Research Paper Architecture

Risk Management in Built Operate Transfer (BOT) in Malaysia

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ABSTRACT

This paper aims to look into risk management in Built Operate Transfer (BOT) projects in Malaysia. Risk management was used as a tool in managing projects in order to reduce risk especially for projects that involved with huge amount of money. Risk management process in the BOT projects involved risk identification, risk classification, risk analysis and risk response. This paper also will identify the usage of the BOT as a procurement method in construction and to make recommendation on the best way to mitigate the risk encountered in BOT project. Questionnaires survey was sent out to 140 contractors Grade G7 contractors registered under the Malaysian Construction Industry Board and 10 interviews were been held to get in depth information from the respondents. It was found that by having a proper risk management procedure, the risk would be reduced in BOT projects. The main recommendation for this research is all parties should have same appreciation to identify the risks by working together in order to improve the effectiveness of the risk management.

KEYWORDS Risk Management, Built Operate Transfer

INTRODUCTION

The concept Built of Operate Transfer, private finance initiative (PFI), or any other privatization schemes have attracted both government and private sectors all over the world in recent decades (Dev and Ogunlana, 2004). While the demand for infrastructure facilities is continuously increasing, many governments fail to implement such development projects owing to their inability to finance these major projects that are remarkably high-cost. Thus, demand for privatization schemes such as BOT and PFI is also rapidly increasing in both developed and developing countries. In Malaysia, there are many kinds of infrastructures, such as roads, toll ways, bridges, harbours, railways, etc. In general, the government or a public sector is required to intervene in the provision of these infrastructures. In many cases, these bodies themselves invest in and operate the facilities. In BOT projects, the arrangement is that the contractor or a consortium comprising the contractor and another party (the operator) commonly known as the 'promoter' will contract to (design and) construct works. For example, to operate a toll road or water treatment plant either as the owner or under a lease, for a prescribed period (say, 20-40 years) and at the end of the operation period, to transfer the works to the principal.

AIM

The aim of this paper is to study the risks encountered and risk management in Build Operate Transfer (BOT) projects in Malaysia and hopes to recommend optimal ways to mitigate the risks encountered in these projects.

LITERATURES ON RISK MANAGEMENT

According to Kochhar (2008), risk management is a discipline that attempts to identify and control future events that may have adverse affects on the cost, schedule, or quality of a project. Risk management provides processes, methods, and tools to manage risks.

It provides a disciplined environment for proactive decision-making to accomplish the following goals:

- Continuously assess potential risks
- Prioritize risks
- Develop and implement mitigation strategies for addressing risks
- Continually improve the risk management process

LITERATURES ON BUILT, OPERATE, TRANSFER (BOT)

There has been a growing trend in recent years for government in many developing countries to place major public investment particular for infrastructure projects, into the private sectors. This has meant that governments look to the private sectors to finance projects using the project anticipated revenues as security rather than relying upon a direct sovereign guarantee of the project debt. Many have adopted the built operate transfer (BOT) approach, so that the private sector have to operate the plant and transfers the ownership to the government after a specified concession period. However, for BOT to success in any major privatized project, the host government cannot withdraw or adopt a passive role; it has to ensure the right political and commercial environment. It covers the responsibility and undertaking that the project sponsors could commit to in order to negotiate favorable concession from the government and raise financing that is so vital for the BOT model to be successful.

Dey and Ogunlana (2004) informed that the concept of built, operate, transfer (BOT), private finance initiative (PFI), or any other privatization schemes, have been attracting both government and private sectors all over the world in recent decades. Although requirements of the infrastructure facilities are increasing continuously, many governments fail to implement the development projects owing to the government's inability to finance such major projects that are remarkably high in

cost. Thus, demand for such privatization schemes as BOT and PFI are drastically increasing in both developed and developing countries especially on infrastructures works such as roads, toll ways, bridges, harbors, railways and others.

According to Oztemir and Weber (2000), collecting enough revenue in Build operate transfer (BOT) projects is the biggest concern for the associated parties. For BOT roads, usually the only income is the revenue collected from the 'toll' that is paid by the roadway users. Therefore, calculating the right tariff becomes critical, and this 'toll' price is usually the determining factor that controls the winning bid.

In general the build operate transfer (BOT) approach to construction contracting involves the investment of private risk capital by a consortium of companies to design, finance, construct, operate and maintain a project for public use for a specific term. During the term or concession period, the private investment consortium is able to collect revenue from the users of the facility to repay the debt provide, operating and maintenance funds and make a profit. When the consortium's limited term of ownership expires, title to the project reverts to the government at no cost. By then, the consortium should have collected enough revenue to recapture its investment and make a profit (levy 1996; Webster, 1996). Generally, unless guarantees are given and demand is insufficient to meet the guarantees, the governmental agency pays nothing for the project (Levy, 1996).

BOT can be defined as a major start-up business venture where private organization undertake to build and operate, which would normally be undertaken by government and return the ownership to the government after fixed concession period. Lenders and investor are expected to look to revenues generated from the completed projects as the main sources of security for repaying the debts. The five (5) phases of typical BOT project are pre-investment, implementation, construction, operation and transfer (Tiong, 2000).

METHODOLOGY AND ANALYSIS

A set of questionnaires was prepared for the targeted groups of respondents comprising Build Operate Transfer (BOT) contractors. From the 150 questionnaires distributed to the G7 contractors registered under the Malaysian Construction Industry Board, only 38 replies were received which represent twenty percent (20) and 10 interview were conducted to obtain more information on the BOT process. Data obtained from the questionnaire survey and interviews were collected and analyzed. Frequency counts and percentages of the data were computed. The average index used in order to analyze the data. The average index will be used and calculated based on the following formula:

$$\text{Average Index} = \frac{\text{Total } a^i x^i}{\text{Total}}$$

Where

a = constant the symbol of weight for;

x^i = changer the symbol of respondent frequency for ^{i} = 1, 2, 3, 4, 5, and illustration as follow:

X^1=Frequency answer for "not critical" same with $a^1 = 0$

X^2=Frequency answer for "less critical" same with $a^2 = 0$

X^3=Frequency answer for "moderate critical" same with $a^3 = 0$

X^4=Frequency answer for "critical" same with $a^4 = 0$

X^5=Frequency answer for "very critical" same with $a^5 = 0$

For risk in design and build, the average index method with used 5 category skill will be used for imagine the degree of risk. Category skill will be used are as follow:

5 = Very critical
4 = Critical
3 = Moderate critical
2 = Less critical
1 = Not critical

RESPONDENT EXPERIENCE ON BOT PROJECTS

The purpose of this questions is to obtain the company background, years of establish, years of working experience.

TABLE 1
YEARS OR WORKS EXPERIENCE IN BOT PROJECT

No	Years	Frequency	Percentages
1	5 years	17	48.6 %
2	5 to 10 years	14	40 %
3	10 years & above	4	11.4 %
	Total	35	100 %

Forty six percent (46%) of the respondents had more than 10 years experience in the construction industry, followed by 34% with 7 to 10 years experience and 20% with 5 to 7 years. None of these respondents had less than 3 years or 3 to 5 years working experience. Only 11% of the respondents had more than 10 years experience in BOT projects, 49% had 5 years or not less than 5 years while 40% had 5 to 10 years experience in these BOT projects. 26% from the respondents claimed that they very clear about BOT projects while another 60% were clear about it and the remaining 14% were unsure. The respondents answered the questionnaire based on their company's experience in handling the BOT projects. The respondents clearly understood the BOT concept because they handled the BOT projects themselves from pre to post contract. The analysis shows that there none of the respondents were involved in average numbers of 5-10 BOT projects as they were either involved with small numbers or large numbers. Most of the respondents, representing 43%, were involved in a small number of BOT projects of 3 to 5, followed by 45% that were involved in 1 to 3 projects and the total of 12% that were involved in more than 10 projects. The respondents reasoned that they were not interested in BOT projects because of their risky nature and that the profit, although high, was only made after a very long period.

BOT METHOD OF PROCUREMENT, REASON FOR ADOPTING THIS METHOD

The purpose of this section attempts to collect the information from the respondent on built, operate and transfer (BOT), the reason used and the suitability of BOT. The analysis is based on the frequency of respondents who answered the questionnaire.

It analyses on group basis and the ranking are as the following:

TABLE 2
BUSINESS OPPORTUNITIES

No	Project specific risks	Range					Average point	Average index
		1	2	3	4	5		
1	BOT projects create business opportunity	0	0	8	21	6	3.94	Critical
2	BOT projects help in facilitating transfer of technology	0	0	9	22	4	3.86	Critical
3	BOT projects return high profit	0	0	19	12	4	3.57	Mode -rate Critical
4	Risk in BOT projects are spread between various party involved	1	6	16	10	2	3.17	Mode -rate critical

The main reason why the respondents choose BOT compared with other methods was that the BOT projects created business opportunities. The average point for this factor was 3.94 which made this a critical factor.BOT projects also help in facilitating transfer of technology received an average point of 3.86 which was also considered a critical factor. The factor that BOT projects return high profits was the third choice with an average point of 3.57. This means that it was a moderately critical factor influencing BOT projects. The idea that risks in BOT are spread between various parties involved is the most disagreed by the respondents who claimed that the risks were mostly borne by the concession companies and engineers. This was a moderately critical factor with an average point 3.17. It was found that the most suitable project to be constructed using BOT was the highway. This was ranked first with an average point of 4.46. Based on the analysis, it was revealed that in the Malaysian construction industry, almost all highway projects in our country used the BOT method.

Infrastructure was ranked third with a 3.31 average-point. The factor was not considered suitable as the basis for carrying BOT methods, making it moderately suitable. Bridge was chosen as moderately suitable with an average point of 3.57 and was ranked second after the highway. The last factor was the building which showed a 3.25 average point and was found to be not very suitable as the basis for conducting BOT projects. The conventional method is most preferred by the contractor to construct such projects.

TABLE 3
PROCUREMENT PREFERRED IN CONSTRUCTION INDUSTRY

No	Project specific risks	Range					Average point	Average index
		1	2	3	4	5		
1	Build operate transfer (BOT)	0	0	10	22	3	3.80	Critical
2	Turnkey	1	9	16	9	0	2.94	Moderate Critical
3	Design & build	0	1	5	23	6	3.97	Critical
4	Convent-ional	0	0	7	23	5	3.94	Critical

Table 3 shows the list of several methods of procurement used in the construction industry. Out of the 4 factors above, the Build Operate Transfer (BOT) method was critically used and was ranked third with an average point of 3.80. This is because not all projects are suitable for the BOT method. For the past few years, the turnkey method was preferred in the construction industry but based on research, nowadays, turnkey is no longer preferred. Respondents ranked the turnkey method fourth, the lowest, with an average point of 2.94 which was moderately critical. The Design & Build method was ranked first with an average point of 3.97 and was the most preferred method voted by the respondent, making it a method which was critically used. The conventional method has been in existence the longest in the construction industry. This method was ranked second and was critically used with an average point of 3.94. 71% of the respondents agreed that Concession Companies were most interested in projects using the BOT method because of the high return profit in the long run. 23% said that clients were most interested to get involved in BOT projects while the remaining 6% who were interested comprised consultants. The analysis supports the view that the construction industry today has helped in increasing the country's economy. Table 3 shows that 88.5% of respondents believed that the progress of the construction industry today was average while 8.6% agreed that it was slow and the remaining 2.9% believed that it was aggressive. Based on these, the researcher concluded that the current status and progress of the Malaysian construction industry today is average.

TABLE 4
SUITABILITY OF BOT METHOD IN MALAYSIA

No	Projects specific risks	Range					Average point	Average index
		1	2	3	4	5		
1	Return high profit	0	0	13	20	2	3.69	Critical
2	Additional experience for firms	0	0	4	22	9	4.14	Critical
3	To generate more expertise	0	0	15	96	30	4.03	Critical

High profit returns is one of the reasons for using BOT in the construction industry today and based on Table 4. This factor received an average of 3.69, making it a critical factor. Additional experience for firms is another factor influencing the suitability and practicality of BOT in the construction industry. The respondents agreed that the BOT method gave additional experience to the firms and parties involved in BOT. This factor showed an average point of 4.14, making it a critical factor. The construction industry today lacks the necessary expertise to handle BOT projects. With an average point of 4.03 which was considered critical, the respondents agreed that the BOT method was useful to generate more expertise in the BOT method of procurement in the construction industry. All the three (3) factors above were shown to be critically suitable and practical to be used in BOT projects in the construction industry.

Risks encountered in BOT projects

It attempts to identify and analyze the risk encountered in the BOT projects and based on the frequency of the respondents answered the questionnaire and the ranking of each of the risk groups are such as the following:

TABLE 5
WHO IS MOST INFLUENCED?

No	Projects specific risks	Range					Average point	Average index
		1	2	3	4	5		
1	Client	0	0	22	9	4	3.49	Moderate Critical
2	Concession Company	0	0	4	12	19	4.43	Critical
3	Architect	0	2	14	17	2	3.54	Moderate Critical
4	Engineer	0	3	10	20	2	3.60	Critical

Table 5 illustrates the 4 main parties involved and most influenced by risks in BOT projects which were the clients, Concession Company, consultants and engineers. It shows that the party that was most influenced by risks was the concession company. As it was ranked first, with an average point of 4.43, this shows that the concession company was critically influenced. The second ranked was the engineers, with an average point of 3.60, followed by the consultants and clients who were ranked third and fourth ranking, with average points of 3.54 and 3.49 respectively.

The concession company was most influenced by the risks because it was involved most in the projects from the design stage, construction stage, completion and also operation stages until the projects were transferred to the clients. The engineers did not carry out the projects during the construction stage as they only monitored the projects' progress.

Which risk category influenced project progress most?

It was found that internal risk was agreed as the risk category that was most influential in BOT projects, with an average point of 4.14 which denoted critical influence. Project specific risks, ranked second with an average point of 3.77, was another critical influence. The third ranked was external risks with an average point of 3.63 which was also a critical influence.

The internal risks influenced the concession companies most because they were internally involved in the projects and thus, bore more risks. Project specific risks and external risks influenced all the parties involved, but with varying degrees of influence.

TABLE 6
TYPES OF RISKS

No	Projects specific risks	Range					Average point	Average index
		1	2	3	4	5		
1	Technical and design risk	0	1	5	27	2	3.86	Critical
2	Client risk	0	0	24	10	1	3.34	Moderate Critic-al
3	Site risk	0	1	8	25	1	3.74	Critical
4	Personal risk	0	6	23	6	0	3.00	Moderate Critical
5	Commercial risk	0	0	10	23	2	3.77	Critical
6	Financial risk	0	0	0	21	14	4.40	Critical
7	Strikes	3	17	6	8	1	2.63	Moderate critical
8	Inadequate plan or specification	0	0	18	17	0	3.48	Moderate critical
9	Operational problems	0	1	4	28	2	3.89	Critical
10	Faulty material used	0	0	22	12	1	3.40	Moderate critical

Technical and design risks constitute some of the internal risks encountered in BOT projects. It shows that technical and design risk was third ranked from the list of ten (10) internal risks with an average point of 3.86, making it a critical risk. There were specifics risks for every risk under internal risks. It was found that under the technical and design risks, 34% or 12 respondents stated that unproven technology risk was encountered in BOT projects, 51% experienced misunderstanding of technique and technology, 63% experienced lack of expertise to complete jobs, and 34% for high quality standard. 83% were of the view that the contractors' lack of expertise was the main risk encountered under technical risks while 40% chose development of new techniques and technology, 71% for ability to do jobs and lastly, 34% for safety standards.

Clients' risk was moderately critical with an average index of 3.34. This was not agreed by the respondents as the main risk under internal risks, so clients' risk was eighth ranked. 21 respondents agreed that the wrong choice of project team as one of the clients' risks in BOT projects. The main risk encountered was delay in making decisions to build the project by the client with 30 respondents in agreement while the least risk as agreed by 14 respondents was unclear briefing from clients. Statistically, delay in making decisions to build the project by the client was the main clients' risk with a percentage of 80%, followed by the wrong choice of project team with 60% and the remaining 40% was unclear briefing from clients.

Site risk was ranked fifth in the list of internal risks with an average point of 3.74 which is critically encountered in the projects and the percentages of the various site risks encountered in BOT projects, with the main risk being the ground condition and 32 respondents (91%) ranking it as the main risk. The second ranked was availability of services with 60% or 12 respondents in agreement while the third ranked was access and boundaries with 21 respondents in agreement. The average point for personal risks was 3.00, making it moderately critical. This factor was ranked 9th in the list of internal risks which was the second lowest. Personal risks, however, can be addressed and are thus, considered not too risky.

It was found that the personal risks were divided into two (2) categories which are staff experience and expertise and performance and efficiency. The most encountered risk in BOT projects in terms of personal risks was staff experience and performance with 94% in agreement while 60% was recorded for performance and efficiency where commercial risks were out of the contractor's control as they were unpredictable. Based on the table above, commercial risks were critically encountered with an average point of 3.77 and were fourth ranked in the list of internal risks encountered in BOT projects. Commercial risks listed four (4) main sub-risks which are strikes/demonstration, skilled labour availability, existing building and availability of materials. From all the four risks, the highest risk was the availability of materials which became a main problem for the concession companies, as agreed by 80% respondents. This was followed by the skilled labour availability (71%), and another 60% and 17% for existing buildings and strikes/demonstration respectively.

Financial risks were ranked first in the list of internal risks, denoting a critical risk with a 4.40 average point. Respondents observed that the main risk factor that hugely impacted BOT projects were financial risks as these projects needed huge amounts of financing. This is especially so as BOT methods involved large projects. It shows that the 6 minor risks under financial risks with the highest rated being financial matters at 80%. The second ranked was project cash flow with 60%, high front-end cost was 34%, interest rate, inflation and local authority having 31% each.

Strikes were the last ranked out of 10 with a 2.63 average point. Strikes did not influence the projects much because they very rarely or never happened in our country. Inadequate plan or specifications were ranked sixth with an average point of 3.48 which was moderately critically encountered in BOT projects followed by financial risks were operational problems, with an average point of 3.89 which was a critical risk encountered in the projects. To operate projects that involved huge amounts of money and high risks was not easy or common.

The last risk listed under internal risks was the usage of faulty materials, which was ranked seventh with an average point of 3.40, thus making it a moderately critical risk.

Project specific
TABLE 7
PROJECT SPECIFIC RISKS

No	Project specific risks	Range					Ave -rage point	Average index
		1	2	3	4	5		
1	Projects organization	0	0	5	26	4	3.97	Critical
2	The site and location	0	0	8	24	3	3.86	Critical
3	The programme of work	0	1	5	27	2	3.86	Critical
4	Communication flow between parties involved	0	2	23	8	2	3.23	Mode -rate critical
5	Contract sum	0	1	19	12	3	3.49	Moderate critical
6	Contract period	0	3	20	11	1	3.29	Moderate critical
7	Project complexity	0	0	4	29	2	3.94	Critical
8	Design and development risk	0	0	9	20	6	3.91	Critical
9	Cost overrun	0	0	3	14	18	4.43	Critical
10	Operation and maintenance risk	0	1	14	18	2	3.60	Critical
11	Market risk	1	8	16	9	1	3.17	Moderate critical
12	Force majeure risk	0	2	10	21	2	3.66	Critical

In the survey, respondents ranked every risk under the specific risks involved in BOT projects. From the list shown, thirteen (13) common risks were encountered in BOT project specifics. The main risk encountered in projects was cost overruns with an average point of 4.43, denoting a critical risk. This was followed by project organization with an average point of 3.97 which was also critical. The third ranked, which was also

critical with an average point of 3.94 was project complexity while the fourth ranked was design and development risk at 3.91 which was critical. The fifth rank was shared by both site location and programme of work with average points of 3.86 respectively, thus making them critical. The sixth rank was past experience which was also critical with an average point of 3.71. The seventh, with a 3.66 average point and was critically encountered, was force majeure risk while the eighth ranked were operation and maintenance risks with 3.60 average points. The ninth was contract sum with an average point of 3.49 which was moderately critical while the tenth ranked, also moderately critical with an average point of 3.29, was contract period. The eleventh ranked was communication flow between parties involved with an average point of 3.23 and also moderately critical. The lowest encountered risk was market risk with an average point of 3.17 and was moderately encountered in the BOT projects.

It was found that the risks mostly encountered under external risks as the economy, weather, political risks, government legislation, disaster risks and financial risks. From the six (6) risks listed, the highest risk to influence BOT projects was financial difficulties with an average point of 4.26 thus showing a critical average index. The second ranked was economy status with a 4.10 average point, denoting a critical influence while the third was political risk with an average point of 3.69. Following this, the fourth ranked with an average point of 3.43 was government legislation, making it moderately critical, the fifth ranked was the weather, being moderately critical with a 3.40 average point. The sixth and lowest ranked was disaster risk with 2.57 average points which was a moderately critical risk.

TABLE 7
WAYS TO MITIGATE THE RISK

No	Ways	Frequency/ 35 respondents	Percentages %
1	Government subsidies and guarantees	14	40 %
2	Management	31	86 %
3	Foreign exchange guarantees	8	23 %
4	Off-take agreement to ensure the profit return of the project	13	37 %
5	Feedstock agreement to supply raw materials	11	31 %
6	Government co-operation in establishing an off-shore escrow account	17	49 %
7	Technical risks and securities in completion delays under contractor liability	21	60 %
8	Operation and maintenance by an experienced maintenance contractor	21	60 %
9	Reimbursed the concession company for the additional cost	11	31 %

From the survey, the respondents confirmed that management was the best way to manage or prevent risks in BOT projects. 86% respondents agreed that effective management would reduce the effects of the risk encountered. The second rank (60%) was shared between technical risks and securities in completion delays under contractor liability and operation and maintenance by an experienced maintenance contractor. The third ranked was the government's co-operation in establishing an offshore escrow account with 49%. The fourth was government subsidies and guarantees with 40% while the fifth ranked was off-take agreement to ensure the profit returns of the projects. This will lower the probability of making losses for the concession company. With 37%, the sixth rank was shared between feedstock agreements to supply raw materials in order to ensure that project materials were sufficiently delivered on time for completing the project. The last method ranked was foreign exchange guarantees with 23%.

INTERVIEWS

From the in-depth interviews conducted with ten contractors, it was found that they had carried out risk management to prevent encountering risks in their projects and to mitigate the effects of any risks that may occur. The contractors tried to practice efficient risk management as the purpose of applying risk management may only be achieved if it effectively reduces the probability of loss and increases the company's profitability.

From the survey, both the contractors said that the risk identification was done by referring to previous similar projects. This was achieved by appointing a team to identify the risks likely to occur and influence their projects. They then prepared the best solutions to manage the risks. The team also used the common methods used by the other contractors as follows:

a) Checklist methods; (mostly used by contractors)
b) Physical inspections;
c) Analysis of available records;
d) Brainstorming sessions.

Based on the responses, the most encountered risks were then divided into three (3) categories as follows:

- Internal risks
- Project specific risks
- External risk

The team analysed the risks and forwarded several solutions. This was a most challenging task as it was necessary to ensure that the lowest ratio of risk was encountered in the projects. The common methods that were used by the contractors in order to analyze the risks were:

i. Sensitivity testing (mostly used by contractors)
ii. Multiple Estimating using Risk Analysis (MERA

TABLE 8
MOST INFLUENCED RISK

No	Risks	Average index
1	Internal risk • Financial risk • Operational risk • Technical risk	 4.40 3.89 3.86
2	Project specific • cost overrun • project organization • project complexity	 4.43 3.97 3.94
3	External risk • financial difficulties • economic • political risk	 4.26 4.10 3.69

The internal risk that most influenced the project was firstly, financial risk with an average point 4.40. Operational problems came second with an average point of 3.89 and thirdly, technical and design risks at 3.86. All the three had the most influence on internal risks for the projects involved. For project specific risks, cost overrun was the most influential with an average point of 4.43. This was followed by project organization with a mean of 3.97 and thirdly, project complexity at 3.94. For external risks, financial difficulties showed the highest average point of 4.26 while the economy had 4.10 and political risks came third with 3.69.

TABLE 9
RISK RESPONSE

Risk Response	Descriptions
Risk Reduction	· Unproven technology · Misunderstanding of technique and technology · Lack of expertise to do the job · Wrong in choosing project team · Delay in making decision to build the project · Availability of material and labour

Risk Transfer	· Safety standard · Ability to do the job · The staff experienced and expertise · Performance and efficiency risk · The project programme · Employers caused delays
Risk Avoidance	· Wrong in choosing project team · Delay in making decision to build the projects · Briefing from client not clear · Misunderstanding of technique and technology · Financial matter
Risk Retention	· Strikes/demonstration

CONCLUSION

From the analysis, it can be concluded that the internal risks that gave the highest impact to BOT projects were financial risks, operational problems, technical and design risks. Projects specific risks included cost overruns, project organization and project complexity while financial difficulties, economy risks and political risks constituted the external risks. The effectiveness of risk management improves if all parties have the same appreciation of the identified risks. Working together under a climate of trust and an open-book policy with a clear understanding of roles can lessen these risks and those that do should be supported by all organizations thereby reducing the impact of risks to the company. Construction professionals should attend seminars organized by CIDB or other organizations to gain better understanding of the risks related to the formal decision-making processes in projects. Research on risk management should be extended to include more projects so that a clearer view and more representative results can be achieved. Future research should focus on identifying project and construction risks and also explore differences in risk perceptions among project participants.

REFERENCES

Ahmad, K. (2009) "Construction Economic", Development Finance, pp 135-152. | Baker, R.W. (1986), "Handling uncertainties", International Journal of Project Management, | Beidleman, C.R., Fletcher, D. and Veshosky, D. (1990), "On allocating risk: the essences of project finance", Sloan Management Review, Spring, pp. 47-55. | Bennett, F.L. (2001), "Using information technology in the management of construction", Master Builders, 1st Quarter, pp. 92-4. | Bower, D. (2003), Management of Procurement, Thomas Telford Publishing, Thomas Telford Ltd, 1 Heron Quay, London E14 4JD. | Diwan, P. (2002), Project Management, Golden Books Centre Sdn Bhd. | Edwards, L. (1995), Practical Risk Management in construction Industry, Thomas Telford, London 1995. | Elyse, (2007) (online) available at http://www.anticlue.net/archives/000816.htm | (accessed on 20th december 2009) | Flanagan, R. and Norman, G. (1993), Risk Management and Construction, Blackwell Scientific Publications. | Ganeson, S. (1982), "Management of small construction firms: a case study of Sri Lanka, Hong Kong, pp. 183-96. | Franks, J. (1984), Building Procurement Systems, CIOB | James T. Gleason (2000), Risk; The New Management Imperative in Finance, Library of Congress Cataloging in Publication Data. | Knight, F. (1921), "Currency problems play havoc on projects", Asian Business, November, pp. 35-46. | Kochhar, A (2008), Project Risk Management Plan (2008), EmpowHR, Unisys Corporation. | Levy, S.M. (1996), Build, Operate, Transfer – Paving the Way for Tomorrow's Infrastructure, John Wiley & Sons, New York, NY. | Li, H., Shen, Q., Scott, D. and Love, P.E.D. (Eds) (2000), INCITE 2000: Implementing IT to Obtain A Competitive Advantage in the 21st Century, The Hong Kong Polytechnic University, Hong Kong, pp. 183-96. | McCarthy, S.C. and Tiong, R.L.K. (1991), "Financial and contractual aspects of build-operate-transfer projects", International Journal of Project Management, Vol. 9 No. 4, pp. 222-9. | Merna, T. and Smith, N.J.(1996), projects procured by private financed concession contracts. Asia Law and Practice, Hong Kong. | Merna, T., Payne, H. and Smith, N.J. (1993), Benefits of a structured concession agreement for build own operate transfers projects. International Construction Law review, Jan (1993), 32-42. | Mohd Nor, K. (1989), Privatisation Through BOT, Surveyor 3rd Quarter. | Nadeem, A. (1998), "Prospects and risks of BOT projects for infrastructure development in Pakistan", AIT Master's thesis ST98-35, Bangkok. | Abdul Hamid, N. (2002), "The Risk and return on Built Operate Transfer (BOT) Contract: Project Risk, pp. 56-64: Project Risk | Oztemir, B and Weber, S. (2000), Member ASCE, BOT Risks and Their Correlations, 2000, Library of Congress Cataloging. | Pelan Induk Penswastaan,(1991), Unit Perancang Ekonomi, Jabatan Perdana Menteri. | Prasanta K. Dey, K.P. and Ogulana, O.S. (2004), Risk Management Tools and Techniques for BOT projects, volume 104, number 4, pp 334-346. | Risk management - Wikipedia, the free encyclopedia.mht (2009), Risk Management, (online) available at http://www.wikipedia.com | . (Accessed on 2oth December 2009). | Saunders, A. (1998), "Aspects of funding for BOO projects", Engineering, Construction and Architectural Management, Vol. 1, March, pp. 22-30. Singapore, Hong Kong, Thailand, The Philippines and Japan", report prepared under APO Oshikawa Fellowship, Asian Productivity Organisation, Tokyo. | The 14th Asia Construct Conference, 2008, Malaysia Report, CIDB Malaysia. | Tiong, R.L.K. (2000), BOT projects, risk and securities, construction management and economics. Vol. 4 No. 3, pp. 201-10 | Uher and Davenport (1998), Build Operate Transfer (BOT): Fellows R, pp. 81-82.