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Various Approaches to Early Contractor Involvement in Relational Contracts

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Abstract

The main rationale for involving contractors is to apply collaboration to mitigate risk and to harvest opportunities to reduce cost and to increase the project owner's value. In the paper we argue in the applied analytical model that there are four levels of early contractor involvement (ECI), which are 1) Preparation of the project (before sparking off competition); 2) During the procurement phase (development of what to build); 3) Project delivery model (before construction contract, but after the contractor and designers are selected); 4) Project delivery model (where involvement also continues in the execution phase). In the paper we argue that category 4 have the largest potential in term of project risk mitigation and possibility exploitation, and category 1 least.

Three road construction case studies are conducted. The findings show that each project had different approaches to contractor involvement, and different PDM. Case 1 and 2 can be identified to be in category 2, while case 3 are in category 4. However, case 3 has reached to short in the execution phase to reveal the expected potential when contractor involvement also continues in the execution phase. It seems, however, like all approaches to ECI had positive impacts on the relationship between the client and contractor. Further empirical studies have to be conducted to improve the addressed analytical/theoretical generalization.

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1. Introduction

An increase in large and complex road construction projects in Norway has encouraged new thinking as to how large projects should be arranged to achieve most value for money. More attention to life cycle costs and sustainability seems to have given the realization that closer collaboration is needed to solve large and complex projects. As a result of this, relational project delivery methods are more and more prominent in Norwegian road construction projects. This means that the Norwegian road construction industry is moving from transaction-based approaches to more relation-based approaches. Traditionally Design-Bid-Build contracts have been used as the main contract type in Norwegian road projects but over the last few years, Design-Build contracts have gained more attention.

A common aspect of the relation-based methods is to involve all of the important contributors at an early stage of the project. Clients have been looking into different ways to find the best moment to involve the executing contractors. With early contractor involvement (ECI), knowledge and experience related to constructability are provided as an important input to the client before the preferred solution is decided (Wondimu 2019). Communication between client and contractor(s) can be done in many ways. For instance, the timing of communication can vary. It can be a part of the preparation for the procurement phase, it can be a part of the procurement phase, or it can be a part of the execution phase. It can happen as a one-time event, a repeated event, or continuously. The communication can involve one contractor or several contractors. By looking at three road construction projects in Norway, this study aims to describe different approaches to communication between clients and contractors.

The following research questions have guided this case study:

- RQ1 How and when can clients use early contractor involvement to gain important input through the knowledge and experience from contractors during a project?
- RQ2 What are some of the benefits and drawbacks of early contractor involvement?

2. Theory – early contractor involvement in large complex projects

For complex projects, it is imperative to ensure that all project participants are engaged as early as possible to ensure the best possible solutions can be implemented in the early design phase of the project where they can have the most impact. The construction industry's call for a more collaborative approach to construction is outgrowing current contractual forms. Early contractor involvement helps not only the main contractor but also sub-contractors to work directly with other stakeholders to ensure the project achievements. There is a growing trend from the industry to move toward collaborative approaches on varying levels. Design-Build contracts and Management Contracting procurement methods are very promising for collaboration (Ferme et al., 2018). Several approaches can be used to involve contractors in the early phases of a project (Wondimu et al., 2020). The involvement of contractors can be divided into three groups, based on the timing of the contractor's involvement: the preparation phase, procurement phase, and execution phase. Basic approaches can be used during a project preparation phase. Others can be used later in the procurement phase (op cit.). Contractors can also be involved in different ways during the project execution phase. It is debatable if this can be regarded as early contractor involvement or not (Wondimu et al., 2016). In the following section, three groups of early contractor involvement approaches will be presented. The first group is the basic approach that can be used during the preparation phase. Information meetings in a project preparation phase can be used by the clients to inform all interested contractors about the project and to get feedback on their project plan. The challenge with this approach of involving contractors is the meeting will be held in an open arena where all interested contractors are gathered. Contractors might not share their idea in an open meeting to keep their company competitive ideas (Wondimu et al., 2020). The second group of early contractor involvement approaches is methods or procedures that can be used during a project procurement phase. Under this category, we find Best Value Procurement (BVP), Competitive Dialogue (CD), and Competitive Procedure with Negotiation (CPN) (Wondimu et al., 2020). BVP is a past performance-based procurement system that allows short interviews of key personnel after

prequalification and shortlisting the best-qualified contractors. BVP has also a clarification phase before contract signing that facilitates the client to get a better overview of the delivery and for the contractor to convince the client that they are the best qualified. Through the interviews with key personnel and the clarification phase, the contractor gets involved in the early phase of the project during the procurement phase of a project (Storteboom et al., 2017). Competitive Dialogue is a procurement procedure that can be used on a certain type of project. To use the procedure, a project should have a list of the complexity criteria defined by the EU procurement directives (European Parliament, 2014). At the core of the CD, procurement procedure is the dialogue phase, after pre-qualification and shortlisting but before the contractors give their offers. During the dialogue phase, the client carries out parallel and closed dialogues with at list three contractors and develop a project together (Røren et al., 2017). During the dialogue phase, the client gets the opportunity to emphasize what is important for them and the contractors get the possibility to clarify things that are not clear in the tender document (Ottemo et al., 2018). Furthermore, the contractors get the opportunity to use their construction knowledge and competence to develop an optimal solution to the project (Wondimu et al., 2018). Competitive Procedure with Negotiation is another procurement procedure that can be used by projects that fulfil the complexity criteria defined by the EU procurement directives. At the core of this procedure is the negotiation phase after the pre-qualification, shortlisting, and first offer from the contractors. The client invites up to three contractors that have passed the pre-qualification, shortlisting filters, and that have submitted a valid first offer. During the negotiation phase, there should be real negotiation about all sides of the first offer. The client carries out parallel and closed negotiations with all invited contractors. The contractors get the possibility to optimize the project during the negotiation phase and revise their offers (European Parliament, 2014). The third group of early contractor approaches are project delivery models and contract forms. Some of the approaches in this category are Design-Build (DB), Design-Build-Operate/Maintain (DBO/M), Public-Private-Partnership (PPP) and Integrated Project Delivery (IPD) (Wondimu et al., 2020). The common features of these four project delivery models and contract forms are the contractors have more responsibilities and risks compared to the traditional design-bid-build contract. DB is a contract form where the contractors get the responsibility for detailed project design in addition to the project execution. Through DB contract form the contractor involved in the design phase and uses their knowledge and experiences from the contraction phase in the design phase by working together with the design team. The client is not responsible for the design that gets transferred to the contractor (Aandahl et al., 2017).

PPP is when the contractor is responsible for the financing of the project in addition to the design-build and operation of the project. Sometimes PPP can also be defined as Design-Build-Finance-Operate (DBFO). In PPP the contractor or the PPP company gets paid during the operation phase of the project for the contraction, maintenance, and operation of the project (Bougrain, 2012). IPD is a project delivery model that accommodates the construction industry's need for more efficient collaboration between a client and project suppliers. IPD has a lot of similarities to other project delivery models based on relational contracts, such as project partnering and project alliancing. In IPD a client and key project suppliers (contractors and designers) sign in a common contract. There is also a pain/gain sharing between the client and the key project suppliers (Thomsen et al., 2009; Aslesen et al., 2018; Kalsaas et al., 2020). The main difference between IPD and project alliance is the inclusion of lean tools, management approaches, and BIM in the IPD (Aapaoja et al., 2013). A relational contract is not about transferring risks rather it is about mitigating risks. One of the methods to mitigate risks through early contractor involvement. Involving the contractors' expertise, specifically on constructability, in an early stage of the project can lead to decreased design costs, increased efficiency, finding better solutions, and building trust. Early contractor involvement is a fundamental factor in achieving cooperation in projects (Hosseini et al., 2017).

Bridging theory and empirical analysis

The main rationale for involving contractors is to apply collaboration to mitigate risk and to harvest opportunities to reduce cost and to increase the project owner's value. In the theory, we have identified three levels of ECI. Here we expand to four levels, which are:

1. Preparation of the project (before sparking off competition)
2. During the procurement phase (development of what to build)
3. Project delivery model (before construction contract, but after contractor and designers are selected)
4. Project delivery model (where involvement also continues in the execution phase)

The first two approaches can be combined with any other level of ECI or transactional or relational contract. The third level is a combination of a relational contract before the construction contract and transactional after, while the fourth level is based on relational contracts that starts during procurement phase and continues in the execution phase. Our analytical model is illustrated in Figure 1.

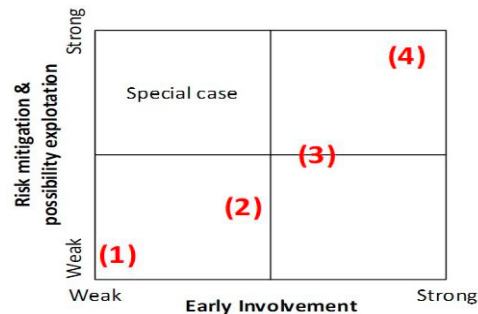


Fig. 1. Analysis model for early involvement of contractors.

Figure 1 indicates the expected findings and will structure our theoretical informed empirical analysis. Contextual factors can, however, change the outcome of the process, i.e. a team of people works extraordinary well together and achieve more customer value than expected from the framework, or vice versa. Leadership and motivated people are important to take out the potential in any model arrangement.

3. Method and research design

To answer the research questions, this research was designed and based on the examination of several road construction cases conducted within the Norwegian construction industry. The case study method was chosen as it represented a sound empirical approach to study the Target Value Design phenomena. As prescribed by Yin (2014), a case study approach is beneficial when one seeks to conduct an in-depth examination of a contemporary phenomenon where the investigator has little control over the events. The three infrastructure cases are all public-initiatives, thus subject to public procurement rules, and administrated by the two Norwegian public projects owners Norwegian Public Roads Administration (NPRA) and Nye Veier (translates to “New Roads”). The data collection involved a qualitative research approach using semi-structured interviews as a means of collecting primary data. Also, a document study was conducted to collect secondary data and to verify data from the interviews. The choice of using semi-structured interviews is attributed to the flexibility provided by this method. Since the study draws evidence from several unique cases, flexibility in approach was needed. All interviews followed an interview guide with pre-defined questions, but the interviewees were encouraged to elaborate and talk about subjects beyond the predefined questions. The questions were formulated to be open-ended with emphasis on collecting responses on particular issues. In order to gather the perspectives from a cross-section of actors involved in all the cases, some specific roles and professions were targeted in the sampling. This included the project owner’s project managers, managers from the advisory groups, the contractors' project managers, and the Public-Private Partnership (PPP) company manager (the predominant target group). 4-6 interviews were conducted in all the cases and the duration of the interviews varied between 1-2 hours. All the interviews were recorded and later transcribed to ensure accuracy in the data. The secondary data was collected from all three projects, this included contracts, plans, summaries of the projects, and various presentations that the projects themselves have developed and which they have shared with the researchers. Lastly, the results from all the cases were shared between the researchers, and the data were analyzed using a qualitative approach.

4. Case study findings and discussion

The three cases studied have used different project delivery methods (PDM) and approaches to procurement. This has led to different approaches to communicate with the contractors during the preparation, the procurement phase, and the execution phase of the projects. Table 1 summarized the cases.

Table 1. Cases studied in this paper.

Case	Project	Client	Project Delivery Model	Info about the projects
1	E6 Helgeland North	NPRA	“Road Development Contract” with Competitive Dialogue	Status: Finished. Approx. cost: \$270 mill.
2	Highway 3/25 Løten-Elverum	NPRA	Public-Private Partnership with Competitive Procurement with Negotiation	Status: Late execution phase. Approx. cost: \$550 mill.
3	E6 Kvål Melhus	Nye Veier	Integrated Project Delivery with Best Value Procurement	Status: Early execution phase. Approx. cost: \$75 mill.

4.1. Case 1 – E6 Helgeland North

The project used a “new” project delivery method (PDM) that they called “Road Development Contract”. The PDM is a Design-Build (DB) contract with extended contractor responsibility (15 years) during the operation phase. Competitive Dialogue (CD) was used for the procurement phase. Figure 2 summarizes the events of communication between client and contractors in case 1 – E6 Helgeland North.

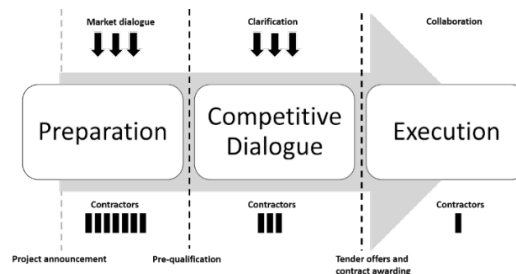


Fig. 2. Communication between a client and contractors in the “Road Development Contract”.

During the preparation of the project, the client struggled with a lack of interest from contractors. The contractors felt that they did not understand the “new” way of carrying out a project sufficiently. As a result of this, the client invited the industry to a market dialogue where the contract setup was discussed. Seven meetings were organized. The market meetings led to greater interest for the project and ultimately, three contractors were pre-qualified for the procurement phase. The project used Competitive Dialogue (CD) during the procurement phase. Three contractors took part in the CD phase, where the client had a continuous dialogue with all three contractors. In sum, this requires significantly more resources than dialogue with one contractor. Since only one contractor can win the competition, the losing contractors required substantial compensation for spending resources on a long-lasting negotiation process. The “loser’s fee” was a fixed compensation sum the two losing contractors received for their participation in the procurement phase. There was an agreement among the contractors that this fee was too low, considering the effort that was needed for participating. With a DB contract, there was no extraordinary communication during the execution phase. An inconvenience in this project is that the contractor changed several of the key actors that participated in the CD process. Because of this, many of the topics that were discussed in the procurement phase called for new discussions in the execution phase. The experience from the client’s perspective is that CD made it possible to build trust with the contractors because of the collaboration during the dialogue phase. The project development during the procurement phase made the parties better prepared for the execution phase.

4.2. Case 2 – Highway 3/25 Løten-Elverum

The Highway 3/25 Løten-Elverum project used a Public-Private Partnership, while the procurement procedure used was Competitive Procurement with Negotiation (CPN). The PPP method was based on similar projects conducted earlier in Norway, while the procurement procedure was relatively little explored in past infrastructure projects. Figure 3 summarizes the events of communication between client and contractors in case 2 – Highway 3/25 Løten-Elverum.

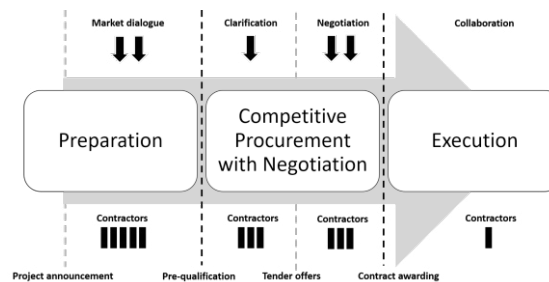


Fig. 3. Communication between client and contractors in the PPP project.

During the preparation of the project, the client arranged two market meetings with the industry. This was done to get the contractors on the same page regarding the preconditions for the forthcoming competition, to give the contractors a chance to identify the needs to be met, and to present preliminary solutions and execution plans. In general, the purpose was to make the contractors better prepared for the procurement phase. Five contractors showed interest in the project, and eventually, three were qualified for the CPN process. The procurement procedure included introductory meetings and three tenders with negotiation. The tenders were delivered anonymously through the electronic procurement competition tool “EU-supply”. After pre-qualification, the three pre-qualified contractors participated in introductory meetings with further clarifications, before presenting their first tender. The negotiation was done in three separate rounds. After the first tender followed communication with each contractor, in the form of negotiations and clarifications meetings. After this, a second tender followed with further communication through negotiations and clarifications, before the third and final tender was submitted. In total, this process took nearly a year. Like in the E6 Helgeland North project, the contractors in this project felt that the “loser’s fee” was too low, and significantly lower than the cost of participating for the losing contractors. Despite this, the participants found great benefits from the one-year-long procurement phase. They felt the long-lasting procurement phase had positive impacts on the projects development and for trust between the parties, which was taken further into the execution phase. Another result of the communication in this phase is the big impact related to the price. Through communication, the parties agreed to a more competitive and reasonable price than they started with. For one of the contractors, the difference between the first tender and final tender was as a reduction of approximately \$100 million. Another example is that only \$1.1 million separated two of the final tenders, which was considered as a small difference for a \$550 million contract. The client also states that they discovered techniques that arose during the negotiations which would have been overlooked without this kind of integration before the execution phase. For the execution phase, the project is using a PPP contract based on DB, so there is not supposed to be any extraordinary communication between contractor and client during this phase. The project has experienced very few change demands during the execution phase, and the execution phase has been effective thus far. Client and contractor felt that clarifications and negotiations that were conducted before the execution phase was important for this consistent consensus throughout the project.

4.3. Case 3 – E6 Kvål-Melhus

The E6 Kvål-Melhus project uses Integrated Project Delivery (IPD) as their PDM. Best Value Procurement (BVP) was used in the procurement phase. With an IPD contract, the engineering designers are valued as an equal party with contractor and client during the whole project. Figure 4 summarizes the events of communication in case 3.

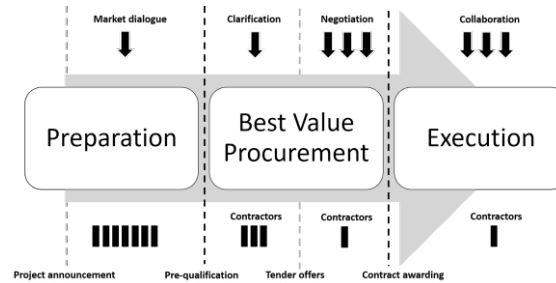


Fig. 4. Communication between client and contractors in the IPD project.

The project had one market dialogue preliminary to the pre-qualification. This was so the industry could get a better understanding of the IPD method. After the pre-qualification, three contractors were invited to deliver a tender based on the BVP approach. The three contractors went through a clarification phase through interviews as a part of the BVP process. This short clarification phase preliminary to tender should not affect the choice of contractor. The winning contractor was the one that best fulfilled a set of criteria, written in a 12-page document. A representative from the client argued that a drawback with this method is that the choice of contractor is based on a short document and even in the best tender, the contractor's understanding of the project needs could differ greatly from what the client is expecting. This could lead to unnecessary arguments in the following phases. Unlike case 1 and 2, the communication during the procurement procedure in case 3 was between the client and a single contractor. A benefit of this type of procurement is that communication with a sole contractor requires fewer resources, which makes it more operable for leaner organizations. After contractor selection through the BVP procedure, the project moved to a project development phase which the client called "integrated collaboration". This was a 6-month phase where the goal was to secure closer collaboration, project development, clarification of responsibility and roles, settling the target price, etc. All three parties (client, contractor and engineering designer) participated in this phase. During the integrated collaboration in this project, the three parties were co-located and had continuous dialogue until an agreement was reached. After the "integrated collaboration" phase, another contract was signed for the execution phase. Even though the same contractor and engineering designer were chosen, a procedure like this means that the client in principle is free to choose another contractor to execute the project if it feels necessary to change. Like the project development phase, the execution phase in the IPD contract is referred to as "integrated collaboration". This means that the same principles, with co-location, continuous dialogue, etc., also to apply in the execution phase.

5. Discussion and conclusion

This paper set out to answer the research questions: RQ1 "How and when can clients use early contractor involvement to gain important input through the knowledge and experience from contractors during a project?" and RQ 2 "What are some of the benefits and drawbacks of early contractor involvement?" To answer these questions, a case study of three projects with relational contract arrangements in Norwegian road construction was conducted. Also, a literature study on early contractor involvement and relational PDMs were conducted. The theory shows that the early involvement of contractors can be arranged in different ways with varying degrees of integration. The timing of the contractor's involvement can be divided into four groups: the preparation phase, the procurement phase, and the execution phase. To bridge theory and empirical findings, this study divided the involvement of contractors into 1) preparation of the project, 2) procurement phase, 3) PDM before construction contract but with contractor and engineering designer selected, 4) PDM with involvement in the execution phase (Figure 1). The three cases studied in this paper all had different approaches to communication with the contractors. The various approaches for each project can be broken down into a few important differences, which are summarized in table 2.

Table 2. Different approaches to involvement with contractors.

	Case 1	Case 2	Case 3
Market dialogue in the preparation phase	Seven market dialogue meetings to give contractors a better understanding of the contract format.	Two market dialogue meetings to describe preconditions for CPN and to present preliminary solutions and execution plans.	One market dialogue in the preparation phase to give contractors a better understanding of the contract format.
Clarification in the procurement phase	Continuous clarification meetings with all contractors through CD.	Introductory meetings with all contractors before the competition.	Interviews with contractors.
Negotiation in the procurement phase	No negotiation meetings during the Competitive Dialogue process.	Continuous negotiation meetings with all contractors between each tender.	Continuous negotiation through “integrated collaboration” with contractor and designers.
Collaboration in the execution phase	Nothing extraordinary. The contractor changed key personnel after contract signing.	Nothing extraordinary, but co-located.	Continuous dialogue through “integrated collaboration” with contractor and designers
Compensation to losing contractors in the procurement phase	Losers fee.	Losers fee.	Losers fee, but lower than in case 1 and 2 since BVP has been used

As table 2 suggests, there are multiple ways and reasons to involve contractors at different stages in the project life cycle. In the three projects investigated, the involvement of contractors varied from fully integrated with continuous communication to no communication at all. The two NPRA projects (case 1 and 2) involved contractors with market meetings with the industry during the preparation phase before the tender was signed. In the procurement phase, cases 1 and 2 involved three contractors, while case 3 only communicated with one. Some of the benefits of including more contractors are that the client can be more certain that they chose the right one to collaborate with and they also get a larger pool of competence. A drawback is that it requires more resources, both from a client and contractors. The losing contractors in case 1 and 2 felt that the compensation (losers fee) was too low compared to the cost of the effort and key resources used in the procurement phase of the projects. A procurement phase with one contractor requires fewer resources and makes the process simpler but it is less certain that the “correct” contractor was chosen. All three cases had some sort of continuous communication during the development process of the projects. Case 1 with dialogue through CD, case 2 with negotiation and clarification through CPN, and case 3 with “integrated collaboration”. The experiences from cases 1 and 2 are that dialogue with the industry preliminary to the procurement phase was important to receive enough offers. A lot of the national organizations knew little about how to carry out the relational project delivery methods that are being used in the three projects. These meetings helped them gain a better understanding of both the client’s needs and the project model that was to be used. Through clarification with the pre-qualified contractors, the experiences from the clients and contractors in the projects are that it helped both parties to get a better understanding of both the project and each other. More effective ways of carrying out the project was also a result of the collaboration in this phase. Collaboration in the negotiation phase secured a better understanding of the project and ultimately more “correct” tenders in terms of price. Only case 3 is using integrated collaboration in the execution phase, and that project is still in early execution. Therefore, it is impossible at this point to say how the continuous communication between client, contractor, and engineer in the execution phase will affect the project in the long run. Case 1 and 2 do not have this kind of integration during the execution period but the experiences are that the effort made in the earlier phases made the execution phase more effective. Regarding the analytical model in Figure 1, case 1 and 2 can be identified to be in category 2, while case 3 is in category 4. However, case 3 has reached to short in the execution phase to reveal the expected potential when contractor involvement also continues in the execution phase. Further empirical studies have to be conducted to improve the addressed analytical/theoretical generalization.

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