

MANAGEMENT OF RISKS WITHIN THE PFI PROJECT ENVIRONMENT

Akintola Akintoye¹, Mathias Beck², Cliff Hardcastle¹, Ezekiel Chinyio¹ and Darinka Asenova²

¹*Department of Building and Surveying, Glasgow Caledonian University, 70 Cowcaddens Road, Glasgow G4 0BA, U.K.*

²*Department of Risk, Glasgow Caledonian University, 70 Cowcaddens Road, Glasgow G4 0BA, UK.*

In the autumn of 1999, Glasgow Caledonian University was awarded an EPSRC/ DETR grant to investigate an aspect of standardisation in PFI projects. This research, aims at developing a state-of-the-art framework for identifying, evaluating, reporting and managing risks in PFI schemes. Literature on risk assessment and management and PFI procurement has been, and is still being reviewed. The initial stage of this project involves an investigation of current best practice in risk assessment and management. Twenty three interviews have been conducted with PFI participants towards identifying contextual factors as well as management approaches, which have facilitated the successful implementation of PFI projects. Having chosen a 'grounded theory' approach, data acquisition is being conducted in discrete stages in conjunction with the analyses, with the outcome of each analysis being cumulatively brought to bear in subsequent data collection exercises. A preliminary analysis of our interviews indicate, that PFI participants tend to identify risks through 'experience' and the use of 'risk prompts'. Both qualitative and quantitative approaches are utilised in evaluating risks. Amongst the major PFI participants, insurance cover and sub-contracting appear to be the principal strategies employed for mitigating risks.

Keywords: risk, procurement, public private partnership, finance, grounded-theory, private finance initiative, risk management.

INTRODUCTION

This paper describes an on-going research project that aims to develop a state-of-the-art framework for identifying, assessing (evaluating), reporting and managing risks in PFI projects. Private Finance Initiative (PFI) procurement, which comes under the umbrella of Public-Private Partnerships (PPP), involves the transfer of risks from the public to the private sector. The allocation of risks in PFI can be optimised only if they are adequately identified and adequately evaluated.

Since taking office in 1997, the new Labour Government has strongly supported the concept of PPP in a number of public policy contexts (Falconer and Ross, 2000). Today, PPP in the financing, construction and maintenance of capital projects is seen to serve a number of objectives, ranging from the need to provide alternative capital funding for the public sector, to the desire to import efficient private sector based management techniques into the provision of public services. Apart from pragmatic considerations, it is worth noting that the origins of partnership can be traced to the last labour administration, when Peter Shore, then environment secretary, visited US and saw how joint public-private initiatives helped regenerate depressed communities (O'Brien, 1997).

The current advocacy of public-private partnership is based on a perhaps less ambitious, pragmatic emphasis on end-users and outcomes, which places partnership in the context of 'Best Value'. Thus in the foreword to the policy document *Better Quality Services* David Clark (Chancellor of the Duchy of Lancaster) stated:

"We want all Government services to be of the very highest quality, efficient, responsive and customer-focused. We are working with the private sector ... to achieve this. What matters ... is quality for the customer at the most reasonable cost to the taxpayer. We want to encourage business to play a fuller role in providing public services. That is why we stress public-private partnerships (Cabinet Office, 1998:3)"

If the organisations involved in PFI projects work together in a truly co-operative manner, which is necessary, then there must be *consensus ad idem* on project issues, especially risks. In addition, for risks to be allocated and shared to the satisfaction of all the concerned parties, these risks must be fully comprehensible to all participants on equal terms. However, there presently appears to be information asymmetries in the understanding of PFI project risks. While financial institutions have developed sophisticated techniques for analysing and managing financial risks, other PFI participants may not be that versatile. A means of unifying the perceptions and approaches of these different parties is therefore needed.

This research project commences with the identification of best practices among PFI participants in terms of risk management and compares these with existing theory. In a later stage, this will provide the basis for developing a single state-of-the-art framework that can be used as a common medium to streamline project development, facilitate communication and harmonise the approaches used for overall risk management in PFI schemes.

Before we discuss our preliminary findings regarding best practice, we will briefly describe the methodological approach of this project. This will be followed by a brief summary of our literature review. The core of this paper will describe findings from our interviews. We conclude with a description of the future steps of this research project

THE GROUNDED THEORY APPROACH

This study relies heavily on 'grounded theory' (GT). This methodology was developed for qualitative research by Anselm L. Strauss and Barney Glaser (see: Strauss, 1998; Glaser, 1973). GT uses inductive reasoning as opposed to deductive principles; it is aimed at generating, and not proving theory.

GT works by observing a scenario of interest to a researcher and noting the actual events in this scenario. These observations are then compared with known theory to see if the two concur. Variations between the two are identified and causes for these deviations are sought from the research scenario. Substantive causes for deviations are then investigated and used to update existing theory.

In GT therefore, investigations do not start with a set of hypotheses but with physical observation to determine existing practice. The findings of the observations are then used to formulate hypotheses that describe them. It is these hypotheses that are compared with literature to see how the two tally. Any discrepancies between the duo are authenticated by a further study in the field and if sustained, then the causes for these deviations are identified.

In the GT approach, investigators weave between field observations and theory development. As observations are made and substantial findings emerge, (new) theory is proposed. This newly proposed theory is then compared with existing theory. As differences are identified and investigated, the proposed theory is modified through 'grounding'. As variants and nuances of a new theory are established a grounded theory is developed. As a consequence of these continuous refinements the application of this technique takes a relatively longer time and demands the support and co-operation of the environment, or subjects therein, being observed.

As a first step in applying GT to this research, we have reviewed the established main stream on risk analysis and management. A synopsis of this literature review is reported below. In the second stage of the project, research participants have been observed to ascertain how they identify, evaluate, report and manage risks in PFI projects. A comparison of these observations with the literature shall be used as a basis for grounding theory.

THE LITERATURE ON RISK ASSESSMENT AND MANAGEMENT

Risk could mean different things to different people/professions. However, most definitions of risk relate to the notion of uncertainty. Risk involves an activity or decision where either the outcome or consequence is less than certain (McKim, 1992; Boothroyd and Emmett, 1996). At times both outcome and consequence can be uncertain. According to Conrow and Shishido (1997) "risk is the probability of failing to achieve particular cost, performance, and schedule objectives, and the consequence of failing to achieve those objectives". Therefore risk is, qualified by both the uncertainty relating to the occurrence of an event, and its impact. These two attributes must always be considered when risk is dealt with.

Risk management

It is impossible to eliminate all project risks in construction (Boothroyd and Emmett, 1996; Simon *et al.*, 1997; Franks, 1998). However, risks can be minimised, shared, transferred from one party to the other, or accepted and managed (Kangari, 1995; Franks, 1998). Even in situations where most risks have been transferred, residual risks may still remain (Institute of Civil Engineering and Faculty and Institute of Actuaries, 1998; Lam, 1999). Thus, some form of risk management is unavoidable in the course of any project delivery (McKim, 1992). Since project risks are inevitable, the management of risks must be optimised rather than risks being ignored (Cost Engineer, 1993). To manage project risks effectively, they must be identified, analysed and controlled.

Risk identification

Some of the techniques available for risk identification, ranging from intuition to risk reviews, are shown in Table 1.

Risk evaluation

Having identified risks the next stage in the risk management process is their quantification. In a simplified form, if the probability of occurrence of a risk is P and its magnitude of impact on a project is I , then the risk exposure or expected value (EV) of this risk would be (Carter *et al.*, 1994): $EV = (P)(I)$.

The quantitative techniques relevant and applicable for risk analysis include: simple arithmetic analysis (risk estimate), decision analysis / (Bayesian decision analysis), sensitivity analysis, multiple estimating risk analysis, probability trees/analysis/theory, Monte Carlo simulation, Controlled Interval and Memory, fuzzy-set theory, game theory, Project Evaluation and Review Technique, and utility theory. In addition to these instruments, financial institutions have developed specialised instruments for risk evaluation, like: Volatility, Factor Sensitivity, Value at Risk, The Z-Score, Capital Asset Pricing Model and Financial Ratios Analyses.

Table 1: A comparison of risk identification techniques in construction

Technique	Conditions appropriate for its use	Sectors/Projects in which it has been used
Intuition	Initial feel of project risks	General
Personal experience (hindsight reviews).	Initial feel of project risks	Construction
Interviews, surveys, research	Where risks are not known, or to build on a prior risk identification effort	All
Checklists	Systematised and non-innovative processes	Construction
Brainstorming	Where risks are many and unknown	Construction, general disciplines
Consultation	Where risks concern a speciality	General
Event and Fault trees	Events/activities can be linked in a sequence, especially where causal relationships can be depicted.	Engineering (chemical, mechanical)
HAZOP studies	Systematised processes	Engineering
Contact	All situations involving some form of demand and supply	Construction
Risk/Safety reviews	New or complex and systematic projects	Construction

It is, however not expedient for companies to use all available risk analyses techniques in all contexts. Rather, the method chosen for any particular risk analysis and the level of sophistication employed must be commensurate with the need and circumstances of the project. Factors, to be considered in the choice of depth in risk analysis include (Simon *et al.*, 1997; Raftery, 1994; Tummala *et al.*, 1997): size of the project; value of the project; complexity of the project; dynamic nature of the project; novelty of the project; newness of a market; (long) payback period; client's requirement; and, high possibilities of delay.

Risk management

After project risks have been identified and quantified, arrangements to mitigate them are usually made. Risk mitigation strategies are generally categorised into four, namely (ICE and FIA, 1998; Zhi, 1995; Baker *et al.*, 1999):

Risk reduction (e.g., reducing uncertainty by acquiring information),

Risk avoidance/elimination (e.g., aborting a planned action),

Risk transference (say, through: insurance, contract provisions)

Risk retention/absorption (i.e., pooling)

These foregoing techniques explained in literature, for identifying, evaluating and managing risks have been used as a basis for studying the practical techniques being used by PFI project participants. Their practices are discussed in consecutive sections below.

INTERVIEW DATA

Over the past two months we have approached organisations involved in PFI project delivery for participation in the research. Initially the PFI journal was used as a source for the identification of organisations involved in PFI procurement. Later on, some organisations that had been interviewed linked us with other contacts, which were also pursued.

In all, 169 organisations have so far been asked to participate in our project. A breakdown of these organisations according to type of business is given in Table 2. These organisations were identified and contacted in March 2000. So far, a total of 39 organisations have expressly agreed to participate in the research. Their composition is also reflected in Table 2.

Interviews to generate relevant data for the research started in April 2000 and are expected to last about 6 months. A total of 23 of these interviews have so far been conducted, while arrangements for a further 16 have been made. Additional prospective interviewees will be sought as the research progresses. The current interviews have not been conducted on case-specific basis, but the investigation will ultimately precipitate into case study specific interviews.

To facilitate the current series of on-going interviews, a comprehensive checklist of questions was developed as a means of probing the participating organisations in respect of their risk assessment and management practices. The questions were developed from the literature review and piloted with a leading bank involved in PFI project delivery. On the basis of the pilot interview, the questions were revised and adapted for subsequent application. The result from the pilot study will be incorporated in the overall body of the research, as it constituted a comprehensive interview.

Analysis of data

The quantitative data being generated will be analysed using the SPSS software, where customary statistics will be computed. The qualitative data is being analysed using the ATLASTi software. In this regard, the opinions expressed by interviewees are transcribed and coded. The coded texts are then linked, on the basis of their relationships, to reveal themes in these opinions. This analysis will be moderated and validated through Delphi method based peer group reviews.

Preliminary research findings

In our interviews we surveyed PFI participants with respect to risk analysis and management, the techniques they use in assessing and managing risks and the conditions in which they are applied. Due to commercial confidentiality, the names of companies, interviewees and the projects upon which data were supplied cannot be revealed. It must be pointed out that the results highlighted here are preliminary findings. In line with the principles of GT, these initial findings will have to be validated by further studies.

Table 2: PFI Risk Assessment Framework Research Interviews

Organisations				
Number: → Type of: ↓	Approached for interview	Agreed to be interviewed (%)	Already interviewed (Locations)	Outstanding Interviews
Clients	23	9 (39%)	3 London(2) Kent (1)	6
Construction Companies	14	2 (14%)	1 Derbyshire	1
Consultants	54	13 (24%)	7 Leeds (1) London (5) Manchester (1)	6
Facilities Management Companies	14	3 (21%)	2 Glasgow (1) Manchester (1)	1
Financing Organisations	25	4 (16%)	2 Edinburgh (1) London (1)	2
Solicitors (Legal Practices)	45	8 (18%)	8 London (4) Edinburgh (2) Birmingham (1) Manchester (1)	0
Total	169	39 (23%)	23	16

NB: Valid as at May 2000

Identification of risk

In putting up a tender, clients normally develop a business case in the project attendant risks are listed. They also indicate how they prefer the risks to be allocated between themselves and the private sector participant(s). In-house experts play a role in identifying these risks. However, due to lack of experience and expertise in certain areas, the services of external specialists are often utilised. Such help is typically sought from legal, technical, insurance, risk and financial advisors. Solicitors would often scrutinise a business case to see if any (major) risks have been omitted. They also examine the (proposed) allocation of risks to see if, it is favourable to the client.

Despite the sophistication in PFI developments, our interviews indicate that 'experience' seems to be the default technique used for identifying PFI projects risks. In addition to this, and coming on the heels of the relatively new standard PFI contract guidance, most organisations have developed some form of a 'risk prompt' (either a checklist, risk table, risk matrix or risk register), and used this tool as occasion demands. Interviewees mentioned the two techniques of 'experience' and 'risk prompt' most frequently amongst the risk identification tools used. The other less frequently used techniques for identifying risks include the use of interviews, books, journals and magazines.

On the effectiveness of their risk identification practices, all the organisations interviewed inferred that these were at worst satisfactory. It was suggested that one reason for this was that most of the risks would be the same for all types of projects. In this context, many interviewees suggested that only a small subset of risks were new or unique to specific projects and that this usually had a negligible impact on the

project. A few organisations claimed to be 100% effective in the act of risk identification.

Evaluation of risk

Bidding consortia often undertake extensive risk evaluation, the outcome of which may determine their interest in the deal and the price they quote for it. Most PFI schemes are large in scope and tend to demand huge resources even at the planning stage. Therefore, most consortia that vie for PFI projects consist of big organisations that employ diverse groups of professionals. In addition, most of these consortia employ the services of consultants when it comes to evaluating PFI project risks. Amongst the types of organisations engaged as consultants are insurance companies (brokers), project management consultancies (with quantity surveying, construction and other expertise), etc.

PFI practitioners most often tend to evaluate both the impact and likelihood of occurrence of risks. The way evaluations are conducted varies from one organisation to the other. The major approaches for evaluating risks, which have been mentioned so far, are three-fold:

Qualitative assessment: These are done subjectively where the likelihood of occurrence and level of impact of risks are assessed as being low, moderate or high.

Semi-quantitative assessment: Probability is assessed subjectively as in No.1, but the impact of a risk is assessed quantitatively in monetary terms.

Quantitative assessments: These assessments are done more thoroughly and in numeric terms. For instance, one insurance company indicated that they would consult databases and (different types of) experts in the field under consideration to establish the likelihood of occurrence of the risks. They would also use their skills and experience and the opinion of other experts in pricing the monetary impact of risks. Quantitative tools are often employed in this approach to conduct sensitivity analyses ('what if' analysis, scenario analysis, etc.). Different software are used by different organisations in these analyses, examples of which include 'Predict', '@Risk', and 'Crystall Ball'.

Different companies use one of these approaches or a combination of them according to the task specific requirements and the value of the project. It is not clear which option yields more effective results.

Management of risk

Ideally risk allocation in PFI should rest on two principles (Private Finance Panel, 1996):

Risks should be allocated to the party best able to bear them; and,

(Most) risks must be transferred from the public to the private sector.

These principles have struck well in practice, where about 95% of the risks are usually allocated to the private sector. A few of the risks are often willingly retained by the public sector while the remaining few are shared, through negotiations, between the two sides.

On the basis of experience and following the Treasury Task Force's guidance on standardisation of PFI contracts, some norms of risk allocation have emerged, examples of which are:

Risk pertaining to the obtaining of outline planning permission for the project lies with the public sector client while that of obtaining the final planning approval rests with the private sector.

Legislative changes that affect the entire market are borne by the private sector while regulatory risks that affect only a specific sector or project are borne by the public sector.

Volume risk is usually borne by the public sector.

Risks attributable to force majeure are shared between the public and private sector, in accordance with the specific nature of the risks.

Having been allocated some project risks, each side would consider if it has the resources to manage those risks in-house. If the resources are available and the magnitude of the risks are not high, then the side would consider retaining those risks and ameliorating any damage, were the risks to materialise.

In the absence of in-house resources, the most often sought alternative is 'insurance' where responsibility for the consequences of risks is transferred to an insurance company. The other strategy is the transference of the risks to third parties, by means of sub-contracting. The SPV could, for instance, sub-contract some construction aspects to sub-contractors, thereby transferring the risk to the sub-contractor.

DISCUSSION

The risk assessment and management practices highlighted above are mere pointers to trends we expect to unfold in our investigation. The interviews conducted so far came from some of the leading international organisations involved in the planning and implementation of PFI. Therefore, the preliminary outcomes reflect 'leading edge' practices and can be used to produce some preliminary hypotheses for our subsequent investigation. They can also serve as a yardstick for revising the research instrument.

Our key findings suggest that the public sector side does not approach risk management in the three discrete steps of identification, evaluation and management. In some projects, like prisons, the assets to be utilised in the provision of services are not specified by the client. In these circumstances the outline business case allocates generic risks. Hence, some client-advisors add a contingency sum to allow for the project risks. Greater responsibility is placed on the private sector (bidders) to identify the project risks, evaluate and price them precisely and manage them in an appropriate manner. Unsurprisingly, the private sector therefore appears to have the edge in terms of risk assessment and management.

Limitations

While our preliminary analysis indicates a clear pattern of a differential use of risk analysis techniques amongst PFI participants, our findings must remain provisional on two accounts. Firstly, of the 23 interviews conducted so far, only 3 of the organisations interviewed had been members of a SPV: one financial institution and two facilities management (FM) companies. In relying heavily on the information of these three interviewees, our analysis may be skewed in favour of ancillary organisations in PFI undertakings. The second phase of interviewing will accord greater preference to organisations which have participated in PFI as members of SPVs. Different or even new findings, might emerge at that stage.

Secondly, some of the interviews were interrupted and at times abruptly ended, due to important engagements on the part of interviewees, as some urgent developments had occurred after booking the interviews. It is anticipated that future interviews will face similar problems. We are now preparing ourselves for situations where all the information needed from an organisation may not be obtainable from one person. One avenue, which we are exploring, is to interview 2-3 people in each organisation. This would limit the time requirement on the part of interviewees and enable us to build a complete picture by fitting different data together.

CONCLUSION AND FURTHER INVESTIGATION

The information collected so far provides some insight into risk management in PFI schemes. It has provided a basis for adjusting, focussing and advancing our research. However, it is too premature to derive conclusive findings. Therefore this section casts a searchlight on the future.

In the future, we will interview more PFI project participants, especially, members of the SPV, to examine their risk assessment and management practices and tools. We shall study the compatibility of the different techniques in use and then seek to develop a harmonised best practice approach that reflects the contributions of the different techniques. Meanwhile, all interviews conducted are being transcribed and analysed and further interviews are being planned.

We have seen so far that the advantages and disadvantages of PFI are, in the view of practitioners, similar to those mentioned in literature. There may thus be no necessity in probing these issues in our next phase. The nature and gearing of finance in PFI and the composition of companies in consortia are other issues that are conforming to norms in the market. As we seek to go in-depth in our investigation, we shall explore the possibility of avoiding these issues. Principally though, our decision shall be guided by further findings from the field, and the opinions of members of the steering and delphi-based groups of the research.

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