

**The traditional standard contracts –
do they deserve their status as the black sheep in Lean Construction?**

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The Lean Construction Institute (LCI) articulated the theory that projects can be characterized as stodgy (simple, certain and slow) or dynamic (complex, uncertain and time sensitive). Within these classifications, LCI characterized various systems that operate within projects: Physics of work (how work gets done), Systems and Organisations (how the relationship among principal companies is structured), and Contracts (how the commercial relationship is structured). Historically, LCI and implementers of the Last Planner System have focused on the physics of the work and attacked the unreliability of project work flow in an effort to reduce project waste. The question has always remained, to what extent do the other systems operate to promote or constrain lean project delivery (Lichtig, 2005).

Ballard & Howell (2005), two protagonists in the Lean Construction literature, in their introduction to a 2005 special issue on relational contracting argue that changing structure of contracts is not enough to change traditional practices and processes of designing and making. Therefore, they deliberately chose in the early 1990's to subordinate organization and contract to what they considered the prior issues of understanding the challenges posed by dynamic projects. However, with this special issue in 2005 they believe that time has come to explore contracts. Ballard & Howell are comprehensively inspired by Macneil's (1980) work on discrete versus relational contracts. As they write:

'He (MacNeil red.) argues that classic theory of contract is based on the idea of discrete transactions and ignores the agreements needed to enable and sustain relationships in more complex contracting situations'.

Apparently, Ballard & Howell equal 'classic theory of contract' which is based on an axiomatic research tradition with real life contracting practices in the construction industry. In other words, they accuse traditional standard contracts of being 'discrete', leading to inefficient construction processes by neglecting the complexity that characterizes most projects.

This is a misinterpretation of MacNeil's work on relational contracts. As will be demonstrated in this paper MacNeil's framework is about social order and not contracts in themselves. It is about human actions in specific settings, it is not about documents or paragraphs. This is crucial because Howell & Ballard construct two hypotheses that are inspired by their interpretation of MacNeil:

Hypothesis: Traditional forms of contract and the associated business structures do not facilitate pursuit of the lean ideals.

Hypothesis: Substantial and enduring improvements in project delivery, value generation, or waste reduction cannot be achieved without changing how work is done; i.e., it is not sufficient to change contracts and incentives. However, doing so can facilitate pursuit of the lean ideals.

These hypotheses state that it is a premise, that contract forms are to be changed in order for lean ideals to be realised. However, MacNeil is not interested in contract forms in themselves, he is interested in how they 'come to live', he is interested in the sociality. The so-called 'traditional

standard contracts' could easily be relational as well as discrete, it all depends on the sociality that can be observed along with the contracts. Therefore, MacNeil's framework can not be used as an argument for the above two hypotheses, stating that contract forms have to be changed.

However, it is not the only objective of this paper to criticize their interpretation of MacNeil. The paper will demonstrate that overall project success compensation (according to the above two hypotheses) is not necessarily a premise for the pursuit of Lean ideals.

All the contributions without exceptions in the special issue support the hypotheses. It seems that the hypotheses are not at all contested; they are simply taken for granted as naturally determined premises. While not questioning the hypotheses the contributions instead propose different solutions on how to change contracts (e.g. Lichtig, 2005, Gerrard, 2005, Colledge, 2005, Sakal, 2005). This paper demonstrates that the two hypotheses are not necessarily supported, and that traditional standard contracts at least in the specific case in this paper do not have to be changed in order for lean ideals to be effectuated in practice. This is not to mean, that the contributions in the special issue are not relevant, they definitely are, and there are many interesting experiences, proposals and ideas to be found in the contributions. This paper only serves to illustrate that integrating contracts with the Lean ideal doesn't have to be done through revised contract forms.

The final objective of this paper is to explore the mechanisms surrounding contracts in construction projects. It is the aim of this paper to offer another way of thinking lean than through the aid of relational contracting theory. Relational contracting theory offers one kind of mechanism to secure lean ideals whereas in this paper agency theory will be proposed as offering alternative mechanisms.

Summing up, there are 3 objectives in this paper:

- Question Ballard & Howell (2005), Miles & Howell (1997) interpretation of relational contracts
- Question the hypotheses on changed contract forms as premises to reaching lean ideals
- Exploring relational contracting theory mechanisms as well as agency theory mechanisms, proposing that relational contracting theory does not have to be an imperative in reaching lean ideals

But what are Lean ideals? What is it that relational contracting more concretely is to mitigate or achieve that traditional standard contracting stands for?

When Ballard & Howell (2005) and Miles and Howell (1997) propose the idea of relational contracting and changed contract forms, they naturally do it for a reason. However, that reason is not clearly stated. Applying solutions to something that is not even defined would potentially from a lean perspective seem extremely wasteful. Generally, the concepts of 'adversarial behaviour' and 'conflicts' are used as problems to which relational contracting is to cope with. Miles and Ballard (1997) use a simple example to illustrate this:

Subcontractor A may need to understand how another subcontractor B plans to do its work, but may not get that information because B has no incentive to expedite. In the world of transactional

contracts, each organisation tends to act as if its costs and profits were independent from one another.

This statement is a clear example of lack of root cause analysis and moreover efficiency analysis. Even though it apparently relates to dysfunctional effects of transactional contracts, this is not necessarily so. The example does not demonstrate any negative financial consequences on the project as a whole if subcontractor B chooses not to deliver information to subcontractor A. If the consequences are that e.g. lead time prolongs because of waiting time or missed improvement opportunities, then costs definitely increase, but if project efficiency is reduced because subcontractor B, has to spend time and effort in transferring information, and at the same time subcontractor A do not save at least as much effort on behalf of project costs, then from a project efficiency point of view there would be no adversarial behaviour.

Adversarial behaviour is a term that is related to transaction cost economics and agency theory, stating that if agents act against the objectives of the principal they are demonstrating adversarial behavior. The principal would in this case be the maincontractor, and the agents are the subcontractors. If subcontractor B is withholding information towards subcontractor A, and it leads to a more efficient project then the behavior of subcontractor B is adversarial towards the principal. It might be adversarial towards subcontractor A, but that is not an efficiency problem, and efficiency is after all what the Lean ideal is about.

However, granting some goodwill to Miles and Ballard one can say that implicit in their example is presumably the idea that information sharing is important because of interdependencies between the subcontractors, and information sharing would lead to a more efficient construction project. In the specific case no incentive is provided for seemingly important information sharing and subcontractor B instigate a non-cooperative behaviour, when what is needed to be efficient is cooperative behaviour. It is nevertheless imperative to decrease the implicitness and increase explicitness to these cause and effect relationships, when discussing contracting issues. Otherwise, there will only come fuzzy answers out of these fuzzy questions.

In this paper possible ideas of adversarial behaviour are proposed on the basis of transaction cost economics and agency theory, which is adequate because the ideas of adversarial behaviour are essential to those theories. In other words, we stick to the concept of adversarial behaviour by using its theoretical basis. Next, we discuss possible solutions in terms of mechanisms that mitigate the developed ideas of root causes to adversarial behavior. These mechanisms are split into two categories each inspired by their own theory. Ideas of **organisational mechanisms** are taken from agency theory and **social mechanisms** are taken from relational contract theory. The reason for this is to maintain clarity, and to demonstrate through the case that follows the chapter on mechanisms, that organisational mechanisms which are not depending on mechanisms proposed by relational contracting literature actually can mitigate the above problems without alterations of contract forms. It thereby serves to illustrate that overall project compensation is not necessarily a premise to achieve Lean ideals. It also serves to illustrate that it is not necessary to use relational contract theory when discussing innovations in construction contracts.

The rest of the paper is structured as follows: Firstly there will be a discussion of transaction cost economics in order to provide a the theoretical basis for agency theory. Thereafter agency theory will be explained in order to account for the organisational mechanisms this theory offer in relation to the contract issue. The successive chapter outlines relational contract theory and accounts for the

social mechanisms that are offered. In this chapter the first objective of this paper, namely the critique of Miles' & Ballard's interpretation of MacNeil's framework, will be forwarded. Thereafter, there will be a short discussion of organisational mechanisms vs. social mechanisms. A case from a specific construction project will follow, which demonstrates that the use of organisational mechanisms and theory thereof can substitute social mechanisms and the theory thereof in mitigating adversarial behaviour. The case at the same time demonstrates that overall project success compensation is not a premise for achieving an efficient construction project. However, there are premises to the success of the organisational mechanism. These are accounted for. In the end there will be a brief discussion of unresolved dilemmas.

Transaction cost economics

According to transaction cost economics (hereafter TCE) a transaction cost is a cost incurred in making an economic exchange. Transaction costs are linked to transaction difficulties and are defined as the 'costs of running the economic system' (Williamson, 1985, p. 18). Transaction costs are the costs of the governance structure of transactions. These costs are influenced by some properties of human behaviour. Not only are human actors assumed to be boundedly rational, but they are also considered to be prone to behave opportunistically.

Bounded rationality implies that human decision makers tend to be rational, but only up to a point when faced with uncertainty and complexity. Opportunism means that human decision makers tend to be 'self-interest seeking with guile' (Williamson, 1985, p. 46) permitting strategic behaviour by individuals. If it is in one's own interest a party in a transaction can, and is ready to, provide wrong or imperfect information. The hiding of 'ex ante' information by one of the parties, for instance by the potential supplier about his competencies, can create a problem of adverse selection for the other party. And hiding ex-post actions and information can lead to a problem of moral hazard.

Information asymmetry can according to TCE only be prevented or overcome at the expense of a governance structure. In a market, the costs of a governance structure depend on several dimensions of transactions. Williamson (1979) identifies three critical dimensions. The first one is the degree of 'asset specificity', i.e. the degree to which investments in physical or human assets are transaction-specific or idiosyncratic. The second dimension that Williamson identifies is the extent of buyer activity: frequency and volume. The greater the frequency and volume of transactions involving more or less asset specificity, the greater the need for an elaborate governance structure will be. The third dimension is the degree of uncertainty and or complexity surrounding transactions (Sheng et al. 2006). Regardless of the type of uncertainty, it exists because of insufficient information (Driskell & Goldstein, 1986 & Huber & Daft, 1987) which makes planning and decision-making difficult. An increase in uncertainty and/or complexity will make the need for future adaptations more likely. Given asset specificity, an increase in uncertainty and/or complexity around frequent transactions of a high volume can cause the transformation of a market transaction into a transaction with an elaborate hybrid governance structure or even into a transaction within an organization (a hierarchy). Contractual arrangements are at the core of hybrid governance structures (Williamson, 1996).

Transaction cost economics offer an insight into why it is preferable in situations to adopt a kind of governance structure instead of market because of transaction costs related to bounded rationality, opportunism, asset specificity and uncertainty. However, a limitation of TCE for adequately explaining control lies in its recognition of the *mechanisms of governance* (Dekker, 2004). TCE's

primary mechanisms to govern 'hybrid forms' are often considered to consist only of *legal* and *private ordering* (Nooteboom et al., 1997). Legal ordering comprises the writing and third party enforcement of contractual agreements. Private ordering comprises formal self-enforcing mechanisms or 'hostages' created intentionally to align the economic incentives of the transacting parties, such as equity stakes and symmetrical investments in specialized assets. This primarily contractual view of governance is incomplete, as it lacks the examination of the *organizational mechanisms* of governance (Grandori, 1997, Sobrero & Schrader, 1998 and Zajac & Olsen, 1993). Gulati & Singh (1998), for instance, identify five important types of control mechanisms in hybrids that include such organizational elements: command structures and authority systems, incentive systems, standard operating procedures, dispute resolution procedures and non-market pricing systems. Sobrero & Schrader (1998) argue that while in general the contractual structuring is used to provide the institution for aligning the partners' incentives, the procedural (or organizational) structuring concerns mainly how firms actually align their joint processes through organizational mechanisms (Dekker, 2004).

Agency theory develops the ideas of how to design hierarchical or hybrid control structures using the more or less the same premises as transaction cost economics but concentrating on the specific organisations and the **agency costs**, which are transaction costs that arise because of the need to coordinate and motivate agents. In other words, agency theory contributes to transaction cost theory by exploring specific organisational control issues.

Relational contract theory, which the Lean Construction literature has embraced, offers another way as how to understand control in hybrid forms. This second form of governance which is also not well recognized by TCE is *informal* or *social control*. By isolating the transaction from its context and treating it as an independent event, TCE ignores the (governance) effects of prior and repeated interactions between firms and individuals (Dekker, 2004). Repeated interactions can cause hybrids to become embedded in an influential economic and social context, which may strongly influence its formal structure. Many alternative views on the nature of hybrid governance exist, such as reciprocity norms, reputations, trust, personal relationships and the embeddedness of relationships in a social network of current and prior ties. These 'informal self-enforcing safeguards' (Dyer, 1996) differ substantively from control by prices in the market and the administrative authority in the hierarchy (Dekker, 2004).

Miles & Ballard and the other Lean Construction advocates are applying for the social mechanisms of governance stream by the influence of the writings of Ian MacNeil. However, theories of organisational mechanisms of governance have to a great extent been left out in their discussion of contracts. This is in fact restricting possible avenues for Lean Construction improvements on contracts. In the succeeding chapters there will be a discussion on fixed contracts having fixed assignments through the organisational mechanisms stream and thereafter the social mechanisms stream to the problems.

Organisational mechanisms - Agency Theory

Agency theory develops ideas about how to control when the pure market transaction is not efficient. An agency relationship is defined as a contract under which one or more persons (the principal(s)) engage another person (the agent) to perform some service on their behalf which involves delegating some decision making authority to the agent. Delegation of decision making is then resulting in the condition of information asymmetry in favour to agent. This is likely to

promote the possibility of moral hazards among agents at the cost of principals' interest. Monitoring systems that produce performance signals (i.e. information) are perceived to be the natural remedy for these problems (Holmstrom, 1979). Agency costs can be divided into two categories, namely coordination costs and motivation costs. Coordination is about determining what things should be done, how they should be accomplished, and who should do what. It is about determining who makes decisions and with what information, and how to arrange communications systems to ensure that the needed information is available. The issue of motivation is to ensure that the various individuals involved in these processes willingly do their parts in the whole undertaking, both reporting information accurately to allow the right plan to be devised and acting as they are supposed to carry out the plan (Milgrom & Roberts, 1992, p. 126).

Coordination

Milgrom & Roberts distinguish between two kinds of resource allocation problems in evaluating systems of coordination, namely synchronization problems and assignment problems.

In a rowing sport example imagine the crew, in which it is crucially important that each rower make his or her stroke at precisely the same moment. The coxswain solves the synchronization problem by determining a rhythm for the crew and calling out the signal for each stroke. Like most centrally directed solutions, synchronization has the disadvantage that the centrally made decision cannot be fully responsive to information of the others in the system. In this case, the coxswain can only guess how tired the individual crew members are. This could be an important disadvantage if the coxswain pushes the crew too hard early in the race, leaving them too weak for a strong finishing sprint (p. 91). However, the great advantage of the system is it synchronizes the actions of the crew, making their individual efforts much more effective. The costs of not setting quite the right pace are very small compared to those of failing to have everyone pulling in unison.

Similar difficulties arise in assignment problems, in which there are one or more tasks to accomplish and there is a need for just one person or unit to do each. The coordination problem is to ensure that each task is done and that there is no wasteful duplication of effort.

These two kinds of coordination problems present features like a sense of urgency about the decision, the extreme dependence of the optimal course of action on particular circumstances and the coxswain's substantial knowledge about the form of an optimal decision (p. 92).

If the same design problems arise repeatedly and call for the same solution each time, it may be unnecessarily expensive to solve each of them anew by centralised direction. Instead, established organisations set up routines that guide decentralised solutions to the recurrent design problems. If the environment of the organization changes, however, then the same routines that were effective may become counterproductive in the new environment, and new routines will need to be devised if the organisation is to continue to achieve its goals (p. 92).

Motivation

Ensuring that the various individuals involved willingly do their parts in the whole undertaking, both reporting information accurately to allow the right plan to be devised and acting as they are supposed to carry out the plan is done through agreements. These agreements are referred to as

contracts in standard economics, regardless of whether they have the legal status of contract (p. 126).

A complete contract would specify precisely what each party is to do in every possible circumstance and arrange the distribution of realized costs and benefits in each contingency so that each party individually finds it optimal to abide the contracts terms. If the original plan was an efficient one, then a complete contract could implement the plan leading to an efficient outcome. According to Milgrom and Roberts motivation problems arise only because some plans cannot be described in a complete, enforceable contract (p. 127). In actual transactions, enacting and enforcing a complete and perfect contract is fraught with problems: Limited foresight, imprecise language, the costs of calculation solutions, and the costs of writing down a plan, bounded rationality (p. 128). All these contingencies introduce the possibility of opportunistic behaviour. The motivation problem is then to overcome these difficulties of opportunistic behaviour.

Incomplete contracting does not attempt to the impossible task of complete contracting but instead settles for an agreement that frames the relationship. The parties do not agree on detailed plans of action but on goals and objectives, on general provisions that are broadly applicable, on the criteria to be used in deciding what to do when unforeseen contingencies arise, on who has what power to act and the bounds limiting the range of actions that can be taken, and on dispute resolution mechanisms to be used if disagreements occur. (p. 131). 'In general, in situations where reasonably complete contracts are too costly or impossible, actual contracts are relational. They serve to structure a relationship and set common expectations, and they establish mechanisms that will be used to make decisions and allocate costs' (p. 132).

When economists speak of "relational contracts," they imagine "self-enforcing" agreements, meaning that "some credible future punishment threat [other than judicial enforcement] in the event of non-compliance induces each party to stick to agreed terms." Agency theory is not *relational* in this sense, but it contemplates an economic relationship that is more complex than the simple exchange of goods or services of neoclassical economics. Generally speaking, agency theory focuses on the incentives of agents to act in ways that maximize the value of their contractual relationships.

Traditional standard contracts in an agency perspective.

Using transaction cost economics and agency theory to evaluate traditional standard contracts in construction projects several issues arise. A traditional standard contract is one with a fixed cost. This means that the contractor will supply all labour and materials for 'x' amount of money. If the contractor missed something on the plans and it ends up costing more, he has to absorb the cost. This puts responsibility on the contractor to be thorough in bidding. The price will typically be higher than a cost-plus contract naturally because the contractor wants to protect his profit and time.

Coordination and motivation

The standard contracts comprising fixed prices and fixed assignments are partly motivating partly coordinating. They inform the agents about which assignments to do and what kind of compensation they can expect to get from doing the assignments. The fixed prices motivate behaviour of high effort. The number of assignments executed in a specific interval of time decides compensation. In other words, fixed contracts motivate agents to minimize costs, and since labour is

the primary cost driver, focus will be on minimizing time used. There will therefore be a high motivation to maximize output. Because of asymmetric information and environmental uncertainty an output related payment system is actually recommended by TCE and agency theory. This is due to the fact that these systems serve two basic functions: 1) They provide workers with incentives to expend more effort and 2) they allocate to the workers some of the risks at the point of production.

However, not all types of uncertainty is transferred to the agents. This is evident by the extra work and day's work pay system. This is an extra compensation mechanism that is supposed to transfer some of the risk away from the agent. Very often the negotiations of whom are to bear the extra cost are described as fierce and adversarial. If there were no interdependencies between agents' assignments, then all that managers had to be concerned about was opportunism because of asymmetric information about the physics of assignments, and the risks of extra costs stemming from environmental uncertainty which leads to negotiations of extra compensation. There would not be any coordination problems between agents. The motivation problem is therefore:

1) Costs related to negotiations on extra compensation due to environmental uncertainty.

However, relating to Ballard and Howell example, the adversarial behaviour is due to a coordination problem, namely the interdependency between the agents' assignments which lead to a synchronization problem. Because of interdependencies between agents, they take on even more risk. There is no assignment problem, in that the principal know which general assignments are to be done, and these create the basis of the explicit fixed contract. The principal however, don't know ex ante the optimal sequence between assignments because of lack of knowledge of sequences in assignments, durations of assignments and environmental shocks (uncertainty). Even though the traditional standard contract form imposes extra risks on the agents because of these factors, also the principals goals are at risk. This is due to a time factor. The construction project has to be finished within a certain time interval and if this is not done, the principal will have to financially compensate the client. Therefore, even though much risk is allocated to the agents, it is very risky business for the principal to hand over coordination to the agents. Following issues increase the coordination problem.

- 1) Some subcontractors can maximise profit on the expense of other subcontractor, leading to a game of competition instead of cooperation.
- 2) Subcontractors don't realise that interdependency exists.

These risks clearly indicate that the motivational mechanisms are potentially raising transaction costs. In order to lessen possible negative consequences of these potential conflicts, the principal can deploy monitoring mechanisms, used to gather information of the efforts of the agents.

Summing up on these thoughts, instead of dismissing the standard contracts as non-efficient, they should be considered extremely effective in terms of motivation, although there still reside some issues on the extra compensation system. However, in this paper we follow Ballard's & Howell's example and assume that that motivation of the agents is efficient, and focus on the evident coordination problem. Fixed contracts are surely non-effective in terms of coordination, leaving to much possibilities/risks open to opportunism and uncertainty related to interdependencies. In other words, fixed contracts decrease motivation-based transaction costs and increases coordination-based transaction costs. Therefore monitoring mechanisms become relevant mechanisms to explore in this setting.

It is interesting that the contracts are actually partially effectuating the problem of bounded rationalism in the guise of asymmetric information. This transaction cost arises at the same time as motivation to work hard and minimize time used on the contractually specified activities is secured. The synchronization problem accounts for a need to implement monitoring mechanisms.

Social mechanisms – Theory of relational exchange

Just as agency theory provides us with inputs to coordination and motivation mechanisms, theories of relational contracts also provide suggestions as how to solve the issues of bounded rationality, opportunism and uncertainty that is related to interdependencies between agents working under incomplete contracts. As mentioned earlier, adaptation is a primary consequence of uncertainty (Rindfleisch & Heide, 1997, p. 31). In a social mechanism perspective employing relational norms, and thus creating a basis of trust, decision-makers can act as if the future is more certain (Zajac & Olsen, 1993). They can do so because partners act as if the expected value of the exchange were stable, even in the presence of uncertainty (Sheng et al., 2006). Norms are considered the primary coordination mechanism.

MacNeil's relational theory of contracts inspired Miles & Ballard to propose relational contracting as a means to overcome 'adversarial behaviour'. MacNeil defines contracts differently than standard economic theory: Contracts are 'relations among people who have exchanged are exchanging, or expect to be exchanging in the future'. It is not a theory of relational contracts, but rather a relational theory of contracts. The difference is to suggest, that 'all exchange occurs in relations'. Whitford suggests that 'because Macneil sees exchange occurring almost everywhere, his theory becomes in effect a general theory of the social order' (Whitford, 1985, p. 252). Exchange relations occur in various patterns along a spectrum ranging from highly discrete to highly relational. This means that the ambition of MacNeil's theory is no way prescribing, it is only describing. In other words, MacNeil provides no operationalisation of norms (Blois & Ivens, 2004).

Ballard & Miles explain in their paper that most construction projects are to be found at the relational end of the spectrum, whereas the traditional standard contracts are accused of being in the discrete end of the spectrum. This argument seems a bit misplaced in relation to MacNeil's theory. MacNeil is not concentrating on the contracts in themselves as documents. He is concentrating on them through investigating the social surroundings. This means that traditional standard contracts from MacNeil's perspective are not interesting in themselves. They can not be placed anywhere in the spectrum he offers. In order to place anything in the spectrum one simply has to be a study of the social interactions related to that contract. It is these interactions that determine the placement, and not the contracts in themselves. As Blois state it:

'Macneil does not categorize exchanges by their governance form but seeks only to describe behaviour within an exchange. Indeed, he argues that the form of governance within which an exchange is occurring does not determine the norms of behaviour that operate within that exchange – these being determined by the atmosphere of the relationship' (Blois & Ivens, 2004, p. 242).

However, before continuing further in that direction, the specifics of partly MacNeil's theory and other theories of relational contracting will be studied.

As mentioned, MacNeil presents two poles of a continuum axis defining the forms of contracting. He proposes the examination of contracts along behavioural lines. The extremes of the axis are *discrete* and *relational*. Heide & John (1992) describe MacNeil's concepts, discrete and relational, as norms: MacNeil's (1980) typology of "discrete" versus "relational" norms reflects this difference. Basically, discrete exchange norms contain expectations about an individualistic or competitive interaction between exchange partners. The individual parties are expected to remain autonomous and pursue strategies aimed toward the attainment of their individual goals. In contrast, relational exchange norms are based on the expectation of mutuality of interest, essentially prescribing stewardship behaviour, and are designed to enhance the wellbeing of the relationship as a whole." Notice that both types are appropriately viewed as norms in that they represent behavioural expectations, though the respective behavioural expectations are fundamentally different (Heide & John, 1992).

Macneil developed nine norms or principles 'of right action binding upon the members of a group and serving to guide, control, or regulate proper and acceptable behaviour' (Macneil, 1980, p. 38). This expression explicitly accounts for the idea of a social mechanism. For a complete explanation of each norm Ivens' and Blois' paper is recommendable. However, what is important to note about MacNeil's framework is that norms do not erase individual freedom of choice but they do determine a range of expected behaviours. Norms thus provide the participants in an exchange with a degree of confidence that they know what they are doing and are thus a major factor in creating the atmosphere within which an exchange occurs. Where the parties to an exchange have such expectations regarding each other's behaviour it pays them to behave consistently. Consequently these expectations both facilitate and restrict the freedom of action of those involved. As Gloria-Palmero pointed out, norms 'do not erase individual freedom of choice but contribute to the convergence of plans by increasing the probability of one type of action within the choice set available' (Blois & Ivens, 2004).

There are two important things to say about MacNeil's place in the Lean Construction literature. Firstly, when Miles and Ballard use MacNeil's theory they seemingly apply an incorrect method on investigating contracts. Secondly, the essence of the norm based perspective relies very much on the problem of information. Because of lack of information on former and future actions not treated in contracts, norms have to be inserted. This type of mechanism is somehow related to trust in opposition to organizational mechanisms, mentioned in the preceding chapter. Norms of cooperation between interdependent actors have to be established, thus it remains vague, how these norms are established to mitigate the example Ballard and Howell are using. Besides this, there is a big gap of argumentation concerning the idea that overall project success compensation should create any norms of behaviour.

Organisational mechanisms vs. social mechanisms

Summing up on the two different kinds of mechanisms offered to the discussion of contract the organisational mechanisms have a monitoring character. For the social mechanisms approach it is the norm-based mechanism that is offered.

Tomkins (2001) in his discussion of the relationship between building trust through norms and using control mechanisms to absorb uncertainty from economic interdependence, suggests that "it is the level of uncertainty absorption effort that has to be related to economic interdependence, not trust per se" (p. 167). Thus, it is the magnitude of the transaction hazards that induces the use of

formal control mechanisms, while the level of trust only influences the strength of this association. (Dekker, 2004)

It must be more clearly recognised that the exercise of trust is an *alternative* uncertainty absorption mechanism to increased information. If information and trust are substitutable uncertainty absorbing mechanisms, it is clear that firms that are highly economically interdependent could strive to avoid collapse *either* by building higher levels of trust *or* by building more extensive control mechanisms with the associated increase in information (Tomkins, 2001).

In TCE, trust is considered to be a redundant concept. Governance structures that are observed in the organisational field are considered to be the result of purposive choice of (boundedly) rational actors. These actors try to foresee and 'calculate' behavioural risks (risks of opportunism) and then decide on the control structure. Insofar as they decide to accept these risks without putting control structures and practices in place, this could be viewed as the *acceptance of calculated risks* and, consequently, does not need to be labelled as trust. According to Williamson (1993), this notion of 'calculated risk' is more precise than the notion of 'trust'. The latter in his view adds nothing to the analysis, and, therefore, he suggests a moratorium on the term trust in the domain of economic transactions, which are calculative and governed by self-interest.

In the following case it will be showed that theories of social control mechanisms, are not necessary when deploying an organisational monitoring mechanism, at least in the particular case. Efficiency will potentially be more secured in the setting where organisational monitoring mechanisms are deployed. At the same time it will be argued that overall project success compensation is neither a necessary premise to an efficient construction project.

CASE

Following case is an illustration of a construction project where an organisational mechanism is deployed in order to mitigate information asymmetry, absorb uncertainty and counteract the dysfunctional coordination consequences of the fixed contracts related to interdependencies between contractors. The mechanism is the Last Planner System of Control, which is a Lean technique developed by Glenn Ballard (1994). The case illustrates that encounters facilitated by the LPS-meetings creates a coordination mechanism that transforms the coordination proposals found in the contract. The LPS both functions as a monitoring mechanism as well as a bonding mechanism, according to agency theory.

The case shows that the presence of fixed contracts and at the same time the special meeting structure facilitates motivated, dynamic planning mitigating information asymmetry. The case demonstrates alterations in sequences of individually planned activity executions. This is due to a realisation of a more complex cause-and-effect relationship between action and compensation than stated in the contracts. In that sense, the contracts are still directing action, but are losing their status as dominant coordination mechanism for prioritizing action. Necessary is it also to say that the project is at present time completed with success. It finished about two months before deadline and costs were balancing the budget.

In the following example we find a number of discussions leading to altered sequences of activity execution. This following episode is an extract of an LPS-meeting. The project is a renovation project where 150 bathrooms in a 30-year old building complex, comprising both apartments and

terraced houses are to be completely renovated. Floors, walls, plumbing installations and electricity are all subject to change. Attending the meeting is the project manager representing the main contracting company, the bricklayer foreman, the plumber foreman, the electrician foreman and the foreman housepainter. We come in when they are planning future activities to be done in the bathrooms:

Project manager: But bricklayer you are turning the apartments over in clusters of 6 next monday?

Bricklayer: Yes, then it fits into the system

Project manager: Yes, but you might think about turning some of them over Friday..

Bricklayer: We will try.

Project manager: If it is 3 or 2 is not so important

Plumber: Exactly! Because we would very much like just a few...

Bricklayer: Ready for Friday?

Plumber: Yes, if I can have just 3 Friday instead of 6 Monday.

Bricklayer: We can't stop that, because that's running..... Well, I will try to turn over 3 on Friday the 8th of December

Project manager: Yes, we have to split it up in clusters of 3-4 and not 6.

Bricklayer: But you have to understand, that if you have to break up the activity here and joint there, then you use unnecessary long time. We do like this, because then it is most rational, then we have a cluster, and then it is finished.

Electrician: But we have always run with clusters of 3...

Bricklayer: Sometimes we have done it with 4, sometimes something else.

Project manager: But clusters of 6?

Bricklayer: Alright, we will not do that. We will do anything possible, but we can't promise. We will try to have 151, 155, 157 ready.

Plumber: That would be genius.

Bricklayer: But I won't get beaten up, if we don't make it.

Project manager: No, but otherwise we wont be able to make it in time. How about you electrician?

Electrician: Well, if he has only got those 3 then I will have nothing to do Tuesday on apartments. But I have to go forward otherwise with switchboards.

Project manager: Yes, cant you just do that?

Electrician: Yes, but it was much easier in the beginning, when we did 2 apartments at a time and then moved on. We can't do that now. Now, we have to do the switchboard and pull the cables without installing it. And then come back later and install it.

Project manager: But earlier on you also installed switches and came back to do the switchboards. We haven't done that here until now, but we just have to return to the old method.

Electrician: Well, alright.

The above example shows first of all that these meetings carry a coordination significance. The participants' ideas about which activities to choose and when to do them are very much out of synchronization. The reasons for this are many:

First of all, for the bricklayer the most rational thing to do is to turn over 6 apartments. This is due to the fact that productive time for him is maximised – at least in the short run. When he and his colleagues can do 6 at a time, they decrease time and materials used on each apartment forming a kind of economies of scale. The bricklayers perform 3 different kinds of activities in this sequence, namely concreting the floor, tiling the wall, and jointing.

He and his colleagues have specialized in their own discipline perfecting their craft and minimizing time used on the activity. When the bricklayers have finished with this sequence doing the 6 apartments they shift over to another sequence, finishing that before returning to this former sequence. Decreased time used on change-over and less scrapped materials, increases the piece-rate as stated in the contract for the bricklayers. As a consequence they prefer to turn over 6 instead of 3 which would increase their change-over time and scrap leaving them with a worse piece-rate in the contract.

Doing 6 apartments at a time however, also leads to more inventory, meaning that the single apartments are waiting much longer for the single activities to be done. Therefore total lead time increases as a consequence of economies of scale for the bricklayer. This affects first of all the end customer, but as the example shows, both the electrician and the plumber are also affected. The plumber would prefer to have 3 on Friday instead of 6 Monday. As his capacity is two a day, he would finish Tuesday, if he got 3 apartments Friday and 3 on Monday. If he got 6 on Monday he would finish Wednesday one day later, again postponing the day of finishing. Besides that his own schedule would be delayed, he would have an unproductive day on Friday decreasing his piece rate.

The electrician is frustrated even though the aim is for the bricklayer to turn over 3 apartments on Friday. He has got a firm schedule stating that he has to install at least 2 apartments a day. Otherwise, he will not be able to finish the remaining apartments in time on his own. This means that he will have to contract another electrician to assist him, meaning that the utility of his own contract decreases. Nevertheless, he accepts to change work method realising that the option of 3 on Friday instead of 6 Monday would make him even worse off.

As we see for the 3 foremen, there is compensation at stake. None of the craftsmen are achieving seemingly full compensation potential as stated in the contracts. The meeting surfaces a lot of information about preferences, risks and relations between participants. The meeting increases the participants' awareness of dependencies, making them revise their own preferences about how and

when to execute activities. The outcome is that none of them are achieving optimal efficiency, but all of them have found a deal they can live with.

Information about the individual activities and crafts is surfacing to a great extent; because the craftsmen will be worse off if they don't share information on their own activity. As a natural consequence of this knowledge on the other parties dependencies and durations is also increasing among the participants in the meeting. The end result is that what we can call adversarial behaviour where craftsmen work to the detriment of the project as a whole is countered against by the effects of communication of information of interdependencies between the foremen.

The outcomes of this LPS-meeting seem to be consistent with Lean Construction literature. However, there are a number of premises that are to be in place in order for the LPS-meeting to be productive.

First of all the participants have to accept the information on dependencies as valid and important. Literature on peer pressure can help to specify this point. Kandel & Lazear (1992) mention two important premises:

- One member's effort must affect the well-being of the rest of the team for them to have incentive to exert pressure on him.
- The team members must have the ability to affect choices of one member.

The first component requires some form of profit sharing. In the case example the individualistic contracts are seemingly perceived as a kind of profit sharing compensation system since they accept to change work sequences because pressure from other participants. The pressure can be termed as external in that it is created when the disutility depends specifically on identification by others. The two premises rest on yet another premise, namely observability.

- The other team members have to be able to observe members actions.

This is partly done through the meetings where accounts of actions are expressed, and partly done through direct observations on the construction site, so-called mutual monitoring. The LPS therefore serves as a mechanism to control the actors in the construction project. Etzioni (1964) distinguishes three types of reactions from an actor facing a control system: (1) a positive reaction of commitment when the controlled actor has positive feelings towards the one controlling it; (2) a reaction of involvement when the controlled actor bases its relationship on the calculation of satisfying its interests; (3) a reaction of alienation when the controlled actor submits to control that it sees as contrary to its interests. Reaction 1 and 2 could also be seen as significant premises for the LPS to be an efficient coordination mechanism.

The meeting demonstrates a number of promises and obligations being made. The idea behind LPS is to let the foremen themselves make appointments not only with the project manager but more importantly with the other foremen. The idea is that foremen may empathise more with co-workers than with managers, which would decrease the risk of not keeping promises, and as a consequence of this, increase lead time.

In order for the LPS meeting to work as an efficient monitoring mechanism, there are issues of decision rights to be solved. Since the LPS-meeting is a constellation of foremen and the project

manager, and since this meeting is where decisions on future workflows are supposed to be made, the foremen also necessarily need to have the decision rights to revise plans, to acquire material and to increase or decrease manpower. In traditional construction projects the foremen are not given the rights to allocate manpower. These rights are reserved the conductors, who lack knowledge about the specific construction project but on the other hand possess knowledge about total company capacity. Therefore the conductor also should be present from a project efficiency perspective. In the specific case there have been problems of this kind. Either the foremen need to be given decision rights about manpower, materials and revision of plans, or the conductor needs to be present.

There are a great amount of efficiency ideas connected with the LPS; however, there is no motivational element in the mechanism in itself. In the specific case the fixed contracts create the motivation and dynamics that is needed for the LPS to be efficient. The LPS needs the 'adversarial' contracting system in order to create a dynamic meeting with motivated participants ready to share information. This does not rule out that other compensation systems could be efficient.

The Lean ideal is founded on Kaizen which is all about continuous improvement. The improvements could be manifold comprising revised activities and sequences, change of materials and so on. However, the fixed contracts already state the structure of assignments the participants are paid for completing. Therefore the contracts do not encourage ideas that could increase project efficiency but at the same time decrease compensation for the individual member. This could be the case in for example extra, prolonged or integrated assignments or more expensive materials. There is no mechanism in the LPS to mitigate this kind of information asymmetry between principal and agent. However, the existence of the extra compensation system can potentially compensate for this limitation. The case has shown that compensation for day's work is not as attractive as the compensation related to the ex-ante formulated contracts; therefore the participants are reluctant to share their ideas. Day's work compensation or extra work compensation could be more financially attractive such that ideas that might decrease the utility of the particular agent's contract to the advantage of the total project are compensated for by a revised contract or extra day's work compensation to the particular agent.

However, the risks of opportunistic behaviour also increases, if day's work compensation become more attractive for the agents than the incentives found in the fixed contract. This is an argument for separating these kinds of ideas from the extra compensation system, or implementing certain conditions.

A few dilemmas

Relating to the premise where one member's effort must affect the well-being of the rest of the team for them to have incentive to exert pressure on him, there is a dilemma concerning the finishing activities. These are not monitored by peers, because they do not have anything at stake if they are not completed at a certain point in time. A foundation of LPS lies in the idea that it is not the project manager that makes decisions. The project manager is actually only there to facilitate communication and make sure that conflicts are managed to the advantage of the construction project as a whole. However, when the specific premise is not fulfilled as in the case of the finishing activities, there is a dilemma. Data from the case shows that the manager then speaks in the name of the end user. There is a verbal agreement of a 5-week maximum duration of each bathroom.

However, throughout the project the end user argument has not always been strong enough to effectuate altered actions by the craftsmen.

Another dilemma relates to learning. The efficient work pace and sequences of activities are not stable throughout the construction project. In the beginning of the construction project the work pace is planned, by the help of simple calculations of deadline for total project divided by the number of bathrooms to renovate. As the construction project progresses, the participants become more time efficient at completing activities. Because of the compensation system they participants are expectedly eager to complete more assignments than initially projected.

This touches upon a recurring tension related to the Lean Production perspective; the issue on standardisation/improvement. It is extremely important that participants are secured by somewhat stable sequences, this is a main task of LPS, namely to secure assignments by avoiding external obstacles. However, in a Lean perspective it is also important to improve/change processes if something is learned by the participants. This potentially deteriorates the conditions for synchronization, which is the main purpose of LPS. Whether it is more efficient for the project as a whole to incorporate this learning into a revised schedule, or to not incorporate it would depend on a cost benefit analysis. However, it remains unresolved how project managers are to cope with this. The conclusion must be that LPS is more focused on stabilizing flow than embracing improvements that are not necessarily stabilizing flow.

The last dilemma to be mentioned in a fixed contract/LPS perspective is the trade-off between arguing for interdependency in the name of decreasing asymmetric information through the LPS, and trying to decrease interdependency in order to lessen the necessity of synchronisation. Which direction is to be taken? The overall goal must be to achieve an efficient production. After all, LPS-meetings are not value-creating in themselves. No bathroom is renovated at the meeting. Whether an efficient production is to be reached by decreasing interdependency or increasing interdependency is an unresolved question.

Conclusion

Social mechanisms of control are not necessary premises to achieving efficient construction projects. It has been demonstrated that the LPS decreased information asymmetry, and therefore also decreased the need for social mechanisms to be inserted into the context. From a relational contracting point of view one would probably argue that the case demonstrates norms of behavior that are in line with relational contracting theory. However, this case analysis has not drawn on relational contracting theory to argue for the mechanisms that were inserted. Instead it was demonstrated that agency theory is sufficient at explaining what made the construction project a success in this case.

Furthermore, the case also shows that the traditional standard contracting system is potentially as efficient as the new contract proposals stemming from the Lean Construction literature. One can argue that the specific case in this chapter is not complex enough in that production has a repeatable character, or its pure focus on the construction phase is too narrow. However, one just has to observe one meeting in this project to understand that complexity is definitely present. Overall project success compensation does not necessarily mitigate against adversarial behaviour. This paper has proposed that adversarial behaviour in terms of interdependency has to do with lack of information and contradictory ideas of efficient production more than purposeful intentions of

damaging other participants. An overall project success compensation will not necessarily change that because other problems such as issues of how to split bonuses and free-rider problems could arise.

The paper offers some ideas on how to perceive and categorize the concept of complexity in a control perspective. Issues on interdependencies have been the main focus in this paper, but also the extra compensation system has been put forward as a critical issue on complexity.

Lastly, the paper has addressed the interpretation by Howell & Ballard and Miles & Ballard of relational contracting theory. Traditional standard contracts could easily be relational, it is not about form but actions that form the symbolic meaning of contracts.

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