and some small boats. This analysis will only look at the road maintenance contract.

The payment scheme in the tendering documents for the partnering project was described as a "target cost with incentives" for acute and day-to-day maintenance. This is expressed as a fixed price with clients sharing in table 8. If the costs ended up below the target cost the gain was divided 30/70 in favour of the contractor. Reinvestments were also included in the contract, where the client stated a maximum amount of orders per year. These jobs were regulated by a cost plus scheme. The non-partnering project was based on fixed prices, but all quantities were adjustable.

Match 9, Flats

These projects are geographically separated but both concern expanding cities of similar size.

Table 9. Descriptive data of match 9

	Partnering project	Non-partnering project
Tendering	2003.09	2003.05
Start of construction	2004.06	2003.09
Type of specifications	ABT	ABT
Contractor	National	National
Type of contract	Cost plus	Fixed price
Number of bidders	3	5
Initial contract amount (SEK)	Non existent	37 150 000
Evaluation of bids	Only soft	Only price
Number of apartments	76	56
Total living area in square metre	5 139	3 344

* with a fixed part (see below)

Evaluation of the tenders in the partnering project was only based on soft parameters. The tendering documents required the contractor to describe their company from four different perspectives: organisation, general qualifications, way of working and a description of success factors to a project. The budget was developed together by the

client and the contractor, since no price was delivered in the tendering process. This budget constituted a base for the payment scheme and was settled with roughly 80 % of the design completed. A fixed payment was then determined for the contractor, including administrative cost and some profit. The rest of the project was run as a cost plus contract.

Match 10, Flats

The projects in this match can be derived to the same region of Sweden, located in Southern Sweden.

Table 10. Descriptive data of match 10

	Partnering project	Non-partnering project
Start of construction	2000.10	2001.05
Type of specifications	ABT	ABT
Contractor	National	National
Type of contract	Cost plus*	Fixed price
Initial contract amount (SEK)	44 520 000	22 700 000
Number of apartments	54	34
Total living area in square metre	3 746.5	2 133

* with a fixed amount

Both projects are built in the central areas of middle size towns and have standard specifications and contracts.

6. Are there any differences between partnering and non-partnering projects?

This section will report the outcome of the 10 pairs described above. The analysis is based on the arguments in Nyström (2006), which makes an argument for cost and quality as the definition of project success. However it is noticed that these measurements are hard to observe and compare. Therefore, the strategy when going through the data was focused on variables of time, contract flexibility, additional work and disputes (Nyström, 2006).

Most projects did provide the financial outcome but since organisations define and report costs in different ways it was hard to make an exact comparison. The strategy was to remove everything but the contractors' invoices to the client for building/maintenance and for additional work in order to make a comparison. This excludes government subsides, overheads, insurance, land cost, etc.

In this study the variable of contract flexibility includes improvements on the initial contact. No quantitative data on additional work could be found in any of the cases studied.

Since the material is heterogeneous, the analysis of each match will start by describing the data that the analysis was based on.

Match 1, Road maintenance

The material from the two projects consists of 77 minutes from site meetings, where 34 were from the partnering project. The client's project manager, who was the same person for both projects, had written both sets of minutes. This meant that the meetings were structured in a similar way for both projects, with paragraphs discussing how the work developed, keeping track of the budget and quality matters. Tendering documents, the contract and the economic outcome were collected for both projects. Two internal reviews were gathered and two partnering meetings were attended.

Results

The partnering project developed comprehensive goals concerning cost efficiency, improved quality, improved customer satisfaction, improved road safety and lower environmental impact. These goals were broken down into intermediate goals and action plans. This document was updated at each partnering meeting. The model used to develop the goals was influenced by Stephenson (1996). Initially there were some problems with getting started on the partnering goals and it took 6 months before the first partnering meeting was held. This meeting also included a presentation of the partnering concept by an external person.[7]

The site meeting minutes indicate that there were productive discussions concerning improvement of maintenance in the partnering project. This led to some changes in the contract. The frequency of inspections was reduced by 3 days, which can be seen as a deterioration of the procured quality. However, upgrading two roads to a higher level of inspection can be seen as a way of compensating for this. There was also a deterioration in ditch clearing, which was compensated for by adjusting the target cost downwards. This renegotiation was the result of a common view of a too-high standard of ditch clearing on some small roads. As both parties agreed to these changes they could be interpreted as leading to a better use of resources.

Concerning innovation, a new dust-retaining agent was tried with a good outcome. The investment cost of 30 000 SEK was shared. There were also tests with warm-water sanding and a subcontractor made a proposition concerning the use of a new snowplough.

A direct outcome of the partnering goals was the decision to hold a spring meeting analysing snow clearance from the past winter with those subcontractors involved. However, some of the ideas that came out of the partnering goals can be considered more or less routine matters. Revision of the plans for ploughing each year was, for example, also carried out in the non-partnering project.

Discussions about finding improved ways of conducting maintenance could not be found as frequently in the non-partnering minutes. However, the same kind of plough as mentioned above was also introduced on one particularly troubled section within the area of the non-partnering project. This cost was borne by the client. The most frequent type of dialogue in the non-partnering project concerned contractor-initiated enquiries about needing more money to fulfil obligations.

[7] The author of this paper.

In the partnering project there were regular meetings with a road-user committee, but no results from theses meetings were recorded in the site meeting minutes.

The contractor in the non-partnering project was credited with effective handling of public complaints on more than one occasion in the site meeting minutes.

Table 11 depicts the economic outcome for the projects. These figures are the amount that the contractor was paid, i.e., the actual cost to the client. The projects differed concerning regulated quantities of winter maintenance, which factor has been excluded in order to make a comparison possible.

Table 11. Real payment in SEK to contractor per km road (excluding winter maintenance)

	2004	2005	2006
Partnering project	12 549	10 004	11 802
Non-partnering project	15 527	17 075	15 960

These figures show that the partnering project was cheaper. As mentioned above the partnering project had a target cost. The economic result was below the target cost in the second year and the client's saving was reinvested in maintenance in the area.

Conclusion
The analysed material indicates that there were more constructive type of dialogues concerning improvements in the partnering project. These discussions led to some tests of new ideas with positive results. The partnering project showed signs of flexibility with contract amounts renegotiated in both directions. It can be seen that none of the contractors delivered an exceptionally poor level of quality, which would have been indicated by the site meeting minutes.

The economic outcome was better in the partnering project and the general conclusion from the analysed material concerning this comparison was that the outcome is in favour of the partnering project.

Match 2, Road maintenance

The data in this comparison consist of the minutes of 79 site meetings; 32 from the partnering project. Tendering documents, the contract and economic outcome were also gathered for both projects. The author attended one partnering meeting.

Results
The partnering project used the same goal model (Stephenson, 1996) as in match 1. Comprehensive goals were developed with a partnering facilitator and concerned cost efficiency, improved quality, improved customer satisfaction and improved road safety.

The site meeting minutes indicate that there were more discussions about improvements in the partnering project compared to the non-partnering minutes. Improvements were a standing topic on the agenda with active discussions. However, the minutes do not indicate that more actual improvements were made in the partnering project. Both projects tried new ideas of warmwater sanding with positive outcome and experimented with different grader blades. A subcontractor in the non-

partnering project presented an accessory to the plough that handled the removal of snow better, and this was tested with a good result. The partnering project developed a new way of washing street signs.

Communication with the subcontractors, the industry and the public was indicated to have been more structured in the partnering project. Subcontractors participated more frequently in the site meetings and both the industry and the public were invited to "dialogue meetings". An Internet site was also created, with a forum concerning road issues. No results from these meetings were recorded in the minutes, however.

Table 12 shows the financial outcome of the projects.

Table 12. Real payment in SEK to contractor per km road (including winter maintenance)

	2002	2003	2004
Partnering project	19 545	21 006	22 549
Non-partnering project	22 763	20 720	22 530

The figures are slightly in favour of the partnering project, which had an incentive scheme with a target cost. This cost was exceeded in 2002 by 5.4 percent but ended up below the target in the following two years: by 7.5 percent in 2003 and by 15 percent in 2004. The client's savings were reinvested in the project and there was an agreement between client and contractor on how the resources should be used.

Conclusion
Despite the fact that there was more frequent discussion of improvements in the partnering project this did not lead to more recorded efficiency-enhancing activities. Both projects indicated a willingness to try new ideas and showed flexibility in their way of working. No recorded problems with quality can be observed in either of the projects.
Based on the economic outcome and the good communication with the public, the general conclusion on the projects is somewhat in favour of the partnering project.

Match 3, Rail maintenance

The analysed material consists of 57 meeting minutes, where 18 were from the partnering project. Both projects also provided the contracting documents and the economic outcome. However, the economic outcome was not detailed enough to make a comparative analysis meaningful. A review was also collected from the partnering project and one partnering meeting was attended.

Results
The contractor suggested four partnering goals in their bid: lowering faults, sustain track-bed standard, decrease the number of delayed trains and improve efficiency of winter maintenance. These goals provided a starting point for further development by the parties. The discussion focused on trying to formulate measurable goals, which excluded various soft goals. An explanation for the concentration on quantifiable partnering goals could be the fact that money was involved in the fulfilment of the goals. The goals were set at a reduction of five percent in the level of faults, delayed trains and time taken to correct errors in comparison with an average based on figures from earlier years. Since the goal regarding delayed trains was outside the

contractor's control, it was eliminated, together with the goal of improving efficiency in winter maintenance. A lot of effort was put into providing good statistics throughout the project. However, indications from the minutes reveals that the focus in the meetings was not on trying to work out how to achieve the set out goals, but instead on providing statistics. Improving the work was not done by means of constructive discussion, but left to the contractor.

There were two discussions where the contractor wanted to raise the target cost. One was approved and concerned a change in winter maintenance. The other issue was more problematic and regarded provision of materials. A deal was made ex ante to lower the tendered target cost by 158 000 SEK because another firm provided the stock of a material instead of the contractor. The new arrangement did not work out well, so the contractor had to keep a stock and therefore wanted to go back to the initial target cost. A suggestion from the client to raise the target by 79 000 SEK was refused by the contractor, and the issue had to be passed onto and solved by higher levels in the hierarchy.

As mentioned in the matching section, the client and the contractor used to work within the same organisation. The fact that some of the contractor's blue-collar workers went directly to the client project manager when there was a problem at the beginning of the contract could be a result of this. A related observation in the minutes was a discussion between the client and contractor concerning finding something for the workers to do during the off season. This might lead to the conclusion that the relationship between the parties was good even without partnering.

Site meeting minutes studied in the non-partnering project do not indicate any serious disputes. The big discussion every year concerned the index adjustment of the fixed price, which was always preceded by a month-long negotiation process.

A new idea of setting aside 100 000 SEK per year from the client's budget for preventive maintenance to be done when other jobs were carried out, was tried. The following scenario can exemplify this idea, where a contractor out fixing an acute problem observes a broken sign. If this type of job was not included in the contract it would not have been done at that time. However, with the money set aside the man already out there could also take care of the broken sign, thereby saving the transaction cost of having to go out there again on a separate order. Jobs under 5 000 SEK could be carried out without the direct consent of the client. This arrangement was successful and extended to 150 000 SEK the second year.

The contractor in the non-partnering project reported some trouble with snowmobiles being ridden close to the rail tracks. This had the effect that representatives of both parties met with the local snowmobile club, informing them about the risks. Reportedly, the meeting led to more careful driving.

A review report in the last year of the contract in the non-partnering project confirmed that the quality of the railway was of the same standard as when starting the maintenance project.

The analysed material indicates that both projects progressed satisfactorily without major problems or disputes. Most issues were handled in a rational and flexible manner. An example from the partnering project is how the problem of high administrative costs due to many invoices for small amounts was handled. The solution was to include these in regular invoices by raising the price of man hours by a small amount.
A similar example from the partnering project was potential problems with unexpected heavy snowfall, where one of the contractor's employees said that he could handle the clearance if he was home at the time. Another example, indicating this willingness to avoid pettiness, was when the client let the contractor use a small unused shed beside the railway. A possible explanation of this behaviour might be found in the fact that the maintenance market in the northern part of Sweden is small and everybody involved knows each other. The effect of relationship building in partnering would then be quite small.

A report from the clients' organisation indicating trends from the project start to 2006 is presented in table 13.

Table 13. Trends in the projects since procured

	Delays	Faults	Time to correct errors	Safety	Costs
Partnering project	Neg	No trend	Pos	Neg	Pos
Non-partnering project	Pos	Pos	Pos	No trend	Pos

Pos = positive trend, Neg = negative trend, which should not be interpreted literally. A positive trend concerning delays, faults, time to correct errors and costs does not indicate more of these but a better outcome.

Table 13 is in favour of the non-partnering project, however the trends do not give a comparable description as the starting value is not controlled for.

Conclusion
In both projects there was a good relationship between the parties. However the analysed material revealed that there were fewer disputes in the non-partnering project and all discussions in that case could be handled at the project level. There were more new initiatives taken in the non-partnering project, e.g. discussions with the snowmobile club and the idea of a special budget for preventive maintenance. All variables examined were in favour of the non-partnering project.

Match 4, Rail maintenance

The data analysed for this comparison come from the minutes of 41 site meetings; 14 from the partnering project. Tendering documents, the contract and the economic outcome were also collected for both projects. However, the economic outcome was not detailed enough to make a comparative analysis meaningful.

Results
This was the first time that both of these maintenance areas were tendered. The first year's minutes indicate that there were a lot of start-up questions, e.g. how invoicing should be organised, how the contractor gets information about new regulations, how reports should be handed in, etc. Neither contractor had any previous experience of publicly procured maintenance projects, but the contractor in the non-partnering

project had worked with maintenance before as an in- contractor for Banverket. The inexperience of the contractor in the partnering project meant that they needed some education, e.g. on how different detectors worked. They turned to the former in-house contractor, with whom they had competed for the contract, but help was refused. This was taken to the minute as something to think of in forthcoming procurements. In relation to this matter, the question of who owned the simulator equipment for detector testing became a national issue within Banverket.

The site meeting minutes indicate that the partnering goals were worked on continuously. There is, however, reason to believe that not much effort was put into the partnering issues. The same "cut and paste" sentence recurred in the minutes without any other indication of active partnering work.

The analysed material implies that the non-partnering project, in comparison to the partnering project, had a more hostile relationship between contractor and client. Both parties questioned each other more frequently. This is not necessarily a bad thing, because there was also a more vivid and recurrent discussion in the non-partnering project on renegotiating the prices in both directions, based on the arrival of new information. An example was when the contractor wanted to raise a specific price for removal of wheel-slip marks, as they claimed that most of these problems were located far out in the project area. The parties later came to an agreement. However the majority of the discussions on price renegotiations were not very constructive. Most often the story was that the contractor wanted more money for fulfilling the contract despite there being no change in circumstances from the tendering document.

The major problem in the non-partnering project was that the contractor had trouble getting access to the rail in order to do the work. This problem was also present in the partnering project, but to a lesser extent according to the minutes. A meeting between the client, the contractor and the organisation in charge of traffic was set up by the partnering client to solve this issue. The client in the non-partnering project did not care about this when it first occurred. After about a year of complaining, the client helped the contractor in arranging a meeting.

The minutes indicate that the client was more powerful in the partnering project than in the non-partnering project. A general, but striking, comparison is that the non-partnering project discussed matters, while the contractor in the partnering project asked questions and the client gave information. This could be explained by a bigger gap in experience concerning rail maintenance between the parties in the partnering project.

A report from the client organisation indicates trends from the start of the project until 2006, see table 14.

Table 14. Trends in the projects since procured

	Delays	**Faults**	**Time to correct errors**	**Safety**	**Costs**
Partnering project	No trend	No trend	Pos	No trend	Pos
Non-partnering project	Pos	Pos	Pos	No trend	Pos

Pos = positive trend, Neg = negative trend, which should not be interpreted literally. A positive trend concerning delays, faults, time to correct errors and cost does not indicate more of these but a better outcome.

Table 14 is in favour of the non-partnering project, however the trends do not give a comparable picture since the starting value is not controlled for.

The client has a system for detecting faults on the rail, which is nationally standardised and called O-felia. Table 15 shows the total amount of reported errors for the two projects per km rail and not just the defects that have been taken care of.

Table 15. Reported faults according to O-felia per km rail

	2003	2004	2005
Partnering project	2.23	2.64	1.37
Non-partnering project		4.11	4.61

These differences cannot only be assigned to the contractors' performance, as it also has to do with the standard of the rail. But it does give an indication.

Conclusion
Both projects put great effort into developing the fundamental routines, which could explain why there was a lack of tests of new ideas and innovations. A difference between the projects can be seen concerning the way questions were solved. The non-partnering project arrived at solutions by discussion, which in most cases, however, was unconstructive. In the partnering project the dialogue was led by the experienced client.

Despite this, there were no major problems in the partnering project and the removal of defects were substantially better, which concludes in favour of the partnering project.

Match 5, Road maintenance

The data consist of the minutes of 50 site meetings; 37 from the partnering project. Both projects have also provided tendering documents, the contract and economic outcome. However, the economic outcome was not detailed enough to make a comparative analysis meaningful. The client in the partnering project wrote a summary of each year, two of those were collected as well as a comprehensive report of the first four years of the project. An external review of the partnering project was also included.

Results
The partnering project was the first procurement of road and park maintenance made by the municipality. This project were going to be carried out in a collaborative manner according to the tendering documents, which did not coincide with how the project was carried out according to the site meeting minutes. The documentation did not include any common goals and also showed a lack of trust. An example of the lack of trust was the structural monitoring of the contractor and occasional withholding of money when defects were found. The lack of trust also worked in the opposite direction, with the contractor often questioning the client's evaluations.

An evaluation of the first four years of the contract credited the contractor with the practical execution of the contract. There were, however, complaints concerning the

administrative work. The administrative assignments of the contractor included more work than is usually seen in Swedish maintenance contracts, with the contractor managing the client's contracts with other parties. This part of the contract had not been carried out in a satisfactory way. The solution was to release the contractor from a lot of their administrative duties. In compensation for this, the maintenance duties were extended to include the harbour.

According to the contract, a customer survey had to be conducted and put forward by the contractor every year. The most positive feedback from the residents concerned snow clearance and skid control, with 56 percent in 2006 answering that they considered it very good or good. Slightly negative (but not significant) trends can be seen over time concerning both road and park maintenance.

The municipality with the non-partnering project has contracted out road and park maintenance since the middle of the nineties. No major issues could be found in the analysed material for this project. The parties did not seem to have conflicting opinions about the question that came up in the site meeting minutes. Most questions at the site meetings concerned issues outside the contract, which could be an indication that the contract runs smoothly. The client can be described as active because the client is continuously updated on the municipality's plans and other new information.

Conclusion
The lack of informative material in the non-partnering project complicates this comparison. However, the material for the non-partnering project did not reveal any disputes, which were current in the partnering project, according to the site meeting minutes. The problems in the partnering project were mainly related to administrative issues while the actual maintenance ran smoothly, with a fulfilled level of quality.

The analysed material reveals more problems in the partnering project.

Match 6, Real estate maintenance

The material analysed for the partnering project consists of the minutes of 106 site meetings, a questionnaire on customer satisfaction and an external review. The minutes of 15 site meetings and a manuscript from an in-depth interview with the project manager were provided from the non-partnering project.[8] Tendering documents and economic outcome were also gathered for both projects. However, the economic outcome was not detailed enough to make a comparative analysis meaningful.

Results
The tendering document in the partnering project state that the relationship between the parties should be based on a collaborative way of working. However, no common objectives or start-up workshop were carried out.

From analysing the site meeting minutes it can be seen that the meetings were mostly an exchange of information and not a forum for innovative ideas and improvements.

[8] The author did not do the interview.

The most recurrent dialogue concerned additional work. These matters were initiated by both parties, e.g. the client wanted a tree cut down or the contractor gave notice that a laundry room was in desperate need of renovation. None of the suggestions were ever noted to have been settled at the same meeting where they were brought up. Instead the non-suggesting party came back with a price (i.e., contractor) or an order (i.e., client) at the next meeting.

Apart from discussions about additional work, the only matters that were recorded in the site-meeting minutes were recurrent problems. This could be interpreted as meaning that most issues within the contract worked smoothly. One specific question concerned a building with a lot of blockages in the sewage system. This matter took over a year to solve without the client getting involved more than in gathering information about the development. According to the contract the client is not obliged to do any more, but it might be interpreted as a lack of collaboration. An external review was carried out in 2002 and pointed out collaboration problems between the parties. It also concluded that some administrative features of the contract were not fulfilled.

The non-partnering project had serious problems with the contractor not fulfilling the obligations of the contract. A random inspection by the client revealed that e.g. weedkilling was non-existent around a few buildings. There was also trouble with the contractor not providing the first year's compilation of invoices for additional work on time. Despite advance reminders it was over two months late, which caused a major problem for the client's bookkeeping. The situation after the first year was so bad that the client was considering terminating the contract on the basis of the contractor not fulfilling their obligations. Results of a tenant survey confirmed the negative perception of the contractor. The contract was not terminated despite the dissatisfaction, but the contractor had to pay a fine for the client's extra work. The continuation of the contract was based on a promise of improvement, which consisted in engaging a subcontractor. Customer satisfaction rates did go back to the level they had been at before the tendering, which indicates an improvement.

The municipality sold some real estate during the project and that meant less work for the contractor. This was regulated by a change in the fixed price without any problematic discussions.

Conclusion

Both projects were procured for the first time and both contractors had problems fulfilling their obligations in the first year of the contract. An explanation might be found in the large extent of performance contracting. This gives the contractor many degrees of freedom, which they might not have been ready for.

The problem in the partnering project was mainly a lack of fulfilment of some of the administrative duties, but there are no indications of the contractor not performing their practical duties. There were more severe problems in the non-partnering project, with the contractor not fulfilling administrative duties and performing the maintenance poorly. The quality level in the non-partnering project must, by all indications, be interpreted as being lower.

Despite problems in both projects, the partnering project emerges as having the least amount of problems.

Match 7, Water supply and sewage maintenance

The data consist of the tendering documents and the contract for both projects. The minutes of 54 site meetings were gathered, with 44 from the partnering project. Two external reviews and the economic outcome for each year were provided from the partnering project. However, the economic outcome was not detailed enough to make a comparative analysis meaningful. An interview was also conducted with an employee of the contractor that had experience of both projects.

Results

The tendering documents in the partnering project mentioned that the work should be done in a collaborative and trusting environment. However no relationship-building activities were undertaken and no common goals were formulated. This was the first tendering of water supply and sewage maintenance that the municipality had done. There were some start-up problems mainly concerning invoicing routines and the structure of the reports that the contractor was required to hand in. Some routines that were, according to the contract, to be presented at the start of the project took over three and half years to settle. This was not only due to the contractor but also because the client's inspections of the routines took some time.

The most problematic matter during the project was found in the site meeting minutes at the end of the second year. A renegotiation was initiated by the contractor concerning what was actually included in the contract. Despite explicit intentions to solve this matter quickly at the project manager level, lawyers eventually had to be involved. The contractor's CEO and the highest representative for the municipality, with the help of lawyers, came to a conclusion two years on from the initial disagreement. Even though the representatives from both parties tried to put this dispute aside during everyday work, it was reported that the disagreement affected the relationship in a negative way. Another complication was a high turnover of employees in comparison to the non-partnering project. This concerned both the client and the contractor organisations.

The project as a whole cannot be characterised as smooth and the partnering phenomenon was hard to find. An example illustrating the non-collaborative way of working was when the contractor wanted to make an interior renovation in a client-owned property. After the job was completed, the contractor turned to the client for permission and some financial support, but the latter was refused.

The number of registered complaints about operational disturbances did go down substantially from the first two years to the following two years, from an average of 337 to 152. A good initiative concerning leakage fixing was also carried out. The contractor actively searched for and fixed leakages in the water and sewage system. This made it more efficient, saving money for the client in the long run, and reduced acute maintenance. In this arrangement the client paid for the hours and the contractor for the materials.

The non-partnering project was the second procurement of water supply and sewage maintenance that this municipality had carried out. A more experienced client might

be the explanation for the less problematic start-up problems in comparison with the partnering project. The analysed material does not indicate that any major problems were encountered.
A recurrent feature in the minutes was an explicitly expressed consensus on agreements, i.e., using terms indicating that both parties confirmed the additional work order. This gives the impression that the parties wanted to avoid misunderstandings. The issues that came up in the discussions were, according to the minutes, easily solved without much discussion.

Conclusion
Analysing the material produces a picture of more problems in the partnering project, with the big dispute on how to interpret the contract affecting the relationship in the project. The non-partnering project seems to run well without any major problems, which might be explained by the attention to clarity between the parties and a better-defined contract than in the partnering project. Despite that, the partnering project improved over time, mainly with the settlement of routines.

However, the result of the comparison concerning disputes and flexibility points to an advantage of the non-partnering project.

Match 8, Road maintenance

The material analysed in this match consists of the minutes of 39 site meeting. 29 of them are from the partnering project, which also provided tendering documents, the final inspection report and three external reports. Tendering documents, the contract and a review with a follow-up meeting were collected from the non-partnering project.

Results
The formal partnering work, with common goals in a partnering charter, did not really start until two years into the contract. A common vision for the project was created with the help of an external facilitator. The vision was later monitored and further developed in separate partnering meetings. These meetings included discussions about coming up with arguments for investment that could be presented to the politicians in the municipality.

Despite the late formalisation of partnering, there was some early collaboration in the project. The contractor moved his office to a client-owned property, which entailed some renovation. This was handled without any larger disturbances and the site meeting minutes indicate good collaboration on how to solve matters concerning building permits and a joint switchboard. Before moving in, the contractor consulted the client organisation about their plans for the space and how the move could be carried out most efficiently.

There was also intense focus on a communication plan for informing the public of the road maintenance work. Strategies for getting newspapers to write articles and also the production of information material were discussed.

The site meeting minutes indicate an interest in new ideas within the construction industry. Subjects like BOT[9] projects, a research report concerning the maintenance of bridges, and recycling of sand and asphalt were discussed. A direct result of the partnering work was task forces that worked on the recycling of sand and asphalt. The groups went on educational visits but the ideas were only tested.

Six months into the contract, restrictions were put on the client organisation by the municipality in order to save money. This was problematic since the contract promised the contractor a minimum amount of work for five years. The contractor naturally opposed a reduction in the amount of work, but an agreement was made to cut quantities in the contract. This disruption did not cause any recorded disputes in the daily work, according to the documentation.

A final review of the projects confirms that the standard of the roads had not deteriorated during the project period.

One year into the non-partnering project the client ordered an external review. The outcome identified some problems, focusing on the lack of contractor routines for monitoring their own work. According to the contract, daily journals of the work should be kept and provided to the client, which had not been done. Most of the problematic issues were, according to the review, due to the contractor organisation, but the review also stated that the client could be more active. The inexperienced contractor might have needed some more assistance on how things worked. A constructive meeting followed this review, showing that both parties had the willingness to improve the project. This meeting provided some new routines for monitoring and a declaration in favour of having an open and respectful dialogue. The client's wish for a larger contractor organisation was not fulfilled.
An equally vivid discussion as in the partnering project was not recorded in the site meeting minutes of the non-partnering project. Although there was a standing issue on finding improvement, nothing was ever recorded.

Conclusion
The analysed material indicated some fundamental problems in the non-partnering project. These problems were, however, approached by both parties with serious intentions of change. Discussions on improvements in efficiency and a curiosity about new ideas were more frequent in the partnering project, but not many actual improvements were recorded. The partnering project also indicated more flexibility in the contract.

Fundamental problems in the non-partnering project, which could not be found in the partnering project, conclude this match in favour of the partnering project.

Match 9, Flats

The data analysed consist of minutes of 79 site meetings; 68 from the partnering project. Both projects have also provided tendering documents, economic outcome and the final inspection report.

[9] Build Operate Transfer

Results

The partnering project in this match can be described as the project that took the partnering concept the furthest, when compared to other projects in this study. Tendering was made using soft parameters and three workshops were conducted before the publicly owned housing company got the investment sanctioned by the municipality. The first workshop was held at a conference establishment and participating parties were the client (4 representatives), the contractor (5 representatives) and the architect (2 representatives). A lecture on partnering was given; all representatives were introduced to each other and gave their personal expectation of the project. At the end of this two-day event a SWOT analysis was conducted and a common vision for the project was produced. The second workshop included the subcontractors and the third the consultants. Both were one-day seminars, which further developed the vision.

The building phase started a year after the first workshop. Site meetings took place once a week and were later increased to twice a week. Every other Tuesday there was a lunch seminar for all involved in the project. The topics could be construction-related but speakers also included a legendary hockey player. According to the minutes, these meetings were much appreciated. An incentive scheme related to individual performance for the construction workers was tested but it did not work out the way it was intended to.

The client asked early on for a forum for getting new ideas for improved detailed solutions from the workers. Despite some reminders nothing happened. Four months into the production phase, the client wanted to pick up the partnering spirit and reminded all parties that they should be coming up with efficiency suggestions. It was the client who pushed the partnering issues throughout the project. According to the site meeting minutes the reminder led to a few suggestions that were carried out. Examples included a new way of laying the sewage pipes and the choice of materials for entrance vents. Some of recorded suggestions seem a bit obvious, however: that the subcontractor should check the surface before tiling would hardly represent an efficiency improvement, for instance.

On a more negative note, it took seven months before settling the time plan and a few discussions occurred concerning what was included in the price.

The site meeting minutes in the non-partnering project do not indicate any major problems, and additional orders that came up did not lead to any big disagreements. In comparison with the partnering project, the client was not as active, which is not unusual in a design and build contract. According to the site meeting minutes, the most recurrent client involvement concerned issues about the client logo. This regarded flags, tiling in the bathroom and the outside wall.

No vivid discussions, i.e., neither negative arguing over money or positive dialogues about efficiency improvement could be found in the site meeting minutes. The impression of the site meetings can generally be characterised as the contractor informing the client about the project's development and giving notification about additional work, which was never questioned by the client. The time plan was settled at the first site meeting and followed through the project; completion of the show flat was a month delayed, however.

The final inspection in the partnering project did not formally conform to the Swedish standard of these undertakings as stated in the general agreements. Although the procedure was done in the same way no data was available, other than the construction part of the inspection. This excludes inspections concerning pipes, ventilation, electricity, lifts and ground works. Hence, the figures in table 16 only concern the construction.

Table 16. Number of defects in final inspection per flat

	Construction
Partnering project	7.08
Non-partnering project	1.77

Despite the fact that both projects had the tenants moving in on the appointed date, there seem to have been more things unfinished in the partnering project. The duration of the construction phase for the partnering project was 15 months and 11 months for the non-partnering project, which is compared in table 17 in relation to total living area.

Table 17. Construction time per area and flats

	Construction time/ square metre in hundreds	Construction time/ number of flats
Partnering project	0.29	0.20
Non-partnering project	0.33	0.20

This difference in duration must be considered as very small. The economic outcome of the projects is depicted in table 18.

Table 18. Final payment in SEK to contractor per living area

	Final payment
Partnering project	13 825
Non-partnering project	10 945

The figures describe the client's cost for the building, i.e., what the contractor and subcontractors priced for construction. This figure excludes additional work, land cost, overhead costs for the client, etc., but it has not been possible to control for the standard in detail, e.g. the quality of material used for kitchen cupboards. Some additional information is that the total cost for the client in the partnering project exceeded the budget by 5.4 percent.

Conclusion

Design and build contracts in comparison to prescriptive contracts are thought not to require much client involvement. The non-partnering project was an example of when this works. Client involvement went no further than reminding the contractor of logos in the shower, and the construction was done satisfactorily without much involvement on the part of the client. In comparison, the partnering project had a lot of client involvement. This has been expressed as a positive feature in reports from the project and the client-driven partnering process did actually lead to some improvements from the contractors and subcontractors. Despite different methods, both projects must be

characterised as good and no significant difference can be seen concerning construction time.

The number of faults in the final inspection and economic outcome, however, are decisive in favour of the non-partnering project.

Match 10, Flats

The analysed material consists of the minutes of 26 site meetings; 15 from the partnering project. Both projects provided the final inspection and the economic outcome. A review and minutes from the client's board meetings concerning the partnering project were also included in the analysed material.

Results

The client had carried out a similar project using a collaborative way of working once before. This partnering model was developed internally and did not include the usual activities, like an initial workshop or common goals. The project started with a nine-month common planning and design stage. Considering that the client, in comparison with usual design and build contracts, participated in the preconstruction phase, there were many changes during the construction initiated by the client. The site meeting minutes indicate that the client had opinions about, e.g., the type of tiles and type of balcony and wanted the contractor to consult the client for each choice of materials fortnightly at a separate meeting. This is not necessarily negative, but the idea of the joint preconstruction planning was to take care of this beforehand. The contractor alone solved these issues coming up with new suggestions that were not discussed by the parties together. The procedure of the client approving the suggestions did however take some time, e.g. the selection of tiles had to be decided at a board meeting in the client organisation and took four months to settle.

Halfway through the project a quality and environmental review was carried out. The result was generally good, with some remarks concerning the contractor's way of handling the environmental impact of the chosen materials, which to some extent justifies the client's initiative in having the separate meetings. The review also points out the positive effect of a facilitator from the contractor side.

According to the site meeting minutes for the non-partnering project, major problems were not found. In comparison with the partnering project, the subcontractors participated to a larger extent in the site meetings. A direct effect of this was avoiding a possible bad smell from a well. One subcontractor had experienced such a problem before and the well was covered. Another suggested improvement came from the contractor regarding an alternative design for the heating pipes. The suggestion was rejected because of being too expensive.

Even though the first site meeting discussed special features like ovens and fridges for the pizza restaurant on the ground floor, there were problems when the tenants moved in. The communication from the client was not perfect.

Both projects had discussions about what type of floor to put in and both ended in being more expensive than first estimated. The partnering project split this additional cost 50/50, while the client took the whole cost in the non-partnering project.

The economic outcome of the projects is compared in table 19.

Table 19. Final payment in SEK to contractor per living area

	Final payment
Partnering project	12 303
Non-partnering project	14 918

These figures represent the price that the client paid for construction, including additional work. The problem is, however, to control for detailed quality standards.

The duration of the construction phase for the partnering project was around 12 months and ten months for the non-partnering project. This is in relation to square metres and number of flats shown to be in favour of the partnering project in table 20.

Table 20. Construction time per area and flats

	Construction time/ square metre in hundreds	Construction time/ number of flats
Partnering project	0.32	0.22
Non-partnering project	0.47	0.29

Both projects had the tenants moving in on time and the final inspection report was ready on time. However, the date for moving in was settled 5 months into the non-partnering project, whereas it was established before the construction phase in the partnering project.

The non-partnering project had made construction inspections throughout the project and found nothing in the final inspection. Figures from the inspection are therefore separated in table 21.

Table 21. Number of defects in final inspection per apartment

	Construction	Others
Partnering project	5.26	1.83
Non-partnering	0	4.2

Table 21 and the site meeting minutes indicate that the partnering project was short on time in the end. The project got the tenants moving in on time but there was still a lot to be done in the building.

Conclusion

None of the projects ran into any major problems. The big difference concerned client involvement in the partnering project, which could be interpreted as a disturbance for the contractor or as an effective monitoring mechanism, e.g. about the choice of materials. Given the comprehensive data it is most likely that client involvement had negative effects by delaying decisions, especially since the client already had a chance of doing this ex ante. The partnering project did not perform poorly in comparison with the non-partnering project, however – both had the tenants moving in on time and for a similar cost. The non-partnering project did give some indications of more flexibility, with suggestions being adapted more easily than in the partnering project. There are indications of the partnering project being cheaper and

faster, but the non-partnering project seemed to be more flexible. No difference can be concluded regarding quality.

Hence, no clear difference in outcome can be observed in this match.

7. Analysis

7.1 Final evaluation

The comparisons of the projects presented above conclude in favour of the partnering project in five out of the 10 matches, if the overall evaluation is used. Table 22 summarise the outcome for the investigated variables in each match.

Table 22. Summary of evaluations per match

	Overall	Quality	Lowest cost	Contract flexibility	Avoidance of disputes	Time*
Match 1	Partnering	No difference	Partnering	Partnering	No difference	-
Match 2	Partnering	No difference	Partnering	No difference	No difference	-
Match 3	Non partnering	No difference	-	Non-partnering	Non-partnering	-
Match 4	Partnering	Partnering	-	No difference	Partnering	-
Match 5	Non partnering	No difference	-	No difference	Non-partnering	-
Match 6	Partnering	Partnering	-	No difference	Partnering	-
Match 7	Non partnering	No difference	-	Non-partnering	Non-partnering	-
Match 8	Partnering	Partnering	-	Partnering	Partnering	-
Match 9	Non partnering	Non-partnering	Non-partnering	Partnering	No difference	No-difference
Match 10	No difference	No difference	No difference	No difference	No difference	Partnering

* not applicable for maintenance
- indicates no data available

Table 23 depicts the same data per variable.

Table 23. Summary of evaluations per variable

	Number of projects in favour of partnering	Number of projects in favour of non-partnering	Number of matches with no difference between the projects
Overall	5	4	1
Quality	3	1	6
Lowest cost	2	1	1
Contract flexibility	3	2	5
Avoidance of disputes	3	3	4
Time	1	0	1

No general trend can be seen in the outcome variables.

A distinction can be made among the matches, however, based on how partnering is interpreted and implemented in the specific project. Identifying partnering projects from what is stated in the tendering documents avoids the problem of only focusing on successful partnering projects, but it entails the potential dilemma of evaluating "partnering projects" carried out without the usual partnering components. A solution to this problem is to use the partnering flower from Nyström (2005b) to ascertain that the "partnering" projects evaluated really included partnering components. In order to

be classified as a "real" partnering project, a project should then at least include common goals.

Examining the partnering project in the matches above, it can be concluded that although five projects mentioned partnering in the tendering documents they did not really include the central partnering components in the actual work. Matches 1, 2, 3, 8 and 9 included common goals at least and can, given these criteria, be considered as partnering projects presented in table 24.

Table 24. Summary of partnering evaluations per match

	Overall	Quality	Lowest cost	Contract flexibility	Avoidance of disputes	Time
Match 1	Partnering	No difference	Partnering	Partnering	No difference	-
Match 2	Partnering	No difference	Partnering	No difference	No difference	-
Match 3	Non partnering	No difference	-	Non-partnering	Non-partnering	-
Match 8	Partnering	Partnering	-	Partnering	Partnering	-
Match 9	Non partnering	Non-partnering	Non-partnering	Partnering	No difference	No-difference

*not applicable for maintenance
- indicates no data available

Table 25 depicts the same data per variable.

Table 25. Summary of partnering evaluations per variable

	Number of projects in favour of partnering	Number of projects in favour of non-partnering	Number of matches with no difference between the projects
Overall	3	2	0
Quality	1	1	3
Lowest cost	2	1	0
Contract flexibility	3	1	1
Avoidance of disputes	1	1	3
Time	0	0	1

Even with the focus on this more homogenous group of "real" partnering projects, no overall trends in the outcome can be seen in the material. The partnering projects did however show some indication in favour of the economic outcome for the two SNR projects but not to a significant extent.

One insight is how hard it was to compare economic outcome in a meaningful way and how important it is to avoid just relying on reported figures. This was due to different reporting of costs, and lack of detail. The economic comparisons included, were either very clearly structured for both projects or the analysis was assisted by people involved in the projects.

7.2 Discussion

A review of partnering evaluations (Nyström, 2006) showed that the most frequent outcomes of partnering were improving communication (Haksever et al., 2001; Chan et al., 2003; Bayliss et al., 2003; Vassie and Fuller 2003; Chan et al., 2005; Beach et al., 2005), improving the relationship between parties (Chan et al., 2003; Chan et al., 2005; Beach et al., 2005) and better quality (Black et al., 2000; Fortune and Setiawan,

2005; Emsley, 2005). These effects in favour of partnering could also be found in some of the matches analysed, but not to a systematic and general extent.

Nyström (2006) argues, from an economist's point of view, that cost and quality are the variables that create value. To this can be added the comments on the absences of tangible effects of partnering in Gransberg et al. (1999) and Beach et al. (2005). Another related concern is the way in which earlier studies have been conducted by providing mostly anecdotal evidence (Bresnen and Marshall, 2000; Bresnen, 2007). This paper has tried to fulfil the demands of these critics and pushed the frontier for partnering evaluations forward. The lack of a common systematic and general trend in the evaluation casts a shadow over the earlier evaluations, due to the fact that this study was conducted with better data and with an improved method, even if the number of observations is small. Intangible effects, like more fun at the workplace, a more attractive profession, an improved picture of the construction industry, etc was deliberately neglected in favour of more tangible effects.

However, a reasonable question is whether partnering has its greatest impact concerning cost and quality and other tangible effects. Partnering in the UK and Sweden emerged as a reaction to critical governmental reviews of the construction industry. An appealing idea is that partnering could be seen as something that is intended to improve the general perception of a construction industry, a declaration of a will to change. Both the clients and the contractors in the UK and Sweden have had a common interest in achieving this, in order to e.g. attract a qualified younger generation to the sector. Partnering is likely to disappear as a specific term in time and many of its components will be included in "traditional projects" and become the natural way of working.

8. Conclusions

In this paper notice has been taken of the arguments put forward by critics of earlier partnering evaluations and the improved methods that have been developed in Nyström (2006). The conclusions there have been applied in this study by using a quasi-experimental approach to the evaluation of partnering.

One, not very surprising, finding is that half of the projects that mentioned partnering in the tendering documents did not include partnering components during the project. Removing these projects, still no general trend concerning the outcome in terms of cost, quality, contract flexibility, avoidance of disputes or construction time can be seen. This result can be contrasted to earlier studies showing optimistic outcome of partnering based on less detailed data and with an inferior method compared to this study.

The main contribution of partnering might lie in its intangible effects, where the concept can be seen as a declaration of a will to change and improve the general perception of an unhealthy construction industry.

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Paper 6: “Observable” and “verifiable”: Can these be the basic concepts in incomplete contract theory? (co-author Hans Lind)

“Observable” and “verifiable”: Can these be the basic concepts in incomplete contract theory?

Hans Lind and Johan Nyström

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Building and Real Estate Economics
School of Architecture and the Built Environment
Royal Institute of Technology

"Observable" and "verifiable": Can these be the basic concepts in incomplete contract theory?[*]

Abstract

The assumption that certain characteristics are observable to the contracting parties but unverifiable to a third party is fundamental in formal incomplete contract theory. This paper sets out to scrutinise this assumption from different perspectives. The arguments from complete contract theorists and legal scholars are presented and reviewed. Alongside these, two new arguments will be presented, one by critically examining some specific examples and one based on an idea in the philosophy of language. The examples show that verifiability can be attained if it is wanted by the parties ex ante, and the arguments from philosophy of language indicate that everything is verifiable in principle. Language cannot be learned if terms are not related to observable events. The paper concludes that if something is unverifiable ex post, it is because the contracting parties have chosen this, based on the trade-off between cost and benefits of verifiability in the specific case.

[*] The authors would like to thank participants in a seminar at the Division of Philosophy, Royal Institute of Technology for useful comments.

1. Introduction

Incomplete contracts are usually explained by transaction costs, which are caused by the existence of unforeseen contingencies, writing costs and/or enforcement costs. The informal story says that contracts cannot be complete, i.e., regulate every contingency, since (i) all contingencies cannot be foreseen, (ii) and even if one could, it would be infinitely expensive to write all of them down and negotiate terms for all contingencies. Even if both (i) and (ii) would be fulfilled, then (iii) language is not clear enough to describe everything in such a way that there would be no problems of interpretation and enforcement.

A seminal work on formal incomplete contract theory[1] is Grossman and Hart (1986), whose work is further elaborated in e.g. Hart and Moore (1990) and Hart (1995). These models explain incomplete contracts, without requiring that people cannot foresee every contingency. The underlying assumption is instead that some information is observable (by the parties involved) but non-verifiable (by a third party). This has been referred to as the *observable- but nonverifiable* assumption (Tirole 1999). Hart and Holmström (1988) express it in the following way:

> "Both parties may recognize that the state of the world is such that the buyer's benefit is high or the seller cost is low… The difficulty is conveying this information to other" (p.134).

An interpretation is that the two contracting parties have symmetric information about states of the world, quality of work or actions carried out, but that these circumstances cannot be contracted on because they are not verifiable to a third party , i.e., a court.

This paper sets out to scrutinise the underlying assumption of incomplete contract theory that says that certain facts are observable but not verifiable. Voices have been raised against this assumption, mostly from complete contract theorists (e.g. Tirole, 1999; Maskin and Tirole, 1999 and Segal, 1999), but also more recently from legal scholars (e.g. Sanchirico and Triantis, 2004; Scott and Triantis, 2006a and Scott and Triantis, 2006b). The paper will review these arguments (section 2 and 3) where it is concluded in section 2 that the complete contract theorists' arguments are not convincing. In section 4 the arguments against the distinction are developed further by a closer analysis of examples that have been mentioned in the literature. Section 5 shows that both the legal arguments and the analysis of the examples can be based on some theories in modern philosophy of language. A central tenet is that language can not be learned if there are not publicly available criteria for judging whether a statement is true or false.

It is finally concluded that the question of ex post verifiability is determined ex ante. Verifiability ex post should not be seen as something given by nature, but as something endogenous. If certain conditions in a contract are difficult to verify, it is because the parties have chosen this, based on a trade-off between gains and costs in the specific case. Examples of why it can be rational to choose not to make certain facts verifiable are given.

[1] Incomplete contract theory will henceforth refer to formal models of contract theory based on the assumption of observable but non-verifiable information (e.g. Hart and Moore, 1999 and similar), not to be confused with transaction cost economics or new institutional economics. See e.g. Brousseau and Fares (2000) and Gibbons (2005) for arguments about the differences between these approaches.

2. Message games as arguments against the importance of verifiability

In a number of articles, models have been created with the aim of showing that the observable but nonverifiable distinction is unimportant for the implementation of contracts. This literature accepts that transaction costs matter in reality and that actual contracts are incomplete. Maskin and Tirole (1999, p. 84), writes for example "… we certainly acknowledge that transaction costs matter in reality…", but the criticism against the transaction cost-based incomplete contract theory is instead focused on what is seen as the *foundations* of the theory. Tirole (1999), Maskin and Tirole (1999) and Segal (1999) do not accept the standard argument about verification problems as rigorous enough to explain the existence of incomplete contracts.

Their strategy is to construct models where some aspects are unverifiable, but where the parties still can implement any conceivable contract. The conclusion is that complete contracts, in the sense that anything can be implemented, are possible even if some aspects are unverifiable. Hence, the problem of verifiability can therefore not be a fundamental cause of incomplete contracts. Before looking in more detail at their message game models it is necessary to be clear about what in general can be accomplished with a model-building strategy of this type.

If a model is constructed where problems of verifiability does not lead to incomplete contracts, then it has been shown that verification problems is not a *logically sufficient condition* for incomplete contracts. There exist worlds where verifiability does not create problems for the contracting parties.

Sugden (2000) has a discussion about why certain "unrealistic" models are convincing and are taken seriously. He argues that the world created in the model then must seem credible even if it is unrealistic in some respects. One aspect of this is that the world in the model must contain a credible mechanism, a mechanism that could work in reality. Another way of formulating this is in terms of the assumptions of the model. Unrealistic assumptions can be included in a model that tries to explain real-world facts, but these assumptions must be *harmless* in the sense that the basic story in the model do not depend upon these assumptions.[2]

This means that even if it is possible to create a world where "A" (e.g. unverifiability) does not lead to "B" (e.g. incomplete contracts) it still might be that case that A is the "fundamental" cause of B in the real world. It is important that the mechanism in the model is in some way possible to implement in the real world, before one should conclude that A is unimportant for B.

The crucial issue is then if the mechanisms in the message-game models are credible. If they are not, then the model gives no reason to draw the conclusion that verification problems are unimportant for the design of actual contracts, even if verification problems are not important for the design of contracts in the model.

In order to ascertain the credibility of the message game models, some of the assumption presented in Maskin and Tirole (1999) will be scrutinised. The model will

[2] See Lind (2006) for further discussion about "stories" and "models".

be evaluated by examples from construction and maintenance contracts (see Nyström, 2005).

Maskin and Tirole (1999, p. 88f) assume that states of the world cannot be described and not verified ex post. They show that this does not matter in a model that is based on some crucial elements.

- The model assumes that there is an *enumerable set of feasible actions* that both parties ex post can verify as feasible actions.

This assumption is very hard to accept in most construction and maintenance contracts, as there are so many options available in the production of a specific building and during e.g. a five-year road maintenance contract. Some of the options can also be seen as including continuous variables, e.g. how much of a specific substance that should be spread on a road during the winter time. The term feasible is also not unproblematic in practice, as it in practice usually includes both a technical- and an economic aspect. Things that are very costly are often classified as not feasible, and this aspect would obviously lead to conflict about whether a certain action is feasible or not. To specify in advance what are "reasonable" costs for a large number of options would then be necessary in order to reach agreement ex post about what is the feasible actions. Investigations about whether a certain action really is feasible or not, would then in practice be very time-consuming and costly.

- A message game in the model is played *after* the state of the world is determined but before the agent chooses his action.

In construction and maintenance contracts that spans over a considerable period of time, the state of the world unravels continuously and new decisions are made every day. In the morning the road-maintenance entrepreneur might find a damaged surface of the road and has to make a decision about what to do, including a decision about whether to make a more thorough investigation about the quality of the foundation of the road. In a situation where the state of the world unravels more or less continuously it is very difficult to apply the idea of playing a message game after the state of the world is determined, but before action is taken.

Scott and Triantis (2005) also point out that some of the examples presented in the message game literature assume that very large punishments can be given, something that is not possible in actual contracts.

The conclusion is then that, at least so far, models like the one presented in Maskin and Tirole (1999) only shows that verifiability do not matter in the rather strange world that they have constructed. As the models contain crucial assumptions that are not credible for many real world contracts, it is not possible to use the results from the models as an argument against those who argue that problems with third party verifiability can explain why many contracts are incomplete.[3]

[3] The issue of what should characterise a "foundation" for a specific theory, e.g. incomplete contract theory, will not be discussed here, but it should be noted that Tirole (1999) discusses this without clarifying the criteria for judging whether something is a foundation or not.

3. Criticisms from legal scholars

The assumption that certain things are observable but not possible to verify in a court has been criticised from legal scholars, see e.g. Sanchirico and Triantis (2004) and Scott and Triantis (2005, 2006). The starting point for their critique is the observation that actual contracts contain a number of vague terms and conditions, e.g. "best effort", "reasonable care", and "good faith", and also that civil courts actually take a stand on these issues if there is a conflict between the contracting parties. These observations lead to a number of more general points.

The first point concerns the meaning of the concept verifiable. Sanchirico and Triantis (2004) interpret this concept in economic contract theory in the following way: "Verifiability in this context refers to the feasibility of establishing the truth to a court" (p. 1). Scott and Triantis (2005) however, argue that there is an important distinction between criminal courts and civil courts. According to their description, in criminal courts there is an objective standard, which says that the evidence should prove "beyond all reasonable doubt" that the accused is guilty. In civil courts, on the other hand, the courts weight the evidence presented by the different parties. Sanchirico and Triantis (2004) write: "Courts in civil action make determinations of complex facts on the basis of the balance of probabilities" (p. 24). Scott and Triantis (2005) formulate the same point in the following way: "…judgments in civil trials compare the case presented by each of the parties. The evaluation of the evidence is relative rather than absolute" (p. 12).

Verifiable then means that there are evidence that affect the probability of a statement, and that the evidence can be used for something like a Bayesian updating of the probabilities of a statement. The authors mentioned above simply assume that for each statement there is some possible evidence that makes truth or falsity more likely. No argument is presented for this assumption, but as will be clear in section 5 below they could find support for this assumption in the philosophy of language.

The second general point made in the articles mentioned above is that when the parties design a contract they can weight what Scott and Triantis (2006) calls "the front end" of contracting against "the back end" of contracting. One alternative is to state as many conditions as possible in precise terms in the contract, which will make the fulfilment of the contract easy to verify. This means putting a lot of resources in the "front end" of contracting. In such a case it will be simple to afterwards find out if the contract has been fulfilled. The "back-end costs" in the form of conflict resolution costs would in such a case be small. On the other hand, the parties can save front end resources by using general and rather vague conditions, knowing that there is a probability that considerable resources might have to be spent at the "back end" of the contract in order to produce enough evidence to get the court on their side, if there should be a conflict over whether the contract has been fulfilled or not. Sanchirico and Triantis (2004) even argue that such a strategy can be rational even if it is known that the other party might present false evidence.

Scott and Triantis (2006) observes that many contracts contain a mix of vague and precise conditions, and that such a mix can be seen as a balance between two ways of choosing the more verifiable proxies that are used to evaluate whether the parties have fulfilled the contract or not. Precise conditions in the contract mean that the parties themselves determine the proxies ex ante, while vague terms mean that the

court ex post determines the proxies. Concerning the choice between these two alternatives they write:

> "When the efficient proxies are highly state-contingent and less dependent on private information of the parties, the parties will be more inclined to use standards to delegate proxy choice to the courts, particularly if uncertainty is exposed to resolve itself by the time the relevant performance is due" (p. 843).

One problem with specifying the proxy in advance is that the agent has an incentive to focus on the proxy alone (p. 845). The problem with leaving the determination of the proxy to the court is that it creates uncertainty, but in reality this uncertainty is reduced by the fact that some standard "vague" terminology can be used, and that the courts have handled similar terms earlier, which makes it easier to predict the decision of the court.[4] The authors underline that what looks like vague terms might in fact reflect a lot of nuances:

> "For example, "best efforts" may be replaced by "commercially reasonable efforts", "reasonable efforts" or "reasonable best efforts"" (p. 835)

Their general conclusion is that the actual distribution of precise terms (proxies determined ex ante by the parties) and vague terms (proxies determined ex post by the court) will reflect the parties' evaluation of the costs and benefits mentioned above.

They also argue that:

> "the parties can achieve further contracting gains by varying the procedural rules that will govern their disputes in court" (p. 814)

and that this has not been given enough attention by economists. As a conclusion they write:

> "Vague terms can be valuable be deferring proxy selection to the enforcement stage, particularly when the parties can also improve the efficiency of litigation by, for example, manipulating the assignment of burdens of proof. The use of deposits or termination rights in combination with vague terms illustrates this strategy." (p. 879).

From the perspective of the argument that certain things are observable by the parties but not verifiable by a third party, two central points have been made in the legal literature. The first one is (1) that it sees verifiability as a matter of degree and second point is (2) that there always exists evidence, which affect the probability of a specific statement compared to another statement, even if the evidence does not prove the truth of the statement. The weak point in this literature is that this is just claimed with reference to standard legal procedures, but not further justified.

[4] The issue of courts interpretation has been discussed by e.g. Schwartz and Watson, 2004; Shavell, 2006.

4. A critical evaluation of examples of observable but not verifiable characteristics

4.1 Introduction

In this section a critical evaluation is made of some examples from the literature, where something is claimed to be observable by the parties but not verifiable for a third party. One way to argue that this is an important distinction is to present convincing and important examples of such cases. The question is then whether any convincing examples have been presented.

The kind of information that, in the examples, is thought to make the characteristics observable will first be presented. Focus will then be turned to whether this information can be made verifiable without prohibitive costs, if the parties actually wanted this. If it can be concluded that this is possible, it would be an argument for the general thesis in this paper that if something is observable for the parties but not verifiable, it is because the parties have chosen not to make it verifiable.

There are very few specific cases analysed, or even mentioned, in the literature where something is observable for the parties but not verifiable. Given the thesis in this paper, this is not surprising. There might of course exist other cases, but the “burden of proof” to present such examples is then on those who argue that the distinction between observable and verifiable is an important distinction.

Before looking at the examples, the term verifiable might need to be clarified somewhat further. To be verifiable here means, as in the legal literature, that it is possible to find evidence that clearly points in a specific direction. There is evidence that changes the probability of a statement, and sometimes evidence to prove something "beyond all reasonable doubt". It does not mean that it in all cases is possible to say what the correct answer is, because there are cases where the difference is small. We do not say that the length of a stick is unverifiable, just because it is impossible in some cases to say which of two sticks is the longest.

4.2 Example 1: The effort of the university teacher

In Bernheim and Whinston (1998) it is stated that faculty members’ effort is non-verifiable but *reasonably* observable. The authors do not develop the example further in their article, but it is an interesting starting point for discussing the central issue concerning in what way effort might be observable, but not verifiable.

Assume that the Professor of an economics department hires two PhDs, X and Y, to deliver two identical courses. There are so many students that they have to be divided into two groups with one teacher each. Both X and Y are given the material used by an earlier teacher.

The newly hired teachers have the same background. They have attended the same PhD-program, read the same courses, have similar grades and wrote their PhD-thesis in a similar area. They are considered to have roughly the same intellectual ability.

The evidence that makes effort "reasonably observable"
When the courses have been completed, the Professor concludes that X has put in a lot more effort than Y. Remember that the starting point is the belief that this effort is "reasonably observable" by the parties. The first question is then what the Professor could base his conclusion on. Given our experience it could be based on things like the following:

- X has consulted a pedagogy consultant and updated the syllabus with clear goals concerning learning outcomes.

- When looking at the handouts it can be seen that Y is using exactly the same material as last year, while X has updated his handouts with new examples and references to recent articles to help students that want to know more.

- Y changed the exam into an exam with multiple-choice questions, using questions that he found on the website from another university. As the Professor has regular meetings with other universities, he recognises the exam.

- X has several times consulted the professor about various issues in the course, e.g. about more recent examples. He has also been discussing such issues with other colleagues during coffee and lunch breaks. Several colleagues have commented to the Professor that X seems to be an ambitious guy. Y is only discussing research issues or his hobbies with the colleagues.

- The course evaluation shows much higher grades for X's course than for Y's. In Y's course there are several complaints that the teacher did not seem to be well prepared and had to stop several times during the lectures.

As will be returned to in the section below about arguments from the philosophy of language, evidence is very seldom conclusive, but that does not mean it should be disregarded. It is e.g. theoretically possible that Y after hard work came to the conclusion that modern pedagogical ideas are wrong, and that the old material was the best possible, that he did not want to bother his stressed colleagues with his petty questions about the course, and that his wife threatened with divorce just when the lectures should start so he had difficulties to focus during the lectures. Notice, however, that most of these things are also "rather observable".

The possibility of making the effort verifiable
Assume that the Professor decides to hire X but fires Y. Y protests and argues that this is based on discrimination as both the Professor and X are afro-americans, while Y is not. The Professor asserts that X is hired because he put in a lot more effort. According to Bernheim and Whinston (1998) this "reasonably observable" effort would not be verifiable for a third party.

Let us then go back to the different things that the Professor used to draw the conclusion that X put in more effort, and see whether it really is impossible to use them in order to convince a third party.

- Some types of evidence are obviously unproblematic: Everyone can for example see that X´s syllabus is updated, that he uses new examples in his handouts, and that the course evaluations are better in X´s course.

- Another type of evidence is related to various meetings and discussions with colleagues, including the pedagogy consultant. With modern surveillance equipment there would not be any technical problems and no large costs to install such equipment so that each visit and each conversion on the premises is recorded.

- Much preparation for lectures is done by using the Internet and working with various files. There are no technical problems to keep log-files on all computers in order to observe how long various files have been in use, what changes that were made during a certain time period, the websites that were visited and the downloads that were made.

- Finally the court can, as in all cases, use witnesses, e.g. a random selection of students and colleagues that would make their testimony under oath about what they have observed.

Given that the Professor had anticipated the problem of verification and the risk for complaints about discrimination, which is a reasonable assumption, as he happens to be an expert in contract theory, he would have kept log-files and installed the camera-surveillance before anyone was hired. If he wanted to be able to verify high effort, there would be no technical and economical problems to make the "reasonable observable" effort also "reasonably verifiable". If effort was not possible to verify in a specific situation, the conclusion would then be that this was caused by a more or less conscious choice not to make it verifiable, and not because effort by nature is unverifiable.

4.3 Example 2: The quality of a service

Fluet (2003) has an example with a service contract, where both parties have a clear idea of what is good quality, which is observable to them, but *near* impossible to communicate to a third party. This is exemplified with a consultant providing a study of some sort.[5]

Let us make the situation more concrete by assuming that a government agency commissions two reports on similar policy issues. Company A and Company B gets

[5] The same kind of argument as the one that will be developed here could be used for the case mentioned by Hart (1995) "The quality of [my] book is observable, in the sense that anybody can read it. (Of course, some are in a better position to evaluate it than others.) However, it would have been difficult for Oxford University Press and me to have written a contract making my royalties a function of quality, since if a dispute arose it would be hard for either of us to prove that the book did or did not meet some pre-specified standard. (For this reason my royalties are made to depend on some (more or less) verifiable consequences of quality, e.g., sales.) In other words, quality is not verifiable." (p. 37-8). The arguments of the legal scholars mentioned above are of course also relevant in this case.

the respective jobs, and when they deliver their reports everyone agrees that the report from Company A (report A) is of much higher quality than the report from Company B (report B).

The evidence that makes quality "reasonably observable"
Most people are assumed to agree that report A is better than report B, and when asked why, possible answers are:

- The references used in report A are much more complete and broader. They have found some recent reports from governments in other countries that report B does not mention. The references in report B are just the standard references that everyone knows about.

- Much of the descriptive text in report B is more or less copied from various earlier reports, but no explicit sources are given in the descriptive texts. In report A there is an attempt to systematise all the studies by identifying certain important dimensions and comparing earlier studies in these dimensions. A large table summarises this information from earlier studies. The analysis of the earlier literature is obviously better in report A.

- The proposals in report B are rather well known and standard, while there are some new policy implications in report A. Several of these have been found in the recent international literature, which is explicitly stated, but the proposals are new for the specific country and there are explicit examples of how these proposals can be adjusted to the legal framework in the home country.

- The analysis of the proposals is much deeper in report A. Possible counterarguments are dealt with and described carefully in a pro-et-contra table. There are some rather obvious arguments against the proposals presented in report B, but these counter-arguments are not commented upon.

- A number of external experts have been interviewed during the work with report A, but report B is mostly based on the expertise within the firm.

The possibility of making the quality verifiable
Fluent (2003) argues that it is a “matter of judgement whether the consultant did the appropriate research and calculations” (p. 50). The aspects described above, as probable causes of why report A is judged to be better than the quality of report B, can however be listed by the Governmental agency, before the companies get the assignments, as dimensions that will be used to evaluate the reports.

Imagine that the authority puts up a prise for the best report, and formulates criteria like the ones discussed above. Then it would, in most cases, be no problem for a third party to use the criteria for evaluating the reports and decide who will get the prise. Different judges would in most cases reach the same conclusions. As always there can be disagreements if there are small differences, but from that perspective there is no difference between observations by the parties involved and verification by a third party.

Competitive tendering in the Swedish construction sector often uses so called "soft" parameters, e.g. a description of the organisational structure, the existence of environmental plans, etc., in order to extract the winning contractor. The courts, the third party, have accepted these parameters and have treated complaints without any major problems.

As in the case with the university teachers above it is also possible to demand that the firms A and B present a detailed log over what they have done, the websites visited, the persons interviewed etc, if the agency wants to make it easier for a third party to evaluate the quality of the work done.

Given the arguments from the legal scholars presented in section 3, it is not surprising that the conclusion here is that it, at least so far, is impossible to find any good examples of things that are observable but not verifiable. The next section tries to give a deeper explanation of why this is so.

5. An argument from philosophy of language: The impossibility of unverifiable propositions

In the earlier sections it was argued that if something is observable for participants in a contractual relation, then there must be some indications to base the participant's knowledge on. If there are such indications, and since this is known in advance, there should not be any dramatic cost for registering these indications in such a way that they can be observed by a third party.

In this section the same conclusion will be reached by a more fundamental argument based on certain theories in the philosophy of language. The argument will primarily be based on the works of Donald Davidson, even though similar views can be found in works from philosophers like Wittgenstein and Quine.

The basic argument - and the observable/verifiable distinction

One starting point for these philosophical arguments is the question how a concept can be learned, and how the concept can be used in a meaningful way for communication. The idea is that in order to learn a concept it has to be related to something observable, and that the meaning of the concept is related to these observable features:

> "The semantic features of language are public features. What no one can, in the nature of the case, figure out from the totality of the relevant evidence, cannot be part of meaning" (Davidson (1979), quoted from Ludwig, 2003, p. 1),

moreover:

> "Davidson's purpose is to show how it is possible to attribute meanings and other propositional attitudes when observable behaviour is our only evidence (and is, furthermore, constitutive evidence)." (Rawling, 2003, p. 93)

If this idea is correct it implies that the terms used in a contract, assuming they are ordinary terms (or technical terms defined in relation to the ordinary terms), must all be related to publicly observable characteristics. Accepting this idea implies that the terms can, as argued above, be observed and recorded by a third party.

These ideas can be illustrated by continuing the discussion above about the concept of effort, which has been used much in the observable/verifiable debate among economists.

A starting point can be how the concept of effort is learned. The most likely answer is that people have learned from cases where they as children tried to understand certain things. They observed that the parents used terms like effort in cases where one child tried again and again while another child gave up after one attempt. One put in a lot of effort, while another did not try hard enough. Or where one child could do a certain thing directly, without effort, while another had to try again and again. Starting with simple cases like these people learn to use the concept in more and more complex situations of similar type.

An important point is that the concept only has a meaning in certain classes of situations where it is ordinarily used. In some contractual situations effort is not relevant. If a movie producer hires a composer to write a theme song, the question of effort is probably of minor importance. With inspiration the composer can write a great song in a couple of hours, and even if effort can polish some details, it would be surprising if the movie producer was interested in how and when the composer worked, and how much time the composer spent writing the song.

Davidson does not claim that interpretations cannot be wrong in a specific situation, where a claim is made that, e.g., a certain person has (not) put in a lot of effort. However, it is impossible to understand language and communication if there is no relation between the observable evidence and the truth of the statement in general. If all imaginable evidence exists, i.e., the person is observed over the whole relevant period, then it must be possible to make a well-founded statement about whether the person really put in a lot of effort or not. Davidson argues that people cannot be "massively wrong" in our everyday statements:

> "But there need be nothing we are indubitably right about for it to be certain that we are mostly right about the nature of the world" (Davidson, 2001, p. 45).

It is, e.g., impossible to imagine that all the things called blue turns out not to be blue, or that all dogs really are cats. An important reason for this is that when trying to identify what a term means, an assumption must be made that those who use the concept are making true statements most of time. Davidson calls this way of interpreting statements the *principle of charity*. A classical example is how an anthropologist learns the meanings of the words used by a tribe with an unknown language.

Notice that there can always be problems about knowing what is correct if there is no evidence, but that is true for all statements, and in this respect the contracting parties are in exactly the same situation as a third party. Usually the difference between the contracting parties and a third party is the amount of evidence. However, as argued above, this depends upon how the situations are structured by the contracting parties ex ante, with e.g. surveillance equipment.

This line of argument from the philosophy of language supports the view of the legal scholars described above, where the main point was that in all cases there are some relevant evidence that the court can use.

6. To make things more or less verifiable – an endogenous decision

The arguments presented above indicate that verification is possible and does not have to be extremely expensive. This leads to the conclusion that the degree to which the variables in a contract will be easy to verify or not is an endogenous decision. Basically it is a question about finding the optimal contract, where the marginal benefit of making conditions more verifiable is equal to the marginal cost of such an increase in verifiability. Such a general optimisation problem about the incompleteness of a contract (where the benefit of more complete contracts consists of avoiding ex post bargaining over surplus and the cost of completeness is identifying and regulating contingencies in the contract) has been formalised in different ways, even if earlier work have not focused on the issue of verifiability.

Dye (1985) models writing costs in a contracting problem by letting producers and consumers have a choice between interacting on the open spot market and signing a contract guaranteeing a transaction. There is a cost assigned to every contingency that the contract is dependent on, and the optimal number of contingencies in a contract is derived given certain assumptions. Other writing cost models are Anderlini and Felli (1994, 1999), who interpret contracts as algorithmic functions, associating a value to a realised state of nature. Battigalli and Maggi (2002) have developed a model based on finding the optimum between writing costs and potential value of the contract. Crocker and Reynolds (1993) make a simple model showing the trade-off between ex post opportunism and ex ante design of a contract. This is similar to the approach in the legal literature, which uses the terms “back end” vs. “front end” costs.

An aspect missing in these formal models is, however, that when the parties enter a contract they can decide about the things that they want to be able to verify after the finalising of the contract. They can e.g. decide what kind of surveillance equipment should be installed. An interesting example from the Swedish construction sector is that some firms step by step photograph the installation of certain equipment that later will be difficult to check because it will be covered by other material. In this way they can convince a third party that they have done the work correctly. Banerjee and Duflo (2006), in an article about public sector absentee in developing countries, describe a case where a teacher had to photograph himself each day together with his students in order to get his salary.

Whether verifiability is important or not, or whether there are important negative side effects of making things verifiable, will depend on the circumstances in the specific case. There are at least two examples of situations, where it can be rational for the contracting parties not to facilitate verification ex post. Firstly, the benefit is judged to be small if the parties have a long run relationship where a good reputation is important, and where both parties can inflict damage on the other ex post if they are not satisfied with the result of the contract. The probability of cheating is then so low that it is not rational to make verification easier of e.g. how the work was carried out. This is usually described as a relational contract, see e.g. Baker et al. (2002).

Secondly, the surveillance, mentioned above, might have various kinds of side effects. There might be a "psychic" cost connected with being surveyed that might reduce the productivity of the agent. Prat (2005) describes an interesting case where the agent has special skills that he does not want others to copy. Strict surveillance might then lead to a situation where the agents do not use all their skills and in such a case it might be rational for the principal not to demand information about any details of how the work was carried out. From this perspective, the development towards more "performance contracts" for road maintenance in Sweden can be noted. Instead of defining how and when the road should be ploughed, the client procures e.g. a minimum level of friction on the road surface, leaving the method of doing this up to the contractor.

7. Concluding comment

The main point of this paper is that no contractual terms are unverifiable in principle. There will always be evidence that makes the truth of a certain statement more or less likely. How easy it is in practice to verify a certain statement will to a large extent depend upon how the initial contract is written and what measures have been taken to document or register specific situations or processes. It is therefore not justified to base the explanation of incomplete contracts on the idea that certain conditions are observable to the parties but not verifiable by a third party. The conclusion is that verifiability should be seen as an endogenous decision, based on standard optimisation.

There is always an interaction between organisational form and the technological development, and there have been some interesting changes in recent years from the perspective of this article. The first is the development in surveillance technology that has made registration easier and cheaper. The second is a higher degree of acceptance for surveillance as a part of the struggle against terrorism and other crimes, which means that the "psychic" costs of being watched over, have been reduced. There also seems to be a change that makes it more and more important to be able to document ones past history and achievements, e.g. when applying for a job. All of this can be expected to change the systems for verification of characteristics and conditions that are important in a specific contract.

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