# Governing the project process: A conceptual framework

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# Governing the project process: a conceptual framework

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There has been considerable development in a process approach in construction management research in recent years. However, such work begs the question of how those processes are governed. Processes, be they flows of information or materials, need to be channelled in the desired direction as they are handed from team to team. This paper aims to present a conceptual framework for understanding the governance of construction project processes, drawing on transaction cost economics. Earlier attempts to apply this theoretical framework in construction management research have been partial, in that they have focused on only one type of transaction, typically that between client and principal contractor. This paper aims to be comprehensive in covering all the different transactions throughout the project lifecycle within one conceptual framework, and thereby it is hoped that more incisive empirical research can be developed and executed.

*Keywords*: Project processes, project lifecycle, transaction costs, project coalition, project governance

## Introduction

How are projects governed? In other words, how are all the different transactions that take place over the construction project lifecycle co-ordinated and controlled so that the client's requirements can be met? The aim of this paper is to provide a consistent set of answers to these questions, drawing on the body of literature known as transaction cost economics, and thereby to address the problem of the costs of doing business in construction. These answers will identify the varying roles of professional institutions, complex contracts, and control actors in governing the project process. It will also integrate this analysis with the governance of supply chains, decisions to subcontract, joint ventures, and the supply of human resources. Thus the paper will offer a comprehensive perspective on transaction governance of construction projects. It is an essential complement to the research on the project process, for project processes are not independent entities: they require effective governance in order to deliver value for the client (Winch and Carr, 2001).

The process of governance refers to practice on specific transaction sets: the microanalytical level. Williamson (1996) distinguishes this from the broader set of issues at the macroanalytical, or institutional, level, which set the 'rules of the game' in the national business system and the broader socio-economic context. The range of governance options open to any firm is limited by the institutional context within which it trades. Bowley (1966) pioneered the institutional analysis of the construction industry business system, while Winch (2000a) provided a review of research in the area. The focus of this paper is on the microanalytical governance level, for which it will propose a conceptual framework to facilitate the more trenchant analysis of construction project governance.

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## Understanding the governance of project transactions

In the classic definition, a transaction occurs whenever 'a good or service is transferred across a technologically separable interface' (Williamson, 1981, p. 552). A technologically separable interface is one that is not constrained by the nature of the production technology – in other words, the production technology chosen does not foreclose the possibility of allocating two different parts of the production process to different parts of the organization, or to separate organizations. The fundamental insight of the transaction cost approach is that in order to economize on the total cost of a good or service, both production costs and transaction costs must be taken into account. Thus total costs are the sum of the costs of production and the cost of governing the transactions inherent in that choice of production technique. A production technique that has the lowest production costs might not be the economizing choice if transaction costs are also taken into account.

The transaction cost approach takes the economics of production as read: it regards them as important, but already well understood. It focuses, instead, on understanding the drivers of transaction costs. The basic framework was first presented by Williamson in 1975, and has been elaborated since without losing its initial insight. The elaborated framework consists of three elements:

- contingency factors, i.e. the features of the transaction under consideration, which are uncertainty, frequency and asset specificity;
- behavioural factors, i.e. the ways in which managers typically respond to those features, namely bounded rationality, learning[1] and opportunism, respectively; and
- context, originally called 'atmosphere' by Williamson, i.e. the institutional context within which the transaction is embedded, which in turn is situated within the broader national socio-cultural context.

This framework is presented in Figure 1, and shows how the appropriate choice of transaction governance mode occupies a three-dimensional space as a function of the three contingency factors. These factors are only troublesome in interaction with each other: remove uncertainty, and complete contracts can be written in advance to negate opportunistic behaviour arising from asset specificity; remove asset specificity, and negotiations to handle unforeseen events can take place when they occur. Frequency is the critical factor in determining the return on investing in transaction-specific governance modes. Differences in institutional context will shift the whole space.

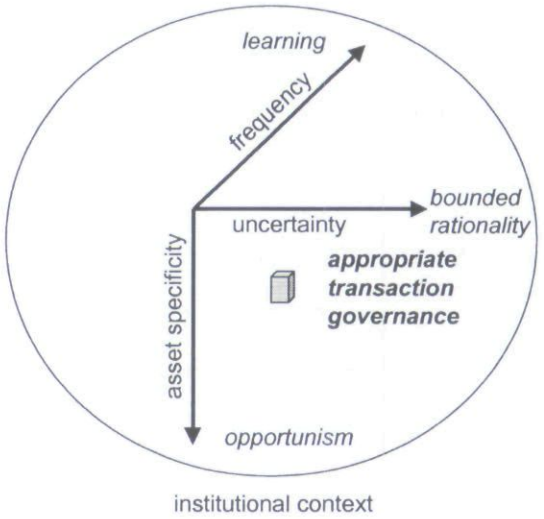


**Figure 1** The transaction governance framework

There have been a number of attempts to apply this type of framework to the construction industry over the years, such as the work of Eccles (1981a), Reve and Levitt (1984), Winch (1989, 1995), Masten *et al.* (1991), Pietroforte (1997), Walker and Lim (1999), Lai (2000). However, these attempts have all been partial in the sense that they have tended to focus upon a particular transaction, usually that between principal contractors and clients, rather than examining the full range of transaction governance modes over the project lifecycle. This paper builds upon and synthesizes this work, and draws upon some recent developments in institutional economics and economic sociology, to propose a coherent conceptual framework which encompasses the entire project lifecycle. This is important, because for too long our understanding of the project process through the lifecycle has focused on particular transactions, typically principal contractor procurement, without placing that transaction in the broader project process context.

## The project process

The project process is, in essence, a process of the progressive reduction of uncertainty through time, and is one of the fundamental business processes in many industrial sectors, including construction. Although this process can be divided into five first-order business processes, and many more second-order ones (Winch, 2000b), our concern here is with the management of the project process as a whole. This idea is presented in Figure 2, showing how the project starts with very high levels of uncertainty at inception, which are reduced until all the information required for the project is embodied in the constructed product.

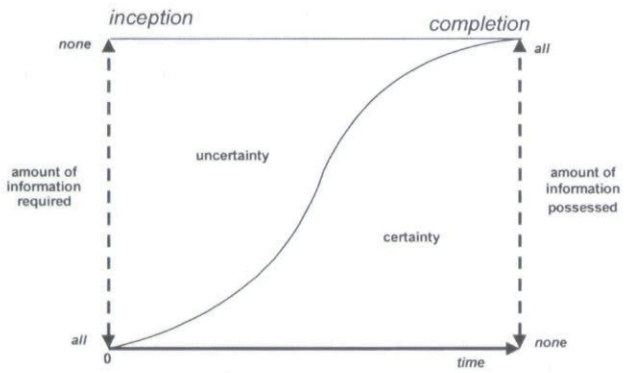


**Figure 2** The project process as the dynamic reduction of uncertainty through time. Source: Winch *et al.* (1998)

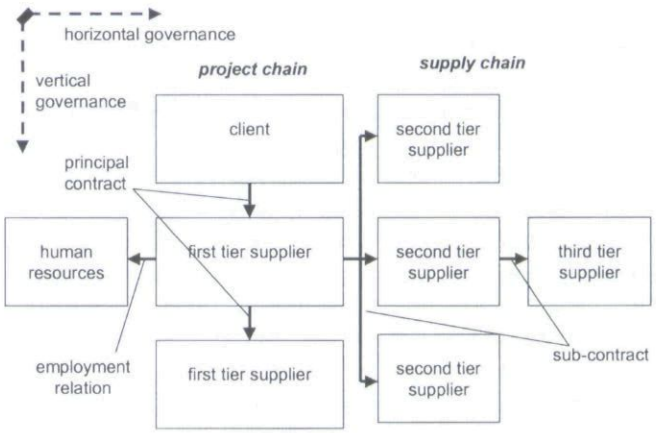


**Figure 3** Vertical and horizontal transaction governance in the construction project value system. Source: Winch (2002)

This process of uncertainty reduction is also a process of value generation: the project coalition is a value system in Porter's (1985) sense. However, it is a value system with two dimensions that reflect the inherent matrix nature of project organization. Porter's analysis is implicitly based upon the model of volume manufacturing, where typically the customer has a single point of interface with the production process. In complex systems industries such as construction (Hobday, 1998; Winch, 1998a), clients tend to interact with multiple actors in the value system, i.e. their 'line of visibility' (Winch *et al.*, 1998) into the production process is much deeper. Thus the value system has two dimensions, a vertical one of all the actors in direct contract with the client and a horizontal one through which each of those actors fulfils its responsibilities towards the client (Campagnac *et al.*, 2000). The vertical dimension can be dubbed the 'project chain'. The horizontal dimension consists of either the deployment of in-house resources through an 'employment relation', or by sub-contracting through the 'supply chain'. This is illustrated in Figure 3, which shows the two dimensions of the value system in construction. The sum total of firms in the project chain and their respective supply chains forms the 'project coalition' (Winch, 1989, 2002).

This framework allows us to identify more precisely the effects of the different contingency factors on transaction governance on the construction project. 'Asset specificity' is not usually an issue in construction before the contract is made: typically there are large numbers of suppliers for any construction service that a client may require. The problems of asset specificity arise post-contract through what Williamson calls the 'fundamental transformation' (1985, chap. 3). Once a supplier has started work, then typically the costs of replacing that supplier are quite high, both in straight financial terms and perhaps more so in terms of project progress. A particular problem on projects is what Masten and his colleagues (1991) call 'temporal specificity', i.e. the ability of suppliers to hold up the project programme and hence disrupt the production of other suppliers. Thus clients are exposed to the costs of opportunistic behaviour up to the full replacement cost of the supplier or, conversely, suppliers make transaction specific investments which would have to be written off if they abandoned the project (Winch, 2002). Typically, transaction frequency is low in construction, often effectively unity for most client/supplier dyads. However, as we shall see, this is one of the areas in which many clients are making changes with the aim of achieving learning benefits.

The conceptual framework will now be developed with reference to the UK case. For a general overview of the institutional development of the UK system, the reader should refer to Winch (2000c). However, it is within the scope of the framework that different national institutional contexts may entail differences in choice of governance mode, and this is planned to be the subject of a future paper.

## Vertical transaction governance

How are projects governed in the vertical dimension of the project chain? In answering this question, we can hold transaction frequency constant.[2] The answer is then driven by the levels of uncertainty and post-contract asset specificities under which the transaction is made. By reference to Figure 2, it can be seen that in the early phases of the project, uncertainty is relatively[3] high, while post-contract asset specificity tends to be relatively low. These are typically the transactions related to the supply of design services: initially for conceptual design and later for more specific design services related to aspects of facility functionality. Asset

specificity is low because relatively little money has been spent, and the client has effectively acquired the information associated with the design. Even if the designer's contract is terminated, the effect is to eliminate that supplier's design solution from consideration, thereby reducing uncertainty.[4]

In the later phases of the project, uncertainty tends to be lower, while post-contract asset specificity tends to be a lot higher, particularly due to temporal specificity. These are typically the transactions associated with the supply of execution services on site. Uncertainty is much lower because the essence of the design process is to narrow down the many options for meeting the client's requirements to a single one, or at least a relatively narrow menu of options. However, post-contract asset specificity is much higher. As many clients know only too well, the costs of replacing a contractor mid way through the project are high in terms of both programme and budget, and are best avoided.

Williamson (1985, p. 75) himself notes in passing the role of the professional in transaction governance when he identifies the role of the architect in governing transactions with contractors, but is silent on how the transaction between the architect and the client is itself governed. The essence of this professional governance is captured in the memorandum for the foundation of the Association of Consulting Engineers, the UK trade association for engineering consultancy firms, in 1913, as follows: '[An engineering consultancy devotes itself] to advising the public on engineering matters or to the designing or supervising the construction of engineering works, and for such purposes occupies and employs [its] own office and staff, and is not directly or indirectly concerned or interested in commercial or manufacturing interests such as would tend to influence [its] exercise of independent professional judgement in the matters upon which [it] advises' (cited Rimmer, 1988, p. 761).

Our argument is that for transactions in which there is great uncertainty about the supply of design services which Williamson would predict would be internalized and governed hierarchically, an alternative is available where hierarchy is not possible due to low transaction frequency nor desirable due to public policy considerations. This option is 'professional governance', which has the following features.

- Purchasing design services separately from construction services greatly reduces the possibility of opportunism due to asset specificity after the fundamental transformation. The contracts for the remaining 95% of the value can be let once uncertainty has been considerably reduced.
- Professional firms offer 'standardized intangibility' (Larson, 1978) of the service offered, i.e. clients do not know what they will get, but they know how it will be achieved due to formal work plans established independently.
- Redress in the case of poor performance is available to the client through the professional institution (e.g. Institution of Civil Engineers), which takes responsibility for regulating the formation and practice of its members.
- Liability is unlimited and personal.
- It offers a form of high trust relation between parties who do not know each other; reputational effects are paramount and generated collectively by the professional institution, supported by the universities which form the professionals.

Turning now to transactions later in the project lifecycle, Stinchcombe (1985, 1990) developed a penetrating analysis of how complex contracts (known in the UK as standard forms of contract) turn market into hierarchy in his analysis of procurement for North Sea oil facilities. He argues that governance problems arise from:

- difficulties in the prediction of the client's desire for contractor performance;
- uncertainty about the costs of performance, resulting in the client retaining the right to alter performance criteria through the project lifecycle; and
- inability of the client to clearly measure the relative performance of the separate (in the vertical dimension) members of the project coalition.

Due to these problems, he argues, complex contracts are written in such a way that they achieve hierarchical effects by:

- specifying authority systems to facilitate change;
- providing incentive systems to motive the project actors;
- using administered pricing systems to handle uncertainties such as bills of quantities;
- providing conflict resolution procedures; and
- providing standardized operating procedures.

Recent innovations in construction contracts in the UK have focused largely on these issues: conflict resolution procedures in the case of the Housing Grants, Construction and Regeneration Act of 1996, and incentive and authority systems in the case of the Engineering and Construction Contract of 1995.

However, there is another aspect of governance later in the project lifecycle that Stinchcombe does not explore explicitly, but is identified by Williamson

(1985), namely 'trilateral governance', or the use of third parties to facilitate the governance of the transaction. This is a distinctive feature of transaction governance in many project-orientated industries (Maher, 1997). As noted above, Williamson identifies the role of architects in governing complex construction contracts. These third parties, also known as control actors (Winch and Campagnac, 1995), perform three roles for the principal actors joined in contract under conditions of high post-contract asset specificity.

- They verify the satisfactory performance or otherwise of the contract – their 'independent' professional status provides a source of verification that is relatively acceptable to both parties to the contact, although it is accepted that they act first and last for the client, rather than the contractor.
- They facilitate negotiations when it is necessary to renegotiate the contract due to changes in client requirements, or unforeseen problems in project execution.
- They can provide a first line of dispute resolution before the dispute goes outside the project coalition to the legal system and into the escalator of adjudication, arbitration, and litigation.

In the UK system, there are two control actors, the architect or engineer for quality of conformance, and the principal quantity surveyor (PQS) for programme and budget. Thus the architect or engineer must be satisfied as to the quality of the execution of the works against specification, and sign off the certificate of completion, as well as approve variations to the specification should changes be required. Similarly, the PQS generates the bills of quantity that facilitate change and remeasurement, and approves stage payments to the contractor against work completed.

Our argument here is not that these arrangements always work well. Indeed much recent commentary on the organization of procurement suggests that they do not. Reve and Levitt (1984) argue that they generate layers of surveillance within the project coalition, while Curtis and his colleagues (1989), and Winch (2000c) argue that they create a vicious circle of transaction cost generation which becomes self-defeating in terms of the client's objectives of minimizing the sum of production and transaction costs, as illustrated in Figure 5. However, it is important to understand the governance problems that the third parties are there to solve in order to be able to offer more cost-effective solutions.

Another element of governance is the ability to develop credible commitments between the parties, which usually take the form of various types of hostage (Williamson, 1985, chaps 7, 8). In construction, hostages are not particularly important at the early project phases. The opportunity costs of replacing a non-performing designer are relatively trivial, and even if the supplier retains the design information generated, the client will have reduced considerably the level of uncertainty through the elimination of non-viable product options. The most credible commitment here is the reputation of the supplier. For a professional firm to lose its reputation for consummate project execution is a serious, and sometimes fatal, penalty. Such fears create incentives for performance. In the later stages of the project, formal hostages are often used. These take the form of bonds issued by the supplier, and held in trust for the client to be called in if the project is not executed as agreed. Retention payments perform a similar function.

## Horizontal transaction governance

Once the contract between a client and its supplier has been formed, such a supplier must then decide how to mobilize the resources required to fulfil their obligations to the client. Those resources may be internal or external to the supplying firm: they may be the firm's employees and own equipment, or they may be subcontractors and hired equipment. This is the classic make or buy problem that is at the centre of transaction cost economics. While buying may economize on production costs due to the opportunity to put suppliers into competition, it may well generate transaction costs due to the problems of writing complete contracts. Making in-house may well economize on transaction costs, but the lack of competition and specialist skills may well lead to production inefficiencies.

### Horizontal hierarchical governance: the employment relation

The 'make' solution requires the employment of staff and investment in equipment. Williamson (1975, chap. 4) argues that there are two basic solutions to the employment of staff, sequential spot contracts and internal labour markets as a sophisticated form of authority relation. Sequential spot contracts are when staff are hired as and when needed on determinate contracts and, typically, paid flat rates or lump sums for the work. With internal labour markets, staff are hired only at specified 'ports of entry' and then retained on indeterminate contracts, motivated through incentive payment systems and opportunities for promotion. While sequential spot contracts possess considerable production efficiency benefits, 'where tasks are idiosyncratic, to a nontrivial degree . . . the feasibility of sequential spot market contracting breaks down' (1975, p. 68). In essence, the use of sequential spot

contracts is efficient only where skills are completely generic and freely available in an undifferentiated pool, and no learning takes place during task execution that is of value to the firm. Atkinson (1985) provides a useful elaboration of this argument in his model of the 'flexible firm', distinguishing between the core group of the workforce, who are part of the internal labour market and offer functional flexibility (such as job mobility and multi-skilling), and those on various forms of sequential spot contract, such as temporary workers, agency workers, and the self-employed who offer numerical flexibility.

Construction is notable for being one of the major industries to use sequential spot contracts extensively, while their use is only peripheral in manufacturing. This is the essence of Stinchcombe's (1959) classic analysis of the craft (construction) and bureaucratic (motors) organization of production – sequential spot contracts are economizing in the former, while internal labour markets dominate the latter. Perhaps the most basic form of sequential spot contract is labour only subcontracting (LOSC), typically on a self-employed basis, where workers are paid lump sums for the completion of a specified task (Winch, 1986, 1998b). However, the maintenance of the conditions under which it is economizing (fully generalizable skills and no learning from task execution) restricts innovation and undermines the development of those generalizable skills. In countries where LOSC and self-employment are unlawful, various other options, such as casual employment, are deployed, to which the same arguments apply.

The transaction cost literature does not, so far as I am aware, directly address the own or hire decision for plant and equipment. However, the contention here is that similar arguments apply to this decision regarding capital resources as to that for human resources. Where plant is completely general purpose and no learning is required by the firm, the hire option is economizing, and where firm-specific adaptations to plant and equipment are required, and learning is required in its idiosyncratic use, then the purchase option is economizing. Similarly, the decision to hire plant can be expected to stifle innovation, compared with the decision to buy plant which can then be adapted to the specific production needs of its owners.

### Horizontal market governance: the supply chain

We turn now to the other main option for horizontal governance, the decision to subcontract. Horizontal governance in construction has always involved market transactions for the supply of specialist skills and services. Trades such as roofing, for instance, traditionally have been the province of specialist rather than general contractors. Our concern here is to understand the variety of different external governance modes for different trades. There has long been a debate about why construction firms subcontract. For example, Ball (1988, chap. 5) and Stinchcombe (1959) argue that it is to manage 'variability', whereas Eccles (1981b) and Üsdiken and his colleagues (1988) argue that it is driven largely by specialization to achieve production efficiencies through economies of scale and the learning curve.[5] Recent developments in supply chain management suggest that both could be right, depending on the trade supplied. Segmentation of the supply chain into those suppliers that are relatively critical to the buying firm's operations, and those which are less critical and can be treated as a commodity is central to effective supply chain management (Dyer *et al.*, 1998).

Various models are available for achieving this segmentation. Dyer and his colleagues argue from their research in the car industry that where uncertainty and asset specificity are low, quasi-markets are preferred, and when they are higher, quasi-hierarchies are preferred. Implicitly in their model, transaction frequency is high in both cases. Focusing on construction, Cox and Townsend (1998, Figures 3.1, 4.2) offer a matrix based on transaction frequency ('type of spend') and asset specificity ('potential market difficulty'), but their focus is vertical governance, rather than horizontal governance, which precludes, for instance, the option of forming a consortium. As argued above, our concern is focused here on the relatively low uncertainty transactions later in the project lifecycle, and so we shall focus on the frequency and asset specificity options. Figure 4 identifies the external horizontal governance options for the management of the supply chain under relatively low uncertainty. Where both frequency and post-contract asset specificity are low, sequential spot contracts (traditional trade subcontracts) will be favoured. As transaction

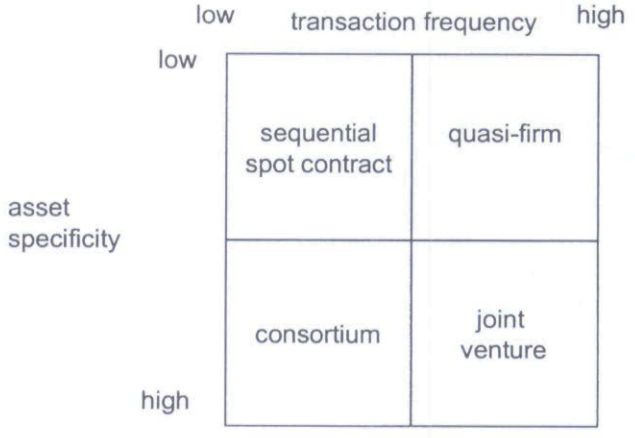


**Figure 4** Horizontal external governance options

frequencies rise, other options become available, most notably that of the quasi-firm (Eccles, 1981a), where trade subcontractors are offered repeat contracts conditional on satisfactory performance.

Where asset specificities arise, greater attention needs to be paid by the principal contractor to mitigating problems of opportunism by the subcontractor. One of the most common ways of doing this is to enter into a collaborative relationship, such as a consortium or joint venture (Winch, 1995; Tsang, 2000). These both enable the sharing of risks between the subcontractor and principal contractor (Clark and Ball, 1991), thereby minimizing opportunistic behaviour by the owner of the specific asset at the cost of the principal contractor. The distinction deployed here between a consortium for a one-off alliance and a joint venture for a continuing relationship is the standard one in the economics literature. The most notable shift between the traditional subcontract and the quasi-firm on the one hand and the consortium and joint-venture on the other is the formal sharing of risk and reward between the parties in the latter, whereas the former typically constitutes a transfer of risk from the principal contractor to the subcontractor.

One of the major issues in horizontal governance is the changing role of trade contractors, some of which are becoming increasingly involved in design. In effect, this places horizontal governance considerations on the agenda earlier in the project lifecycle, and hence raises the level of uncertainty under which such trades are procured. One of the ways that principal contractors can handle these developments is to move towards a quasi-firm-type arrangement through raising transaction frequency.

## A note on power and trust

Up to this point, the argument has accepted Williamson's definition of economizing as the criterion for choice of transaction governance modes. However, this assumes that 'economizing' can be defined unambiguously in a context when the choice is made through, as Williamson (1975, chap. 2) argues, satisficing rather than optimization. In the context of bounded rationality and 'satisficed' decisions, the possibility of genuine debate over the economizing choice remains open. Where such differing views are held, they can be resolved in order to arrive at a decision either through the generation of consensus or the exercise of power, where power is defined as having three faces (Lukes, 1974):

- the ability of A to directly influence the decision by B (overt power);
- the ability of A to set the range of choice available to B (agenda setting); and
- the ability of A to create a culture in which B does not consider options unacceptable to A (hegemony).

One of the most consistent criticisms of the transaction cost approach in general, and Williamson's work in particular, has been its rejection of the proposition that power-seeking provides the principal reason for the development of the employment relationship (e.g. Perrow, 1981). Williamson's own attempts to rebut his critics on this point (e.g. 1985, chap. 9) remain some of the most unconvincing parts of his work. Our position here is that because of the problem of bounded rationality, alternative options for the economizing choice of governance mode may be viable, and that in order to resolve such alternatives frequently the exercise of power is required.

Power considerations have the greatest influence on governance mode in the horizontal dimension. This is clearest in the employment relation, a point that Williamson (1985, p. 272) would appear to accept. Put simply, firms can exercise more power over workers they employ than those they do not, and therefore can impose their own definition of efficient work organization on those workers. However, it is also an important factor in external horizontal governance. Indeed, the shift from traditional subcontracting to supply chain management is first and foremost about the exercise of power (Lamming, 1996).

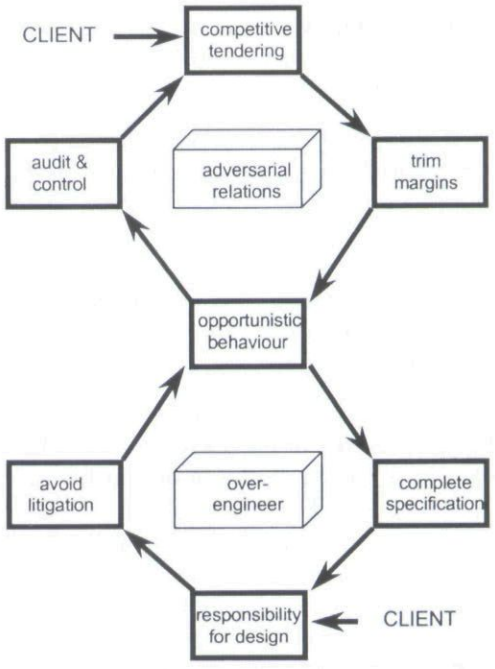


**Figure 5** The dynamic of adversarial relations and over-engineering. Source: Winch (2000c)

Power considerations also play a role in vertical transaction governance. Some clients are starting to use supply chain management principles to govern the project chain,[6] thereby reducing reliance on complex contracts. Cox and Townsend (1998, chaps 4, 13) discuss the case of Rover's Effective Cost Management (ECM) supplier partnerships. Under ECM, three principal contractors have been selected which then undertake programmes of construction work for Rover, allocated according to capacity and performance on earlier projects. Standard forms of contract have been replaced by a short partnership agreement, while projects are run on an open-book basis giving the client access to their suppliers' input costs, with agreed profit levels and the client retaining all cost savings. Through these means, Rover has achieved 'a hierarchical structure of dominance and control over its suppliers' of construction services. This is reinforced by the client retaining elements of trilateral governance through using cost consultants to benchmark their suppliers' costs. This one-way openness is not reciprocated, for instance, by Rover telling its suppliers the true value of the facility to it, thereby allowing a more equal negotiation over costs and levels of profit.

An important aspect of transaction governance choice is the level of trust between the parties. In the context of transaction governance, trust is the confidence that the parties to the transaction will not take advantage of asset specificities to behave opportunistically (Lyons and Mehta, 1997), either by withholding information or seeking monopoly rents. Where transactions are made under high uncertainty, trust is essential for their effective governance (Nooteboom *et al.*, 1997). Two types of trust can be distinguished (Lyons and Mehta, 1997):

- self-interested trust, which essentially is future orientated in terms of the expectation that one's transaction partner is trustworthy and will not behave opportunistically in future transactions; and
- socially orientated trust, which is past orientated in that it is generated through obligations generated through social and family networks.

Self-interested trust predominates in business transactions, but can be supported at crucial points by socially orientated trust.[7] The generation of self-interested trust is largely a function of frequency, because only through repeat transactions can parties come to know each other, and only when there is the prospect of further transactions does enlightened self-interest preclude opportunism. In terms of the transaction governance framework presented in Figure 1, self-interested trust is a feature of appropriate transaction governance, while socially orientated trust is more a feature of the institutional, or even socio-cultural, context. However, Lane and Bachmann (1996) have identified the role of trade associations – which essentially are part of the institutional context – in generating trust in between transaction partners. This supports our earlier identification of the role of professional institutions in transaction governance in construction. Where the parties do not know each other, the professional governance of transactions offers considerable advantages: its trust-inducing properties generated by professional validation and grievance procedures, professional codes of ethics, and the central importance or reputation in supplier selection all favour the generation of trust between parties which do not know each other.

## Towards a research agenda in construction project governance

Much of the work in applying the transaction cost approach to construction has been conceptual. In this, it shares much with the field more generally. Obtaining good quality data on the 'costs of doing business' is difficult, in that firms do not routinely collect these data, resulting in transaction costs being the 'hidden factory' (Miller and Vollmann, 1985). As a result, typically the influence of transaction costs on managerial decision-making is based on perceptions of the relative transaction costs of alternative governance modes, not hard data (Buckley and Chapman, 1997). However, the body of empirical work on the economics of transaction governance is growing (Shelanski and Klein, 1995; Masten, 1996), and methods are being developed of operationalizing the propositions deriving from the theory. Perhaps the work that is of most immediate relevance to the governance of construction projects is that of Masten and his colleagues (1991) on naval construction. They reconstructed internal management accounts through manipulation of existing data, complemented by interviews, to enable regression analyses to be performed. Chang and Ive (2001) have also done important development work in analysing the options for the empirical analysis of alternative governance modes.

## Conclusions

This paper has proposed a conceptual framework for the governance of transactions through the construction project lifecycle that combines the presently diverse perspectives of construction law, economics, and management. It is, thereby, hoped that specialists in each of these three areas can now develop a full analysis of how projects are governed within a common

conceptual framework. The task now is to develop this conceptual framework so that it can explain the full diversity of construction project governance modes both within and across different national institutional contexts.

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## Endnotes

1. Williamson and his followers tend to ignore transaction frequency in their analyses, and Williamson himself never associated a behavioural factor with it. I propose learning as that missing behavioural factor.
2. In others words, we are assuming that no members of the project chain have partnering agreements with the client.
3. The comparator here is within the project. The overall levels of uncertainty on projects, even towards their close-out, are very high compared with, for instance, manufacturing cars, or providing insurance.
4. This process is very clear in architectural competitions where clients use the various proposals to 'fish' for good design ideas, and pass them on to the winning architects – the experience of the Tate Modern project (Sabbagh, 2000).
5. Eccles actually argues in critique of Stinchombe's (1959) article that complexity is the problem, rather than variability. However, all his data and the formulation of the problem suggest to the present writer that his argument is based more on economizing production costs rather than transaction costs.
6. Slough Estates is a well-known example.
7. The classic problem is how to govern the last transaction in a series. If self-interested trust relies upon the expectation of future relationships, yet it is known that this is the last time the parties will do business, then the whole development of self-interested trust can unravel.