

Target pricing in Partnering Projects: Examining the Effect of Integrated Project Teams and Target Pricing in Three Pilot Projects

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ABSTRACT

In Norway there is a trend in organizing the building process with focus on better integration of the different parties and use of new procurement methods. Our experiences started with the research project “*The Integrated Building Process 1996 - 1999*” where we developed and tested different partnering models in several small scale building projects. These experiences has led us into a number of other development projects using different elements of partnering models with procurement based on negotiations, target pricing and incentives.

In our recent studies we have evaluated three pilot construction projects, two small road projects and one railway crossing point, all involving a tunnel and a roadbed. One of the projects was classified as a research project and based on a negotiated contract, one contract was based on competitive bidding among pre-qualified contractors and one contract was made between two separate divisions within the same public agency. The goals in these projects have been to create better integration and co-operation between the clients, the external consultants and the contractor. This integration should be leading to a better result with respect to total costs and quality. The contracts between the public clients and contractors have been based on an agreed target price with incentives linked to the final costs. We were involved in order to evaluate the co-operation between the parties.

The evaluation is based on reports from interviews and discussions

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with the project participants. The results from the evaluation are presented in internal reports, only intended for the participants in the projects. Our main impression is that the project participants had a share of positive experiences that was predominant to the share of negative experiences. The participants chose better and more cost effective technical solutions during both the programming and production period, and they considered the partnering models as inspiring. At the same time there was a potential for an optimization of the procurement methods and project organizations used.

Our studies confirm the general international understanding of the success-factors for partnering in construction projects:

- Teambuilding - creating an integrated team based on trust and with a common workplace
- Risk analysis and better planning in the early stages
- Efficient project management with clear definitions of roles and responsibilities combined with good leadership
- A change from comprehensive formal communication and documentation between the project partners to well structured, but more open and informal communication

Keywords: Partnering, Integrated Project Teams, Incentive Contracts, Mutual Trust.

Introduction

Since the late 1980s we have seen the development and use of different partnering models in the construction industry. This has been a primary management strategy for improving organizational relations and project performance (Li et al. 2000). The driving forces for this strategy have been studies based on the concepts of total quality management (TQM) and business process re-engineering (BPR). These studies of the construction industry have documented an industry with low productivity and efficiency at a project portfolio level.

To increase productivity and efficiency in the construction industry, a strong focus has been set on better integration of the client, architects, engineers, general contractors, subcontractors

and suppliers in one integrated project organization. The different parties are normally independent firms and organizations, with separate goals and objectives and different operation procedures. Typically problems that occur are lack of communications and co-ordination leading to changes and alterations during the process. This again causes disputes, rising costs, reduced performance and reduced quality.

Li et al. (2000) gives a thorough international overview of the background for partnering in construction since the late 1980s, different partnering definitions, status and future regarding research in this area. Future studies are recommended to emphasize on the identification of performance measures and critical success factors, development and test of partnering models and processes, and the formation and selection of partnering strategy.

Compared to the international arena, the development of partnering models in Norway started in the early 1990s. Our experiences started with the research project “*The Integrated Building Process 1996 - 1999*” (Haugen 1999), where we developed and tested partnering models in different small scale building projects. Our basic findings (Bølviken 2000) regarding the establishment of a successful integrated organization are:

- Focus on the process
- Common goals and objectives
- Mutual trust - openness
- Knowledge transfer between the parties
- Teambuilding
- Project management – routines
- Commitment from top management
- Rules for conflicts and sanctions

These findings correspond well to the different views on trust in the partnering literature. This is discussed by Thomassen (1999) who especially refers to Barlow (1997) giving six elements of successful partnering (in order mentioned); a) the

need for trust; b) the “right personalities”; c) openness in communication d) organizational culture and organizational learning e) teambuilding and f) the role of management.

Our first experiences related to partnering and integrated project organizations has led us into a number of other development projects using different elements of partnering models with procurement based on negotiations, target pricing and incentives. The first development of partnering models was done in the private sector. Today in Norway we see a growing interest for partnering models used in the public sector, both for infrastructure projects, in health care and education. There are initiatives for using Public-Private-Co-operation (PPC) in a few infrastructure projects, and several public projects are involving various kinds of BOOT-contracts (Build-Own-Operate-Transfer). This is not only a trend in Norway, we also see this trend in different Scandinavian countries (By & Boligministeriet 2000), (Barok 2000).

In the first pilot projects we tried out some very simplified and idealistic contract models, focusing on the elements and process in creating an integrated project organization. These simplified contract models and procurement methods can only be used in research projects where there is a strong focus on success and commitment from all the participants. We are therefore in the process of developing new procurement and contract models for project partnering in construction, taking into account legal issues, risk, conflict resolution etc.

For the three pilot projects discussed in the following, three new contract models based on agreed target prices and incentives has been developed.

Case Studies of the Three Pilot Projects

In our recent studies we evaluated two small road projects and one railway crossing point project, all involving a tunnel and a roadbed. The projects have some comparable aspects:

- Key personnel from the clients and the contractors share site offices with canteen, telephonist, computer servers, printers and so on.
- The length of new roadbeds range from 1000 to 2000 meters.
- The tunnels have lengths ranging from 100 to 300 meters.
- Contract sums between 30 and 50 mill. NOK.
- The contractors participated in the programming teams
- The clients participated in the designing of the contractors' working plans.

Goals and Objectives for the Pilot Projects

The goals for the three projects were almost identical. After translation from Norwegian the wording would be like:

The two parties, the public client and the general contractor, have a common interest in creating an integrated project organization and a goal of achieving a better total project performance. The basis for the work will be a contract with an agreed target price and incentives for both parties.

Objectives for a better total project performance:

- Produce better technical results/solutions
- Improve the project economy for both parts
- Optimize the use of resources in the project

Objectives for an integrated project organization:

- Mutual confidence in the relationship between the client and the contractor
- An inspiring and pleasant working atmosphere
- Mutual transfer of experiences between all parts in the project

The goals for the three projects focus on co-operation and use of resources. We were mainly involved in the projects to evaluate the co-operation, but it was not possible to do so without regarding the use of resources.

The Contract Model

The characteristic of the target price contract used in the three projects is the formula:

$$K = F + S + (M-S)/2$$

Where: K = contract sum

F = the contractors preset profit

S = actual laid-down costs of the contractor (and eventually of the client)

M = target price, i.e. pre-assumed laid-down cost

The proportions of F and M are set after tender competitions and/or negotiations. The target price formula offers economical incentives to both the client and the general contractor, and basically both parties will benefit from making the S as low as possible. If S also includes the laid-down costs of the client, both parties are rewarded when the extent of tasks for the client in the project is reduced.

One of the projects was classified as a research project and based on a negotiated contract based on existing standards (NS3430). In the second project a specially designed contract was signed after competitive bidding among pre-qualified contractors. In the third project two separate units within the same public agency had the role as client and contractor. They signed an agreement based on an incomplete and brief project description.

Research Methodology

We interviewed participants from both the programming and production period of the three projects. All the interviews were based on an interview guide, with some slight revisions from project to project. The questions were qualitative focusing on the following topics:

- Individual background and competence
- Teambuilding – agreement on common goals and objectives
- Contractual allocation of responsibility and power
- Communication and involvement
- Documentation and written communication
- Partnering structure and management
- Feedback and openness
- Trust and co-operation
- Learning and knowledge transfer
- Shared risk
- Overall results regarding technical and economical performance

Written reports from the interviews have been sent to each of the respondents for verification. This has been the basis for a neutral intermediate reporting back in separate workshops, with following discussions that led to clarifications of various disagreements. The respondents were very positive to this feedback and the discussions.

The feedback was given on a very practical level in order to get a more thorough discussion and involvement from the parties. We saw that our findings were used in the ongoing project development processes. In this way our work represents action research. The results from the studies were finally reported in internal reports the summer of 2001.

The respondents were allowed to speak free and easy, so the interviews were affected by their personal interests. Furthermore, it is not necessarily the procurement methods or integrated project organizations that caused the experiences of the respondents.

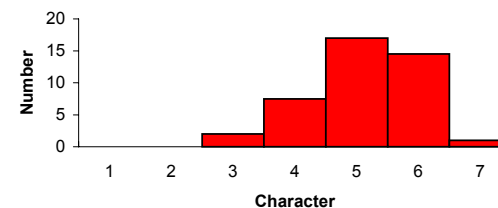
Quantitative Results

For a number of the topics the respondents were asked for a quantitative value from 1 – 7, (neutral is 4) compared to a

traditional construction project. We obtained the following histograms:

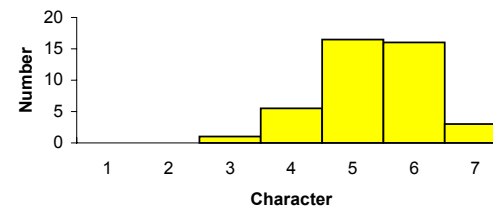
Are your expectations regarding the project integration satisfied?
(Scale 1-7 where 1 is worst, 7 is best and 4 is neutral)

$n = 42$
 $\bar{x} = 5,12$
 $\sigma = 0,81$



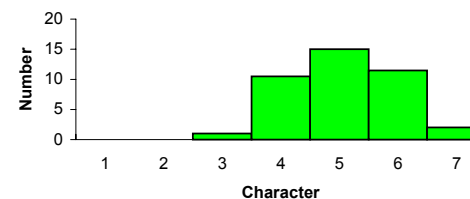
Your engagement in this project compared with other projects?

$n = 42$
 $\bar{x} = 5,35$
 $\sigma = 0,87$



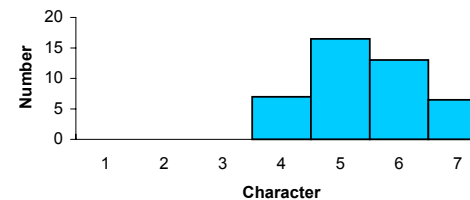
Co-operation and results in this project compared with earlier projects?

$n = 40$
 $\bar{x} = 5,08$
 $\sigma = 0,87$



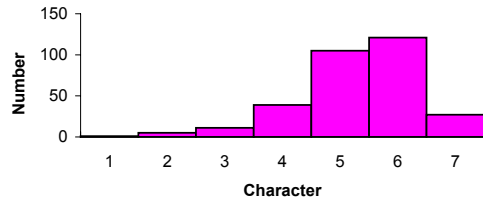
In what degree are your point of view and professional utterances regarded in this project compared with other projects?

$n = 43$
 $\bar{x} = 5,44$
 $\sigma = 0,90$



How good has the communication and co-operation with the other project participants been? (*n is big because the participants was asked to give a character to each of the other participants*)

n = 309
 $\bar{x} = 5,31$
 $\sigma = 1,12$



In order to find standard deviation and mean value we used the following formulas:

$$\sigma^2 = \frac{n \sum x^2 - (\sum x)^2}{n(n-1)} \quad \bar{x} = \frac{\sum x}{n}$$

Our histograms shows that the characters are mainly normally distributed, with an average bigger than 5. The trends indicate that the respondents have experienced a high degree of satisfaction compared with other projects as far as expectations, engagement, communication and co-operation is concerned.

Qualitative Results

The Effect of the Partnering Models:

- The effect from the use of partnering models varied in the three projects. In the first project the management personnel did not notice any dominating effects, but the foremen and their workers at the site really did. In the second project the management personnel did notice big effects, while the foremen and their workers did not. In the third the client had decided to have a peripheral role, so both parties experienced the effect.

Positive Experiences:

- Theoretically, all formal project routines were described in the various contracts. Practically, the participants had to

adjust the project management routines as time went by.

- Both parties tried to find technical solutions that were more cost-effective and better for the total project organization, not only for one single party in the project. The target price contract was the basis for creating the win-win situation. Focus was moved from the project economy of the single parties to the total project economy.
- The projects benefited from the participation of the contractors in the programming work.
- The contractors contributed with improved technical solutions, plans adapted to the production and communication of the plans throughout the project organization. The target price was considerably reduced in the three projects, as the contractors proposed technical solutions differing from the ones in the original plans.
- The participants found the partnering model inspiring, as they used their experience and competence regarding technical solutions during the programming and production period.
- The continuity in the project organizations was high since key personnel from the clients and the contractors participated in both the programming and production period.

Sharing site office facilities makes it easier for the project participants to communicate and to have less formal information and documentation in the project.

Possible Traps and Moments to Remember:

The consultants must be involved in the project organization. They have no natural incentives in the target price formula, but their participation is necessary when the contractors suggest changes of the technical solutions and original programming plans.

- Good was defined as sufficient quality. Potential expenditure cuts are cashed out, and the financial savings were not directly used to improve the product quality. The future owner must have the opportunity to participate in

the integrated project organization.

- Both parties have to review the program and specifications thoroughly to find any disagreements from the initial technical and functional specifications. In all cases they reported that more time should have been spent on planning in order to examine risks and possible changes during the production period.
- Even though the right arrangement for a partnering process are made, the co-operation will be dependent on the personal skills and former experiences of the project participants. The co-operation will benefit from a continued focus on creation and maintenance of partnering processes.

Summing Up

Relating the results and findings in the three pilot studies to our previous work on partnering issues, we sum up the following success factors (Bølviken, 2000):

Focus on the process

There is a need for continuous focus on the goals and objectives for the partnering processes. Evaluation with interviews and workshops has positive effects, it will always be beneficial to make the participants aware of actual improvements.

Common Goals and Objectives

The economical incentives in the target price formula led to common goals for the parties, which encouraged to a co-operation leading to optimization of technical solutions and expenditure cuts. The discussions were more focused on technical issues than on economical issues. At the same time the parties spent less time on arguing about mistakes that had occurred, and more on spotting future problems.

Mutual Trust and Openness

The traditional roles of the client and the contractor are not forgotten even though the parties are co-operative. Mutual trust and openness makes it easier to discuss both positive and negative incidents at the project. The positive potential of the target price contract is dependent on the participants' personal will to show mutual trust and openness.

Knowledge Transfer Between the Parties

On a long term basis all parties will benefit from knowledge transfer, and get an understanding of each other's aspects. The possibilities of mutual transfer of experiences will be best exploited if the necessary arrangements are made. Knowledge of processes connected to both programming, production and maintenance will effect the participants' performance.

Teambuilding

There are several ways to establish an integrated project organization. Sharing of site offices and social gatherings were arrangements that contributed to teambuilding in the projects. The feeling of being part of an integrated project organization helped the participants to focus on the common goals and objectives.

Project Management Routines

The client and contractor must not become allies with a front against the future project owner, the interests of the future owner must be taken care of. Simultaneously, it must be possible to make decisions in situ. Documentation concerning changes and economical development must be continuously updated. Successful partnering demands clear definitions of roles and responsibilities combined with good leadership.

Commitment from Top Management

The top management of both the client and the contractor have to show commitment to the principles of partnering. At the same time the top management must give the sufficient decision-making authority to the participants from the

integrated project organization.

Rules for Conflicts and Sanctions

A target price contract should have clear specifications of technical and functional quality. Clear contract specifications will prevent later unpleasant surprises and discussions between the involved parties. Precise specifications of sanction possibilities and rules for managing conflicts contribute to clarification of the roles of the project parties.

With regards to the wording of the agreements, payment routines, risk sharing and organization, the three projects we have evaluated are different. At the same time they have similarities that have led to co-operation between the parties, and presumably an increase of both efficiency and productivity.

Acknowledgements

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Information on the Web

More information about the projects can be found on the following web addresses:

www.trekantsambandet.no

www.vegvesen.no/vestfold/prosjekter/start.stm

www.jernbaneverket.no/prosjekter/vestfoldbanen/nykirke

www.veidekke.no=>prosjekter=>referanseprosjekter=>samferdsel=>nykirke

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