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Governance of complex procurements in the oil and gas industry ☆

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Abstract

This study focuses on the use of contracts and governance mechanisms for handling complex procurements involving several actors. We develop a contractual framework arguing that different combinations of incentives, authority and trust should be used to govern such procurements. The framework is applied to two complex procurement cases in the Norwegian oil and gas industry. The empirical findings show that incentives, authority and trust complement each other, and furthermore, that there is a complex interplay between the specific uses of the different mechanisms. We denote this interplay a multiplier effect. Multiplier effects have not previously been addressed in the literature, and this study contributes to our knowledge about inter-firm governance by showing that governance mechanisms affect each other. Proper use of one mechanism improves the use of other mechanisms, while inadequate use of one mechanism hampers the use of other mechanisms.

Keywords: Complex procurements; Governance; Contracts; Relationships

1. Introduction

In the early and mid-1990s the world oil price reached rock-bottom level, and the Norwegian oil and gas industry experienced lower profitability. Two major problems for the North Sea oil and gas industry compared to on-shore production are high cost levels and a long lead-time from exploration to production. The industry was therefore challenged to investigate the organization of exploration and production in order to come up with new solutions that could make the industry less vulnerable in periods of low oil prices.

The use of contracts and governance mechanisms for handling complex procurements was one area the industry investigated for possible improvements. Building a new oil platform or rebuilding an existing one requires the involvement of several contractors, subcontractors and vendors, and it is rather difficult to fully specify such procurements in advance. Such procurements are therefore associated with a high level of transaction or governance costs (cf., Williamson, 1985), as extensive coordination between several actors is required. Furthermore, the use of contracts and governance mechanisms also has an effect on production costs and production time. Traditionally, the oil companies (operators) have entered into a number of individual contracts with each contractor. However, the oil companies changed this practice in the mid-1990s and started to use new contractual forms such as "integrated project organizations" or "alliances". A variety of different practices were used, and their common rationale was to smooth coordination between

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all parties involved (operators, contractors, subcontractors and vendors), and thereby reduce costs, increase quality and shorten production time. The core idea was to develop new interfaces and overlapping boundaries between the parties that would enhance procurement and contracting efficiency. In general, it was assumed that one problem with individual contracts was that the actors were too loosely coupled, and that all parties could benefit from a higher level of integration.

Complex procurements involve a large number of actors, they are often associated with a high degree of uncertainty and technological complexity, and will often last for several years. Within the procurement and supply chain literature, complex procurements have been studied in relation to construction projects, defense procurements, information technology and public–private partnerships. Such studies have, for example, focused on the use of contracts versus relational strategies in construction projects (cf., Cox and Thompson, 1997; Thompson et al., 1998), the role of integrated teams in defense procurements (cf., Moore and Antill, 2001), IT sourcing decisions and the use of contracts and relationships in IT sourcing (cf., Cheon et al., 1995; Clark et al., 1995; Kern and Willcocks, 2000; Kern et al., 2002; Willcocks et al., 1997). Furthermore, studies have also paid attention to the use of private companies in public health care (cf., Harland, 1996; Sussex, 2003; Thompson and McKee, 2004) and urban redevelopment projects (cf., Malizia, 2003).

However, the simultaneous use of contracts and other governance mechanisms, such as relational norms and administrative controls is not well understood. It has long been argued that different governance mechanisms can be combined (cf., Bradach and Eccles, 1989; Stinchcombe, 1985), but still researchers do not share a coherent view on issues such as whether the use of one governance mechanism may exclude the use of others, or if different governance mechanisms act as complements (Poppo and Zenger, 2002). Empirical studies have shown that different governance mechanisms can be used for solving one specific problem (cf., Rindfleisch and Heide, 1997), and lately studies have shown that the combined use of contracts and relational norms increases performance (Cannon et al., 2000; Poppo and Zenger, 2002). One important reason for arguing that different governance mechanisms can be combined is that a large number of governance challenges are prevalent in most inter-firm relationships, and relying on one single mechanism is therefore not sufficient. Pure governance forms are therefore rarely found in practice (Bradach and Eccles, 1989), but specific mixes of the pure forms seem to be tailor-made according to the nature of the exchanges in question.

The purpose of this article is to investigate the use of contracts and governance mechanisms for handling complex procurements. We are concerned to understand how different governance mechanisms such as contractual incentives, hierarchical mechanisms based on authority, and relational or trust-based mechanisms can be used to smooth the coordination process and thereby improve procurement efficiency by reducing transaction or governance costs. We focus on the interplay between different governance mechanisms, particularly the simultaneous use of different mechanisms and if different mechanisms may affect each other.

The article is organized as follows: we first present different contractual models commonly used for handling complex procurements in the oil and gas industry, followed by a discussion of the theoretical background to our study. We then report the research methodology, and present two cases from the Norwegian oil and gas industry. Thereafter, the two cases are analyzed, and finally the results are discussed and implications emphasized.

2. Contractual models for handling complex procurements in the oil and gas industry

As pointed out above, building a new offshore oil platform or rebuilding an existing one is a rather complex type of procurement involving several contractors, subcontractors and vendors. Such procurements consist usually of four phases: (1) engineering, (2) fabrication, (3) installation and (4) commissioning. Plans and specifications are first worked out in the engineering phase, followed by procurement or production of the different parts in the fabrication phase. The different parts are then installed on the platform in the installation phase, and finally, the platform is moved to its specific location offshore in the commissioning phase. Furthermore, extensive coordination is required between the different phases (engineering, fabrication, installation and commissioning) and between the different actors. We will call the different phases and coordination between phases and between actors *work processes*.

From the point of view of both the oil company, i.e. the buyer, and the contractors, such an exchange setting can be labeled hazardous. Such exchanges cannot be fully described ex ante due to technological complexity and the fact the each new oil platform is more or less unique. As a result it is difficult to estimate costs, or whether the platform can be delivered on time, and the actors do not know how well the platform will function before production offshore is started. Such exchanges are thus often associated with specialized investments, it is difficult to measure performance, and a high degree of uncertainty is present. A key managerial challenge is to craft contracts or governance arrangements that are capable of coping with these exchange hazards (Williamson, 1985, 1991). In general actors will often try

to specify in the contract how specific contingencies should be solved, or specify processes or procedures for handling unforeseen contingencies (cf., Poppo and Zenger, 2002; Williamson, 1985, 1991).

Several forms of contracts and governance arrangements are used in the oil and gas industry in order to handle such exchange conditions. It is common to distinguish between three major forms. These are: (1) individual contracts, (2) EPCI (Engineering, Procurement, Construction and Installation) contracts and (3) project alliances. These represent different types of coordination between the actors, and different approaches to handling foreseen and unforeseen contingencies.

The operator manages individual contracts with each contractor on a one-to-one basis. Each contractor delivers his/her defined scope of work according to the individual contract. The operator is responsible for the overall planning and monitoring of the project. Each contractor will usually design a separate project organization that is responsible for performing the required tasks, and the project organization will be followed-up and controlled by the operator's site team. For each phase or task of the project—for example, engineering, fabrication and installation—a new contractor with a separate project organization is thus required.

Within the framework of an EPCI contract, a main contractor (the EPCI contractor) is responsible for the coordination of subcontractors. The main contractor has the responsibility for the entire product until a defined delivery date. The delivery date can be defined in multiple ways, for instance, the day all installations are mechanically complete, or the so-called 'first oil' milestone. The compensation format is often a mix of fixed prices, profit-related rates and reimbursable elements. Normally, the main contractor will enter into individual contracts with each subcontractor and develop a project organization in order to handle the overall responsibility for and management of the project. The EPCI contractor will monitor the subcontractors.

In a project alliance, the operator enters a contractual relationship with several contractors, based on a mutual sharing of risk, rewards and resources. The partners join efforts through the alliance by sharing resources, skills and competencies. Here the operator has the role of an equal partner, as opposed to having the customer role in individual and EPCI contracts. A project alliance develops one unified project organization that is organized as a separate unit, although it is not legally established as an independent company. The parties establish in this way an integrated organizational unit with the intention of functioning *as if* the parties had established a single firm. The organizational structure of project alliances is rather similar to the structure of a firm, with a steering group, an alliance manager, and an alliance management team. One important objective of project alliances is to avoid duplication of positions and efforts. The three contractual forms are illustrated in Fig. 1.

By using individual contracts the operator decides how the total procurement will be divided between the contractors, and the operator is responsible for coordination between phases and between actors. When using an EPCI contract, the main contractor is responsible for the division of tasks between own company and the subcontractors, and both the operator and the main contractor are responsible for coordination between phases and between actors. In a project alliance contract, the operator and all contractors involved are responsible for how the tasks are divided between the actors, and for coordination between phases and between actors.

3. Contracts and governance mechanisms

Given the characteristics of the task structure in complex procurements, what kind of contract or

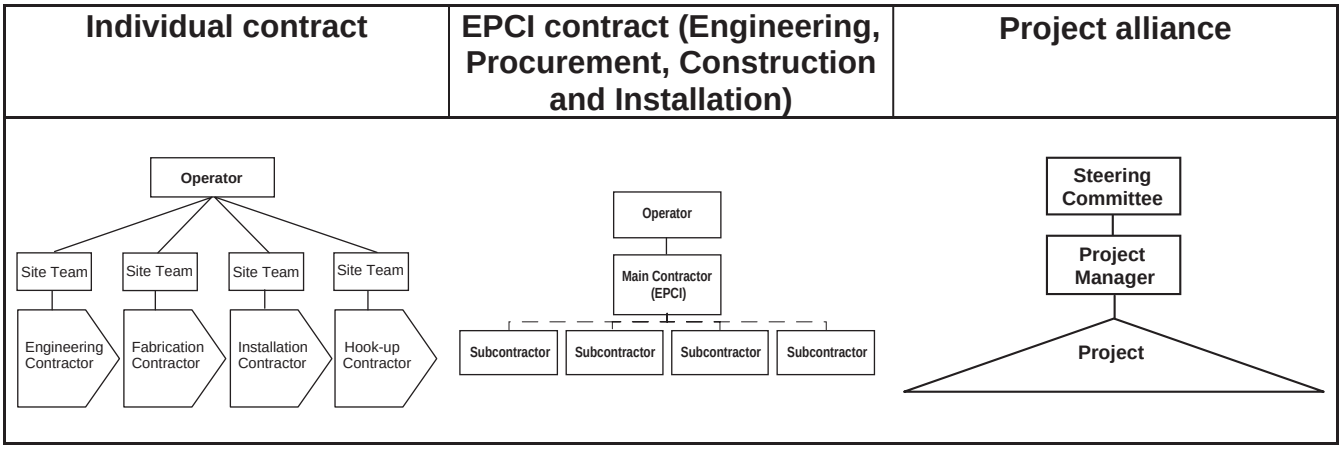

Fig. 1. Three contract forms commonly used in the oil and gas industry.

governance mechanisms should be used? In this section, we will describe three theoretical forms of contracts: (1) market contracts, (2) internal contracts and (3) relational contracts. We will briefly present the key characteristics of each type, discuss their ability to handle lack of information and uncertainty and discuss their primary governance mechanism.

3.1. Market contracts

A short time horizon, discrete relations and complete information are key characteristics of market contracts. All contingencies are specified in the contract, and there is no uncertainty or lack of information. Adaptation takes place through economic incentives and the price mechanism. Buyers and sellers respond independently to parametric changes in order to maximize their own utility and profits (Ring and Van de Ven, 1992; Williamson, 1991). In its pure form, market prices are assumed to convey complete information, thus giving sufficient incentives for coordinating exchanges between buyers and sellers. Market contracts can further be divided into classical and neoclassical categories. Neoclassical contracts allow for an extended time horizon, and some degree of flexibility can be built into the contract. However, economic incentives still represent the primary governance mechanism.

3.2. Internal contracts

Internal contracts correspond to exchange within a hierarchical structure. In such contracts, the time perspective is long, information is incomplete and a high degree of uncertainty is expected. Here the primary governance mechanism is hierarchical control, often labeled authority, and includes systems for decision-making control, routines and procedures. Although hierarchical governance is primarily associated with authority or fiat within organizations, it can also be used to govern exchanges. According to Stinchcombe (1985), hierarchical governance between independent actors can take the form of giving one party the right to: (1) set the agenda, (2) control and motivate, (3) develop rules and procedures, (4) specify conflict-solving procedures and (5) decide on reasonable costs when market prices do not exist.

Two commonly used hierarchical mechanisms are: (1) formalization and (2) centralization of decision-making power (Haugland and Reve, 1994). Formalization includes the use of rules, routines and procedures such as, for example, regular budget procedures, control procedures and information routines. Centralization is a question of who has the legitimate right to make decisions.

3.3. Relational contracts

Relational contracts refer to norms of obligation and cooperation for coordinating exchanges (Macneil, 1980; Bradach and Eccles, 1989). Here actors are expected to follow certain patterns of behavior (Rousseau, 1995) embodied in a set of shared norms and values (Dwyer et al., 1987). Norms serve the roles of guiding, controlling and regulating behavior (Macneil, 1980). Important norms are solidarity, reciprocity and flexibility. The norm of solidarity focuses on what the actors do to maintain the cooperative relationship beyond accomplishing the clearly defined tasks. More specifically, developing a norm of solidarity implies that the parties maintain a long-term perspective on their cooperation, and act accordingly, even though short-term benefits might be reaped through breaking the cooperative relationship. The norm of reciprocity is related to a fair distribution of rewards between the parties. In many cases, no objective criteria by which the parties can clarify what characterizes a fair distribution of rewards will exist, and the parties must develop a "give-and-take" attitude. In the long run, however, reciprocity and perceived fairness is a precondition for relations to remain stable. Flexibility addresses the willingness and motivation to change plans and strategy according to new circumstances in the best interests of all actors involved.

Furthermore, trust plays an important role in such contracts: "Trust (or, symmetrically, distrust) is a particular level of the subjective probability with which an agent assesses that another agent or group of agents will perform a particular action, but before he can monitor such action (or independently of his capacity ever to be able to monitor it) and in a context in which it affects his own action" (Gambetta, 1988, p. 217). Trusting another actor means that, we implicitly assume that the probability that she/he will perform an action that is beneficial, or at least not detrimental, is high enough for us to consider engaging in some form of cooperation. Thereby, trust is a type of expectation that alleviates the fear that the exchange partner will behave opportunistically.

3.4. Interplay of governance mechanisms

The three contract forms focus on three different governance mechanisms: incentives, authority and norms/trust. Even though the three mechanisms can be viewed as independent, they will often be combined (Bradach and Eccles, 1989; Murry and Heide, 1998; Cannon et al., 2000). Pure types are rarely found in practice, and Bradach and Eccles (1989) argue that incentives, authority and trust are intimately intertwined, and that we should expect the co-existence of incentives, authority and trust. However, we still lack

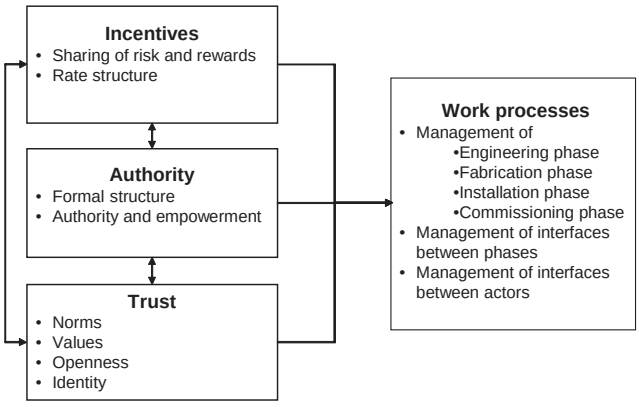

Fig. 2. Research model.

knowledge about the specific ways in which governance mechanisms interact, and whether different mechanisms supplement or complement each other (Poppo and Zenger, 2002).

Effective governance requires that a specific mix of the pure types be tailor-made to the nature of the exchange. We thus argue that incentives, authority and norms/trust mutually influence exchange performance by means of the specific way they are connected. It is therefore not sufficient to explain exchange performance by looking at each single governance mechanism; it is the mutual interplay between the mechanisms that is important for understanding exchange performance. This is illustrated in Fig. 2.

Our primary research question is thus related to how the interplay of incentives, authority and norms/trust affects exchange performance, defined as work processes in this study. We are concerned to understand how the use of specific governance mechanisms and the interplay of these mechanisms affect the different procurement phases (engineering, fabrication, installation and commissioning), and furthermore, the effect of governance on coordination between phases and coordination between actors.

4. Research method

Our research questions were empirically explored within the Norwegian oil and gas industry. We selected two cases both representing complex procurements. The procedure for selecting the two cases was based on theoretical sampling (Yin, 2003). As we will describe in more detail below, the two cases used different contractual models. We were concerned about selecting cases that represented variation with respect to the use of contracts, governance mechanisms and work processes, but rather similar with respect to size, scope and complexity. The two cases can be viewed as polar cases (Pettigrew, 1990), as they vary along the key theoretical dimensions of interest in this study. Performance and outcome differences between the cases can thus be traced back to theoretical dimensions (Yin, 2003). The primary reason for choosing this research strategy was the fact that interactions among governance mechanisms are not well understood in the literature (cf., Bradach and Eccles, 1989; Poppo and Zenger, 2002). A case study approach enables us to conduct an in-depth analysis of specific interactions among the three mechanisms. This may reveal new knowledge about how governance mechanisms can be combined.

With respect to validity and reliability, we should note that contracts and governance mechanisms are well-defined constructs that have been used in both qualitative and quantitative studies. We used the same procedure for data collection in the two cases, and our operational measures of the theoretical constructs were based on previous studies. The concerns for construct validity and reliability should thus be satisfactorily handled (Yin, 2003). Regarding internal validity, cause-effect relationships between specific variables may be difficult to reveal, and we cannot exclude other explanatory factors. However, since our objective is to provide new knowledge and broaden our understanding of the interplay of the three governance mechanisms, we should be able to make some inferences (Yin, 2003), particularly in explaining why specific interactions of the three governance mechanisms emerge. Concerning external validity or the generalizability of the results, we should note that since we only study two cases, the results should be interpreted with cautiousness. Our findings may be more or less idiosyncratic for the two chosen cases, and we cannot generalize the results to other complex procurement projects or inter-firm cooperation in general.

The task of Case A was to build the topside of an oil platform, and the project was organized as a project alliance between the operator (an oil company) and three contractors. The aim of Case B was to execute offshore hook-up/commissioning of an oil platform, and the project was organized as an EPCI contract. In addition, the two main contractors formed an integrated team. The two cases were of similar size (NOK 1.5 billion) and duration (approximately 2.5 years), but differed somewhat with respect to technical complexity. The key characteristics of the two cases are listed in Table 1.

Data from the two cases were obtained from semi-structured interviews, surveys and participant observations. With regard to Case A, we conducted 87 in-depth, semi-structured interviews at two different phases of the project, and 35 interviews were conducted in Case B. Each interview lasted for 2–3 h. All interviews were typed into a database for qualitative analysis. The structure of the database made it possible to compare information about key issues, both across different

Table 1
Case specifications

Criteria	Case A	Case B
Purpose	Building of topside	Hook-up/commissioning of a platform
Size	Approx. 1.5 billion NOK	Approx. 1.5 billion NOK
Length	Approx. 2.5 years	Approx. 2.5 years
Contract form	Alliance agreement	EPCI contract
Organization form	Project alliance with operator integrated in the alliance	Integrated team—operator not integrated
Numbers of main partners	Four (including operator)	Three (including operator)
End result	200 million NOK below MLC	Costs increased due to increased use of overtime and hidden carry-over work
	Finished on schedule	Delayed

functions and levels, and across companies. We also obtained survey information from 80 respondents in Case A and 120 respondents in Case B. The questionnaire measured how each individual respondent perceived a wide rage of different aspects concerning project execution. The questions were framed as statements and measured by Likert-type rating scales. In addition, we participated in steering group meetings, project management meetings and functional meetings in both cases. The combination of qualitative and quantitative data made it possible to get both in-depth knowledge and more general or overview knowledge about the two cases.

5. Case A

Case A was organized as a project alliance between one operator and three contractors. The specific task was to build and install the topside of an oil platform. The topside is where the wellhead and drilling fluid modules are located on an oil platform, and the topside is thus a critical part in the oil drilling process. More specifically, the project alliance partners were responsible for engineering and fabrication/delivery of the different parts of the topside, installing the different parts on an onshore location, and finally, moving the topside to the offshore location and installing it on an existing oil platform (commissioning).

The operator had originally prepared individual contracts with each contractor. However, based on previous experience, one of the contractors suggested that the parties should rather form a project alliance. The decision to form an alliance was made six months after the project start-up. Before entering into the alliance, the parties got to know each other by working together on the basis of individual contracts. Furthermore, after the decision to form an alliance was made, the parties designed a process with the aim of developing a contractual model and an organizational structure for handling a high level of integration between them. The aim of entering into a project alliance rather than individual contracts was to reduce costs, save time and increase quality and safety. The scope of the work consisted of four main parts, and the alliance was made responsible for completing all parts.

5.1. Incentives

The alliance agreement that regulated the relationship between the four parties was based on four principles. First, a budget—Most Likely Cost (MLC)—representing the costs of executing the project by individual contracts, was established. Second, alliance performance was to be measured and compared with the MLC, with a bonus if the alliance performed better than the MLC and a share of extra costs if the MLC was exceeded. Third, the scope of the work and each partner's share of the work were defined. However, each partner's share of the total work could be redistributed among the parties during project execution.

The incentive structure in the alliance was based on a principle of mutual sharing of risk and rewards between the operator and the three contractors. This means that if one of the contractors did not fulfill contractual obligations, the final outcome for all parties would be reduced. On the other hand, if one contractor increased performance compared to expectations, all partners would share the extra profit. The parties were thus mutually responsible for the final result. The rule for sharing risk and rewards between the parties was based on each company's share of the work. In order to limit possible losses for the contractors, the operator accepted a higher share of the risk than the rewards. In addition, a maximum level for each contractor's potential losses was set.

It was first suggested that the companies' man-hour rates should not include profit. The purpose was to prevent the companies selling more services to the alliance than required, as rates with a substantial profit may motivate contractors to increase their number of man-hours in order to increase their total profit.

Nevertheless, the parties decided that the rates should include profit, but the rates should be comparable and should not contain any indirect elements.

5.2. Authority

The alliance was organized with a steering group, an alliance manager and an alliance management team. Both the alliance manager and the alliance management team reported to the steering group. The main function of the steering group was to develop the overall structure of the alliance. The alliance management team consisted of nine members, including the alliance manager. Three members, including the alliance manager, represented the operator. The other positions were distributed among the three contractors based on the "best man for the job" principle, independent of which organization she/he represented.

The alliance management team and the alliance manager in particular, had overall responsibility for project execution. The role of the alliance management team was to function as one coherent team, focusing on the alliance and not on the individual companies. Problems were to be solved by discussions between the parties involved, and if they were unable to reach a solution, the steering group was to make the final decision. The steering group, the alliance manager and the alliance management team were given authority and responsibility to monitor the project as regards scope of work, costs and schedule.

5.3. Trust

Teambuilding and start-up programs were initiated with the purpose of establishing a common vision and values in the project. The aim of the start-up programs was to develop a cooperative climate between the parties, and moreover, to focus on potential problems and gains. Formal boundaries between the companies were to be toned down, and a project logo that was to be used instead of the company logos was developed. The fact that the alliance had one specific location was intended to promote the development of trust and openness between the parties, and develop a feeling of identity in the project.

6. Case B

Case B was organized as an EPCI contract with the additional use of individual contracts with bonus schemes. Also, the two main contractors formed an integrated team. The specific task was to perform hook-up/commissioning of an oil platform. The primary activities were installing the different parts of a platform at an onshore location, and thereafter, moving the platform to its offshore location and getting it ready for drilling and oil production. These activities represent the final stages in the larger project of building the entire platform, and covered less than 10% of the total costs of the entire project. However, complexity increased in the final stages as previous work conducted by other contractors located at different sites and in different countries largely influenced the project.

The two main contractors that were awarded the contract established an integrated team. The operator was not formally part of the team, but a high level of integration characterized the relationship between the contractors and the operator, as the operator had both management and discipline personnel in the project.

6.1. Incentives

The incentives in the contract between the operator and the two main contractors were based on a combination of measurable targets and more complex mechanisms, such as milestone bonuses, bonuses for completion on schedule, the operability of the platform and minimizing changes. Furthermore, the incentives were directly related to the performance of each of the two contractors.

The degree of realism in the use of incentives was regarded as varying. Bonuses related to time schedules were seen as achievable. However, since the project had to rely on the performance of other contractors in the earlier stages of the project, and as the quality of work performed in the earlier stages varied, the likelihood of the contractors achieving their goals was reduced. The major incentive, representing approximately 50% of the total potential bonus was considered unrealistic. The possible effects of the incentives were rather limited, both with respect to potential rewards and potential losses. The perceived rewards for exceptional performance were limited, and the perceived penalties for not performing to target were not seen as sufficiently deterrent.

6.2. Authority

The project was organized with three different bodies on the steering group level. In addition to the formal steering group, two corporate steering bodies were formed in order to ensure the interests of the two main contractors. The two main phases in the project formed separate project organizations, and only one reported to the steering group while the other reported to the operator. Most technical disciplines responsible for different phases in the project were located at one site, but at the end of the onshore period one technical discipline moved to a separate location. A split leadership between a contractor representative and an

operator representative was chosen for the overall management of the project.

6.3. Trust

On the steering group level, trust was mainly a question of company membership. Limited trust between the companies reduced the steering group's potential as a supportive body for the project. The steering group meetings focused on detailed reporting, errors and problems. The meetings had limited focus on long-term, strategic issues. The fact that several steering groups existed increased the number of informal lines of communication. At the project execution level, we identified a low level of trust between the two main disciplines, but not between personnel from different companies.

7. Case analysis

We have above provided a brief description of Cases A and B with respect to the use of the three governance mechanisms. We will now compare and analyze the cases with special focus on the interplay between incentives, authority and trust, and how the interplay may contribute positively or negatively to performance. When discussing the interplay between the governance mechanisms, we will focus on the process of developing and implementing governance mechanisms, as well as on the specific objectives they should serve in each case.

7.1. The role of incentives

Case A. The process of clarifying the scope of work, budget, schedule and incentives was viewed as systematic and fair to all parties. This can partly be seen as a result of a high level of trust between the parties. When the decision to form an alliance was made, the scope of work was mainly defined on the basis of individual contracts between the operator and the three contractors. However, there were uncertainties regarding the interfaces between the companies and how these should be handled. These uncertainties were clarified and agreed upon, and through the process of defining the scope of work the steering group was able to develop a good inter-firm basis for defining the budget and schedule that all parties considered both realistic and measurable. The following statement from a contractor representative serves as an illustration. "We must have a correct budget, it should not be like a play between the parties, we need to calculate a price, and we need to view ourselves like a team".

The incentive structure consisted of both reimbursable and fixed price elements. The contractors regarded the risk/reward structure in relation to the fixed price elements as the main motivational element in the incentive scheme. The contractors felt that the fact that the operator gave the contractors a higher share of potential rewards than risk was an important factor for reaching critical milestones. Furthermore, the contractors felt that the milestones related to both schedule and MLC were tight but realistic. The high level of trust between the parties seemed to give the parties confidence in designing an incentive scheme with a common budget, and a high potential for both extra profits and losses. The incentives related to the fixed price elements were, according to the contractors, a strong motivation to achieve milestones and thus prevented opportunistic behavior.

The reimbursable elements of the contract were rates that included profit. After project completion this was evaluated as a potentially limiting factor for integration between the actors, since it gave the contractors a motive to increase the number of man-hours in order to increase profit. However, contractors did not increase their number of man-hours. In total, the use of incentives was considered by all parties as one of the main factors contributing to a positive end result.

Case B. The intention of formulating a cooperation agreement stating common objectives and incentives was an effort undertaken by the parties in order to achieve a high level of integration. On the other hand, the fact that the cooperation agreement defined limited additional rewards if the parties achieved positive outcomes and contained a very limited downside, made it difficult to obtain a high level of integration, and resulted in the project being given little priority, especially by one of the contractors. One example illustrating the lack of priority is the fact that, due to a crisis in another project, one contractor moved a substantial number of employees from Case B to the crisis project. The other parties stated that this reduced the efficiency of the project, as all actors had to invest time and energy in continuous "start-up processes" and training new personnel, instead of focusing on specific activities in the project. The fact that the level of trust between the parties was initially rather low may be one reason why the parties were unable to formulate a better incentive scheme. The following operator statement illustrates these problems. "I wonder how we can get full control as an operator over a reimbursable contract. I am afraid the hook-up contractors will focus on maximizing the man-hours".

7.2. The role of authority

Case A. The steering group consisted of key personnel who were given a high level of authority by the organizations they represented. This gave the members of the group a solid base for making decisions. The alliance manager came from the operator. This prevented

conflicts of interests between the contractors. The members of the alliance management team were delegated a high level of authority, both by the steering group and their respective companies. The operator's view on this issue was that "I believe that the owners of the steering committee have to give the alliance the power and responsibility to govern itself based on some broad guidelines, and this has to come from high levels in the company". The alliance manager himself felt that he had been given authority by the operator to run the project organization *as if* he had the role of managing director in a company. The high level of delegated authority resulted in a low level of interference from the operator and contractor companies. It seems reasonable to argue that in a situation characterized by a low level of trust and inappropriate incentives, such an empowered project organization with a high level of integration would not have been established.

Case B. The parties in Case B seemed to use authority to secure their own interests at the expense of the project. An operator representative's view was that "we need to check if they have a happy marriage or if they are close to a divorce". First, the contractors formed two extra bodies on the steering group level in order to secure their own interests before meetings in the steering group, and also to directly influence the project. Second, a split leadership between the contractor representative and the operator representative resulted in duplication of management resources, and contributed to a low degree of empowerment in the project. Third, each company established a high degree of informal communication with their project personnel. Moreover, two separate functional project organizations were formed, despite the fact that they were highly interdependent. The result can be viewed as a complex structure, created mainly to secure each actor's individual interests, rather than contributing towards a unified and coherent focus. The use of authority may further have limited cross-company and cross-functional contact, and thereby hampered the development of trust both between actors and between functions.

7.3. The role of trust

Case A. The level of trust between the parties was relatively high when the parties entered the alliance agreement. The parties had by that time already been working together on the basis of individual contracts. In addition, the operator and two of the contractors were known in the oil and gas industry as companies showing both ability and willingness to cooperate. However, these three actors had limited trust in the third contractor, especially in the start-up phase, as this contractor was considered to be a top-managed company that was rather unwilling to delegate authority. However, trust in this contractor increased during the project. After project completion, people from the other partners described this contractor as an ambitious company that showed great creativity and contributed positively to the project. The alliance manager expressed the role of trust by stating that "we have achieved an open and informal tone".

Case B. The contractors entered the project with limited previous experience of cooperation. In addition, the two contractors were from different countries, and the parties suggested after project completion that different national cultures were one important factor that hampered the development of trust. Due to cultural differences, each contractor feared that the other would act opportunistically. A contractor representative stated this in the following way: "We believe that if we are open too soon, it may result in a boomerang-effect. We have had negative experience being too open too early before". Furthermore, low levels of trust were also a problem across the different functional disciplines. A survey evaluating the functional disciplines with respect to factors such as degree of collaboration, mutual respect, openness, encouragement of team spirit and acknowledgment of contributions showed that scores for all variables were significantly higher within each discipline than between the disciplines. These groups had no common manager, they were physically separated, and they did not have a regular common meeting structure or any cross-functional teams. Such organizational conditions may also have hampered the development of trust. This may suggest that the degree of trust was mainly dependent on contractual conditions at the steering group level.

Comparing trust in Cases A and B, we note that the parties in Case A already trusted each other before the alliance agreement was signed. This seemed to be important for the process of defining incentives and deciding upon the use of authority. Trust in Case A thus had more of a relational character, while trust in Case B can be described as calculative (Rousseau et al., 1998).

The roles of incentives, authority and trust in the two cases are summarized in Table 2.

7.4. Interplay of incentives, authority and trust

Both cases indicate that incentives, authority and trust play important roles, and that the use of governance mechanisms affects work processes and the final outcomes. It is interesting to compare the two cases on the use of the three governance mechanisms. Case A represents a situation where the actors extensively relied upon all three mechanisms, while Case B was characterized by lower levels of all three mechanisms.

In Case A, two of the contractors and the operator had previous experience of inter-firm cooperation, and although these three actors had limited trust in the fourth actor in the start-up phase, the parties managed

Table 2
Roles of incentives, authority and trust

	Case A	Case B
Incentives		
Realism in scope	High realism Clear scope	Medium to low realism Unclear scope
Measurability	Good	Good
Reward potential	High Seen as realistic	Low Lack of realism in incentive scheme representing approx. 50% of the bonus
Risk potential	High risk	Low risk
Strength in incentives	Strong enough to get the parties to focus on common objectives	Limited upside and downside contributed to lack of priority to the project
Authority		
Legitimate authority and responsibility	Steering group given full authority by parent organizations The project manager and the project management team were given full authority within the agreed scope, budget and schedule	Steering group not given full authority by parent organizations • Three different bodies at steering group level • Split leadership between contractor and operator • The two main disciplines formed separate project organizations
Trust		
Cooperation experience	Previous cooperation experience before the alliance agreement was signed	Limited previous cooperation experience
Nationalities	Norway	Norway and UK
Start-up program	Teambuilding/start-up programs to promote common identity, vision and values in the project	Teambuilding/work meetings on critical issues throughout the project period

to form a project alliance characterized by trust at the outset. The initial level of trust made it possible to implement incentives with a high potential for both risk and rewards, and an organizational structure integrating all actors. Trust thus enhanced the parties' ability to use incentives and authority. Furthermore, the use of strong incentives focusing on common goals, and an authority structure designed particularly for the project, further increased the level of trust as the parties cooperated. We may speculate as to whether a lower level of trust at start-up would have made it more difficult to implement incentives and authority.

The following dynamic interplay can be described in Case B. A low level of trust at start-up made it difficult to implement incentives promoting common gals, and the parties, therefore, relied on incentives that were related to each individual contractor. This resulted in even stronger focus on the actors' own interests, and made it even more difficult to establish one common organizational body for the project, which again hampered the potential for developing shared values, norms and identity. Lack of trust reduced in this way the potential for developing effective incentives, and furthermore, lack of appropriate incentives resulted in a rather weak authority structure. As the prerequisites for trust were not satisfied, adverse effects emerged not only with respect to trust, but also with respect to incentives and authority. Moreover, a low level of authority had further adverse effects on incentives and trust as the parties cooperated in the project. Hence, an important finding is that a negative dynamic interplay gradually resulted in a process of disintegration rather than integration. The different interplays in Cases A and B are illustrated in Fig. 3.

8. Discussion

The analysis of the two cases has demonstrated the value of understanding the interplay of different governance mechanisms. The parties in Case A were able to develop a project alliance with a high degree of integration and focus on common objectives, resulting in effective coordination both between phases and between actors. Furthermore, the project was completed on schedule, and at lower costs than first calculated. On the other hand, the two main contractors in Case B and the operator were never able to achieve a high level of integration, and the parties paid more attention to their own goals than to common goals. This resulted in a high level of friction in coordination between phases and actors, and moreover, the project was delayed and the final costs exceeded the budget.

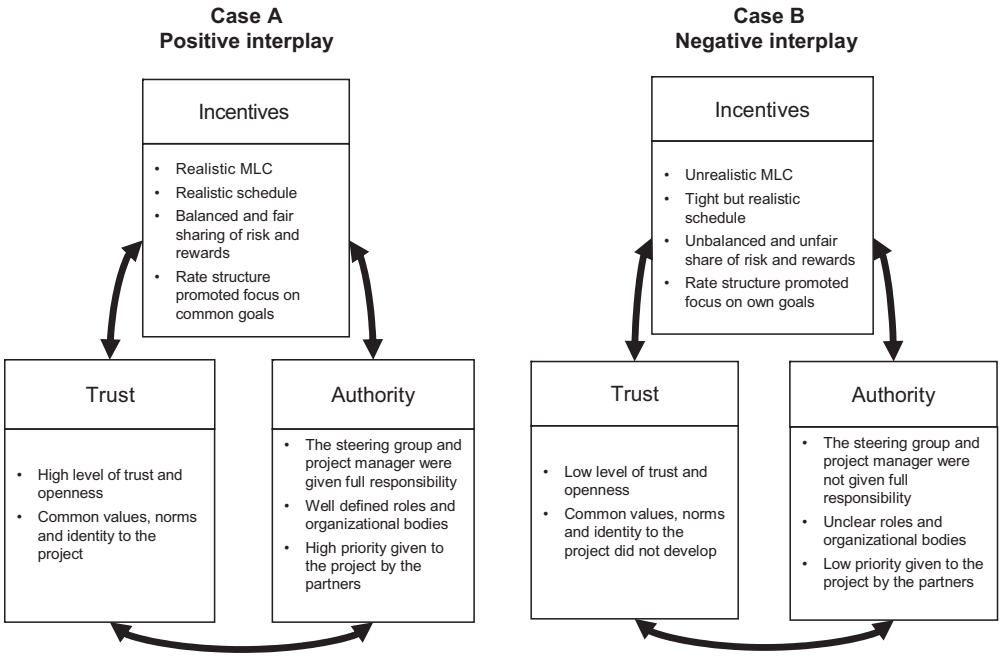

Fig. 3. Interplay between governance mechanisms.

These results indicate that if we try to isolate the effect of one single mechanism, our understanding will be limited. Incentives, authority and trust are linked to each other in specific ways. We will term this interplay a multiplier effect. Such multiplier effects can be either positive or negative. A positive multiplier effect indicates that proper use of one mechanism, for example trust, not only pays off within its specific use, but also has positive effects on the use of incentives and authority. On the other hand, a negative multiplier effect has the opposite effects. Lack of, for example, authority may also hamper the use of incentives and trust.

Bradach and Eccles (1989) suggested several years ago that price, authority and trust could be combined in different ways. However, our theoretical understanding of how the various mechanisms may interact is rather scant (Murry and Heide, 1998). Poppo and Zenger (2002) argue that formal contracts and relational governance are commonly viewed as substitutes in the literature, while they argue for a complementary relationship between formal contracts and relational governance. Other researchers argue that a combination of hierarchical control and relational governance is problematic since control procedures signal a kind of distrust, while relational governance is based on trust (cf., Ghoshal and Moran, 1996). Recent empirical results indicate that different governance mechanisms complement each other. Cannon et al. (2000) found that adding relational governance to legal bonds improved performance in situations of high transactional uncertainty, and Poppo and Zenger (2002) found that relational governance and formal contracts complemented each other, and that the joint use of these mechanisms improved exchange performance.

The complementary nature of governance mechanisms basically means that combinations of mechanisms are better than relying on single mechanisms. The findings in this study broaden our knowledge about how different mechanisms interact. A multiplier effect indicates that different mechanisms affect each other. Proper use of one mechanism facilitates and increases the efficiency of other mechanisms, while inadequate use of one mechanism may disturb or hamper the use of other mechanisms. Different governance mechanisms are thus not only complementary, but they can also function as facilitators for each other. Such multiplier effects have not previously been addressed in the literature.

This finding is also interesting from a managerial point of view. Companies can realize joint benefits by cooperation (Dyer and Singh, 1998; Ireland et al., 2002). However, the realization of such benefits is dependent upon effective inter-firm governance (Dyer and Singh, 1998), but the ability to manage inter-firm relationships is, according to Ireland et al. (2002), asymmetrically distributed across firms. Inter-firm governance is especially important for managing complex procurements. Procurements involving several contractors, subcontractors and vendors require close coordination and interaction over a long period of time. Compared to handling dyadic relationships, complexity increases as

more actors are involved. Our study has highlighted the importance of the interplay between various governance mechanisms. Different governance mechanisms are mutually dependent, and they affect each other. A lack of trust, for example, can make it difficult or impossible to develop and implement incentives. In order to obtain good performance, all three mechanisms must be jointly developed and tailored to each other; otherwise they may impact each other negatively and cause large transaction costs. It is thus a managerial challenge to develop a productive rather than a counter-productive interplay.

8.1. Conclusion

This study has illustrated a complex interplay between different governance mechanisms, and furthermore, that combinations of mechanisms in some cases strengthen each other and in other cases weaken each other. Having found empirical support for such interactions, the next step will be to provide prescriptions for the use of various governance mechanisms in different circumstances. According to agency theory (Eisenhardt, 1989) and relational contract theory (Macneil, 1980), three important considerations for designing contracts and governance mechanisms are: (1) measurability of outcomes, (2) programmability of tasks and (3) need for continuous flexibility. Based on theoretical reasoning, we should expect incentives to govern tasks with outcomes that are easy to measure. Authority should be most suitable in situations characterized by high degree of task programmability and for outcomes that are difficult to measure. Trust is expected to be used in situations characterized by low degree of task programmability, a continuous need for flexibility and for outcomes that are difficult to measure. However, for most practical purposes exchange situations are characterized by varying degrees of outcome measurability, task programmability and need for flexibility. Our cases suggest that actors should in the first place try to agree on what they consider to be the most important governance mechanism. This should be based on an evaluation of the most critical governance challenges, as well as the actors' ability to use the different mechanisms. Thereafter, other governance mechanisms should be added based on an evaluation of how they can complement the first chosen governance mechanism, and a judgment of the likelihood that positive interactions can be created among the different mechanisms.

The different conditions at start-up for our two cases illustrate this point. Both cases represented complex procurement situations involving substantial exchange hazards as it was difficult to measure outcomes, task programmability was low due to technological complexity, and a high degree of flexibility was therefore required. Such procurement situations demand a certain level of trust. The different levels of trust in the two cases may be one important explanation for different interactions among the mechanisms, and finally resulting in different outcomes. However, we cannot draw the conclusion that trust in all situations will facilitate the implementation of other mechanisms.

What seems to be an important finding is that the pattern of interaction that develops in the initial stages of cooperation is difficult to change later on (cf., Doz, 1996). The parties in case A were able to find common interests and joint objectives in the early stages partly due to the existing level of trust, while the partners in Case B paid most attention to their own goals and were not able to reach consensus on common goals. It may, therefore, be tenable to argue that the primary role of any governance mechanism at start-up is to stimulate and enhance a common focus on joint goals. Our study has shown that trust can serve this role. However, can incentives or authority also serve this role? In situations characterized by higher levels of task programmability than our cases, authority in terms of agreeing on an administrative apparatus may function as a formal framework for how to interact that can stimulate focus on joint goals, and in situations with outcomes that are easy to measure, incentives may also direct attention to joint goals. What seems to be important is to have a good understanding of which mechanism that is most important in the early stages and secure that this mechanism promotes focus on joint goals, and secondly, introduce other mechanisms in such a way that they complement each other resulting in the development of a positive multiplier effect.

As long-term relationships, strategic alliances and networks are becoming more and more important for many companies, the proper understanding and use of contracts and governance mechanisms may become a managerial asset. Future research should continue to elaborate on the complex interplay of different mechanisms. In developing new knowledge in this area, there is a need for both conceptual research and empirical studies.

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