RISK IDENTIFICATION PRACTICES UNDER PFI ENVIRONMENT

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In an investigation that focused on best practice risk management, literature was reviewed on that subject and on 'Private Finance Initiative' (PFI) schemes. As a sequel a comprehensive instrument was developed for the investigation. A qualitative methodology was adopted in the conduct of the investigation where a grounded theory like approach was adopted. Forty-eight interviews with major PFI participants, based in England and Scotland, are discussed. These pertain to: Independent consultants (solicitors, actuary professionals, cost and management consultants); Public sector clients (Government departments/agencies, Local Authorities, etc); and, Private sector participants (financial firms, construction companies and service operators). The 'AtlasTi' software was utilized in analysing the data generated. Analysis showed the main risk identification techniques employed by the PFI participants to include the use of experience, checklists, site visits, brainstorming, workshops, case studies and intuition. A compatibility evaluation revealed that, all sectors rely primarily on experience for identifying their PFI project risks. The level of usage of the other main risk identification techniques seems to vary with the participants.

Keywords: grounded theory, private finance initiative, risk identification.

INTRODUCTION

Risk identification practices in 'Private Finance Initiative' (PFI) schemes are discussed. The paper is informed by the findings of a research, conducted at Glasgow Caledonian University and sponsored by both the Engineering and Physical Science Research Council (EPSRC) and the Department of Environment, Transport and the Regions (DETR). The overall research aimed at developing a state-of-art framework for the management of risks in PFI.

The risk management practices of key PFI participants were studied, namely: public sector clients, financial institutions, construction companies, facilities management companies (operators) and independent consultants. The manner in which each of these sectors identified, evaluated, mitigated, controlled and reported on risks in PFI was studied. However, only risk identification practice is discussed in this paper.

PFI PROCUREMENT

PFI is a public service delivery type of 'public-private partnership' where responsibility for providing public services like transportation, leisure, sanitation, etc is transferred from the public to the private sector for a considerable period of time. Usually the private sector is given the task of providing any (physical) facilities

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requisite in the delivery of services. By virtue of a concession contract between the public and private sector(s), the later sector owns these facilities and operates them to provide the specified service(s) for the duration of the agreement. At the cessation of the concession agreement, the responsibility for providing the service(s) and the requisite facilities is transferred to the public sector partner, who initially commissioned the delivery of services.

PFI is assumed to counter some of the negative aspects with public project delivery, such as over design, poor project management, time and cost overruns, over degradation of assets, higher maintenance and operational costs and lower asset residual values (Forshaw, 1999). Through PFI, the dichotomy between the public and private sectors was assumed to disappear (Birnie, 1999). Kuennen (1997), however, has suggested that private financing had to co-exist with, and not completely replace traditional funding schemes.

Although PFI and allied forms of procurement had been successfully implemented in other countries, like USA, Australia and New Zealand it took until November 1992 before the scheme was launched in the UK. Since its introduction in the UK, the usage of PFI has steadily grown. More than 300 PFI deals have been signed with total capital value in excess of £12 billion (Robinson, 2000).

It is a fundamental requirement in PFI procurement that appropriate risks are transferred to the private sector. The Institution of Civil Engineers (ICE) and Faculty and Institute of Actuaries (FIA) commented that:

> "PFI has heightened the awareness of project risks in ways that public procurement hitherto has not been able to do, so that the identification, allocation and management of risks has grown to become an essential part of the PFI process" (ICE and FIA, (1998).

Best practice risk management in PFI can only be achieved if the risks are adequately identified, comprehended and evaluated. It is against this understanding that the investigation sought to determine and document for future use, the best practices in the PFI domain concerning risk assessment and management.

THEORETICAL RISK MANAGEMENT

Risk can mean different things to different people or professions. However, most definitions of risk relate to the notion of uncertainty. Accordingly, risk involves an activity or decision where either the outcome or consequence is less than certain (McKim, 1992; Boothroyd and Emmett, 1996; Conrow and Shishido, 1997). 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 risks are dealt with.

The risk management process

It is impossible to eliminate all project risks, especially in construction (Boothroyd and Emmett, 1996; Simon *et al.*, 1997; Franks, 1998). However, risks can be minimized, 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 (ICE and FIA, 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 optimized and not ignored (Cost Engineer, 1993). To manage project risks effectively,

they must be identified, analysed and mitigated. These three steps underlie the principles of risk management.

Risk identification

To minimize the impact of the multiple project risks, participants involved in each scheme ought to strive to identify all relevant risks likely to impede a given project (Wirba *et al.*, 1996; RICS, 1999). However, the process should be practical and cost effective (Simon *et al.*, 1997). Risk identification is an important phase in the project management cycle, because, risks which have not been identified cannot be managed (Boothroyd and Emmett, 1996). Although different projects share some common risks, each scheme has risks that are peculiar to it (Touran *et al.*, 1994). Therefore, the identification of specific risks associated with each individual project is an imperative task.

The techniques available for risk identification include (Boothroyd and Emmett, 1996; ICE and FIA, 1998; Dickson, 1987):

The use of intuition;

Recourse to the use of personal experience;

The use of interviews, surveys, and research;

The use of checklists;

Consultation with experts;

The use of risk prompts;

Assumptions analysis;

Analysis of organizational charts;

Analysis of flow charts;

Hazard identification studies (HAZOP);

Analysis of 'event and fault trees';

Brainstorming;

Through workshops;

Case studies;

Literature searches;

Physical inspections / Site visits;

Risk / Safety reviews of past projects;

Interactions with other organizations/professional;

The use of risk management databases;

The use of expert systems;

Etc.

Having identified the project risks through one or more of the foregoing techniques, they (risks) should be quantified to gauge their individual and cumulative impact on the project, and steps to mitigate these risks should be taken.

RESEARCH METHODOLOGY

The investigation adopted a qualitative methodology, which was based on a 'grounded theory' (GT) approach. GT uses inductive reasoning as opposed to deductive principles and it is aimed at generating, not proving theory (Strauss, 1998; Glaser, 1973). In GT investigations do not start with a set of hypotheses but with physical observations of existing practice. The findings of these observations then inform the formulation of hypotheses that reflect prevalent happenings. The formulated hypotheses are then compared with existing literature to see how the two tally. Any discrepancies between the two are identified, and causes for the deviations are sought from the research scenario. Any emerging substantive causes for the deviations are investigated and used to update existing theory.

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, and is continually modified through 'grounding'. 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.

In the course of applying GT in the research, some PFI participants were observed to ascertain how they identified, evaluated, reported and managed risks in PFI projects.

Observing PFI participants through interviews

As PFI procurement takes long (months or even years) to complete, the researchers could not take part in live project deliberations to assess the practices of diverse participants. The investigation thus resorted to asking these PFI participants to relay their experiences. The need for interaction made a mail questionnaire based approach unsuitable, and led the researchers to centre their investigation on face to face interviews. More so that some of the issues on which information was sought, and some interviewee responses needed follow-up questions for clarification.

To facilitate the interview process, a comprehensive checklist of questions was developed as a means of probing the participating organizations in respect of their risk management practices. The questions themselves were developed on the basis of the literature review and piloted with a leading Scottish bank involved in PFI project delivery. On the basis of the pilot interview, the questions were revised and adapted for subsequent application.

Interview sample

A breakdown of the organizations interviewed, according to business function, is given in Table 1. These categories of PFI participants were chosen in line with some of the objectives of the investigation, which concerned the study and comparison of the risk management practices of the main sectors involved with PFI project delivery. Publications and advertisements in journals that report on PFI were used as the primary basis for identifying potential interviewees, who were then contacted by postal mail. Some replies were received following the initial inquiry, upon which arrangements were made to interview those that had expressed a willingness to participate in the research.

Table 1: Sample of PFI participants interviewed

Type of Organization	Number Interviewed
Clients	5
Consultants	15
Construction companies	12
Facilities Management Companies (Operators)	6
Financial Institutions	10
Total	48

The interviews were held between April and December 2000. The format of interviewing followed discrete stages. Between 3-10 organizations were interviewed at a time, based principally on the criteria of convenience and availability.

The clients interviewed were public sector establishments that cannot be named here, due to a confidential undertaking. The consultants included Solicitors (8 in number), Cost experts (2), Insurance and/or Actuary firms (2), and Project and/or Management consultants (3). The Operators were involved in the provision of hard and/or soft facilities management services. In some projects like roads or prisons, the operator

companies were directly responsible for the provision of services while in schemes like hospitals they merely supported independent experts, who were employed by the public sector clients (NHS Trusts). The financial institutions were mainly large banks.

Analysis of data

A computer package, 'AtlasTi - 4.1' was used for the analysis, as it particularly supports the grounded theory approach. Atlas.Ti can process textual, audio and graphical data, which do not subscribe to formal statistical analysis, and it can help analysts to extract from unstructured or large volumes of data, thematic information in a flexible and systematic manner. Its tools can manage, extract, compare, explore, and reassemble meaningful pieces from extensive amount of data in a creative way.

As the research partly aimed to build theory, themes of interest, based on the research objectives were identified from the interview data. As there was a lack of a common vocabulary between the respondents, different ways were used in expressing some issues while referring to the same thing. Clarifications had to be sought from the interviewees where their intentions were not clear. These clarifications later enhanced the interpretation of data.

Each discrete set of interviews was analysed before embarking on another set of interviews. This progressive analysis was done in line with the GT technique adopted. More themes emerged over time as progressive interviews and/or analyses were conducted.

For the investigation of risk identification, a checklist of 18 techniques was developed from literature as a guide, and interviewees were asked to confirm if they have used any of the techniques in the compilation. In addition, the interviewees were asked to enlighten the investigators on their other applicable risk identification techniques.

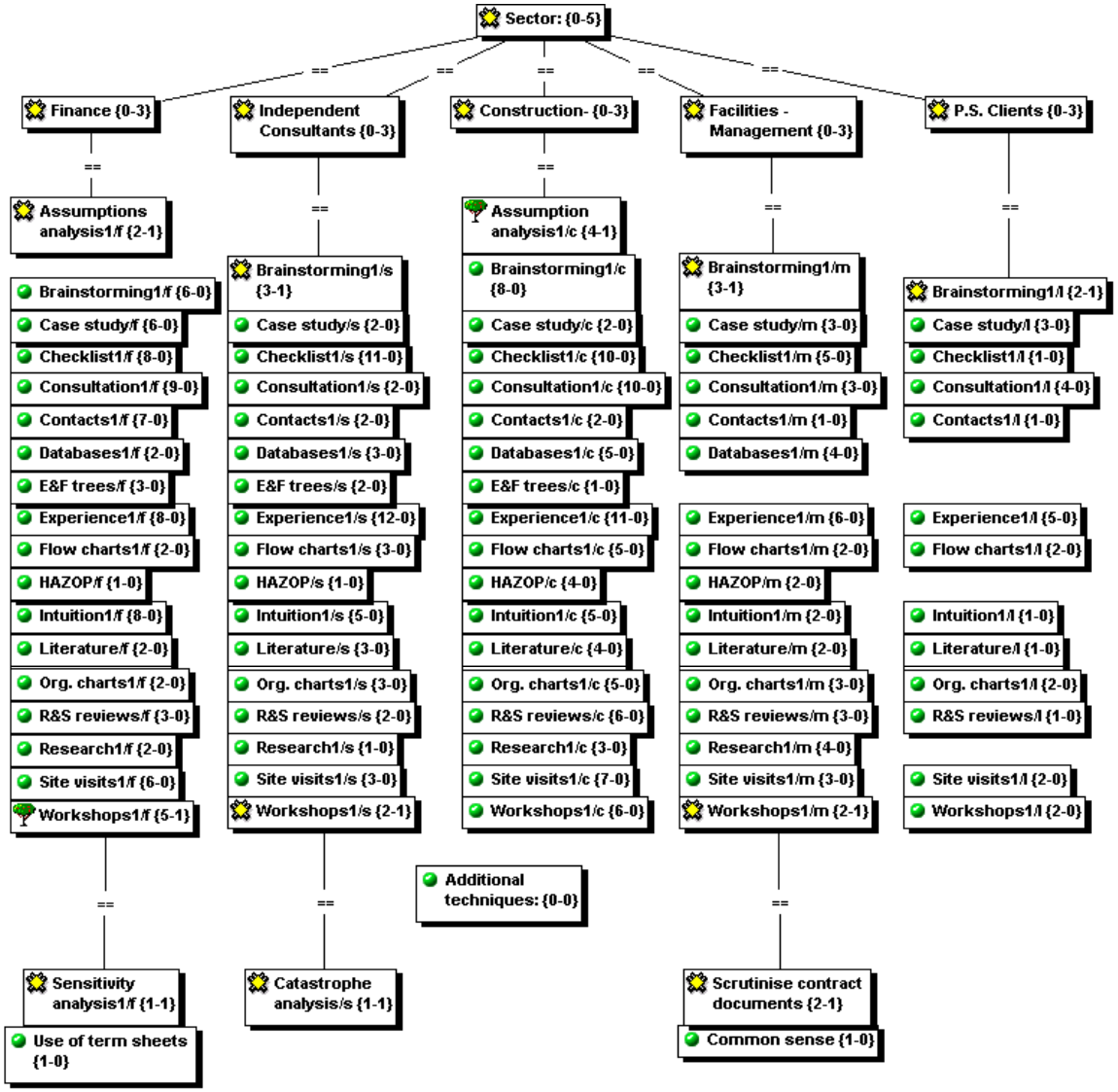
RISK IDENTIFICATION STRATEGIES EMPLOYED IN PFI

The interviews ascertained, in part, the risk identification practices of the PFI participants. The techniques established are compiled in Figure 1, according to the five sectors studied. The risk identification techniques they use are arranged in alphabetical order in Figure 1 where 'assumptions analysis' comes first.

What Figure 1 portrays, in part, is the reported usage of assumption-analysis as a means of identifying risks by only two sectors, namely: finance and construction. Where a cell in Figure 1 is blank, the interpretation is that, interviewees from that sector did not affirm using that technique. It thus means that consultants, facilities managers and clients did not report to have used assumption-analysis for risk identification purposes. In the same vein, public sector clients did not report on using databases, HAZOP analysis and research in their quest to identify project risks. Facilities Management (FM) companies infer they do not use 'event and fault trees' for risk identification.

Each risk identification technique in Figure 1 is proceeded by both a forward slash and a suffix. This imposition was introduced to help cope with the inflexibility of AtlasTi. Notably, this software does not allow a given word or phrase to be repeated in one plot. For example, one cannot write 'assumption analysis' twice in one Figure. This deliberate restriction is in accordance with the main purpose of the 'network' facility of the software, which is, to plot relationships between themes. In order to circumvent this restriction for a comparative outlay of information, suffixes were introduced. In this regard, the suffix '*f*' was used to distinguish the responses of financial

institutions. Similarly, the suffixes *s,c,m and c* were used to denote the responses of consultants, constructors, FM organizations and clients.



Notations:
P.S. Clients = Public Sector Clients; E&F trees = Event and Fault trees; HAZOP = Group of hazard identification studies; Org. charts = Organisational charts; R&S reviews = Risk and Safety reviews; Contacts (with allied organisations); Literature (searches).

Figure 1: Usage of diverse risk identification technique by PFI participants

Apart from the suffixes, each boxed phrase in Figure 1 is also proceeded by two numbers in parentheses, which are separated by a hyphen. These numbers were generated automatically by AtlasTi in the course of the data analysis. Their significance is explained for clarity. The nature of the analysis was such that, identifiable themes were assigned code names. As each theme was encountered, the text that described or defined it was highlighted and assigned a code name. If different interviewees had expressed the same opinion on a given subject, its theme was logically assigned the same code name over and over again in the course of analysis.

AtlasTi generates an automatic count of the number of times a code name is assigned to text in a given body of data. This count is reflected as the first of the two numbers in parenthesis. Therefore, the code 'Assumptions analysis1/f {2-1}', at the top of column 1 in Figure 1 means that the phrase 'Assumptions analysis' was assigned 2 times while analysing the data from the financial sector. It means that only two financial organizations said they used 'assumptions analysis' as a risk identification technique. Similarly, four construction companies said they have used this technique while the other sectors did not.

The second number in the parenthesis refers to the number of times each code was associated with other codes in the data. For instance, 'Sector: {0-5}' at the very top of the Figure, is associated with 5 other codes which, in this particular case, can be seen in the next row immediately below it. Thus, the coded answers in Figure 1 reveal both the number of organizations per sector that used each risk identification technique (first number in parenthesis) and the link between each answer and the other coded answers in the data. The information in Figure 1 is further described below, without inferring a generalization.

A comparative overview of the risk identification practices of the five sectors

Out of ten financial institutions interviewed, nine of them (90%) used consultation for risk identification, while eight (80%) used checklists, experience and intuition. 70% exploit contacts with allied organizations to enhance their understanding of certain risks, while 60% often brainstorm and conduct case studies and site visits to enable them comprehend some risks fully. Some techniques were not employed by many financial institutions, examples of which are event and fault trees (used by 30%), flow charts (20%), HAZOP studies (6%) etc.

Of the 15 consultant organizations surveyed, only two of the techniques seemed to be prominently used. These are the usage of checklists (73%) and experience (80%).

Construction organizations rely often on brainstorming (67%), use of checklists (83%), consultation with experts (83%), experience (92%) and site visitation (58%). FM companies rely more on the use of checklists (83%), databases (67%), experience (100%) and research (67%). The public sector clients used more of case studies (60%), consultation (80%) and experience (100%).

All the five sectors studied predominantly rely on experience while identifying their project risks. Except for public sector clients, all the other four sectors frequently use checklists to prod memory. The use of experience and checklists for risk identification are the two avenues that prominently appear to cut across all sectors. There are techniques, which are used frequently by at least one, but not all sectors. Examples of such are brainstorming, conduct of case studies and research, consultation with external experts, liasing with allied organizations, using databases, intuition and research. Some other techniques are rarely used, such as analysis of assumptions, event and fault trees, flow charts and searching of literature.

Discussion

The comparative frequencies with which the risk identification techniques were practically employed do not necessarily indicate the level of importance of these techniques. Rather, these frequencies suggest that certain techniques are applicable on different types of schemes while others are not. For instance, HAZOP studies and analyses of flow charts are more susceptible to manufacturing, waste treatment, and allied types of schemes.

Notably, all the techniques compiled before the survey have been used by at least one of the PFI participants that were interviewed. In addition, five techniques were added to the compilation. These are shown at the lower part of Figure 1. Amongst these is the use of sensitivity analysis by a financial institution, not to identify risks afresh but to identify those that are more crucial. One other financial firm uses term sheets, which are documents that describe the conditions under which they lend money. In this regard, the term sheets are used as a prompt list to help ascertain that PFI participants do not pose any major credit risk.

Two FM companies said they would scrutinize the draft contract documents that would eventually be binding on them, to see the terms therein. Solicitors are used in interpreting the risk implications of contract documents. Another FM company said it relied on common sense, meaning that certain risks were too obvious to be overlooked or left unmitigated.

'Experience' seems to be the major endowment that informs risk identification. Given the nature of PFI where projects are usually big and complex, it is usually the long established, large and experienced organizations that get to win such schemes. The personnel resources of such PFI participants are often able to cope with risk identification. Although diverse types of consultants are often engaged for risk assessment, the task assigned to them pertains, more, to the aspect of risk quantification.

CONCLUSION

A wide range of techniques is utilized for risk identification in PFI schemes. All the techniques compiled before the survey have been used by at least one of the PFI participants that were interviewed. All the five sectors studied rely on experience while identifying their project risks. Most participants also use checklists to prod memory while identifying risks. The use of 'experience' and 'checklists' are the two avenues that appear to cut across all sectors as predominant risk identification techniques. At the other end of the spectrum, some techniques are rarely used, such as analysis of assumptions, event and fault trees, flow charts and searching of literature. In between the most and least used techniques, there are some notable techniques, which are popular, but not used by all sectors. These include the use of brainstorming (sometimes at workshop sessions), conduct of case studies, liasing with allied organizations, using databases for references, use of research, consultation with external experts and reliance on intuition.

Having identified the mainstream practice of PFI risk assessment and management, project-specific case studies were conducted to further substantiate the findings. This enhanced the necessary grounding warranted by the grounded theory approach. On that basis, the development of a state-of-art framework for the risk management of PFI projects was embarked upon. Thus, apart from identifying the ways in which risks were identified in the PFI domain, the investigation explored the manner in which these risks were evaluated, communicated and mitigated. However, this paper discussed risk identification only.

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