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Critical success factors of the BOOT procurement system: reflections from the Stadium Australia case study

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Abstract Recent trends in the provision of infrastructure development indicate that the private sector is playing an increasingly important role in the procurement process. This trend has partly arisen out of a necessity for the development of infrastructure to be undertaken at a rate that maintains and allows growth. This has become a major challenge for many countries where it is evident that these provisions cannot be met by government alone. The emergence of Build-Own-Operate-Transfer (BOOT) schemes as a response to this challenge provides a means for developing the infrastructure of a country without directly impacting

upon the government's budgetary constraints. The concepts of BOOT are without doubt extremely complex arrangements, which bring to the construction sector risks not experienced previously. This paper examines perceptions of BOOT schemes in order to develop a framework of critical success factors. The developed framework is then tested against a case study of Stadium Australia, and the outcomes of the comparison are discussed.

Keywords BOOT, case study, critical success factors, infrastructure challenge, public-private partnerships, Stadium Australia

INTRODUCTION

According to McDermott (1999), a significant development in construction procurement has been the rapid increase in the use of Build-Own-Operate-Transfer (BOOT) arrangements. There is a growing trend for governments and other clients in the construction industry to place major projects into the private sector (Angeles & Walker, 2000). The private sector is playing an increasingly important role in this trend that has partly arisen out of a necessity for the development of infrastructure to be undertaken at a rate that maintains and allows growth. This in turn has become a major challenge for many countries, and particularly so where it is evident that these provisions cannot be met by the government alone, as they have typically been in the past.

The emergence of BOOT schemes as a response to this challenge, provides a means for developing the infrastructure of a country without directly impacting on the government's budgetary constraints. With the Build-Operate-Transfer (BOT) family of procurement options an alliance or joint venture group forms to provide a facility for a client for which the client makes a concession agreement to fund the facility until that facility's ownership is transferred to the client. This

arrangement is more common for infrastructure projects than buildings because the concession allows for tolls or other payments to be made by end-users to cover the cost of both procuring the facility and its operation (Walker *et al.*, 2000).

Many countries have now embarked on infrastructure projects procured via BOOT or the use of similar methods. The scheme is now widely practiced and spreads among a diverse range of countries from Australia, Canada, Hong Kong, UK and the US to countries like India, Malaysia, Mexico, Thailand and the Philippines (Walker & Smith, 1995). Most of these projects are financed on a limited recourse basis and built and operated as a private venture under a project agreement involving the host government.

Many of the infrastructure partnerships between public and private sectors in the past are yet to provide evidence of successful completion, as few of the concession periods have expired. Therefore, the aim of this paper is to examine the perceptions of BOOT schemes in order to establish a framework of critical success factors that can be tested and developed against a case study undertaken on a current project.

It became evident several decades ago that governments globally had major shortcomings in funding public works. The fundamental influences from these

issues are what have developed the trends towards privatization and more specifically infrastructure procurement strategies such as BOOT. According to Walker & Smith (1995), the infrastructures of 'developed' countries such as those of western Europe, North America, Japan and Australia are under strain from two principal influences. First, the existing and limited infrastructure is unable to keep pace with the growth of the country and secondly, the demand for health and welfare because of an ageing population. Walker & Smith (1995) also acknowledge the problems and challenges for 'newly industrialized countries' such as Malaysia, Hong Kong, Taiwan, Mexico and South Africa. Here the common problem, defined as urbanization, is caused by a population explosion placing heavy demand on an already limited infrastructure.

The New South Wales (NSW) Government has an enviable reputation for working with the private sector in the provision of public infrastructure – particularly in relation to road, rail and Olympic infrastructure. The government has provided guidelines in its publication 'Guidelines for Private Sector Participation in the Provision of Public Infrastructure', which is reviewed regularly and most recently updated in October 1997. Since the last evaluation there has been considerable international attention towards partnerships between the private and public sectors. A review is timely. The latest government Green Paper 'Working with Government – Private Financing of Infrastructure and Certain Government Services in NSW' attempts to capture this opportunity to increase the benefits and comment on the issues and concerns held by the private sector that may impede development. 'Working with Government' is not a policy statement or a detailed explanation of procedures. The paper is a means of seeking comments and ideas for how the public sector can better work with the NSW Government in the delivery of the services which have a major infrastructure or asset creation component (NSW Government, 2000). This is a welcome opportunity to broaden relationships between the public and private sectors that may involve innovative recommendations and the formulation of new policies.

HISTORY OF BOOT PROJECTS

History records that the Industrial Revolution began when Abraham Darby first smelted coke in 1709. Urbanization and the need for associated infrastructure were to follow. Governments of the time had only rudimentary tax arrangements primarily to service heads of state. Infrastructure was therefore left to

individuals to finance and build the canals and railroads of Europe and later those in the America's, China and Japan were procured this way (Smith, 1999).

A key historical development in the funding of infrastructure then occurred from the late 1700s, as Smith (1999) indicates that tax generated from the Industrial Revolution meant that Governments were now able to fund their own infrastructure. But, where large undertakings were suggested, the concession or franchise arrangement was adopted. The need for water distribution initiated the first concession being granted in 1782 to the Perier Brothers in Paris.

The use of concession contracts declined in industrialized countries as the initial infrastructure was completed but the wonder of the age, the 195 km Suez Canal opened for navigation on 17 November 1869 (Smith, 1999). The Suez Canal Company was empowered by the Egyptian government to build and operate the canal. The Canal was to be financed by European capital with Egyptian financial support, and a concession to design, construct and operate this revenue producing facility was expected (Levy, 1996). The project agreement for the procurement of the 195 km Suez Canal was based around a 99-year concession contract (Walker & Smith, 1995).

Industrial countries generally funded new infrastructure between the late 1800s and the 1970s from their respective fiscal resources. However, a series of influences emerged in the late 1970s which placed pressures on this established system for both developed and developing countries. The infrastructures of 'developed' countries such as those of western Europe, North America, Japan and Australia are under strain from two principal influences. First, the existing and limited infrastructure is unable to keep pace with the growth of the country and secondly, the demand for health and welfare because of an ageing population. The problems and challenges for 'newly industrialized countries' such as Malaysia, Hong Kong, Taiwan, Mexico and South Africa are caused by a population explosion placing heavy demand on an already limited infrastructure (Walker & Smith, 1995).

The Suez Canal experience demonstrated that the concept of private sector participation in infrastructure provision is not a new idea. It is, however, only in the last two decades that BOOT concepts have become high on many government agendas. Australian examples of the BOT and BOOT approach include the Sydney Harbour Tunnel, M4 and M5 tollways in New South Wales and the Ord River Hydro-Electric Scheme in Western Australia (Angeles & Walker, 2000).

THE BOOT CONCEPT

According to Smith (1999), the phrase BOOT describes the earliest concession model, although the late Turkish Prime Minister, Turgut Ozal, is popularly cited as originating the phrase in the 1980s in connection with proposals for the construction of power plants in Turkey. In the BOOT model, ownership of the utility rests with the concessionaires until the end of the concession period, at which point both ownership and operating rights are transferred free of charge to the host government.

When a private sector group has a concession to build and toll a motorway project for say 20 years, this is a BOT. If, however, their concession also allowed them to own, build and rent warehouse space (for the concession period of 20 years) at certain locations along the motorway then the contractual arrangement in place is described as a BOOT agreement (Walker & Smith, 1995).

Most BOOT projects are first identified by the host government. In advertising or requesting for proposals, the host government asks for bids to have a particular project delivered on a BOOT basis. The BOOT concept uses a well-established approach of financing the project known as 'project finance'. Project finance techniques have been applied in the US to the development of commercial real estate, and were further developed in the 1970s in the North Sea in connection with oil and gas projects. Now commonly used in BOOT or similar arrangements, they are being used for numerous infrastructure projects involving power plants, roads, railways, bridges and water treatment plants. The financing of this infrastructure is very different to the financing of a shopping centre for example. In equipment or real estate financing, the lender's primary security is the capital value of the asset. Toll roads or power plants, on the other hand, have uncertain capital value and a very limited potential for resale. The lender's primary security therefore, are the contracts supporting the project and the certainty of the revenue stream set out in the project agreement (UNIDO, 1996).

In practice, most BOT or BOOT projects are financed on a limited or, in some cases, a non-recourse basis. Non- or limited-recourse financing is a financing structure in which the main source of debt repayment or equity return is the assets or returns that result from the project. The lender is relying on the project assets and cash flows for repayment and debt service. The deals are called 'limited recourse' when the sponsors' liability is limited to the amount they invested in the project if it fails, or 'non-recourse' when the sponsors

have no liability for project failure. The non-recourse approach is only used in cases where the project is clearly capable of supporting the debt (Walker & Smith, 1995).

CRITICAL SUCCESS FACTORS

The concept of 'Critical Success Factors' (CSF) was developed by Rockart and the Sloan School of Management with the phrase first used in the context of information systems and project management. Rockart defines CSF as:

Those few key areas of activity in which favourable results are absolutely necessary for a particular manager to reach his or her own goals...those limited number of areas where 'things must go right' (Rockart, 1982).

Morledge & Owen (1999) developed the concept of CSF to identify certain weaknesses associated with the practical application of Rockart's method. Six main areas of weakness are listed below:

1. Subjectivity.
2. Bias.
3. Human inability to process complex information.
4. Change in relation to surrounding environments, time dependency.
5. Imprecise definitions; generalization.
6. Qualitative performance measures.

Rowlinson (1999) states that critical success factors are those fundamental issues inherent in the project which must be maintained in order for teamworking to take place in an efficient and effective manner. They require day-to-day attention and operate throughout the life of the project.

A number of authors have identified factors they consider critical to the success of project procurement under BOOT or similar concepts. The following list attempts to summarize these:

- Developed legal/fiscal/economic framework (Tiong, 1990).
- Avoiding delays and cost overruns (Tiong & Alum, 1997).
- Comprehensive feasibility study (Keong *et al.*, 1997).
- Project management ability and proven expertise (Salzmann & Mohamed, 1999).
- Having a local partner (Salzmann & Mohamed, 1999).
- Existing infrastructure (Keong *et al.*, 1997).
- Political stability and support (Keong *et al.*, 1997).

- A well-prepared Environmental Impact Statement will assist in the binding process (Tiong & Alum, 1997).
- Technical innovation (Tiong *et al.*, 1992).
- Favourable inflation, exchange and interest rates (Tiong, 1990).
- Financial capability and support (Tiong *et al.*, 1992).

Tam *et al.* (1994) developed a 'five P's' framework for the successful launching of public-private sector joint venture projects with special significance given to the power industry in South-east Asia and China. The authors suggest that:

many companies have found careful planning to be the simple secret...they researched the market and its characteristics, found the best partner and project, and structured the project to protect their position and to assure profitability.

Their research concluded that successful planning and execution involves consideration of the five P's. This framework tends to view the success factors from an investors perspective, wishing to identify and then establish a project. The five P's being:

1. Project – identification of suitable projects is the first critical step.
2. Partner(s) – close attention must be paid to aspects such as goals, possession of political influence, provision of equity and possession of project management skill.
3. Pattern – investors must consider the structure of the investment, for instance, the importance of local participation and representation.
4. Profitability – providing a predictable level of profit.
5. Protection – protecting the relationship created with the project partners.

Ogunlana (1996) stresses that not all projects are suitable for procurement by this type of procurement method, and that given the numerous risks faced, projects should be in the local interest with government support, there should be long-term demand for the service offered by the project with limited competition from other projects and the legal and political systems in which the project is situated should be stable.

RESEARCH METHODOLOGY

In their consideration of research methods, particularly within the construction field, Fellows & Liu (1997) comment that a case study yields deep but narrow results. The possibility of the case study results being

'narrow' is accepted in that they are restricted to the case study project in question. The development of a 'perfect' BOOT model applicable to 'all' infrastructure projects is not the aim of this research. This is difficult given the complex, fragmented and unique characteristics of individual construction projects. However, the case study will serve to test the validity of the success factor framework developed from the related literature, and possibly provide for further refinement as a sound foundation applicable to BOOT projects in general.

Yin (1984) noted that the single case study method is an appropriate application where the case in question represents an extreme or unique case or that the situation has not previously been the subject of detailed scientific investigation. Given the fragmented nature of the construction industry, the many forms of BOOT procurement and its variations, and the 'unique' nature of commercial infrastructure projects in general, it is not possible to study either a 'typical' project or a group of projects which represent the entire application.

A single case study has been selected as the most appropriate means for the research reported in this paper. Collection of evidence for the case study was achieved by reviewing the documentation and reports provided by the consortium stakeholders, government office and general project literature and an informal interview process with key management personnel involved in the project. The research has identified CSFs from the literature and these CSFs have been tested and validated through the interview process with key senior project participants. The case study further validates these CSFs in a generic 'real world' context.

PROJECT BACKGROUND: STADIUM AUSTRALIA

Following the announcement on 24 September 1993 that Sydney had won the right to host the games of the XXVII Olympiad, work began on the planning and development of the facilities. The Olympic Co-ordination Authority (OCA) was established on 30 June 1995 by the NSW State Government, replacing Homebush Bay Corporation (HBC) to oversee the process. The NSW Government issued a call for proposals in August 1994 for private sector investment in the new Olympic stadium facility. This call was framed around a BOOT delivery scheme with an intention for the Government to shortlist successful tenderers (Magub & Hampson, 1999).

Multiplex and Hambros led the private sector consortium, known as Australia Stadium 2000, to respond to HBC's invitation for proposals to design, construct, finance, operate and maintain an Olympic stadium. In

January 1995, HBC announced a shortlist of three consortia, including the then named 'Australia Stadium 2000' consortium, and a call for detailed proposals was issued in June 1995. It was at this time that Macquarie Bank joined the consortium. In September 1995 Obayashi Corporation also joined the consortium (Stadium Australia Group, 1996a).

In January 1996 negotiations began with the 'Australia Stadium 2000' consortium as the preferred proponent to build, finance and operate the Sydney Olympic Stadium (Magub & Hampson, 1999). It was not until August 1996 that the OCA then awarded the proposal to design, construct and operate the facility to the 'Australia Stadium 2000' consortium. The Stadium Australia Trust and OCA signed the project agreement in September 1996 (Stadium Australia Group, 1996a).

Although the stadium evolved as a result of Sydney's successful bid for the 2000 Olympics, the project is now being run by Stadium Australia Management as a classic BOOT scheme. The A\$615 million project was capable of seating 110 000 spectators for the Olympic Games, and is now being reconfigured, following the games, to provide a capacity of 80 000 spectators.

Relationships and contractual arrangements

The OCA granted the Stadium Australia Trust the Trust Lease on the completion date of the stadium, being March 1999. The term of the Trust Lease expires on 31 January 2031 or, if the Project agreement is terminated before this date, on the date of termination of the project agreement. On the lease expiry date, the ownership and operational rights of the project transfers to the government (OCA) for nominal consideration. Up until that time, the Trust Lease covers, by lease and exclusive licence, the land on which Stadium Australia is constructed. The Trust Lease does not however, cover the precinct or adjacent area. The Trust has in turn granted the sublease and sub-licence over the same land to Stadium Australia Management.

Stadium Australia Management is therefore the operational entity of the group which generates revenue from operation of the facility. From this revenue Stadium Australia Management is required to meet certain operating expenses. The Sublease obliges Stadium Australia Management to make quarterly fixed and variable rental payments to the Trust. The rental income received by the Trust is used to meet payments to the major maintenance reserve, the principal and interest obligations under the debt documents, administration expenses and payment obligations to OCA under the Trust Lease and the Project Agreement (Stadium Australia Group, 1996a).

Beyond this intricate web of legal relationships, the Trust has an appointed Trustee. Perpetual Trustee Company Limited is one of the largest independent trust companies in Australia and has this responsibility. The Trust manager is Tower Hill Investment Managers Limited, a company jointly owned by Hambros and Multiplex (Stadium Australia Group, 1996a).

Financing the project

Financing of Stadium Australia has been as unique as the stadium itself. The approach broke a number of financing barriers because of a unique set of structures and an innovative approach. The Stadium Australia Group is a publicly funded group. According to a Senior Manager, interviewed for this research project, of Stadium Australia Management Limited 'We are a publicly listed entity and we were founded on our ability to raise both debt and equity...of the initial A\$550 million investment, the public float raised A\$350 million. The float was unsuccessful in that it finished short, but from a stadium viewpoint, it didn't make an enormous difference to us because the underwriters paid the shortfall'.

The project is stated to have a total development cost of A\$615.2 million. This cost includes design and construction costs of Stadium Australia and the associated precinct area; fitout costs of the stadium (apart from the fitout of private suites leased to third parties); the cost of reconfiguring the stadium and precinct area after the Olympics; development costs including those incurred during the bid process, design fees, listing and legal fees, stamp duty, financial advisory fees, accounting taxation advice and those to achieve financial close including marketing; pre-opening costs incurred prior to the project completion date; and financing costs including equity underwriting fees, debt-related fees and costs, funding for a debt service reserve account and capitalized interest on the construction loan facility (Stadium Australia Group, 1996b).

Equity funding for the project was raised via gold and platinum investors, founders and commercial investors. The capital structure of the Trust and Stadium Australia Management was such that at financial close, investors would hold or be obliged or entitled to subscribe for approximately 97.3 million units in the Trust, and an identical number of shares in Stadium Australia Management. The time obligations for payment of these investments were different, with gold and platinum investors (or underwriters take-up) being paid before financial close, while most founders and commercial investors' subscriptions were required to be

made within 5 days of project completion (Stadium Australia Group, 1996b).

The innovative techniques employed on the financing of Stadium Australia helped to break several barriers. These included introducing the first Australian Stock Exchange (ASX)-listed lifestyle product. It was also the first triple-stapled listed product. Most shares on the ASX are simple products which involve straight ownership of equity. Stapled products involve add-ons which are designed to make the overall product more attractive or to suit the particular needs of the project. In the original float offerings, gold and platinum packages involved three things – Olympic tickets, membership entitlements and equity investment; thus the recognition of a triple-stapled product. Each unit in the Trust is stapled to a share in Stadium Australia Management.

The ability to attract equity investors into a BOOT project is only a component of the overall financing requirements. Ability to raise debt and attract organizations willing to offer these arrangements is the other significant component. The primary debt funding for Stadium Australia was a Construction Loan Facility and now a Term Loan Facility. ANZ Bank and ABN AMRO agreed to provide a A\$161 million Construction Loan Facility to the Trust under the terms of the Construction Loan Facility Terms Sheet.

The project's revenue sources

The future financial success of the Trust and Stadium Australia Management depends substantially on their ability to generate corporate hospitality revenues and membership subscriptions. The achievement of these revenue targets will depend on the number and type of events held at Stadium Australia. Revenue generated from corporate hospitality and membership subscriptions over the 32 years concession period, need to be adequate to cover interest payment, debt repayment, dividends on equity investment, operational costs and ideally a sufficient profit margin.

Corporate hospitality revenues are expected to be the largest contributor towards operating revenue. Fees from Stadium Australia Club are also expected to be a significant revenue source. These two sources together are expected to contribute approximately 65% of the revenue of Stadium Australia Management in the year ending 30 June 2002. This is anticipated to be the first year with a full season of sporting events. During the Olympic period in 2000, Stadium Australia Management will receive negligible income from the Sydney Organising Committee for the Olympic Games (SOCOG). Food and beverage sales, merchandising, event rentals and signage rights outside the Olympic

period form part of the anticipated operating revenue (Stadium Australia Group, 1996b).

RESULTS

The culmination of reviewing contract summaries, project documentation and discussions with several key project personnel is evident in the following critical success factor framework (Table 1) specific to Stadium Australia. The 'ticks' identify which particular success factor is applicable to the relevant party managing the success factors and includes a summary of the key issues or responses from the interviewees.

DISCUSSION OF RESULTS

The procurement of Stadium Australia under BOOT, is in accordance with Australian Government's increased acceptance of alternative forms of project procurement and search for private sector infrastructure investment. Both the literature and case study confirmed the critical importance of consortium structure as a success factor in winning BOOT projects and the successful operation of them. The case study identified that the consortium had a wealth of expertise, considerable experience, high profile and a good reputation. This played a significant role in the consortiums successful bid. The literature stated the critical importance of a well organized and defined structure for the parties taking a stake in a BOOT project. The literature also noted the importance of reputation and profile among the participating parties as a success factor in winning project bids.

The literature stated that '...choosing the most suitable project consortium is the single greatest determinant of the success or failure' (UNIDO, 1996). The case study reflected much of that comment as a member of the Senior Management team of Stadium Australia identified that 'a crucial success factor of the project was that team members got on very well in a trusting relationship'.

The literature progresses to list the following factors necessary for the success of such a project. The way that the case study project was found to address each of the issues follows each point.

1. Market concerns with regard to competition and the flexibility to adjust to new markets.

The case study revealed Stadium Australia's flexibility to cater for different or new markets. This is evidenced by the Post-Olympic re-configuration of the layout to allow cricket and football matches. Market concerns with regard to existing competition

Table 1 Critical success factor framework (including parties managing success factor) developed from the Stadium Australia case study.

Critical success factors	Stad. Australia Trust	Insurance/underwriters	Contractor	Project participants	Host government (OCA)	Comment/response
Environmental impact	✓				✓	A carefully prepared EIS will often assist in bid and approval processes. Particularly important given Sydney's bid for the Olympics as the Green games
Approval process-efficiency/complicated negotiations	✓		✓		✓	The promise of efficient approval processes assists likelihood of success. Comprehensive DA was in fact submitted by OCA. Efficient approval process meant that consent was given 8/8/96 before project agreement was signed in September 1996
Technical innovation/complexity	✓	✓	✓	✓		Technical innovation can be a solution to overcoming project complexity. Innovation was certainly a success factor in winning the project. The financing methods/ASX listing broke new barriers. Project design very innovative, particularly on environmental/waste management
Developed legal/economic framework	✓				✓	Is a critical success factor which all parties must be aware of yet is sometimes a gamble borne by the project company in undertaking a project
Political stability-opposed/support	✓				✓	Government was certainly supportive of the project, given the country's responsibility in staging the Olympic games. By virtue of the concession period, BOOT projects will see changes in administration. Greater political stability and support will aid in success
Selecting the right project	✓				✓	Not all projects are suited to BOOT. Public and private agreement over the advantages the concept has to offer needs to be found. Project feasibility must show evidence of viability
Existing JV/ strategic alliances	✓					This experience or network is viewed favourably. A local partner in an international BOOT contributes greatly towards success. Experience viewed in terms of country (previous host)
Org. size-resource management/ability	✓					Proven experience and adequate resource to expedite such contracts relaxes government concern in award of the project. Issues of level and availability of local/national knowledge and expertise are vital
Trust					✓	Government will feel more comfortable in awarding the project if the sponsors are known and trusted
Community support	✓				✓	Strong community support can only assist the projects likelihood of success. It may result also in a quicker and more efficient approval process
Feasibility study	✓				✓	Comprehensive feasibility is critical to project success from both public and private perspective

Transfer of technology	✓	✓	Technology transfer benefits may assist with government and local support, thus raising success likelihood. NSW government publication (Guidelines for private participation in public infrastructure) raises the issue and highlights it as a success factor in evaluation of bids/proposals
Financial capability	✓	✓	Financial capability and credibility are critical to the success of the project especially regarding investors. The need exists also for the project company to be able to account for contingencies
Compatibility/complimentary skills	✓	✓	This was a significant factor in Stadium Australia. All consortium teams 'fitted' well with complimentary styles and created a sense of trust among key parties
Consortium structure	✓	✓	Structure forms the foundation for all risk management and contributes significantly to the projects likely success. In international BOOT, local participation and representation is crucial

were not seen as a major threat given the advantages expected in achieving better economies of scale with the larger venue. Some risk mitigation was however offered within the project agreement with regard to limiting the effect of introducing competitive venues within a 50-km distance.

2. Concerns with pricing. As the facility may have a degree of monopoly power, the government may wish to regulate fees and charges.

The only concern revealed by the case study with regard to pricing are in association with the operational revenue risk previously described.

3. Consideration for the quality of infrastructure which actually feeds the new facility.

The case study revealed this factor as an important issue, with particular regard to transportation within the Homebush Bay region. The Transportation Implementation Masterplan outlined OCA's responsibilities in providing this infrastructure which the stadium obviously depends on.

4. Relationships with the 'large' organizations anticipated to use the facility as a hub or essential part of their operation.

The case study revealed agreements with a number of project participants who partially underwrite revenues for the facility. Beyond this, several agreements have been made with organizations such as the National Rugby League for the staging of a minimum numbers of events.

The project's significant critical success factors

During the research interview process all participants identified the following key CSFs as significant and vital in order maintain a sustainable project:

1. The consortium had a wealth of expertise, considerable experience, high profile and a good reputation.
2. An efficient approval process that assisted the stakeholders in a very tight timeframe.
3. Innovation in the financing and equity raising methods meant that the consortium had a very good 'winning' strategy. They demonstrated the ability to raise both debt and equity.

A Senior Construction Manager during the preferred tenderer and early construction stages of the project described a further critical success factor, perhaps overshadowed only by the innovative 'winning', 'a crucial success factor of the project was also the representatives of the two key companies involved (Multiplex and Hambros). These people were extremely committed, dynamic, aggressive and yet

accommodating. Multiplex and Hambros were a very good fit. The team members got on very well and worked together in a trusting relationship’.

This comment reiterates the critical success factors of teamwork and complimentary style, consortium structure and general trust as identified in the framework established from reviewing the literature. Asked whether it is likely that, in hindsight, any of the stakeholders would change their approach, the senior construction manager thought not. He qualified this by commenting that this was easy to state given that the comment came from within the consortium that actually won the bid. Comment was however, made of a different approach taken by OCA on subsequent Olympic projects procured under similar methods, ‘In hindsight from a government perspective, instead of selecting a single preferred tenderer as early as they did, they would have taken two consortiums further down the evaluation process in the hope of realizing further competition benefits’.

The case study project has shown evidence in all respects of fulfilling the success factors required for a sustainable operation.

CONCLUSION

The emergence of BOOT schemes provides a means for developing the infrastructure of a country without directly impacting on the governments budgetary constraints. Consideration given to BOOT characteristics and perceptions has allowed the development of an overall critical success factor framework. With application to BOOT projects generally, the framework serves the purpose of raising awareness to factors at an early planning stage, such that further consideration can be implemented where applicable. The framework considers issues from all perspectives throughout the construction and development phase through to the operational and eventual transfer phase. The undertaking of a case study allowed the identification of critical success factors relevant to a large infrastructure project procured under the BOOT concept.

The most significant critical success factor applicable to the project in terms of operation is revenue sustainability. The success factor underlying this issue is the logic of achieving better economies of scale out of a much larger venue. In considering the most significant success factor at the developmental stages, the issue of consortium structure was most evident in both the literature and the case study. The consortium structure was of an extremely complex nature, yet consisted of teamwork, complimentary styles and trust among key parties. Contributing to the successful consortium bid,

this array of companies demonstrated a wealth of expertise, considerable experience, high profile and a good reputation. However, although this success factor is considered most significant up until completion of the construction phase, it has substantial consequence for the entire project life. As such, extensive consideration and planning given towards the consortium structure may be viewed as the single greatest determinant of success or failure of BOOT projects.

The next stage of the work is to refine the CSFs highlighted in this study and to identify their key attributes that make them success factors. Refined success factors are tested in continuing work case studying BOOT projects that were procured after Stadium Australia.

REFERENCES

- Angeles, N.H. & Walker, D. (2000) BOOT schemes – a project delivery system for a new millenium. *Chartered Building Professional*, March 2000, pp. 21–23. ISSN 1324-0990.
- Fellows, R. & Liu, A. (1997) *Research Methods for Construction*. Blackwell Science, London.
- Keong, C.H., Tiong, R.L.K. & Alum, J. (1997) Conditions for successful privately initiated infrastructure projects. In: *Proceedings of the Institution of Civil Engineers, Civil Engineering*, Vol. 120, May, pp. 59–65.
- Levy, S.M. (1996) *BOT Paving the Way for Tomorrow's Infrastructure*. Wiley, New York.
- Magub, A. & Hampson, K. (1999) Sydney's Olympic Stadium: a world class event? *Construction Process Re-Engineering 99. Proceedings of the International Conference for Construction Process Re-Engineering*, 12–13 July, pp. 121–132. UNSW, Sydney.
- McDermott, P. (1999) Strategic and emergent issues in construction procurement. In: *Procurement Systems: A Guide to Best Practice* (eds S. Rowlinson & P. McDermott), pp. 3–26. E. and F.N. Spon, London.
- Morledge, R. & Owen, K. (1999) Developing a methodological approach to the identification of factors critical to success in privatised infrastructure projects in the UK. In: *Profitable Partnering in Construction Procurement* (ed. S. Ogunlana), pp. 487–498. CIB W92 Proceedings, Publication 224.
- New South Wales Government (2000) *Working with Government – Private Financing of Infrastructure and Certain Government Services in NSW*. NSW Government Green Paper.
- Ogunlana, S.A. (1996) Build operate transfer procurement traps: examples from transportation projects in Thailand. In: *Procurement – A Key to Innovation*, pp. 585–594. CIB W92 Proceedings Publication 203.
- Rockart (1982) The changing role of the information systems executive: a critical success factors perspective. *Sloan Management Review* Fall, 3–13.
- Rowlinson, S. (1999) Selection criteria. In: *Procurement Systems: A Guide to Best Practice* (eds S. Rowlinson & P. McDermott), pp. 276–299. E and F.N. Spon, London.

- Salzmann, A. & Mohamed, S. (1999) Risk identification frameworks for international BOOT projects. In: *Profitable Partnering in Construction Procurement* (eds S. Ogunlana), pp. 475–485. CIB W92 Proceedings Publication 224.
- Smith, A.J. (1999) *Privatized Infrastructure: the Role of Government*. Thomas Telford, London.
- Stadium Australia Group (1996a) *Stadium Australia Group – Summary of Material Contracts*. Stadium Australia Group, Sydney.
- Stadium Australia Group (1996b) *Stadium Australia Group – Price Waterhouse Corporate Finance-Independent Accountant's Report*, September 1996. Stadium Australia Group, Sydney.
- Tam, C.M., Li, W.Y. & Chan, A.P.C. (1994) BOT applications in the power industry of South East Asia: a case study in China. In: *East Meets West* (ed. S. Rowlinson), pp. 315–322. Procurement Systems Symposium CIB W92 Proceedings Publication 175.
- Tiong, R.L.K. (1990) BOT projects: risks and securities. *Construction Management and Economics*, **8**, 315–328.
- Tiong, R.L.K. & Alum, J. (1997) Distance winning elements in BOT tender. *Engineering, Construction and Architectural Management*, **4**, 83–94.
- Tiong, R.L.K., Yeo, K.T. & McCarthy, S.C. (1992) Critical success factors in winning BOT contracts. *Journal of Construction Engineering and Management*, **118**, 217–228.
- United Nations Industrial Development Organisation (UNIDO) (1996) *Guidelines for Infrastructure Development Through Build-Operate-Transfer (BOT) Projects*. UNIDO, Vienna.
- Walker, C. & Smith, A.J. (1995) *Privatized Infrastructure: the BOT Approach*. Thomas Telford, London.
- Walker, D.H.T., Hampson, K. & Peters, R. (2000) *Relationship Based Procurement Strategies for the 21st Century*. Aus-Info, Canberra.
- Yin, R.K. (1984) *Case Study Research Design and Methods*. Sage Publications, California.