

Interview notes

A summary of interview responses is provided for each of the 14 industrialists who participated in the empirical research. These summaries are paraphrases of the industrialists' comments. They have been written in the author's own words from notes taken both during and after the interviews.

Section 4.3.4 reported that it was decided not to tape record the interviews because some of the industrialists expressed concerns about confidentiality. It was also believed that the relatively informal approach to the interviews led to a better quality of data.

Each industrialist's summary of interview responses has focused upon the key responses to each question area. For each industrialist, these key responses are presented in the chronological order that they were made during the respective interview.

The industrialists who completed questionnaires provided interview responses that justified the estimates that they made in the questionnaires. These interview responses were reported in section 4.4.3.

Question Area	Key comments from industrialist P2
3	A contract will have some form of impact on each of the listed cost and time elements. Some types of contractual arrangements may not be suitable for the particular type and size of project. Therefore additional costs and delays will arise if an inappropriate contract strategy is selected.
2	It is impossible to know what impact a contract strategy will have on a project at the beginning of a project. There are too many decisions, events and people involved to attempt to estimate a contract's likely effect upon a project. It may be possible to hazard a guess when more is known about a project. For example, it may be possible to estimate whether a particular clause in the contract documents will have a positive or negative effect upon cost and time.
8	If it was possible to quantify the cost and time differences between contract strategies, little knowledge would be gained because this data would not apply on future projects.
1	<p>At the outset of a project, any decision has to rely upon experience. Decisions about which organisations to involve in the project and under which type of agreements are often made automatically. This is because there are certain procedures and contract forms that we are accustomed to using. JCT80 and JCT81 are the typical contract forms used, but we have used ICE 5th and JCT87. The decision also depends on which contract forms the client has had experience, if any, of using. Clients are particularly keen to introduce their own clauses into standard contract forms.</p> <p>From the type and size of a project, certain contract strategies are ruled out. The decision process typically addresses the client's requirements. Most client's are keen to stipulate a completion date. Although project price is regarded as important by all clients, many clients appear to appreciate that the final project price is subject to a great deal of uncertainty at the beginning of a project.</p> <p>Different contract strategies have different likelihoods of achieving the client's price, time and quality objectives.</p>
4i	On most projects, a contract strategy that facilitates fast-track construction is expected to reduce a project's duration relative to a strategy that requires the design to be completed before construction begins. However, fast-track construction is expected to generate additional costs. An estimate of the potential time saving and additional costs at the beginning of a project would be very unreliable.
4ii	A contractor will normally demand a higher mark-up for a fixed price type contract than a cost reimbursable type because the contractor is exposed to more risk if a fixed price is agreed before the work is undertaken. It is not uncommon to estimate the contractor's mark-up, but this estimate would not usually be made until the tender stage.
4iii	Early involvement of a contractor can generate some cost and time savings, but the contractor's actions that induce these savings cannot be predicted. Estimates that account for the contractor's efficiency-improving actions may be possible once the contractor is appointed.
4iv	It is not possible to reflect the type of client in estimates of a project's likely cost and time performance. It is impossible to predict what a client will do. At the project outset, even the client doesn't know his level of involvement.
5	I think it would be very difficult to incorporate a contract strategy's possible impact upon a cost/time element in any type of estimate. I appreciate that probability distributions can account for some uncertainty, but there is probably too much uncertainty surrounding the estimates
6	I am prepared to look over the questionnaire in my own time. I expect that once I have consulted with colleagues we will attempt to complete the questionnaire [Questionnaire 1B].
7	Data of the type presented in the figure would be very helpful to the contract strategy selection process. However, the results incorporate all of the untested assumptions and prejudices upon which the cost and time estimates are based. Therefore it is considered that even if the quantitative approach was feasible, the attainment of these results is not sufficient justification for the additional effort required in comparison to the normal approach to contract strategy selection.

Question Area	Key comments from industrialist P3
1	<p>It is simply not possible to select from the full range of available contracts. We use standard forms that we are accustomed to using and which our clients want to use. Our clients can have strict policies about which contracts to use.</p> <p>Different contract types are expected to influence the price and duration of a project. The contract strategy decision is based upon the suitability of a contract strategy to the particular circumstances of a project. A contract's suitability is ultimately measured in terms of whether it will help the client achieve his desired price, duration and quality.</p>
2/3	<p>Given that cost and time are the main decision criteria, the quantitative approach, initially, sounds feasible.</p> <p>It is possible that, at the outset of a project, one may have an instinctive feel about the effect that a particular contract will have on each of the listed cost and time elements. It may even be possible, in certain projects, to estimate the overall price and duration of a project if the project was to be procured using different contracts. The accuracy of these estimates would be improved if it was possible to consult with a contractor.</p>
1	<p>Although a particular contract may be expected to enable the client's price, time and quality requirements to be achieved, there are often other constraints that govern the decision (e.g. when the client's funds are available and what sources of contingency finance are available).</p>
4i	<p>It would be possible to give an approximate estimate of the time saving generated by fast-track construction especially if it was possible to consult with a contractor. Fast-track construction can produce many problems. Therefore an estimate of the possible time impact would be different from one project to another.</p>
4ii	<p>A contractor will normally apply a fairly standard percentage to his cost estimate to account for his risk and profit margin. On average, I would guess this percentage is about 5% to 10%. A higher percentage is expected if the client is required to enter into a fixed price, rather than a cost plus type contract. Although it is possible to make an intelligent estimate of a contractor's mark-up, it is often very difficult to estimate a similar value of the contract cost as that estimated by the tenderers.</p>
4iii	<p>Many project benefits can result from involving a contractor at a very early stage in a project. In some projects, a contractor's involvement at the early stages has no effect and sometimes even a negative effect (it can require excessive administration). At the outset of a project it would be difficult to predict whether the contractor will have a positive or negative effect.</p>
4iv	<p>You cannot always predict, at the beginning of a project, the extent to which a client will get involved in a project because it depends upon how the relationships develop between the client and the contracted parties. It is very possible that a single event during construction can create a bad atmosphere which may lead to a lot more client participation during the remainder of the project.</p>
6	<p>Providing that it is understood that any quantitative estimates would be highly intuitive, I am prepared to estimate the probable effect that different contract strategies could have on a project's set of cost and time elements. I will complete the questionnaire[Questionnaire 1B] outside the interview.</p>
7/8	<p>I like the fact that the results show a distinct difference between alternative contract strategies.</p> <p>There is scope to improve understanding about the effect that contract strategies have on the cost and time performance of projects. Owing to the explicitness of the results, they may prove to be a useful reference for contract strategy selection on future projects. I would prefer to undertake a more rigorous decision process than that normally undertaken. During the early stages of a project, important issues often do not receive the attention that they deserve. If the contract strategies were less complex and it was possible to confidently select an appropriate contract strategy we would not hesitate to consider a broader range of contract strategy alternatives when the decision is made.</p>

Question Area	Key comments from industrialist P4
1	<p>Contract strategy selection is a very difficult and subjective decision. It is a widely discussed subject, but it is suspected that in practise the decision does not receive the same degree of attention.</p> <p>Everybody has their own opinions about the conditions in which particular procurement methods should be selected. You have to base the decision upon personally gained experience. Even though every project is different, certain categories become apparent. The main project type categories refer to cost, complexity, and client type.</p> <p>Many decisions made at a project's outset tend to be regarded, by the industry, as fairly innocuous. However, decisions made at the beginning of projects are often crucial.</p> <p>Sometimes clients prevent us from giving early project decisions the attention that they deserve. When we are appointed as client advisers we offer the benefit of our experience. We make decisions for the client and sometimes it is better not to consult with the client on every issue because of the time pressure which exists at the beginning of projects.</p> <p>It is crucial to obtain a clear and comprehensive specification from the client. All decisions must make reference to this information. This information must include what the client wants in terms of final cost and duration. Quality tends to be less important than cost and time.</p> <p>I distinguish between procurement methods in terms of their capacity to obtain a firm price and fast-completion. These objectives are often regarded as the most important to clients.</p> <p>A contract strategy effects whether a project is completed successfully or not, but it is not the only factor. A major factor is which organisations are involved in the project.</p>
2	<p>It may be possible to estimate the final price and duration of a project if it were to be procured using different procurement methods. I have never attempted it, but if I reviewed BCIS records, it may be possible to identify a relationship between contract strategy types and the cost and time performance of projects.</p>
3	<p>It would be impossible to estimate precisely the cost and time impact of a contract strategy upon specific cost and time elements because there is too much unknown. Given the uncertainty, it would probably be more feasible to estimate the overall project price and duration for different contract strategies.</p>
4ii	<p>Providing details were available about which risks the contractor was allocated by a contract, it would be possible to estimate the mark-up for a fixed price type contract. This mark-up would be higher than that under a cost-reimbursable type contract.</p>
4iii	<p>It is possible to identify, at a fairly early stage, whether the project is likely to benefit from the early involvement of a contractor. However, it would be very difficult to estimate the benefits in terms of actual cost and time amounts.</p>
4iv	<p>It would be necessary to conduct in-depth research [reference to BICS records] before attempting to estimate the cost and time effects of particular clients under different procurement methods.</p>
5/6	<p>Probability distributions are necessary for estimates of this type. I understand why triangular probability distributions have been chosen [simple to estimate], but from experience, there tends to be a lot of controversy over the values estimated at the minimum and maximum points. I would be prepared to predict a project's cost and time performance using probability distributions.</p>
4i	<p>It is probably possible to adjust time estimates along an inexact scale to reflect any subjective assumptions that differentiate between contract strategies.</p>
7	<p>The demands that are placed upon the estimator could be regarded as unrealistic. However, the results of the process offer an advantage relative to the normal result of the selection process; a few speculative comments that justify the selected contract strategy.</p>
8	<p>More time should be spent reviewing records of past projects. The pressures that exist in today's construction industry require all work to be restricted solely to the essential.</p>

Question Area	Key comments from industrialist P5
1/4ii	<p>Contract strategy selection is a subjective art. There isn't a contract strategy that is appropriate for all projects. There is an infinite number of factors that may be considered before any decision is made. Therefore it is necessary to be pragmatic. Focus on the important decisions and the important factors. Many of the factors are not foreseeable (e.g. risks that do become apparent until after the start of the design work).</p> <p>JCT80 is the main contract form used, but I have experience of using most standard forms.</p> <p>For some projects a particular contract strategy is the obvious choice. For example, we were asked to select a contract type for a contract to design and undertake extensive repair work to an industrial building's roof. The type and amount of work was unknown when the contractor was appointed. Therefore a cost-reimbursable type contract was selected. If a fixed price contract had been selected the client would have paid a higher price because the contractor had to account for the possibility of incurring higher-than-expected costs.</p>
2/3	<p>It would be impossible to quantitatively differentiate between contract strategies at a project's outset. For example, it may be possible to confidently state which contract strategy will generate the most claims, but it would be impossible to estimate the cost of claims generated by each contract type.</p> <p>It is only possible to have an intuitive feel about what type, and what extent, of effect a particular contract strategy will have on a project.</p>
1	<p>I believe that if you spend too long analysing the decisions made at the project outset you will lose sight of other decisions which are more significant because they have a definite effect on a project (e.g. decisions about which particular contractor to appoint or which form of contract to use, which allocation of risk to adopt).</p>
4i	<p>A contract strategy that facilitates fast-track construction does effect the project duration significantly. It is probably possible to estimate an approximate difference in a project's completion date if fast-track, rather than sequential design and construction, was executed.</p>
4iii	<p>The early involvement of a contractor will not achieve cost and time savings for the client. Any cost savings made by the contractor (e.g. improvements in buildability) are inevitably lost to a contractor's unforeseen costs.</p>
4ii	<p>Most contracts are fixed price, but there is plenty of opportunity for contractors to legitimately recover costs and often with very little effort. Variation clauses are the main reason for this. Certain clients can add 10-15% onto the price of a contract. It is crucial for the client to clarify his requirements at the outset of a project.</p>
4iv	<p>The type of client influences a project's performance, but there is too much uncertainty to speculate about a client's possible impact on a project at the very early stages.</p>
7/8	<p>We do occasionally refer to procurement guides [published by Royal Institute of Chartered Surveyors] to show clients the reasoning behind our contract strategy decisions. The example results from an application of the quantitative approach would certainly complement the communication process, but I have reservations about the reliability of the results. The results are not real because the inputs are clearly subject to a great deal of uncertainty, regardless of the fact that the quantitative approach uses probabilistic techniques.</p> <p>Efficient intuitive decisions are required at the beginning of projects. Contract strategy selection cannot and should not be analysed to the depth demanded by the quantitative approach. The quantitative approach may be feasible to some extent, but it sounds quite impractical.</p>
2	<p>The feasibility of the quantitative approach depends upon the amount of information available when estimates are made.</p>
6	<p>I am prepared to complete a questionnaire [Questionnaire 1B] outside the interview.</p>

Question Area	Key comments from industrialist P8
1	<p>The contractual decisions made at the beginning of projects tend to be the result of an implicit process. There is no major discussion. Other than a little experience in some Develop and Build projects, our organisation normally adopts a Traditional procurement method. The contract documents vary on every project, but the general system is the same.</p> <p>The system we use is tried and tested. There is no impetus for change. If a different system was used it is probable that problems would arise. These problems would lead to delays and extra costs that are ultimately borne by the client. Therefore there is a good reason for not undertaking a very thorough contract strategy selection process.</p> <p>Every client has their own priorities about a project's price, duration and quality . As advisers to clients, it is our responsibility to ensure that we make managerial decisions that enable the client to achieve the pre-defined price, time and quality requirements. However, contract strategy selection is not considered as the most important factor that governs whether the client's requirements are met. More specific managerial decisions made throughout the project are considered more significant. Some of these management decisions may be regarded as contractual decisions, but they are not all made at the beginning of projects. These management decision include which tender to accept and what action to take in the event of problems.</p>
2/3	<p>Different contract strategies are likely to have different effects upon a project's price and duration, but it would be very difficult to predict their effects. It does not appear to be feasible to estimate the potential effect of a contract strategy upon the listed cost and time elements.</p>
7/8	<p>It may argued that contract strategy selection is not suited to this level of detailed analysis. The model output is a product of highly subjective inputs. Therefore the value of the output is greatly undermined. Nevertheless, it would be useful to see similar sets of results produced for a series of projects. For example it may be possible to determine whether there is a tendency to expect a particular contract strategy to induce a lower price than other contract strategies. It would also be interesting to learn what assumptions different people based their estimates upon. I would like to see a contractor apply the quantitative approach in an evaluation of Traditional and Design-Build contract strategies on a given project. Because there are some contractors that are always keen to promote Design-Build type arrangements.</p> <p>Although many people argue that more attention should be given to contract strategy selection in current practice, I am not sure that the contract strategy decision warrants the level of attention demanded by the quantitative approach. The early stages of a project are very demanding. There would probably not be enough time to justify a rigorous evaluation of many contract strategy options.</p>
4i/4ii	<p>It may be possible to quantify, at a project's outset the cost and time effects of a design-construction overlap and a contractor's mark-up for different contract types.</p>
4iii	<p>A contractor's contribution at the design stage is unlikely to have any effect upon the cost and time performance of a project. Negotiation between a client and contractor during the early stages of a project can be useful, but generally negotiation is expected to lead to a more expensive contract price.</p>
4iv	<p>The amount of experience that a client has can effect a project's performance. For example, if an experienced client was to negotiate a contract price, the client may be able to get value for money. However, it is not possible to quantify the effect that a client's experience might have on a project.</p>
5/7	<p>I am not convinced that the quantitative approach is feasible because of the uncertainty that contract strategy selection presents. Probabilistic techniques are able to account for some of the uncertainty, but because the results simply reflect the degree of uncertainty in the original estimates, there seems to be very little to gain from the whole process.</p> <p>The fact that contract strategies have been evaluated in units of cost and time is a very appealing feature of the quantitative approach. It is possible to compare the project price and duration for different contract strategies with the client's price and duration targets. It would be advantageous to analyse many other decisions in terms of cost and time.</p>
6	<p>I will complete a questionnaire [Questionnaire 2] outside the interview.</p>

Question Area	Key comments from industrialist P9
1	<p>Contract strategy selection is a very difficult decision. There are many factors that can influence the decision. Every project presents a different set of factors. The main factors which commonly require consideration include project size, complexity, location, experience of the client and whether the client will use or lease the final product.</p> <p>Sometimes the client can override the decision and insist upon a particular contract strategy because it has been successfully used on a previous project or a third party has recommended it.</p> <p>In the instances where the client allows us to make well-reasoned decisions, the objective of contract strategy selection is to optimise the likelihood that the client's price and time targets are met. Although there are many factors to consider, the client ultimately wants to complete the project within a given price and date. Even the client's quality targets tend to be compromised to ensure that the risk of cost and time overruns are minimised.</p> <p>The organisation used to routinely adopt the Traditional type of project procurement, but there is now a team of professions within the organisation that are very experienced in Design-Build procurement. Our experience with Design-Build has become a major selling point for the company. The organisation also has experience of Design and Manage and other management type procurement methods. Amended standard contract forms are always used.</p>
2/3	<p>When selecting a project's contract strategy it is sometimes necessary to estimate the price and duration of a project if it were to be procured using different contract strategies. However, these estimates are treated as very rough guides. They are never documented. There is too much uncertainty surrounding an estimate of a contract strategy's possible cost and time effects, particularly estimates of specific cost and time elements.</p> <p>I would be prepared to give an approximate estimate of a contract strategy's possible positive (i.e. saving) or negative (i.e. additional cost) effects upon each cost and time element, but it would be very difficult to estimate actual cost and time values.</p>
4i	<p>At the contract strategy selection stage I would be able to roughly estimate the time that may be saved if fast-track construction was undertaken.</p>
4ii	<p>A fixed price contract would force a contractor to demand a higher risk premium and profit margin than a cost-reimbursable type contract. An approximate estimate of the difference between these two contracts could be given if details of the actual project were provided. A more accurate estimate could be given if it was possible to know which particular contractor were to undertake the contract.</p>
4iii	<p>It is appropriate to involve the contractor at the beginning of projects that are particularly large and complex, but there is too much uncertainty to expect any quantification that differentiates between alternative strategies on the basis of the timing at which a contractor is appointed.</p>
4iv	<p>The role of the client during a project can effect the cost and time performance of a project, but there is just too much uncertainty to quantify the likely effects.</p>
3/8	<p>It is probably possible to estimate the overall price and duration of a project for different contract strategies rather than specific cost and time elements. However, I can see advantages to estimating a series of cost and time elements. It is easier to incorporate the wide range of factors that influence the decision. The decision should be made using a more organised method than the usual "top-of-head, gut-reaction" type method often used.</p>
6	<p>I might be able to give broad estimates of a project's construction and design cost for different contract strategies. Therefore I will complete a questionnaire [Questionnaire 2] outside the interview.</p>
7/8	<p>I like the fact that the results are case-specific. It is possible to make reference to all of the relevant factors in a given set of circumstances. It is just questionable as to whether all of the factors can be quantified in units of cost and time.</p>

Question Area	Key comments from industrialist P10
1	<p>Both the organisation and myself have experience of using a wide variety of procurement methods and contract forms. Amended standard contract forms are always used.</p> <p>The main criteria that govern contract strategy selection are the client's price, time and quality objectives. Although there are many other requirements that need to be met (e.g. safety requirements, tender competition), the majority of these requirements have to be assessed in terms of their implications to the client's price, time and quality objectives. The client's price, time and quality objectives take priority.</p> <p>Contract strategy selection is an important decision. The decision process is dependent upon years of experience. However, regardless of how much experience is acquired, the decision remains open to a lot of interpretation. In an attempt to control the subjectivity, contract strategy is usually a group decision. The client is usually involved in the decision process.</p>
2	<p>I have never been asked to quantify the cost and time differences between contract strategies in a given set of project circumstances. If I was asked to apply the quantitative approach in an actual project situation I would probably object on the basis that it is impossible task. Any estimate of this type at the outset of project would be very unreliable.</p>
4i	<p>In a given set of project circumstances it may be possible to estimate the difference in project duration between a contract strategy that facilitates fast-track construction and a contract strategy that requires sequential design and contraction.</p>
4ii	<p>An estimate of a contractor's mark-up may be given provided sufficient details of the project circumstances, the contract strategies and risk allocations were available.</p>
4iii	<p>Early involvement of a contractor can lead to cost and time savings on certain projects. It would be very difficult to speculate as to how these savings could be achieved.</p>
4iv	<p>The level of client involvement can effect the project. Many clients want to assume the same, very active role regardless of the procurement method selected. I may be able to estimate the cost and time effects of a particular client in some circumstances, but the estimate would be very tenuous.</p>
2/3	<p>It may be possible, in some circumstances, to estimate the effect that a contract strategy may have on particular aspect of a project (e.g. a project's design).</p> <p>It may be possible to estimate the impact that different contract strategies are likely to have on a project's overall price and duration.</p>
5	<p>Given the unreliability of the estimates, it seems more appropriate to estimate a range of values rather than a single value.</p>
7	<p>Clients would certainly be in favour of the quantitative approach if they were shown a set of the results of the type shown in the figure. Clients would particularly like the results because they enable decision alternatives to be compared against the client's ultimate objectives: final price and completion date.</p>
8	<p>There is scope to obtain a better understanding of the different effects that contract strategies have on projects. However, irrespective of the quality of contract strategy decision-aids, the decision is different on every project. Therefore there appears to be no means of obtaining a better understanding of the decision problem.</p>
6	<p>I will complete a questionnaire [Questionnaire 1B] during the interview.</p>

Question Area	Key comments from industrialist P11
1/2/3	<p>There are many decisions, other than that which determines the procurement method, that governs how the project is to be completed. There is an explicit decision that determines the contract form under which the construction, and in some cases part of the design, is to be let, but this decision does not take place at the beginning of the project. We have experience of using most building contract forms and some civil engineering contract forms.</p> <p>A project's organisational structure tends to be dictated by the type of project (e.g. size, client's specification). For example, it is probable that the designers chosen for a project will be a particular organisation or even a particular profession that has relevant experience (i.e. undertaken a similar project in the past).</p> <p>The details of a contractual arrangement (e.g. variation clauses, payment details) have a more significant impact upon the cost and time performance of projects than the overall method of procurement.</p> <p>At the end of a project it may be possible to say how a contract strategy has influenced each of the listed cost and time elements, but it would be impossible to foresee a contract strategy's effects because too much is unknown about project events and how the client's contracted parties will perform. Construction projects are very complex and uncertain. As a result, it is necessary to rely upon the experience and intuition that you have acquired in the industry. One should keep contract strategy selection simple.</p>
4i	<p>Fast-track construction can enable some projects to be completed within a faster time than sequential design and construction. When sufficient project information is available it may be possible to approximately estimate the difference in project duration if either of these strategies were implemented. The project stage at which sufficient information is available varies from project to project.</p>
4ii	<p>A contractor will normally demand a higher mark-up if a fixed price, rather than a cost-reimbursable type contract was used. It may be possible to give an approximate estimate of the difference between these two options at the tender process stage of the project.</p>
4iii	<p>Early involvement of a contractor can have a positive effect on the project. However, it is unrealistic to expect these effects to be predicted and quantified in units of cost and time.</p>
4iv	<p>In some cases, the client, fortunately, is prepared to give virtually all of responsibility to the project managers once the client has specified his requirements. It is possible to foresee whether a client will assume this type of inactive role at an early project stage, but it is not possible to estimate the savings that this type of client involvement can amount to.</p>
1/2/3	<p>All clients have their own individual requirements with regards to the price, duration and quality of projects. Different contract strategies are often differentiated in terms of their expected impact on the price, duration and quality of projects. However, it is unsound to base contract strategy selection upon very speculative assumptions about contract strategies' likely cost and time effects on a project. It is necessary to consider many other issues such as when it is the best time to start on-site and is the client's specification complete. These types of issues cannot be quantified and neatly represented graphically on axes of price and duration. Furthermore, it is possible to argue as to why the client's quality objective is not addressed in this analysis when quality is regarded as an ultimate objective along with price and duration.</p>
7/8	<p>The quantitative approach places excessive demands upon the decision-maker. It may be argued that once the very speculative estimates are made, the model only manipulates the data. The model does not contribute anything which may aid the decision-maker.</p> <p>The decision process is different for every project. There is not sufficient time at the beginning of every project to quantify the differences between prospective contract strategies. The quantitative approach increases the demands on an already-demanding decision process. Therefore the quantitative approach is unlikely to permit a decision-maker the time to obtain a better understanding of contract strategy selection.</p>

Question Area	Key comments from industrialist P12
1/2	<p>The organisation is accustomed to using most procurement methods. The traditional system remains the most popular. JCT80 is the usual form of contract selected.</p> <p>Different contract strategies have different impacts upon a project's performance. A particular contract strategy will have a different effect upon different projects.</p> <p>The contract strategy type has a major impact upon the duration of projects. The price of a project is unlikely to be significantly effected by the contract strategy type. It is appreciated that price and time are interrelated (e.g. a project can incur additional costs if it is to be completed in a shorter than average time), but any cost savings or extra costs that may result from using different strategies are expected to be fairly insignificant. Even if they proved to be significant it is not possible to anticipate the exact events that impact upon the cost of a project. In contrast, it is possible to estimate how different contract strategies are likely to effect a project's duration. At the early stages of a project it is not uncommon to estimate the overall project duration that is likely to result from procuring the project using different strategies.</p> <p>Clients typically prioritise project duration ahead of price and certainly ahead of quality. The quality of a project is largely governed by the quality of the client's brief. Clients are normally informed about the approximate price and duration of a project at a very early project stage.</p>
4i	<p>A project's duration can be effected by fast-track construction as well as by other strategies (e.g. two-stage tendering). It is possible to estimate, at the early stages of a project, the time that may be saved by implementing particular strategies.</p>
4ii	<p>Although it depends upon the particular risks that a contractor has to bear, a fixed price contract will typically include a higher mark-up than a cost-reimbursable type contract. It may be possible to quantify the difference.</p>
4iii	<p>The cost of a project is not affected by the timing at which a contractor is appointed. The cost of labour, materials and equipment will be same irrespective of whether the contractor is appointed during after the design process.</p>
4iv	<p>Although the degree of client involvement can influence how smoothly a project is undertaken, it is not possible to anticipate whether a client will lead to delays and unnecessary costs. Therefore it would be impossible to quantify the effect of a client. This would be very difficult even at the conclusion of a project.</p>
5	<p>Given the uncertainty surrounding any estimates, the use of probabilistic techniques seems appropriate.</p>
3	<p>A contract strategy might effect all of the listed cost and time elements. It might be possible to anticipate some, but not all, cost and time effects.</p>
7/8	<p>The results of the quantitative approach are a useful means of justifying the selection of a particular contract strategy. However, there appears to be too many estimates required to obtain these results. It is impractical to expect a detailed analysis to be undertaken for a series of different contract strategies. In addition, because every project is different the estimates would have to be revised for every application of the quantitative approach. I doubt that it would be possible to recycle estimates from past projects.</p>
6	<p>I am prepared to complete a questionnaire [Questionnaire 2] during the interview.</p>

Question Area	Key comments from industrialist P13
1/2	<p>It is very difficult to know exactly which decisions constitute contract strategy-related decisions. Many managerial decisions are influenced by the collection of organisations established by the selected procurement method. Therefore it would be impossible to forecast how a contract strategy will affect a project and it is certainly impossible to expect an individual to assign actual cost and time values to reflect the possible impact of a contract strategy upon a project.</p> <p>For example, the choice of contract strategy will influence the decision as to which contractors to invite to tender and it is perceived that the particular contractor that is appointed will have a major influence on the project performance. For example, the contractor may own a suitable plant item whilst another contractor may have to hire the same plant item. However, this type of information cannot be considered at the project outset when selecting a project's procurement method.</p> <p>Procurement method selection is not as important as the choice of contract form. I have experience of using virtually all standard contract forms, including all supplements and sub-contracts. The details of these documents have a significant impact upon a project's performance. For example, the difference between domestic and nominated subcontractors as well as responsibility exempt clauses can determine whether the client pays a reasonable or excessive price.</p> <p>The client organisation will tend to prioritise its price, time and quality objectives. The client's priority rating of each objective influences contract strategy selection. However, there are many other criteria. A major factor is market conditions. A few years ago [when the market was just beginning to pick up] a client was fairly assured of getting a low price if a fixed price contract was used.</p>
4ii	<p>A contractor's mark-up depends upon the market conditions. In a particular set of circumstances it is possible to estimate the difference between a contractor's mark-up for different contract types.</p>
2/3	<p>Different contract strategies may have different effects on some of the listed cost and time elements, but it is impossible to estimate the effects at the beginning of a project when the procurement method is selected. There is too much fee competition in today's construction industry to allow time and money to be spent evaluating contract strategies in great detail, especially when the decision as to which strategy to adopt at the beginning of a project is not as important as other decisions made (e.g. contract form and the timing at which the main contracting party is awarded the contract).</p>
4iii/4iv	<p>Early contractor involvement can impact upon a project's cost and time performance, but it depends upon the project type. A contractor's planning skills are essential on projects where fast-track construction is to be undertaken and on any other project where the client particularly wants to complete the project in minimal time. The type of client can also impact upon a project's performance. However, these two issues cannot be quantified. It is more appropriate to discuss these issues.</p>
4i	<p>The capacity of fast-track construction to reduce project duration depends upon a project's particular circumstances. If the project can be separated into distinct packages at an early project stage, it is possible to overlap design and construction. On these types of projects it may be possible to give a very approximate estimate of the time that might be saved by fast-track construction compared to sequential design and construction.</p>
5	<p>Probability distributions will simply over-complicate the process further. It is too impractical to undertake an elaborate decision process.</p>
7/8	<p>The results show that the project price may assume any value within a wide range. This type of information is not considered particularly useful to contract strategy selection.</p> <p>Competition within the industry is too fierce to deal with an unresolvable problems. Even if it was possible to estimate the effect of different contract strategies upon the cost and time performance of a project, there simply isn't the time available to undertake a detailed analysis at the early stages of a project.</p>

Question Area	Key comments from industrialist P14
8	Contract strategy selection often does not receive the attention that it deserves. The decisions made at the beginning of projects can have more effect upon a project than subsequent decisions. It can cost a lot of time and money to change project plans even at an early stage. I have been involved in projects where, at the beginning of the detailed design stage, it has become apparent that it would have been better to have included the detailed design in the main construction contract.
1	Different contract strategies are expected to have different effects upon a project's price and duration. The client's financial budget is the main criterion that directs contract strategy selection. Clients, especially local authorities, typically have a strict price budget. It is also very important to know when the client's funds are available.
3	Different contract strategies will have different impacts upon each listed cost and time element for a particular project.
2/3	The quantitative approach does not appear, initially, to be feasible. It is very different from normal practice. It sounds somewhat impractical. However, the concept of a rigorous, structured approach to contract strategy evaluation has some appeal.
3/8	The structure of the process is likely to assist a decision-maker to evaluate each prospective contract strategy for a project in terms of the same key decision criteria. There is no standard procedures followed when a contract strategy is selected in practice. In a given project it is usually possible to construct an equally valid argument for selecting a variety of contract strategies. There is scope for many errors and irrational decisions.
4i/4ii	It is probably possible to approximately estimate, at a project's outset, the difference in project duration and contractor's mark-up if the project was procured using two different contract strategies.
4iii	I have worked on projects where the contractor has managed the design and in doing so has minimised many of the project risks before starting on-site. When we approached a contractor, in one case, the contractor claimed to be able to make a 10% saving on the existing cost estimate. In some projects, it may be possible to estimate the potential saving that may result from appointing a contractor during the design stage. The disadvantage to early contractor appointment is the additional fee incurred by the client and the loss of competition when a price is established for the construction. Construction price competition can sometimes enable the client to achieve value for money.
4iv	It is possible to identify, at a very early project stage, whether the client is likely to cause disruption by taking an over-active interest in the contracted work and responsibilities. In some circumstances I would be prepared to estimate an approximate percentage increase in cost and time that a client may generate. However, any such estimate would obviously remain personal and it would not be referred to in a contract strategy selection process.
7/8	<p>The quantification process is very speculative, but because the decision is inevitably based upon subjective judgement, there is nothing lost in at least attempting to clarify the assumptions and reasoning behind a decision. The drawback of the process, however, is that the subjectivity in the assumptions simply filters through into the calculated price and duration results. Nonetheless there are clear advantages to be gained from breaking the evaluation process down into a series of sub-decisions. For example, it imposes a definite procedure which must be followed before selecting a contract strategy. This procedure ensures that the decision receives a reasonable amount of consideration and it also facilitates group-decisions.</p> <p>The quantitative approach may reduce the level of subjectivity through continued application. If the decision process is made explicit there is a greater opportunity to learn from the inevitable mistakes that result because many difficult decisions have to be made at the outset of, and during, construction projects.</p>
6	I am prepared to complete a questionnaire [Questionnaire 2] during the interview.

Question Area	Key comments from industrialist P15
1	<p>It is questionable as to whether research into contract strategy selection is productive because there are no generally-applicable rules. The decision relies upon experience. It is often difficult to explain why intuition leads to certain decisions made at the beginning of projects. However, owing to the limited information available at this project stage, intuition is a crucial resource.</p> <p>Price, time and quality are the main selection criteria. Different contract strategies have different likelihoods of enabling the achievement of the client's price, time and quality objectives. Other more specific criteria include project type factors (e.g. project size, major risks and project duration). Contract strategy selection requires consideration of many factors, but the client's price, time and quality objectives ultimately govern the decision.</p>
2	<p>I think the quantitative approach is feasible in some project circumstances. For example, it maybe feasible when sufficient information is available or if the project is one in a series of similar contracts. When we make early project estimates of the project's likely price and duration, reference is always made to past similar projects.</p> <p>The client often wants to be involved in contract strategy selection. On most projects, we produce a report that reviews the appropriateness of the most feasible contract strategy alternatives in order to justify the option that is considered the most appropriate. The report can include estimates of the overall price and duration for different contract strategies. There have been cases where the client has not followed our advice.</p>
3	<p>Although different contract strategies can have different impacts upon each listed cost and time element, we would not normally estimate these effects. In some cases, if sufficient information was available, it may be possible to estimate whether a contract strategy could induce a cost or time saving on particular cost and time elements relative to other contract strategies. There would have to be a great deal of information available before estimates of actual values for each cost and time element were made.</p>
6	<p>I will complete a questionnaire [Questionnaire 2] based upon a project where the client insisted upon using a particular contract strategy without adequate justification and where we advised the client that a different contract strategy would be a more appropriate option.</p>
4iii	<p>The early involvement of a contractor can enable significant cost and time savings to be made. It particularly applies where the appointed contractor has experience of constructing a similar project or where we have worked successfully with the contractor in the past.</p>
4iv	<p>It is necessary to account for the client type when selecting a contract strategy, but it is only possible to refer to the client's experience and in-house resources. It would very difficult to estimate the amount of cost and time that may be saved by choosing a particular contract strategy that assigns the appropriate level of responsibility to the client.</p>
2/5	<p>If I had to quantify the likely impact of a contract strategy on a series of cost and time elements, any estimates would be instinctive. I would not feel totally comfortable, but yet if conducted within a brain-storming session it could prove useful. There tends to be a lot of secrecy behind contract strategy selection. This can create friction when problems arise which are attributable to the contract used on a project.</p>
7	<p>The results display a lot of interesting information. This type of information is a very useful aid for any decision, but the accuracy of the results depends upon the accuracy of the inputs. Consequently the results could lead to conflict because different people could have different opinions about the input estimates. Nonetheless the results could provide a useful check for the decision made. For example, it would be possible to review calculated results and ask yourself whether you think a particular contract strategy is likely to save £0.25M relative to another contract strategy.</p>
8	<p>I would prefer contract strategy selection to be easier. It is difficult to know how much time and other resources to devote to contract strategy selection because there are always issues that can't be addressed in the decision process. It is necessary to identify the key factors. I think it would be very useful to keep a record of the particular issues that were considered in the selection of contract strategies on past projects.</p>

Question Area	Key comments from industrialist P16
1	<p>At one time [approximately 15 years ago] all projects that I was involved in were automatically procured using a Traditional arrangement (i.e. design completed before construction let on a fixed or admeasurement basis). Although it was acknowledged that alternative arrangements existed, we had become accustomed to using the Traditional arrangement. In today's industry, it has become necessary to be familiar with most types of arrangements and tendering procedures. At the end of the 1980s management type strategies were popular, but Design-Build and Traditional are presently the most commonly used arrangements. Procurement methods are also changing because of the increasing market of privately-financed projects.</p> <p>Price and time are the main contract strategy selection criteria. The client's quality requirements are often less important. It depends upon the client and project type.</p> <p>Although a contract strategy will influence a project's price and time performance, it would not be advisable to estimate, at the beginning of a project, a contract strategy's likely cost and time effects. Many factors effect a project's price and time performance. It is not always possible to attribute good or bad project performance to specific decisions and actions.</p>
2	<p>There are differences between contract strategy alternatives that will have readily-identifiable impacts upon projects. However, quantification of these impacts, is a much more difficult task.</p>
3	<p>During a project, a contract strategy could have an impact upon each of the listed cost and time elements. It may be possible to speculate about the type of effect that a particular contract strategy is likely to have on each cost and time element.</p>
4i	<p>It is possible to estimate different project duration values that may result from the use of different strategies.</p>
4ii	<p>A fixed price contract will include a higher contractor's mark-up than a cost-plus fixed fee type contract. However, the fixed price contract could still prove to induce a lower overall price than the cost-reimbursable type contract. In some cases it may be possible to estimate the difference in project price that may result if the project was procured using either of these two contract types.</p>
4iii	<p>The early involvement of a contractor can have a positive impact on a project. For example, if a contractor is allowed to work closely with the designer the amount of required design work is reduced significantly. For a given project it would possible to estimate the cost and time that may be saved by appointing a contractor at a project's conceptual design stage.</p>
4iv	<p>The type of client has an effect upon the project performance. Under the Traditional arrangement a client is given too much opportunity to interfere in the project management. I would not be prepared to estimate, at the beginning of a project, the impact that a client could have on the project's price and duration.</p>
5/8	<p>The use of probabilistic techniques is essential if I had to undertake a detailed quantitative analysis of contract strategies at the beginning of a project. The estimates that incorporate subjective assumptions about how a project is likely to perform under a particular contract strategy will be highly intuitive. Nonetheless, it is suspected that, providing the process can be undertaken quickly at the outset of a project, it may highlight which aspects of a project need to be looked into more closely before any decisions related to these aspects are made.</p>
7	<p>The example set of quantitative results are useful because they show the conflict that exists between a project's price and duration. For example, a lower price tends to demand a longer project duration.</p> <p>Given the quantitative results, it is possible to say that one particular contract strategy will enable the project to be completed at £X million than if this other contract strategy was used. This type of information is very useful to contract strategy selection and it is likely to be a very useful aid for communicating with the client.</p>
8	<p>Contract strategy selection is addressed on a personal level. It is reliant upon the decision-maker's personal experience. There is clearly scope for a lot of conflicting views about the appropriateness of a particular contract strategy for a specific project. Research that aims to reduce some of this conflict is worthwhile.</p>
6	<p>I will complete a questionnaire [Questionnaire 1B] outside the interview.</p>

Question Area	Key comments from industrialist P17
1	<p>Contract strategy selection appears to be over-researched. I am not convinced that contract strategy selection is as important as many academics perceive it to be.</p> <p>An unsystematic, instinctive approach to decisions is common in all commercial operations, yet academia regard it as unscientific and therefore inadequate. Research is very worthwhile in the case of some decision problems, while in others, it has little value because commercial pressures effectively make it impossible to abandon tried and tested procedures. I classify contract strategy selection as the second type of decision problem.</p> <p>I know of some experienced contract strategists that, at the outset of projects, base their decision on highly intuitive, generally-applicable assumptions about the likely impact of broadly-defined contract strategy types (e.g. Traditional) upon the price, duration and quality of projects. For example, "Design-Build arrangements are less expensive than Traditional arrangements". I have reservations about the validity of these assumptions because they are very general and they are not, and never can be, supported by hard evidence. Furthermore, clients are likely to consider these types of assumptions as a set of rules which can be blindly followed. Every project is different and, consequently, contract strategy selection must be made on a case-specific basis.</p> <p>The common types of factors considered include the nature of a project's design (e.g. are specialist design skills required?), the client's time requirements, the type of risks that need to be managed and the method of construction. Price, time and quality are any client's ultimate objectives, but the differences between contract strategies do not always relate to price, time and quality.</p>
2	<p>It would be impossible and inappropriate to attempt to quantify the cost and time differences between contract strategies for a given project.</p>
4i	<p>Some contract strategies can reduce a project's duration relative to other contract strategies, but this is normally at some expense. It is not uncommon for the client to require a project duration estimate at various points when the project is developed at the feasibility stage.</p>
4ii	<p>There is no way of knowing precisely the level of a contractor's mark-up, but generally it is expected to be less than 10%. The type of contract will effect the mark-up figure that a contractor includes in a bid. There is no such thing as a fixed price contract.</p>
4iii	<p>In some projects, appointing a contractor during the early design and planing stages can be advantageous. It may lead to cost and time savings. However, the magnitude of any savings could not be identified until after the contractor has introduced his ideas.</p>
4iv	<p>Some contract strategies can be regarded as more appropriate for particular client types. It appears unnecessary to attempt to translate these types of assumptions into cost and time estimates.</p>
1/8	<p>Contract strategy selection cannot be based solely upon quantitative cost and time estimates. There are many issues relevant to the decision that cannot be quantified. Even if the quantitative approach was feasible, it would be necessary to address the other issues which could not be quantified. In which case, it is probably better, certainly less demanding, to evaluate contract strategies qualitatively. The quantitative approach is unlikely to be of benefit.</p>
5	<p>It is appreciated that probabilistic techniques can be used to account for some of the uncertainty in estimates of a project's price and duration, but it is not possible to quantify the differences between contract strategies. Any attempt to do so would result in estimates which are too uncertain to represent as probability distributions.</p>
7	<p>The same argument applies to the results of the quantitative approach. Although the results are presented in the form of probability distributions, they do not account for all of the uncertainty. The results do not acknowledge the fact that the values are subject to considerable variation. In fact, the nature of the results could mislead a decision-maker, particularly a client, to regard the values as objective.</p>
8	<p>Contract strategy selection has to rely upon experience. The commonly-cited rules about the conditions in which a particular contract strategy is appropriate are not particularly useful because they cover very broad conditions. They don't add anything to an intuitive decision.</p> <p>The decision uncertainty cannot be reduced. Every project presents a different set of factors to consider.</p>

