

CIB TG72 on PPP *
'Revamping PPPs'

***From 'Revisiting and Rethinking'
to 'Revamping and Revitalising' PPPs***

**28 February 2009
The University of Hong Kong**

Symposium Proceedings

Organised by

Centre for Infrastructure & Construction Industry Development
The University of Hong Kong

* CIB - International Council for Research & Innovation in Building & Construction
TG72 – Task Group 72 on PPP (affiliated with CIB W92 on 'Procurement Systems')



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ISBN 978-962-8014-16-3

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Printed in Hong Kong

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Message from CIB – The International Council for Research and Innovation in Building and Construction

It is a pleasure to greet the participants of the TG72 ‘Revamping PPPs’ Symposium. I am also pleased to see TG72 ‘coming of age’ with this large-scale international event so soon after its birth in late August 2008. Indeed TG72 has been introduced and its objectives published at the October 2008 CIB W92 Conference in Montreal and through CIB networks; as well through other networks as I understand, and at other events such as the RICS annual Construction, Building and Real Estate research conference (COBRA) in Sep. 2008 in Dublin, Ireland, and the Oct. 2008 Konstruksi Indonesia Conference in Jakarta.

Levels of interest in the PPP theme and enthusiasm generated are evidenced in the papers and audience attracted to this event at short notice. This has led to an originally planned smaller Workshop blossoming into this multi-purpose Symposium. I understand the organizers have designed this to facilitate knowledge sharing and dissemination at the morning Seminar and more intensive interactions in the afternoon Workshop.

I whole-heartedly wish TG72 well-deserved success in their present and future ventures.

Dr Wim Bakens
CIB Secretary General
Rotterdam, The Netherlands



Message from the Chairman of CICID

On behalf of the HKU Centre for Infrastructure and Construction Industry Development (CICID), may I warmly welcome you to this Public Private Partnership Symposium, jointly organized with the International Council for Research and Innovation in Building and Construction (CIB).

Economic development of many Asian countries over the past few decades has led to the construction of numerous infrastructure projects. To optimize the use of financial resources, public private partnerships have often been used to supplement public funding of such projects. One example is the development of infrastructure projects in China, where private corporations have been active in participating in the construction of toll roads, toll bridges, container ports, power plants, etc. Here in Hong Kong, a number of toll tunnels have also been successfully built and operated through the PPP model. The consolidation, evaluation and sharing of such experiences may prove to be of value in the planning of future projects; hence the theme “revamping and revitalising PPP” for the present symposium.

We hope that you would enjoy the event, and, for our overseas guests, enjoy your stay in Hong Kong – a vibrant, global city with numerous attractions, cultural and otherwise.

Ir Prof C F Lee

Chairman

Centre for Infrastructure & Construction Industry Development

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Message from Dean of Engineering The University of Hong Kong

I have great pleasure in congratulating you on this large scale international event - the TG72 'Revamping PPPs' Symposium. The CIB Task Group TG72 was launched in August 2008 and has received positive responses from enthusiasts and generated high level of interest in the PPP theme within a short period of time. It is without doubt that this first TG72 event, organized with our HKU CICID (Centre for Infrastructure & Construction Industry Development), has attracted an enormous amount of papers and a great number of attendants.

The flourishing economic growth of many Asian countries in the past few decades, particularly China, has resulted in the construction of many infrastructure projects. Because of the maturity of public sector procurement policy, public private partnerships have often been used to supplement public funding of these infrastructure projects. Given the current worldwide financial crisis, it is becoming more important than ever to consider as many funding sources as possible, and to use all funds judiciously.

I strongly believe that the TG72 'Revamping PPPs' Symposium is an excellent platform where participants can address PPP on an international level through the exchange of ideas on the issues that underpin PPP, and to identify emerging international practices within PPP in facilities and infrastructure developments.

I sincerely wish TG72 every success in this symposium and in future endeavors.

Prof Weng Cho CHEW
Dean of Engineering
The University of Hong Kong

MESSAGE from CIB TG72 Joint Coordinators

CIB - International Council for Research & Innovation in Building & Construction

TG72 – Task Group 72 on PPP

We warmly welcome you all to this international PPP (Public Private Partnership) forum under the banner of CIB Task Group 72.

The theme of this symposium moves us from ‘revisiting and rethinking’ to ‘revamping and revitalising’ PPP. This theme aims to reflect not only the background to the development of PPP, but also to look at the maturity in this public sector procurement policy. The choice of location, Hong Kong, for the symposium is very symbolic given the level of infrastructure development that is ongoing in this region. The timing of the conference is also very important, considering the current world wide credit crunch, driven by a sharp drop in the private sector money market to the extent that that many countries are now putting financial packages together to bail out the their financial institutions.

The overall aim of TG72 which is encompassing in the conference theme is to address PPP on an international level by providing a forum to facilitate exchange of research on the issues that underpin PPP. In addition, there is the need to identify emerging international practices within PPP in facilities and infrastructure development. The symposium has attempted to do precisely this by bringing together well-positioned speakers, academics, practitioners and interested professionals to address how PPP practices can be re-visited and revamped. The level of interest shown in the conference is also very encouraging with delegates from many countries, apart from the public and private sectors of Hong Kong and Mainland China.

PPP has evolved in many countries to accelerate economic growth, procure and improve infrastructure development and achieve quality service delivery and good governance. For developing countries, the need for PPP has been intensified by the vital role of modern infrastructure in economic growth and poverty alleviation. However, many developed countries have embraced PPP to reduce the public sector borrowing requirements, and also to improve efficiencies of infrastructure development and sustainability commitments, through private sector-led modern technology facilities provision.

On the other hand, the choice and applications of any possible PPP procurement routes and project-specific modalities must be approached with careful consideration of all relevant factors, stakeholders, lessons learned, priorities, overall value and sustainability. A careful balance is evidently needed.

These issues and more are explored by our keynote and other specialist speakers, papers in the symposium proceedings and presentations in the morning seminar and through deeper deliberations in the afternoon workshop. We hope you enjoy what we trust will be a memorable PPP forum.

Akintola Akintoye and Mohan Kumaraswamy

CIB TG72 Joint Coordinators



Message from the Editors

The notion of involving private sector for the provision of public facilities and services by means of public-private partnerships (PPP) is becoming increasingly popular in today's world as its usage is driven by the belief that governments should steer more and row less. However, the recent financial upheavals have thrust us into new forms of PPP which heighten the imperatives for fresh approaches to formulating a realistic range of viable partnership objectives and mechanisms.

The 'Revamping PPPs' Symposium aims to bring together PPP players and researchers from many countries, to revisit and rethink PPP based on past lessons learned, present and potential imperatives; towards more realistic appraisals of potential PPPs, and higher 'holistic success' levels in projects chosen for PPP.

The symposium has attracted a great deal of attention and we are delighted to have a total of 11 very high quality papers in this proceedings including the overseas keynote paper and 10 position papers from Australia, China, Denmark, Greece, Hong Kong SAR, Malaysia, Netherlands, South Africa, UK and USA. These papers were reviewed by a panel of expert reviewers under the auspices of the Technical Committee. The submitted papers cover a wide spectrum of topics related to "revamping PPPs" which may be categorized under the following four main areas:

- PPP Structures, Systems & Mechanisms
- Risk Management in PPPs
- Stakeholder and Sustainability Management in PPPs
- Selection of Partner Organisations and Key Personnel in PPPs

We wish to thank all the authors and members of the Technical Committee, especially the panel of expert reviewers, for their generous assistance and enthusiastic participation in upholding the quality of this Symposium. We trust that readers will find these Proceedings useful and informative.

S Thomas Ng, James M W Wong and Mohan Kumaraswamy
Editors of the 'Revamping PPPs' Symposium Proceedings
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The University of Hong Kong

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Keynote Paper

VALUE FOR MONEY IN A CHANGING WORLD ECONOMY

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Abstract

The issue of whether public infrastructure projects deliver ‘value for money’ (VFM) is a contentious issue. The procurement of large infrastructure projects via Public Private Partnership (PPP) arrangements have been in existence for some time. Recent research by a number of the world’s leading financial advisers has indicated that a project’s procurement methodology will often play a significant impact on its ultimate true cost and hence its value to the various stakeholders.

This paper will refer to a number of independent studies which have reviewed the cost of a range of projects which have been procured by both Traditional and PPP arrangements. It will also highlight a number of non financial VFM outcomes which have been achieved through the PPP procurement process. This includes better project scoping and quality outcomes and the application of public interest tests in order to ascertain a project’s impact on a range of public interest elements. The paper concludes by highlighting evidence which clearly points to the fact that greater VFM can continue to be achieved in challenging global financial circumstances by using the PPP procurement arrangements.

1. History of Infrastructure Procurement Performance

1.1 Overseas Experience

Documentation confirming the existence of cost overruns for infrastructure procurement dates back as far as the mid-1800s. Especially within the public arena, when a public infrastructure project goes wrong, it gets much media, public and political attention. Historically significant projects throughout time have experienced substantial cost overruns as Table 1 shows.

Table 1: Cost overruns over time

Year	Project	Cost overrun
1869	Suez Canal	1900%
1883	Brooklyn Bridge	100%
1914	Panama Canal	200%
1973	Sydney Opera House	1400%
2002	Federation Square (Melbourne)	330%
2003	Athens - Olympic Stadium	\$1 billion
2005	Boston Central Tunnel	275%

Source: Flyvbjerg et al (2003a) cited by Auditor-General, Victoria (2004)

Cost overruns occur all over the world. They are a ‘global phenomenon’ (Flyvbjerg et al, 2003a:16). It appears obvious from worldwide media attention to project cost escalations, but a significant body of literature also supports this. Flyvbjerg et al (2003a) investigated 258 transport projects, totalling \$90 billion, across 20 nations, finding mean cost overruns of 28 per cent. Figure 1 shows the continental breakdown of these overruns. All the nations studied experienced overruns, of differing magnitudes.

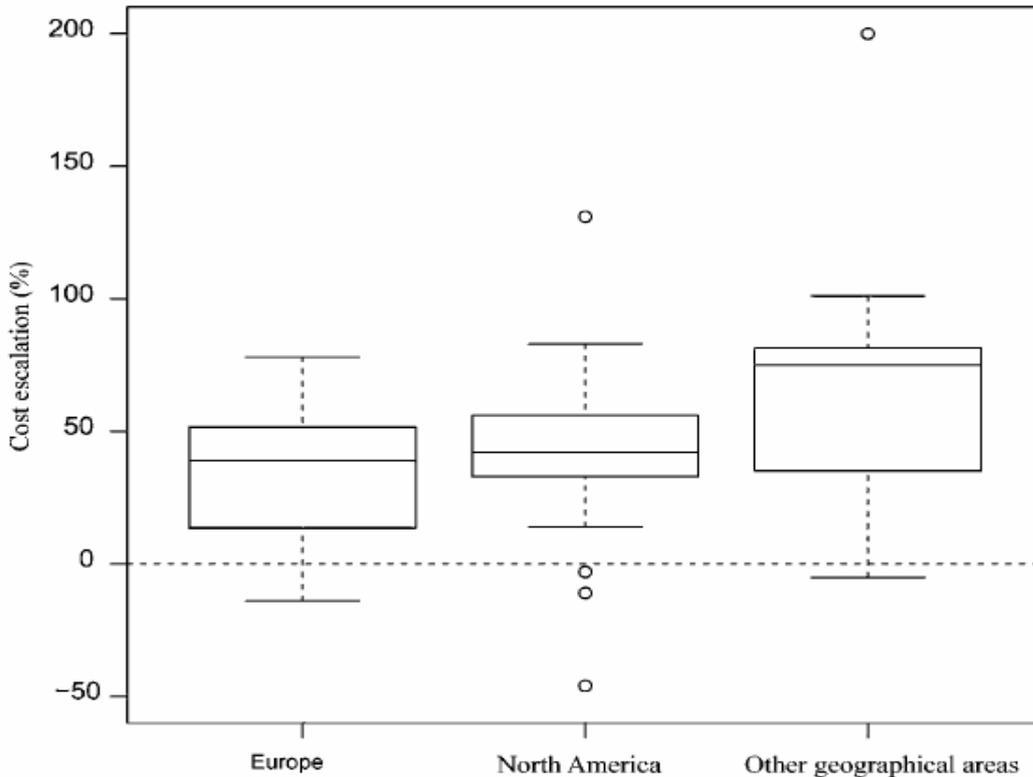


Figure 1: Cost overruns worldwide – transport projects

Source: Flyvbjerg et al, 2003b:82

International research into cost overruns has grown. Publications from the UK, America, Europe, Asia and Africa all recognise the problem posed by overruns in major works. Notably, Elinwa and Joshua (2001) investigated in detail the causes of cost overruns in the Nigerian construction industry. The outcomes from this investigation are not dissimilar from Flyvbjerg et al’s (2003b) study.

Academics in Indonesia, China and Thailand are focusing on the problem of cost escalations in their respective countries, and commissioning studies to determine the key causes of cost overruns (Mott MacDonald (2002), Sangrey (2003), Kaming et al (1995)).

1.2 Australian Experience

Many major, publicly funded Australian projects have received intense media attention for their extensive cost and time overruns. These include the notorious Sydney Opera House project, Melbourne’s Federation Square, the Royal Melbourne Showgrounds and Spencer Street Station redevelopments, and Perth’s city rail project. Forecast excessive cost blowouts have also brought the Victorian Regional Fast Rail project under focus.

A 2005 newspaper article in the Melbourne *Herald Sun* suggested that the combined cost escalation for Victorian Government supported projects was approaching \$1 billion (Mickelborough 2005). Kleid (2005) obtained data on nine projects from Auditor-General's reports (the majority of which are located in Victorian) and eight newspaper articles. While the size of the sample is not statistically significant, it does confirm that cost overruns do occur in Australia. Figure 2 shows that:

- the Victorian Regional Fast Rail project has incurred extraordinarily large cost overruns of 838 per cent; and
- excluding the Fast Rail project, the average cost overrun on these projects was approximately 60 per cent.

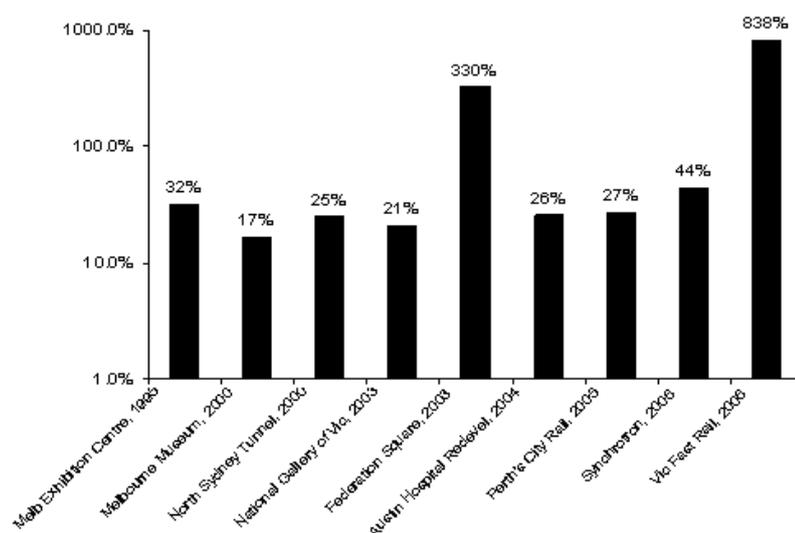


Figure 2: Cost overruns on Australian projects

Source: Kleid (2005) (Post 2005 project close dates added by thesis author.)

Using a representative sample of 54 procurement projects (21 PPPs and 33 Traditional projects) from an original sample of 206 projects, the Allen Consulting Group (2007:6) concluded that, for the Full Period (ie. the period from Original Approval to Final Actual), the cost over-runs experienced by Traditional projects due to a combination of scope changes and contractor inefficiency were 35.3%.

Melbourne University's Benchmarking Study (Duffield (2008)) presented at the National PPP Forum in Dec 2008 reviewed 67 projects (25 PPPs and 42 Traditional) across a range of industries including, social infrastructure, transport, sustainability and IT. It showed that Traditional projects had an average cost escalation of 52% over the full procurement period of the projects. It also found that Australian Traditional projects have a better cost performance than UK projects with 43.3% of Traditional Australian projects being completed within 5% of the expected cost compared with 27% of UK Traditional projects being completed within budget.

The evidence, therefore, suggests that cost overruns exist in Australia, and that this phenomenon is not significantly different from that documented internationally.

Capka (2004), while not disputing the existence of cost overruns over time, suggests that it is the inherent complexity and innovation characteristics of major projects that result in consistently low cost estimates. Flyvbjerg et al (2003a) contend that the persistence of cost overruns over time reflects an equilibrium. They note that any rational profession would have improved estimating techniques over this period of time, through peer review and learning experiences. It is commonly suggested that there are incentives for underestimating costs, resulting in the consistent magnitude of cost overrun over time. This is reflected in the Mott MacDonald (2002) review:

‘Those who do not learn from the past are condemned to repeat it’.

Perhaps those who have learnt from the past are today’s proponents of PPPs.

2. Balance Sheet Treatment and Value for Money

PPP’s have been used to procure public infrastructure in the UK for around 20 years, and 15 years in Australia. Issues relating to accounting for the transaction “on balance sheet” are not new in jurisdictions that have a long history with PPPs. The UK Accounting Standard that was purpose built for PPPs (Financial Reporting Std. No. 5, Application Note F) dates back to 1998.

Victoria, from the initial *Partnerships Victoria* Policy Statement in June 2000, subsequently developed a comprehensive policy package and practitioner guidance on PPPs. For accounting and reporting purposes, Victoria adopted FRS 5 as guidance on accounting for PPPs. In an ideal world, the transition to international accounting standards amplifies the need for a global, purpose built PPP accounting standard. Since the International Financial Reporting Interpretations Committee (IFRIC) first released its draft interpretations on service concessions (IFRIC 12), the Victorian Treasury has been lobbying the international body, both as an individual stakeholder and as part of an amalgam under the letterhead of HoTARAC (Australian Heads of Treasuries Accounting & Reporting Advisory Committee). Victoria has tried to get the international body to adopt a risk/reward framework (in preference to control) and consider that a global standard should be formed with all key stakeholders in mind (not just the private sector). Unfortunately, to date the submissions have not resonated with the IFRIC and it now seems likely that Interpretation 12 will become the global standard.

Nevertheless, from Victoria’s point of view reporting an arrangement is a matter of compliance and accountability. The key issue is the extent of risk transfer and resulting VFM reflected in the Project Agreement (service contract) and delivering any particular accounting result should never be an objective per se. Victoria is content with whatever balance sheet result emerges from an assessment of the contractual arrangements as there is no reverse engineering aimed at attempting to achieve a particular outcome. Most Victorian projects are currently on the State’s Balance Sheet. As stated previously, contracts are executed on the basis of VFM. But how is VFM measured?

3. Measuring Value for Money (Financial Outcomes)

In Victoria the standard practice of measuring a PPP project's VFM is calculated as the difference between the cost of a PPP delivery and the cost which would have been incurred if the project had been delivered on a traditional basis. The Public Sector Comparator (PSC) is the hypothetical risk adjusted cost of Traditional public delivery. Estimating the VFM of a PPP delivered project using the PSC methodology may not be the only measure of VFM. With the knowledge that cost overruns for Traditional public infrastructure projects have been dramatic over time, focus only on the PSC may result in an underestimation of the real value being added by using PPPs.

There have now been a number of studies comparing the performance of PPPs to traditional procurement. These include:

- UK Treasury Taskforce report of 2000;
- Haskins S, Gale D and Kelly L review of 2002, "*Creating and optimising new forms of public-private partnerships in Seattle*". Water, Science & Technology: Water Supply;
- Mott MacDonald's 2002 *Review of Large Public Procurement in the UK* undertaken for HM Treasury;
- Peter Fitzgerald's 2004 report to the Department of Treasury and Finance, Victoria on the review of *Partnerships Victoria Provided Infrastructure* in which he reviewed 8 Victorian projects;
- The Allen Consulting Group's Nov 2007 review of 54 projects for Infrastructure Partnerships Australia on the *Performance of PPPs and Traditional Procurement in Australia*; and
- Melbourne University's 2008 Benchmarking Study undertaken for the National PPP Forum in which it reviewed of 67 projects.

Table 2 below lists the researchers and key findings in this regard.

Table 2: Performance of PPPs compared to traditional procurement

Research	Findings
Treasury Taskforce (2000)	Cost savings of 17% for PPPs based on 21 projects
Haskins et al (2002)	Cost savings on the PPP project's Capex component varied between 30% and 40%
Mott MacDonald (2002)	Capital expenditure resulted in a 1% cost overrun on average for PFI/PPP projects relative to an average of 46% for Traditional procurement projects.
Fitzgerald (2004)	Value for money in the order of 9% was achieved. The VFM was assessed against the project's corresponding PSC.
Allen Consulting Group (2007)	Cost overruns experienced by Traditional projects were 35.3% and in the case of PPPs, it was 11.6%.
Duffield (2008)	Based on 40 observations from a sample of 67 projects, average cost overruns experienced by Traditional projects were 52%. In the case of PPPs, it was 23.8%, a difference of 28.2%.

As can be seen from Table 2, VFM can range from 9% against the PSC to 46% compared to Traditional procurement (Mott MacDonald), but more conservatively 28.2% according to Melbourne University (Duffield (2008)) study, which is the most robust of all these studies due to sample size and the sourcing of data from government.

4. Scope and Quality Outcomes

VFM can also be achieved through increased scope not requested in the tender documents. Two Australian examples include Eastlink, a 40 km toll road and the A\$1 billion Royal Children's Hospital (RCH) in Melbourne.

In the case of Eastlink the successful tender provided a number of additional VFM design features including:

- The untolled A\$85M Dandenong southern bypass;
- Longer tunnels;
- Additional freeway lanes (thereby creating greater capacity);
- A\$20M for station upgrades in 2005; and
- A number of significant enhanced features including noise walls, freeway lighting, bike paths and open spaces.

The net present cost of the Royal Children's Hospital project was approximately 7% below the PSC. However, this comparison does not recognise a range of other significant VFM benefits. The successful tender for the Royal Children's Hospital also included:

- Enhanced amenity from expanded food and retail operations, gymnasium, hotel, childcare facilities, consulting suites. These additional facilities will also be transferred back to the State for nil consideration at the expiry of the Project;
- Significantly larger gross building area for the hospital compared with that assumed by the State in its Reference Project, including additional shell space;
- Approximately \$35m in underwritten donations to the RCH Foundation;
- World class, 'iconic' design (both exterior façade and interior design);
- Capital and recurrent funding for the 25 year operating phase to be used to fund extensive distraction / entertainment programs such as the feature aquarium, ongoing programs with Melbourne Zoo, Scienceworks, Melbourne Aquarium and a children's cinema;
- A significant annual guaranteed payment to RCH from the retail precinct plus upside sharing if actual retail performance exceeds forecast; and
- Various Environmentally Sustainable Development initiatives that go significantly beyond the State's minimum requirements as set out in the Project Brief (and assumed in the Reference Project) including CO2 reduction initiatives, 2.8MW

trigeneration plant providing base load electricity, heating and cooling and a blackwater treatment plant that will provide approximately 100,000 litres of water per day in excess of that required for the hospital that may be used for irrigation on Royal Park and Melbourne Zoo.

While issues relating to accounting and excess profits for the private sector have been highlighted for PPPs across a number of international jurisdictions, minimal attention has been focused on the effect these projects are having on the general public. In Victoria, the *public interest test* (PIT) is an assessment used to determine the project's impact on a range of elements of public interest including: effectiveness; accountability and transparency; affected individuals and communities; equity; consumer rights; public access; security and privacy.

A summary extract of the PIT for the recently completed development of the RCH has been included as Appendix 1. Traditionally procured projects do not have to meet a PIT in Victoria.

5. Benefits of the PPP Model to Service Delivery

Australian Government agencies are increasingly adopting PPPs to deliver social infrastructure projects. These long term partnerships with the private sector are helping to address the ever growing demand for services such as: health; education; social housing; corrections and justice.

The experience of developing and delivering these services has created new disciplines on both sides of the infrastructure industry. Private companies have learnt to deliver the 'user experience', for amenities such as schools, hospitals, courts and prisons, as a long term service outcome. At the same time, government agencies have developed greater discipline surrounding: service specifications; contract design; and project management. With many early PPP projects now operating, in September 2008 leading financial advisers *Ernst & Young* (EY) undertook a survey to examine how the model was performing in Australia. EY's key findings can be summarised under three broad headings:

A. ***PPPs delivering on their value promise.*** With a focus on end-user and government perspectives, the survey revealed PPP projects are delivering VFM to the public sector.

- New infrastructure and facilities were delivered as planned, on time and to government budget requirements;
- PPPs have enabled public sector personnel to focus their attention on delivering core services, providing confidence that facilities are being monitored and maintained to a high standard;
- Payment and abatement regimes are an effective commercial incentive for the private sector to perform to a high standard;
- Third party use of public sector facilities builds relationships with the community, as well as improving VFM.

B. *PPPs require collaborative and comprehensive planning.* Investing time and resources early in the process is critical for project success.

- Investing in developing a robust output specification helps complex contracts to operate smoothly;
- Innovation in infrastructure delivery is not easy. However, freedom of design combined with building a wide range of operating services increases the potential for innovation;
- Collaborating with end users and the public sector during the development phase strengthens the connection between the contract requirements and their practical application;
- Valuable project knowledge is often lost due to changes in personnel. Rigorous documentation is required throughout the project to safeguard intellectual property.

C. *Effective partnerships are built on relationships.* Successfully executing a PPP project depends on a sound relationship between the government agency and the private sector partner.

- Contract management is a critical skill for government;
- The contract must provide a supportive framework within which the parties operate in a spirit of partnership to find pragmatic solutions to issues as they arise.

6. Implications of the Global Financial Crisis

It remains very difficult to predict the future of the financial markets and their effect on PPPs.

The Australian market indicates that there is adequate equity for investment in public infrastructure but new projects are competing with existing assets that are being heavily discounted. This will have the effect of increasing the cost of equity and reducing VFM for governments. The provision of debt is much more difficult. Capital markets for project finance (debt) are closed and banks are not prepared to underwrite and syndicate debt as liquidity is highly constrained.

There are alternative structures to overcome this liquidity crisis:

- Governments guarantee the debt component of the PPP financing;
- Governments partially fund the debt component on a pari-passu basis with banks;
- Governments partially fund the debt component on a senior/subordinated basis with banks;
- Governments fully fund the debt component as debt, or as a capital contribution leaving equity as the only form of finance.

Consideration of each of these approaches is complex as each involves varying degrees of risk transfer, and as a consequence, VFM. For a period of time there is no doubt that the cost of debt will be higher, due predominantly to liquidity premiums and as a result the sharing of refinancing risks and rewards will have to be readdressed.

7. Commercialism versus Capture of Future Value

The economic downturn has focused investors' interest toward distressed existing assets, i.e. purchases available in the secondary market. Conversely, governments recognise the need to stimulate local economies and the early commencement of infrastructure projects (i.e. major procurement) is a tried technique for creating such stimulation. This requirement for early investment by government, without the commensurate appetite by the traditional financial markets creates the urgent need for the development of new mechanisms that capture the benefits demonstrated by the recent era of PPP project delivery.

In this regard further research is required to explore the reasons for PPPs unlocking past value and the development of frameworks that capture these benefits going forward and facilitate best VFM practice continuing into the future.

8. Conclusion

While PPPs have delivered value for money to date, given the challenges faced, can PPPs continue to deliver benefits? The answer lies in considering the various financial and non financial VFM measures highlighted in this paper. Table 3 below lists those measures and indicates the authors' assessment of likely VFM outcomes against those measures.

Table 3: Summary of VFM assessments

Research	Findings	Assessment
Fitzgerald (2004)	On the basis of the 8 projects reviewed a value for money in the order of 9% was achieved. The VFM was assessed against the project's corresponding PSC.	✓
Mott MacDonald (2002)	Capital expenditure resulted in a 1% cost overrun on average for PFI/PPP projects relative to an average of 47% for Traditional procurement projects.	✓✓
National Audit Office (2003)	76% of PFI Projects were delivered on time and 78% on budget, compared to 30% on time and 27% on budget for Traditional (government) procurement.	✓✓
Allen Consulting Group (2007)	Cost overruns experienced by traditional projects were 35.3% and in the case of PPPs, it was 11.6%. The weighted time overrun was 25.6% for Traditional procurement and 13.2% for PPPs.	✓✓
Duffield (2008)	Based on 40 observations from a sample of 67 projects, average cost overruns experienced by Traditional projects were 52%. In the case of PPPs, it was 23.8%, a difference of 28.2%.	✓✓
Standard & Poors (2007)	Of 161 survey responses, 61% believe PPPs have a better track record of delivery than Traditional procurement, 30% said ' <i>it depends</i> ' and 9% disagreed.	✓✓
Ernst & Young (2008)	In their September 2008 report into PPPs in Social Infrastructure, Ernst and Young concluded that overall the projects delivered on their value promise.	✓✓
Public Interest Test	Recent projects procured on a PPP basis have resulted in additional outputs to what was outlined in the initial project scope, whilst satisfying robust public interest tests	✓✓

Legend: ✓ Possible, but difficult; ✓✓ Highly possible

Demonstrating VFM against the PSC will be problematic in the short term due to high debt margins because of constrained liquidity. Against all other key measures of value PPPs should continue to deliver VFM, particularly compared with Traditional procurement.

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APPENDIX 1

Partnerships Victoria The new Royal Children's Hospital Project Summary

February 2008 23

Appendix 3: Public Interest Issues

The *Partnerships Victoria* Guidelines require that the public interest be considered from the early stages of the options appraisal process and reviewed at key stages of the procurement process through to the approval to enter into the Project Agreement. As part of the finalisation of the tendering process, the public interest test has been reviewed to ensure that the Project continues to comply. This review included a review of the Project against the following eight elements of public interest:

- effectiveness;
- accountability and transparency;
- affected individuals and communities;
- equity;
- consumer rights;
- public access;
- security; and
- privacy.

Summary of Public Interest Test

The public interest test identifies each constituent element of the test, the Government standard to apply for each element and an assessment of whether appropriate mechanisms are available to provide an adequate level of protection. The conclusions reached from the assessment are:

- the Project is consistent with a number of State objectives and policies, including those specifically related to health services, and will help to facilitate the RCH in meeting its objectives;
- the contractual arrangements are transparent and ensure that the community can be well informed about the responsibilities of the parties. In particular, Victorian Government Purchasing Board Probity Policy and Best Practice Probity Advice guidelines were followed including the appointment of a Probity Auditor. The Project Agreements will be published subject to confidentiality provisions of the FOI Act and the Auditor-General will have full access to any information relating to the Project;
- an extensive list of stakeholders was identified in the business case and a range of stakeholders were consulted throughout the procurement process. CHP has submitted a communications strategy that outlines strategies and initiatives for continued State and stakeholder engagement during the delivery stage of the Project;
- the Project will comply with the relevant equity laws and regulations. The specifications of the State and the ongoing provision of services by both the public and private sectors will need to recognise the requirements of disadvantaged groups;

- public access is protected through the *Health Services Act 1988* and, under *Partnerships Victoria* procurement guidelines, the State will have contractual remedies if public access is compromised;
- consumer rights are safeguarded through a number of legislative procedures and the Office of the Health Services Commissioner protects access to health information;
- Victorian legislation, enforced by WorkSafe Victoria, in conjunction with DHS and RCH policy guidelines ensure that community health and safety will be secured; and
- user's rights to privacy are protected by a number of Acts, with specific legislation and DHS

Position Papers

PPPS AND THE GLOBAL CREDIT CRUNCH: WHAT NEXT FOR THE PPP FINANCIAL MODEL AND GLOBAL GOVERNANCE?

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Abstract

The demise of global finance now makes it difficult for governments around the world to privately finance social infrastructure through the PPP model. In PPP markets, debt margins have risen and fewer banks are willing to lend because of tightening liquidity. In this new financial landscape, what new models are beginning to emerge and how can the purported benefits of PPPs still be captured in these models? This position paper will present a strategic diagrammatic survey of these proposed models. The paper will begin by presenting an overview of the global PPP market leading up to the present. The key events leading to the current situation will be briefly outlined. The paper will then examine the Queensland's Supported Debt Model and will briefly describe the UK's Credit Guarantee Finance model. The issues raised by these models will then be used to discuss the evolution of government supported PPP models. The paper will describe the impact on risk borne by different stakeholders under these models and suggest what implications do these new models have for PPP economic policy. More importantly, how will these new models be used to transfer and allocate risk between private and public entities? In conclusion, the paper will suggest further avenues of research by asking what will be the impact of these new models on PPP theory and research?

Keywords: Public-private partnerships, project finance, PPP models, risk allocation

1. Introduction

Between 2000 and 2007 governments across the globe used PPPs to deliver some of the world's most important infrastructure. During this time banks were willing to lend money over the longer term to a diverse range of projects. This market facilitated the building of economic infrastructure such as toll roads, social infrastructure such as hospitals and sustainable infrastructure such as water treatment plants. In the UK, after the inception of the UK PPP market in 1992 the PFI market expanded rapidly between the years PFI volume in this market reached a height in the years 2005 and 2008. In the UK in 2008 25 projects closed with a capital value of over 4 Billion pounds with a further 21 Billion pounds in the pipeline. (Rose, 2008) This wave of PPP financing immediately prior to the credit crunch was characterized by strong competition between banks that were willing to lend at fixed rates over longer terms. (RBC, 2009) Some have described the financial deals done at this time as "Bull market structures". (RBC, 2008) Even as the financial

crisis unfolded prior to the collapse of Lehman brothers it was suggested by some capital market advisers that infrastructure finance would be immune from problems in leveraged loan and credit markets. However, the global PPP market has now collapsed after the demise of a number of banking players and monoline insurers. For example, in Europe a number of banks which had supported the PPP market such as Fortis, Dexia, Depfa Bank plc and Eurohypo AG no longer exist in their pre-crisis forms and have been acquired by other banks or bailed out by governments. Syndication markets are closed because banks are unwilling to lend to each other and they now have less money to lend. This has been exacerbated by the collapse of the monoline wrapped bond market which supported and provided credit enhancement to PPP deals.

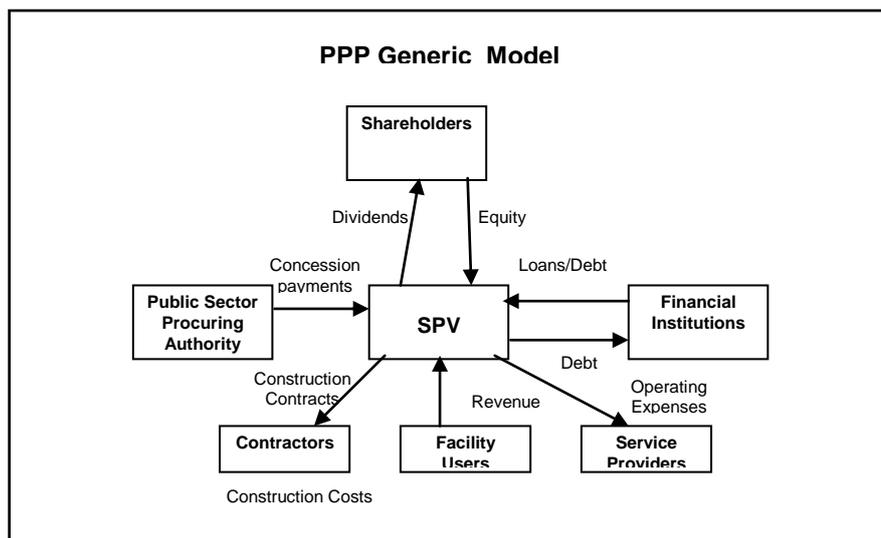


Figure 1: PPP generic model (Adapted from Raisbeck 2006, Dixon et. al., 2005)

The demise of global finance now makes it difficult for governments around the world to privately finance new infrastructure through the PPP model. In past global recessions government's funded infrastructure projects in order to stimulate their economies and alleviate unemployment. This macro-economic approach is now problematic because the financing of infrastructure through PPP markets is now difficult: debt margins have risen, and fewer banks are willing to lend because of tightening liquidity; both the size and length of infrastructure loans has diminished. LIBOR, The London Interbank Overnight Rate previously an obscure measure of how willing banks are to lend to each other, or even trust each other, has gained much media attention. In this landscape the generic PPP model now appears to be untenable. In terms of current academic research it must now be asked in hindsight if this model was ever as simple as it was claimed to be. The tenet that risk is allocated to the party best able to manage or mitigate may have worked in theory. In reality this aphorism masked the chains of risk transference that occurred in complex PPP deals. In the generic PPP model PPPs were to be funded by capital sourced from senior bank debt or from equity. This mix of debt and equity was seen to be set at the financial closure and then seen to be stable over the project's life. (Figure 1) However, over time and particular during the last seven years of the PPP market most projects reflected a broader range and mix of capital sources. This diversity was inevitable in market were banks were aggressively competing for the right to fund PPP projects. As

suggested by Pretorius *et al* the “differing risk profiles of individual projects and the participants themselves dictate that a wide range of sources of finance may yield the best terms and outcomes.” (Pretorius et al, 2008 p.239)

2. Impact of the Credit Crunch

Since September 2007 there have been structural changes in the global banking industry. Alongside the collapse of Lehman brothers a number of global banks have been taken over and a number of others bank institutions, including insurers, have been nationalized. Banks which previously provided funds to the developers of PPP projects such as Depfa, Dexia, Eurohypo, and Fortis no longer exist. In the second half of 2007 a number of large PPP deals began to struggle to close as credit margins began to rise. For example, the 1.1bn Euro Hungarian M60/M6 Motorway struggled to close for the full amount. The middle motorway section of the contract for this project closed as a “club deal” in July 2008 at margin of 90 to 110 bps over the swap rate. Two weeks after financial close the EIB refinanced the project. In July 2008 the \$650 million Euro A1 Motorway in Germany closed at around 90bps over after the original banks to the deal did not participate (RBC, RBS, West LB). This was reportedly the last syndicated transaction to close. (RBC, 2009) The M80 Motorway, Glasgow, Scotland closed at over 100bps in a club deal with the banks with only \$50 Million Euro being underwritten. (Schramm, 2009)

In October 2008 Ernst and Young’s Infrastructure group in the UK estimates that senior debt margins for UK PPP projects with availability payments, as compared to volume payments, increased on average by 12bps from 82 to 94 basis points between May and August 2008. Ernst and Young argued suggest that these margins may increase further and may go as high as 140 basis points. Senior debt margins in projects where the payment mechanism is determined by volume are higher again. The UK’s M25 deal is at the time of writing reported to be a club deal with step-up margins rising from 250bp in year 7 to 350bp in year 11 via 50bps increments (Ernst and Young, 2008).

The stress in PPP markets is a result of the rapid change in the structure of the banking industry that has taken place. This evidence by the collapse of banks, the nationalisation of other banks, the shift way from syndication, and the collapse of the monoline insurers who underpinned the PPP market through credit guarantees. Banks themselves do not now have as much cash to lend and need to ensure that they have enough regulatory capital in order for them to lend. This is compounded by the fact that in the bond markets companies will be looking to the banks to help them to refinance and roll over various instruments on their balance sheets over the next 2 years. It is now unlikely that banks are willing to lend over the longer term of a concession period. At present it would appear that banks may wish to provide debt finance to PPP projects for a 5 to 7 year period. After this time the PPP project will need to be refinanced. With an improvement in market conditions and the stabilisation of the banking sector and the bond markets this may offer an opportunity for governments, banks and project developers to share in refinancing gains.

A number of deals currently in the market across the globe, as of January the 20th 2009, such as Manchester Waste financial close have been ensured as a result of lending by the

European Investment Bank in addition to some form of government funding. This points to the potential role of supra-national banking institutions in this climate and for new deals that are currently coming to market these sources of funding may become more relevant. For example in Victoria, Australia’s most sophisticated PPP market a number of large projects are currently in the market and due to be closed. These are the Biosciences Research Centre and the Desalination Project. Once closed it is likely that these projects will be looked to as exemplars.

3. The Basic PPP Model

The global PPP market can be defined as that market in which governments offer projects for private buyers offer to buy the rights to construct, deliver and operate projects in order to receive equity and ongoing project cash flows from these projects. Figure 1. In the past PPP projects have been funded by capital markets through debt provided by banks and through the issuance of bonds sourced from the bond markets. Investors have also taken equity in the PPP model. In practice during the PPP boom years of 2000 to 2008 default risk was transferred to parties best able to manage it and the sources of finance provided by lenders was governed by complex financial instruments and contracts. The generic PPP model, alongside long duration concession periods gave the suggestion that generic PPP model, or researchers at least, was deceptively simple.

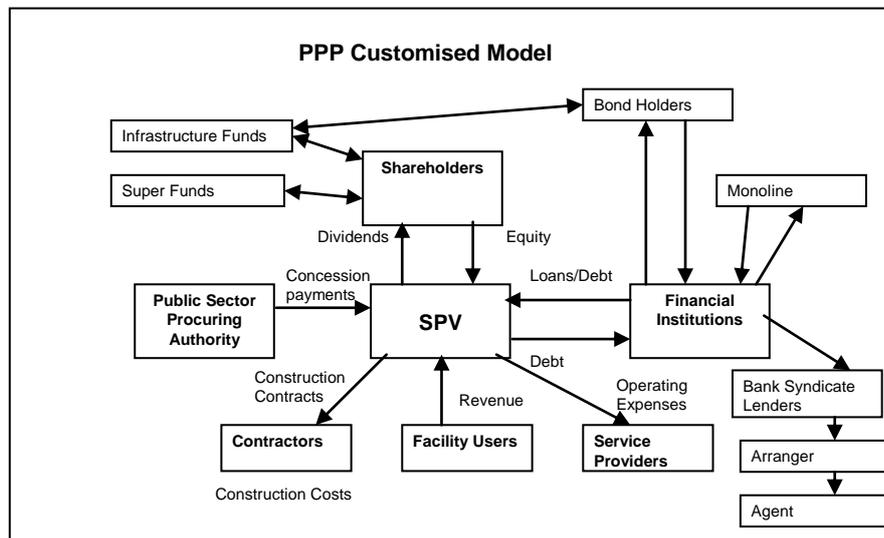


Figure 2: PPP customised model

(Adapted from, Raisbeck 2007; Pretorius et. al, 2008; Dixon et. al., 2005)

4. The Queensland Supported Debt Model

In the current landscape the Queensland Supported Debt Model (SDM) points to some of the issues that may bedevil post credit crunch models where senior debt has been provided by the government. Figure 3. Whilst this model was developed prior to the global financial crisis it illustrates the ways that the public sector may shape and change new PPP models. In the SDM the private sector provides all of the financing during the

construction period. The state via its treasury will provide 70% of the revenue during operations and this then ranks first amongst senior debt. In the SDM project the private sector would provide both debt and equity to the project for the construction phase. Senior debt provided by government would then be provided at the completion of construction and the majority of this will be provided for the operations phase (Blundell, 2008). The problem with the SDM is complex inter-creditor relationships, potential conflicts of interest and extended procurement timeframes. If private lenders are only providing funds for the riskiest portions of project procurement, such as construction the risk capital provided to fund the construction of the project may then be rated more highly than if no government debt was provided. The lower cost off government debt may be offset by the fact that the subordinated debt and equity is now being employed, or working harder as it were, in the riskiest period of a project. As noted by one adviser of the Queensland Model “It’s not really supported debt at all—it’s just government funding.”

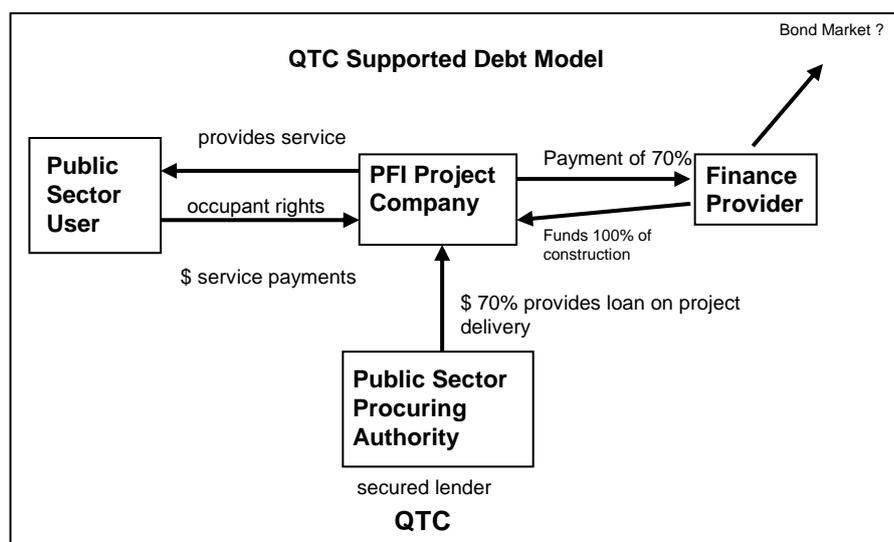


Figure 3: QTC supported debt model
Source: Foulkes, 2008

5. Government Debt as Senior Debt

Senior debt provided by public sector, as suggested by the Queensland model, is one option that may be pursued by different governments or supra-national institutions a project by project basis. In the current market place where banks are finding it difficult to raise larger amounts of capital there may be a shortfall in the amount needed to fund a project. This appears to be the case in a number of recent PPP deals in which the European Investment Bank has stepped in to provide capital. This appears to be the case with the M25 and Manchester Waste projects in the UK. Obviously in the current market public debt is cheaper to provide than debt from banks. The issue then becomes one of how much debt to provide, timing, and how this debt may rank against debt provided by the public sector.

The provision of government debt, particularly if it is backed by some kind of guarantee, subsidy or one off payment, may change the incentives in a project. This may lead to

gaming. For some private stakeholders, such as contractors and operators, the presence of government debt could be read as a signal that the government will bail out a project that fails to be delivered on time or on budget. Government presence is then seen as a way to cover any future losses. Incentives in the project may also be changed if the government is both the facility user, providing rent and service payments and the lender to a project vehicle. This may result in conflicts of interest and will necessitate a high degree of probity when refinancing falls due or when concession related payments are re-negotiated.

6. Government Funding and Financial Risk

Grant funding can be defined as funding provided by government in “order to cover the balance of project costs” in a situation where a projects internal cash flows are not sufficient to cover all of the projects direct and financing costs (Moody's, 2008). In principle grant funding or subsidy payments by government to a project would presume that the grant may cover the gap that exists between the projects cash flows and its expenses. The situation may be different if the intention of the grant funding is to a shortfall in the availability of debt finance for the project. In this situation grant payments may be used in order to reduce a projects overall cost because “public capital should be cheaper than a mix of private sector debt and equity, as long as risk transfer is preserved.” (Moody's, 2008)

In early PPP practice government funding were structured as a non-refundable payment to the project. However, as the PPP market evolved this changed as result of the termination provisions were designed. Often in compensation provisions the value the value of any grant funding was removed from the projects value before determining the value of any compensation due to private sector debt or equity holders. (Moody's, 2008) Clearly in this scenario the government grant or subsidy ranks more highly than private finance and this private finance will then bear a greater level of loss if a termination event occurs. Government grants may structured into a project in way that rank lower than private senior debt and in this situation government grants or subsidies to a project may absorb some losses if they occur. Moody's however argue that the whilst the injection of a public sector grant, either during construction or the operating phase of project, may have a positive impact on the projects economics it may not have a positive impact on the senior debt provide by the private sector to the project. Moody's argues that this may happen because “grant funding into a PPP deal may reduce its ability to bear losses/overruns before senior debt becomes exposed to loss.” (Moody's, 2008)

7. Co-Investment Models

The above situation points to the idea of co-funding as a means to achieve a better risk balance between public and private sector finance in the structures supporting a PPP project. In a co-funding or co-investment model the government's grant funding would rank equally with the senior debt provided to the project by lenders. Or it may be regarded as equity, through hybrid or mezzanine instruments, that governments can hold and sell off at a later date. By taking equity or senior debt in a PPP project a number of dilemmas are raised. Firstly, in this model the government is acting as a private investor on the

behalf of taxpayers and this may be done through the employment of funds from a large infrastructure fund. For example, in Australia this could be done through the Australian Future Fund. In the EU this appears to be taking place through the provision of debt to PFI and PPP EU mandated projects via the EIB through its EPEC arm. In theory this may be seen as having a crowding out effect on private financial sources; but, more significantly, conflicts of interest may arise if the government is both a equity holder as well as owner of a facility providing revenue payments to the project as well. The agency and moral hazard issues become complex if one considers that in the current climate a government may co-invest in a project alongside a bank that has been nationalized by the same government.

8. France: A Solution?

Governments are now faced with choice of strategies in order to fund new infrastructure. To either fund it entirely out of government funds perhaps through the issuance of infrastructure bonds, to promote financing structures where the government partially supports the project with an injection of funds either as debt or equity. Another approach that has emerged is the concept of the partial risk guarantee. This is when a government will guarantee a proportion of a project's revenues during the concession period. For example, the government will guarantee 75% of these revenues during the first 5 years of the concession and then 65% during the next 5 years. The UK's CGF PFI model, developed before the crisis, can be considered as a prototype for this type of approach.

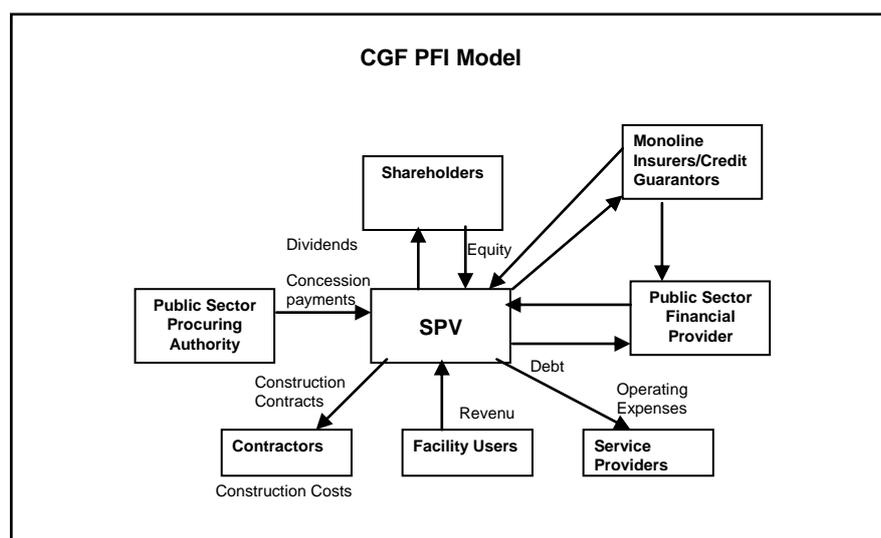


Figure 4: CGF model

Source: Raisbeck, HM Treasury CGF Technical Note 1

In France PPP risk is mitigated with broad government guarantees. The French government has announced an 8Bn Euro facility to guarantee borrowings by SPVs. This is done when the government will guarantee the service payments made during the operating phase of the project. This is done by assigning to the banks the rights to receive the service payment normally paid to the SPV. The service payment is paid direct to the banks. This fixed payment, determined on a project by project basis, is then guaranteed by

the government. This means that the banks are insulated from SPV credit risk and or failure of the SPV to pay down any debt that it may have (Bergere, 2008). In theory, governments may provide financial support to projects over the short term in the hope that they can make refinancing gains in the medium term.

9. Conclusion

The PPP model was never a generic model that could be applied as a unitary template to each project. In the PPP lending cycle that we have just witnessed the generic model was customized for each project as determined by project risks and available finance. With the radical changes in the structure of banking markets it would appear that further customization of the model will take place on an individual project basis. Given that governments are being called to take on more financial risks and become both sellers and funders of PPP projects a new approach to PPP governance is needed. This may be either through government backed or guaranteed funds. As in France, or through new policy approaches at national and international level. The role of supra-national agencies such as the EIB in PPPs need to be examined from the perspective of both accountability and as a possible model for a global PPP funding bank. In the current market the pre-credit crunch PPP financial model is no longer possible. Yet, as the Managing Director, of the World Bank argues "Infrastructure offers significant investment opportunities for long-term investors, even in a time of global crisis," (World Bank, 2008) Both in theory and practice new financial models and models of governance, possibly at a supra-national level, are required. Revamping the global PPP model will require further academic research and commercial insight in order to capitalise on its strengths of matching private sector innovation with the strengths of public sector.

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PPP IN DENMARK – ARE STRATEGIC PARTNERSHIPS BETWEEN THE PUBLIC AND PRIVATE PART A WAY FORWARD?

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Abstract

It is the aim of the paper to contribute to the discussion on restating the PPP principles. The paper is based on an ongoing research project: “Procuring Facilities Management through PPP’s”. A review of literature with a critical, but positive attitude towards PPP is given. An overview of PPP in Denmark is presented. Only a few PPP’s have been initiated and though more might be in the pipeline, it is likely that the market for PPP is too small. Government policy is positive toward PPP. Private financing is not seen as an essential part of PPP. Attitudes among participants in PPP are described on the basis of 11 open interviews. Though the principles of PPP are considered to favour innovation and whole life costing, doubts are also raised about the possibilities for realization of the potentials of PPP. The Danish situation points towards a need for a broader view on how innovation and whole-life thinking can be released in PPPs. The question is raised whether the formation of partnerships between the public and private part might be a way forward for PPP in Denmark and elsewhere.

Keywords: PPP, Denmark, strategic partnerships

1. Introduction

A need for revisiting, restating or even revamping PPP has been declared. The concept of PPP is gaining ground in both developed countries and countries under development. However the recent financial crisis has spread uncertainty about any kind of investment, but maybe particularly about private investments in public facilities and infrastructure. Both circumstances make it interesting to revisit PPP.

It is the aim of the paper to contribute to this discussion through using PPP in Denmark as a case. The paper is written as part of an ongoing research project on procuring Facilities Management through PPP. The aim of the research project is to contribute to the understanding of when or under which circumstances it is beneficial from the point of view of the price and quality of the FM services to procure these through a PPP, i.e. with the facility and the facility management in the same package.

The paper begins with a review of literature i.e. a review of papers - from construction management journals – with a positive-critical approach to PPP. Papers with a very

positive or very negative attitude towards PPP have been omitted. The review is thus not complete, but gives an impression of issues discussed. Then follows a basic description of the PPP market in Denmark: The projects that have been and not been initiated and the actors on the market. The information on this has come from the internet and has been supplemented with information from interviews. Finally results from open interviews with 11 persons from the group of actors in the Danish PPP market are described. In the conclusion it is suggested that strategic partnerships between the public and the private parties might be a way to develop the concept of PPP further.

2. Review of Positive-critical Literature on PPP

Looking at the performance of PPP projects, it does not seem evident that the PPP concept itself leads to higher quality and lower costs.

Reviews of various evaluations of PPP projects suggest that the evidence of cost reductions is ambiguous, but it must be concluded that they do seem to take place (Greve et al., 2005; Hodge and Greve, 2007; Kristiansen, 2008). This seems to be in contradiction with reports from the National Audit Office, that have evaluated 9 PFI projects and discovered mean cost reductions of 17% (CIC, 2000), and also with the report from Arthur Andersen that looked at 17 projects and found average cost reductions of 17% (HM Treasury, 2000). However CIC conducted an investigation that might clarify this seemingly contradiction. It showed a marked difference in cost reductions between type of projects. Transport and prison projects had the greatest reductions of costs in the range of 10-20%, while hospital- and educational projects were between 5% less expensive and 5% more expensive. Furthermore that large and experienced clients were far more successful in realising cost reductions. CIC states that NAO in its sample had many road projects and that the evaluation from Arthur Andersen had many centralised clients in its sample. Also that procurement and maintenance of prisons previously had been handled somewhat inefficiently and that technological innovation in the form of the new types of asphalt had taken place in the road projects. (CIC, 2000)

CABE has in two evaluations looked at the design quality of buildings in PPP projects. In a more general evaluation it is concluded that though examples of excellent design can be found, they are more often an exemption than the rule. Most of the buildings were considered to be of insufficient design quality (CABE, 2005). In an evaluation specifically of PFI secondary schools built between 2000 and 2005 it was found that more than half of the schools were of poor or inferior design and only 19% were considered to be partly good or excellent. (CABE, 2006)

In general it seems like a positive outcome – lower price and/or better quality - of using PPP is not self generated. Then what has in the debate been suggested as factors or circumstances that can influence the outcome of using the PPP model?

One important point in the PPP model is that innovation is supposed to take place. The private party is considered to be able and willing to find new ways of managing the building processes and the facilities.

A Swedish Ph.D dissertation has looked in to this and concludes that there are serious hindrances for the innovation potential in PPP. One is that the financial part, that has greater influence than in other types of tendering, will be interested in reducing risks and therefore tends to look at new and untried solutions as too expensive and risky. This is said to be worsened through the interest of the public part in transferring risk to the private part by setting a fixed price and delivery date. A partnership-like relationship between the private and public parties is suggested as a possible solution (Leiringer, 2003)

Participants from 68 PFI projects have been interviewed to find out what challenges are seen as the most important for PPP projects. It is concluded that the participants think:

- Risk management needs to be developed
- Transaction costs are very high
- Negotiations are complex and run over a long period of time
- It is difficult to specify the quality of services
- It is difficult to set prices for facilities management services
- There are potential conflict of interests behind the negotiations
- Clients are considered to often have difficulties in handling PFI projects

(Akintoye, 2003)

It can be said that PPP projects change the relationships between the parties from one-off to longer lasting. Since “trust” often is considered to be crucial for relationships an investigation has attempted to measure how much trust there is between the parties in PPP projects. In general it seems like trust is actually developed between the parties on the private side, but mostly on a team level, not as a part of the managerial approach. Between the public and the private parties not much trust was found. This is said to be a challenge for the PPP concept, since it builds on long lasting relationships between the public and private parties and it is suggested the PPP firms should engage themselves in strategically developing trust in order to create increased value (Smyth and Edkins, 2007)

The use of the “public sector comparator” has been criticized for leaning too much on quantitative measuring and thereby excluding broader societal concerns that are difficult to quantify and force the participants to work on a contract based on cool cash instead of trying to take care of long term considerations.

Use of partnerships are suggested as a solution to these problems and considered to offer more value for money than traditional PPP’s:

- Risk sharing can be less expensive for the public party than the transferral of risk.
- Conditions for innovation will be improved if all issues are not locked down in a detailed contract, but are held open through collaboration
- Synergy between the public and the private parties can be made when the public party is recognized for its particular competences through a collaborative arrangement.

(Clifton and Duffield, 2006)

PPP is about integration of the delivery of a product and the related services, and cultural differences between construction firms and facility management firms have to be overcome. In an investigation employees in construction firms were characterized as “hunters”, while facility management employees were called “farmers”. Hunters were said to be driven by the rush of winning a project, delivering on time and to the price and were

good at improvising in an atmosphere of strict deadlines. The farmers on the other hand believed in long lasting relationships based on the needs of the clients and to create solutions that were experienced as valuable by the client. Not much sympathy were discovered between the two mentalities (Johnstone, 2007)

Cultural differences often reflect structural conditions. System integration is more common in for instance the transport sector or in the capital goods industry than in construction. A study has looked at this and concludes that integrated delivery of products and services take a long time to develop and is a profound and radical change. The value chain has to be integrated and the needs of the costumer must lead the design of solutions where hardware, software and services are seen as one. And the supply chain has to be managed from the parent firm through contracts or partnerships (Brady *et al.*, 2005)

Overcoming cultural differences and develop integrated solutions are probably more difficult in construction industry, which is often characterized as a “loosely coupled system” orientated towards singular projects making partnerships, costumization, change management, supply chain management or system integration something that has been discussed a lot, but seem to be difficult to introduce successfully (Dubois and Gadde, 2002)

Though this brief review is far from exhaustive it does show that PPP have to overcome cultural differences between the participants as well as conditions embedded in the structure of the construction industry. Though cost reductions do occur it does not seem evident that the PPP concept itself leads to lower costs and higher quality. A number of hindrances for innovation in PPP projects can be mentioned and partnership between the public and private part are suggested as a mean for improving PPP.

3. The PPP Market in Denmark

The Danish government is encouraging formation of PPP projects and has made it mandatory to screen public construction project for suitability for PPP. On the other hand all state PPP projects of more than 10 mill. euro has to be approved in the financial committee. And for municipal projects with private financing the municipalities have to deposit an amount similar to the construction costs of the project.

So far very few PPP projects have been realised. Since 2005 only four real PPP projects have been initiated, i.e. projects with private financing and running over 20 or 30 years. The projects include two schools, a courtroom and the public record office. Only one of these projects has been constructed, while two are under construction and one is now delayed because of the financial crisis.

Three more projects are sometimes mentioned together with the projects above, but are not really PPP projects either because they are not financed privately or run for only 10 years.

The mandatory screening procedure has meant that additional 19 projects have been screened: For five of these projects PPP have not been chosen, 8 are still under consideration and PPP have been chosen for 4 projects while 2 projects have found a form with a 10 year period and a shared public-private equity.

Seen from the demand side the market for PPP seems weak. This has put its mark on the supply side. 12 PPP consortia have made bids, but 9 have only bid for 1 or 2 projects, while 3 have bid for all projects. One consortium has been rather successful and won 3 projects. Another consortia has won one project, but is also working at PPP projects internationally, particularly in the UK.

Neither on the demand nor the supply side the market for PPP in Denmark seems large enough for the actors to gain experience with the PPP form. Whether there will be more PPP projects in the future is uncertain in these days of a financial crisis, but the results from the screening procedure make it unlikely that any boom in the demand for PPP is waiting.

The Danish Enterprise and Construction Authority have recently formed a new umbrella concept called “Public and Private Cooperation” subsuming PPP, service partnerships (where the public party collaborates with a group of companies on maintenance and renovation over a period of time), “PPP-light” (which is PPP with public financing and public ownership), sale-and-lease-back arrangements, public-private joint ventures, as well as other forms such as partnering (Kristiansen, 2008).

4. Experiences with and Opinions on PPP among Actors in the Danish PPP Market

11 open interviews have been conducted and the results will briefly be summarized below. There was a general agreement on PPP actually leading to integration of concerns related to the management of the facilities into the design and the construction of the building through (among other issues) whole life thinking. Actors from both the private and the public parties thought that PPP led to better buildings in the sense that materials and products of higher quality were used, and that repeated cuts in budgets for maintenance were avoided.

It was also generally agreed that placing the responsibility for both construction and maintenance on one actor was a sound principle and that the long dialogue phase led to improved projects.

On the other hand it was also said that it was difficult to make an interesting bid solely on the basis of integration of hard FM. Possibilities for innovation in this area were considered to be limited and could only lead to minor reductions in the total price. And it was also said that being very innovative meant increasing your risks.

Challenges were seen in coordination of the team and creation of team spirit. In particular cultural differences were seen as a problem. One said that the Facility Management people always preferred simple solutions with low maintenance costs, while the architects

considered that the building should be a nice place to be in and the contractor primarily was interested in economic aspects and buildability. The interviewed from the facility management side said that they often had felt that it was difficult to convince the others and that their arguments were met with “that this would be too expensive”.

Some said that whole life costing was a difficult discipline and it was difficult to set the right price for maintenance services.

The interviewed from contractors expressed that they were mainly interested in PPP projects as construction projects, though they did not mind investing a little bit of their principal capital in PPP projects.

The PPP concept was also seen to have certain disadvantages. One mentioned was the high costs of bidding. The detailed contracts attempting to specify all future events. And also that the PPP projects had to be rather large because of the high transaction costs.

One interviewed said that it seemed evident that PPP did not lead to interesting new design solutions like sustainable buildings or best possible design solutions, because the public client could not choose an excellent building when it was a little bit more expensive than another of mediocre design which fulfilled the criteria.

There was in general an interest in discussing how the public can get better value for money within or without PPP. Several expressed interest for partnering or partnerships between the public and private parties, saying that the most important factor behind a positive outcome was an experience of shared goals for the project. Framework agreements were also seen as interesting. One said that PPP was quite a thing. Instead of a 30 year long contracts it might be a lot more convenient with a partnership and several smaller contracts.

5. Conclusion and Discussion

Starting with the lessons that can be learned from the use of PPP in Denmark, it seems obvious that the market for PPP project can be too small for both the public and private parties to gather enough experience with PPP's to handle them professionally. This is relevant for other smaller countries. It is also logical that if the market is too small it will be natural to sort of bundle PPP with other similar types of tendering and focus on how to improve the interaction between the private and public sector in the procurement of public facilities through the use of a number of project types.

In Denmark hindrances has been made for private financing by making it mandatory for municipalities to deposit an amount when private financing is used. This is done to avoid excessive public spending on new facilities that will endanger the opportunities for future generations. The result must logically be that focus on better value for money will be stronger.

A more general lesson is that the discussion of the future for PPP has to take account of national political and economic context.

In the Danish context PPP will have to compete with similar project types solely on ability to deliver effective public buildings efficiently. The interviewed found that the basic ideas of PPP were sound, i.e. to have one actor have the responsibility for both construction, operation and maintenance of the facility. On the other hand they also asked for more room for innovation, possibly through risk-sharing and the inclusion of more issues to innovate on. Among the interviewed PPP was criticized for high transaction costs and the very detailed and inflexible contracts.

This points towards the use of partnerships, partnering or other types of collaboration between the public and the private parties.

The reading of positive-critical literature on PPP seems to support this to some extent. Some directly suggested use of partnerships (Leiringer, 2003; Clifton and Duffield, 2006). Advocation of developing of trust is indirectly supportive for partnerships (Smyth and Edkins, 2007). The challenges for PPP described in the investigation made by Akintoye (Akintoye, 2003) might be handled through partnership arrangements. A partnership might be a way to handle the cultural differences (Johnstone, 2007) and gradual change of the construction industry towards system integration that could be supported through partnerships.

Inclusion of partnerships in PPP opens a discussion on what PPP really is. It could be argued that PPP consists of certain elements that cannot be omitted, such as: private financing, the private party is responsible for all aspects of the building over a long period of time, the public party gets the advantages of not having the risks and responsibilities related to ownership and possible also ideas from what is called New Public Management. Since partnerships are about collaboration on the basis of shared goals and values and defining an area of shared interests, it could be argued that since this will mean more risk sharing and public financing, partnerships are not compatible with PPP. On the other hand it could also be argued that this is a semantic discussion and that the basic idea of PPP is to improve the interface between the public and private parties and that some of the elements of PPP can be changed and developed.

So all in all there seems to good arguments for looking at the potentials for using partnerships between the public and private parties in a further development of PPP, though the national context has to be taken into account rather than opting for an universal model.

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FINANCIAL CRISIS SHOW STOPPER FOR DBFMFO PROJECTS IN THE NETHERLANDS?

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Abstract

As an outcome of the turmoil on the financial markets the market situation for privately financed projects has been changed. Since several projects are planned to be procured within the coming years in the Netherlands, this might have negative consequences. The question is whether there are still enough private investors interested in putting their equity at risk and how it can be prevented that procurement processes will unnecessarily fail. In this paper the possibilities for project financing are explored, taking the financial crisis as a starting point.

From the recently closed Design-Build-Finance-Maintain-Operate (DBFMFO) deals on the European market it appears that these projects are still interesting projects to third party investors. However, several steps have to be taken into account to make sure DBFMFO processes are optimally organized. Besides, they should make these projects more attractive to third party investors by for example increasing the marketability of participation in DBFMFO projects, introducing a funding competition to facilitate project financing for preferred bidders or making DBFMFO projects attractive to infrastructure funds with a focus on short-term investment periods.

The financial crisis will be a challenge for the future. However, the Dutch Ministry of Finance is convinced that DBFMFO projects with the right conditions will remain delivering more value for money in the long-term than public financing.

Keywords: PFI, procurement, financial markets

1. Introduction

A Design-Build-Finance-Maintain-Operate (DBFMFO) project is an arrangement between public and private organizations for the provision of an infrastructure of accommodation facility, in which the private sector designs, builds, finances, maintains and sometimes even operates it; for which it is reimbursed by the awarding authority based on the services delivered in the facility it has provided (Blanken, 2008). A special purpose vehicle (SPV), usually consisting of a construction company and service providers, is set up by a private sector consortium to deliver the project.

In the early days, macro-economic policies combined with the aim of governments to find investments to meet constantly increasing demand for infrastructure were considered as the main drivers behind the introduction of DBFMO. However, this standpoint has been changing. Governments now emphasize that DBFMO will deliver value for money, which is nowadays seen as the key motive for DBFMO (Broadbent & Laughlin, 1999; Edwards & Shaoul, 2003; Shaoul, 2005; Dewulf & Spiering, 2006). In return for organizing the DBFMO project, including its finance, the SPV receives payments from the awarding authority in the form of a unitary charge (and in infrastructure projects sometimes from the users). This charge is designed to cover the project costs and to provide an equity return, subject to penalty deductions for substandard service delivery, defined in terms of availability and service performance.

Today, DBFMO projects are being used or are about to be applied all over the world. DBFMO is not yet in the majority in terms of its size or expenditure but it does represent a considerable volume of infrastructure provision. The trend today is for governments to look more and more for these kinds of solution (Atkin & Leiringer, 2000). In Europe, DBFM is used for building motorways for many years. Some countries, like Ireland, Portugal and Spain, have also been using the private sector in the provision of accommodation facilities like prisons and hospital buildings. In the early 1990s, the United Kingdom government launched the Private Finance Initiative (PFI), a variant of DBFMO, in an attempt to attract private sector support for a wide range of government projects in such sectors as health, prisons, transport, and defense. Up to the end of 2007, over 900 PFI projects had been signed, with a capital value of £60bn (IFSL, 2008). In the Netherlands, like in other European countries, infrastructure projects are at the forefront of the DBFMO developments. The contract value of DBFMO projects in this country is currently estimated to be more than €5bn euro, including developments in the accommodation sector. Recent DBFMO projects are the highway A12, the Coen tunnel project, a detention centre in Rotterdam and the refurbishment of the Ministry of Finance.

1.1 The Finance of DBFMO Projects

In most DBFMO projects, the financing method employed is project finance. Project finance is the term used to describe the financing of a major new project or large project expansion when the lenders place primary reliance on the revenues of the new project for repayment. Project financing is typically on a 'non-recourse or limited recourse' basis, that is, the lenders have no financial recourse for repayment of their loans against either the project sponsors or the awarding authority. Hence, recourse is limited to the SPV and its assets from where lenders most commonly receive external support through bonds and guarantees. The obligation to finance DBFMO projects is usually satisfied through various shareholders' subscription arrangements, third party equity investors, and debt investors. The finance type is determined by the nature of the facility and the relative costs of the finance: in most cases equity is more expensive than debt (Heald & Geaghan, 1997). Traditionally, project finance structures have consisted of predominantly debt, reflecting the predictability of the cash flows, with a smaller proportion of equity, or risk capital. The shareholders provide the equity finance and the SPV is responsible for securing the additional debt funding required to construct the asset. The SPV usually approaches a bank for debt funding.

Attracting third-party funding is a crucial part of DBFMO projects. It is only not a source of capital but also a form of independent project validation due to the due diligence process executed by these third parties.

In the Netherlands, there has been a lot of speculation about the direction of DBFMO finance in light of the current financial crisis. Many have concluded that long term bank loans are no longer feasible in light of the capital and liquidity constraints the banks face. But is this the really the case?

1.2 Research Methodology

The Dutch Ministry of Finance, keeper of the DBFMO philosophy in the Netherlands, has executed several meetings with other Dutch Ministries, third party investors, SPVs and the UK Treasury in order to form a notion of the consequences of the financial crisis on the appetite for DBFMO by third party investors. In total, ten of such meetings were organized in which data were collected showing the implications of the financial turmoil on DBFMO projects. These data are supported by financial outcomes of projects, which mainly stem from indirect data, including official evaluation publications, annual reports and accounts of awarding authorities, government and private sector reports, respected newspaper articles, journal articles and conference papers. The findings of the interviews and desk research are presented in this position paper.

2. Former Practice in Financing DBFMO Projects

Until recently, it was common practice that SPVs already had the full commitment of shareholders and investors at the moment they made their best and final offer (BAFO) in the procurement process. Both the awarding authority and the SPV were secured of having financing during the life time of the project. The life time of the financing was equal to the time of the contract and the project, while in most cases refinancing the deal was one of the opportunities to optimize the financing once the required facility and related services were brought into operation as the project risks were then lowered. Refinancing creates an opportunity to reduce the financing costs as funders are willing to provide better terms for projects with lower risks. The result of this is that improved funding terms are achieved. Whilst lower margins are possible, the majority of the benefit is derived through being able to increase the gearing of the project, i.e. the amount of senior debt. In early DBMFO projects, the awarding authority did not receive any benefit from refinancing, but in recent projects the refinancing gain was equally divided between awarding authority and SPV. This was the case in most European countries.

2.1 Banks versus Bonds

Traditionally, the European DBFMO finance market has predominately been a bank market with bonds playing a small but important role on some primary transactions and a larger role in the secondary markets like the refinancing market. Historically, DBFMO projects were too small to make bond finance attractive. Also the assumption that bonds are not refinanced made them less alluring to SPVs. However, over the last decade bonds have become the financial structure of choice for large DBFMO projects in Europe as well (Cartlidge, 2006). The principal driver for any SPV when assessing the benefits of bond over debt is the comparison of the cost of bond versus bank debt. It is also

dependent on the size of the project, the debt requirement, maturity, pricing and repayment, issue costs, hedging, deliverability and the flexibility needed (Cartlidge, 2006).

Credit quality is an important consideration for investors in bonds. To enhance the credit quality of a bond, bonds can be 'wrapped'. A wrapped bond is a bond where the payments are guaranteed by an insurance company known as a monoline insurer. Monolines played an essential role in the DBFMO market, guaranteeing repayments to bond holders in return for a fee, reducing overall financing costs for many of the larger DBFMO projects.

3. Effects Financial Turmoil on DBFMO Projects

One of the consequences of the financial turmoil is that insufficient money is circulating through the financial system. By choosing for private financing the government competes with other investors for the limited financial resources available for circulation. The question is whether this hampers the investment possibilities for third party investors. Considering the amounts related to DBFMO projects this does not seem to be the case.

However, that project financing is going through a hazardous time is first of all shown by the decrease of the number of DBFMO projects that were financially closed lately. In the United Kingdom, only 34 new PFI projects were signed, which is the smallest number in the last decade.

Another sign is the effective close of the wrapped bond market, which has been the financial structure of choice for some large DBFMO projects over the years. Monoline bond insurers in the United States were hit by the sub-prime crisis and have lost their triple-A investment grade, which has effectively put an end to this kind of lending (Hellowell, 2008). The closing of the monoline wrapped bond market has increased reliance on the banking market.

3.1 Banks

Pricing in the bank market is mainly driven by competitive pressure on bank margins and the interest rate swap, since most bank-funded DBFMO transactions involve medium to long dated interest rate swaps. However, also in this market, it appears that fewer third party investors are available to SPVs: less commercial banks are willing to invest in public projects, which market is still a relatively new and complex for them. Fewer banks are available to invest in privately financed projects while they analyze these projects differently. The banks that are still willing to invest in DBFMO are only doing this under stringent conditions. While the banks' views of the DBFMO risk profile have not changed materially, funding availability is limited and credit margins have moved up. The selection criteria of banks for investment options have become more rigid as well. The former business of giving guarantees up-front and wrapping loans afterwards lies behind us and projects are increasingly shown on-balance sheet of banks. Further, the funding these banks offer are mostly non-committing and non-binding, while in the past this was not the case.

PWC (2009) has conducted a review on the appetite of banks for lending DBFMO-like transactions and their structural preferences. The results are shown in the figure below.

Bank	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W
27 year lending	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✗	✗	✗	✗	✓	✓	✓	✓	✗	✓	✓
20+ year lending	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✗	✗	✗	✗	✓	✓	✓	✓	✓	✓	✓
Hard mini-perm acceptable	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✗	✗	✓	✓	✓	✓	✓	✗	✗	✗	✓	✓	✗
Margin ratchets acceptable	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✗	✓	✗	✓	✓	✓	✓	✓	✓	✓	✓
Cash sweeps preferred	✓	✓	✓	✓	✗	✗	✓	✗	✗	✗	✓	?	✓	✓	?	✓	?	✓	✗	?	✓	✗	✗
Short maturities only	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✓	?	✓	✗	✗	✗	✗	✗	✗	✗	✗
Shorter concessions and loans	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	?	✓	?	✗	✗	✓	✓	✓	✓	✓	✓

Figure 1: Lending appetite of banks for public private partnerships (PWC, 2009)

From Figure 1 it appears that in general, banks are still willing and able to participate in project financing but that they do have a preference for shorter term loans. Banks also desire a shortening of loan maturities in DBFMO projects. The appetite for other choices like hard mini-perms and cash sweeps seems to be more divergent among banks. A hard mini perm is a project finance structure where legal maturity is set typically around seven years, forcing the borrower to refinance before maturity or face default (PWC, 2009). A cash sweep is the use of surplus cash to prepay debt or provide extra security for lenders, instead of paying it out to investors. This incentivizes refinancing of deals. Whether this is a preferred structuring device remains to be seen; banks are currently doubtful whether the incentives of cash sweeping will materialize. This is reflected in the different appetite of banks for hard mini-perms and cash sweeps in Figure 1.

Also in the meetings the Dutch Ministry of Finance had with third party investors, it was claimed that the market conditions for DBFMO projects have significantly changed. The combination of capital adequacy requirements, reduced liquidity and higher funding costs has increased the strain on the project finance banking model.

The tariffs they operate are also rising as risk premiums on interest are increased and liquidity premiums are asked for. In the United Kingdom, credit margins and fees have increased from the 60-80 basis points level to 150-200 basis points (PWC, 2008). That is up to 2% over the banks' own cost of capital. In lower rated countries, credit margins have widened as underlying country risk premiums have widened, which will probably intensify problems on the Irish and Spanish DBFMO market.

3.2 Changes in DBFMO Processes

Besides the fact that financing rates have been volatile and a wide range of rates have been experienced, parties involved in DBFMO projects are claiming that procurement processes in DBFMO projects are affected by the financial turmoil as well. Hall (2009)

argues that the time it takes for a DBFMO project to come to financial close has been increased, since the market of wrapping debt has come to a stop. For example, in the United Kingdom large deals in the waste PFI program have been delayed due to the current difficulties in the financing markets (NAO, 2009). Some of these projects had to be funded by SPVs out of existing financial resources giving the prospect of faster deal closure.

It also seems that more third party investors are needed for one project since banks are not willing to be exposed to all financial risks a DBFMO project brings forward. They also argue that they are handling stringent risk management principles. Banks ask for more equity in SPVs, are less willing to take risks, and increasingly ask for guarantees.

Besides having an effect on currently procured DBFMO projects, the financial crisis will have implications for existing projects as well, as many SPVs raised short-term debts to launch DBFMO projects, expecting to refinance it once the project would be operational. They will find it difficult to get new loans without increasing the cost of interest payments in the current circumstances.

4. Looking Forward

Other financing constructions are needed to unlock the investment potential in public projects. Probably commercial banks will never be willing to finance DBFMO projects under the conditions that we were used before the credit crunch has hit the DBFMO market. In the next section, several financing options are discussed, which are mentioned by both public and private respondents as potential solutions for the current situation.

First, it might be appropriate to consider new financing models like Credit Guarantee Finance (CGF) and models that represent funding through governmental bonds as long as the monoline market will be closed. GSF implicates that the senior debt requirements are funded with loan finance provided directly by the government, which are fully guaranteed by private risk takers, which in turn are funded by the issuing of gilts. It combines the lower cost of using government funds with the benefits of paying a risk premium to private financiers to take, allocate and manage risk (Cartlidge, 2006).

Another solution mentioned by the respondents now the market of wrapping bonds has come to a stop, is the club deal. In a club deal, a SPV asks banks to ‘club’ together during the final stage of project negotiations. This means that the syndication, in effect, takes place upfront, instead of after a contract is signed. It also means that the degree of competition in the DBFMO finance market is materially curtailed. Another way of restricting the commitment third party investors have to give prior to financial close is obtained by introducing a margin clause, which implies that outside a certain band width other conditions are applied.

More innovative is the introduction of a funding competition, in which a group of third party investors must compete for the funding of a DBFMO project after the preferred SPV is selected by the awarding authority. Another solution to stimulate the DBFMO market also mentioned by Rose (2008) is the introduction of private sector debt funds. However,

it remains to be seen whether the terms for this type of funding can be made attractive for all third party investors. In this respect, it is essential that actors involved in setting these terms realize that DBFMO is not simply a financial model, but aimed at delivering value for money. Financial conditions therefore should be supportive to value for money principles, and not the other way around.

Banks will also still accept long tenors if accompanied with significant refinancing incentives. In the longer term, there may be opportunities for SPVs to secure refinancing gains if these risks reduce. In answer to the current disruption to the financial market, the UK Treasury has introduced a sliding scale whereby awarding authorities are now entitled to up to 70 per cent of refinancing gains on all PFI contracts compared with the previous normal arrangement of 50 per cent (NAO, 2009). The financial crisis therefore might also be a chance for the future. It might be more difficult to obtain optimal conditions for project funding at the moment, but better arrangements can be agreed on the moment and distribution of refinancing gains.

4.1 Process

During the meetings, a number of process measures were defined as well in order to respond to fight the symptoms of the changed financial landscape. There are fewer financiers, while more financiers are needed to finance a project. In order to solve this, the number of SPVs in need of project financing must be decreased or otherwise it should be allowed that financiers could finance more than one SPV. This implies that the requirement that financiers must be exclusively bonded to one SPV should be released. A few options are available to decrease the number of financiers needed to come to financial closing of a deal: decreasing the minimum number of SPVs participating in the competitive dialogue. In the Netherlands this implies that the decision to downgrade the number of SPVs participating from three to two should be made in an earlier stage of the dialogue.

In general, in order to be able to ride in the teeth of the financial crisis DBFMO should be made more attractive to a broader audience of potential DBFMO financiers. To do so, awarding authorities should for instance lower the threshold for third party investors to get involved in PPP projects by settling and fitting to uniform conditions in DBFMO projects. Especially in the Netherlands, the DBFMO market needs to open up to foreign third party investors. This can be enhanced by writing contracts in the English language. Currently, contracts in the Netherlands are mostly written in Dutch and therefore of less interest for foreign third party investors. Risks involved in DBFMO can be reduced by setting a guaranteed part of the unitary charges. This will potentially attract more financiers to DBFMO projects.

Public and private actors are convinced that it will remain possible to attract private capital for the financing of public projects. However, specifically for big projects with an investment value over €300mln, new partners, like the European Investment Bank and pension funds should get involved in DBFMO. Over the past months, there has been an increase in European Investment Bank funding in European DBFMO projects which is an important and positive development for this market. In the Netherlands, the conditions for involvement of partners like the European Investment Bank and pension funds are favorable since both types of investors already have shown their appetite for this.

5. Conclusions

As a matter of course the financial turmoil does not implicate the bankruptcy of DBFMO. DBFMO still appears interesting to third party investors given the recent financial closes of DBFMO projects in Europe. One example is the Douro highway in which €765 million was provided for 27 years, with 230-250 basis points and a cash sweep after eight years (November 2008, Portugal). Another is the M80 high way which is a club deal of £360 million (January 2009, United Kingdom) in which the European Investment Bank was willing to provide more than half of the finance. Certainly for the short term, but partly also for the long term, the conditions for funding will be less attractive than we were used to since banks will not price the deals as aggressively as they were used to. The expectation is that future projects should be financed with a higher part of equity. Besides, commercial banks will demand higher returns and more flexibility.

Awarding authorities need to anticipate on the changed market conditions and follow new courses in order to come to deals. While there is a consistent desire for a shortening of loan maturities in the project finance sector, there is still a significant number of banks prepared to lend long term. These will give less commitment to DBFMO project up front, and only prepared to close the deal after the preferred bidder is appointed. Awarding authorities therefore should not throw DBFMO standards to the winds, but incorporate more flexibility in order to adapt to actual developments. For both small and big DBFMO projects the funding construction, conditions and procurement processes should be adapted. A new standard must be created, which offers space for big (infrastructure) as well for small (accommodation) projects.

The Dutch Ministry of Finance recognizes the challenges of the DBFMO market in the near as a number of important transactions are in the pipeline in a market where bank lending capacity is constrained. However, private financing will still offer value for money in the long term than public financing for projects which lend themselves for a public private partnership.

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RISK ALLOCATION FRAMEWORK IN ENGINEERING METHOD FOR PPP PROJECTS

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Abstract

PPP projects are used to be consisted with complicated contracts, involving at least three participants, but simplifying as public client and private contractor (SPV) two parties. It is a wide belief that to achieve PPP project best value, firstly it is to place the risk to the party who has the best risk management capacity. The central government, like UK OGC has published a series document for guiding public authorities in the procurement process. During a PPP project procurement, the private contractors (SPV) priced the risk metrics which is identified by the public sector (possibly with the help of consultants), and further negotiation has to be carried out until both sides reach final agreement and sign the main contract. The negotiation results in whether the public sector should either accept the high risk cost, share the risks with the public sector, or retain the risk in the public sector. However, the guidelines are not provided a general method for distributing the risk between the public client and SPV. Many researches have been carried out trying to solve this problem, such as through game theory, insurance theory, option theory, etc. Unfortunately, these methods are not adopted in practice in industry. A research project was funded by the Xiamen University to develop a practical risk allocation model based on a common method which is familiar to industrial professionals.

Moment distribution has been popular used by structural engineers since 1930s and are still very effective. The principle behind is to allocate bending moment to the members in proportion to their relative bending stiffness, which is called distribution factor (DF). In the PPP project, the public known principle of risk allocation is to distribute the risk to the one who has the greatest capacity, such as expertise and authority, to manage the risk effectively and efficiently, and thus charge the lowest risk premium. However, in practice, the greatest risk management capacity is unable to be clearly determined but based on instincts. Some literatures suggest that risk should be better allocated if the management capacity of the parties are pair-wise determined. This paper is trying to use moment distribution method to develop a quantitative risk allocation model, which avoid directly calculating project risk management capacity (RMC), but introducing enterprise risk management and carryover (the impact factor of project to the enterprise). The components of RMC mainly include the financial indicator and non-financial indicator, additionally, a coefficient β was proposed when comparing the RMC between two different parties in order to eliminate the discrepancy among different industries.

Keywords: PPP project, risk allocation, risk management capacity, moment distribution

1. Introduction

PPPs are the arrangements of private sector taking part of the government's responsibility in provision of public facilities. For the purpose of achieving VfM and obey the public regulation, the public client needs to go through a series of procurement procedures, including publish in the international media, conduct market research, first contact with contractor, invitation to tender, bid evaluation, negotiation with preferred bidder, financial close and contract award. This lengthy procedure cost much transaction cost to both the public sector and private contractor, as much as 6 times to the private contractor more than that in traditional procurement system. The government realized that with the help of risk management, it would achieve one of primary objectives in introducing PPP --- transfer risk genuinely to the private sector. In the early day of introducing risk management, there is no a matured principle for risk allocation either in procedure or amount distribution, though the government demand the public agent adopting Gateway Review and Best Practice etc. Li et al (2005) had proposed a risk allocation procedure for PPP projects, and principal framework.

The public client (agent) would express its expected risk allocation framework along the ITN/ITT document, by setting out a list of the main risks contained within the scheme, and bidders are required to specify their views on:

- The probability of each risk event occurring;
- The cost consequences, if the event did occur; and
- Whether they were prepared to take all, or part of the risk, within their bid price.

The guiding principle of risk allocation is that risk should be allocated to the party best able to manage it. Generally, therefore, the proposed risk allocation framework can follow the recommended preferable categories (Li et al 2005), in which the public sector client retains political risks and the risk pertaining project site availability. Both the public sector client and private sector contractor should share the risks pertaining to general legislation, force majeure and relationship, while the contractor should take most of the project risks. The allocation of some risk factors, like obtaining project approval and permit, varies with different projects, and depends on prevalent circumstances.

Various risk allocation principles had been suggested by a number of researchers, as Lam et al (2007) summarized, adopting these principles as the basis for allocating risks is useful in reaching an equitable decision. It would be ultimately beneficial to both owners and contractors. Like most of the management doctrines, all these risk allocation principles commonly use natural language in the expression, which are nevertheless ambiguous in actual application. For example, one of the principles mentioned by Abrahamson (1992) states that 'a party should bear a construction risk where it is in his control'. The term "in his control" is difficult to be precisely interpreted as the "control" by a contracting party on a real situation could be 'partial'. The application of those principles to final decision making thus heavily relies on the qualitative judgment and experiential knowledge of construction experts. The problem of this kind of decision making process is its implicitness. Too often it is difficult to be analyzed and retrieved by others. Since the PPP become a hot topic in political and academic arena, a number of researchers carried out extensive study on risk allocation from 21st century, such as Li et al (2005), Lam et al (2007), Ng and Loosemore (2007), and Medda (2007) . Most people like to seek a simple and reasonable model (mathematical model) for allocating risks, and

this framework would explain the reasons behind real allocation world, such as fuzz set theory by Lam et al, and game theory by Medda11 did. This paper is seeking to employ an engineering method which is familiar to most of construction industrial professionals to establish a mathematic risk allocation model.

2. Moment Distribution Method (MDM)

Moment distribution method initially developed by Hardy Cross in 1924, was the most widely used method for analysis of structure from 1930, when it was first published, until the coming of computer in 1970s. However, since it provides a better insight into the behavior of structure, this method may also used for preliminary designs as well as for checking the results of computerized analyses by many engineers nowadays.

The moment distribution method is an iterative procedure in which it is initially assumed that all the joints of the structure that are free to rotate are temporarily restrained against rotation by imaginary clamps applied to them. External loads and joint translations (if any) are applied to this hypothetical fixed structure, and fixed-end moments at the ends of its members are computed. These fixed-end moments generally are not in equilibrium at those joints of the structure that are actually free to rotate. The conditions of equilibrium at such joints are then satisfied iteratively by releasing one joint at a time, with the remaining joints assumed to remain clamped. A joint at which the moments are not in balance is selected, and its unbalanced moment is evaluated. The joint is then released by removing the clamp, thereby allowing it to rotate under the unbalanced moment until the equilibrium state is reached. The rotation of the joint induces moments at the ends of the members connected to it. Such member end moments are referred to as distributed moments, and their values are determined by multiplying the negative of the unbalanced joint moment by the distribution factors for the member ends connected to the joint. The bending of these members due to the distributed moments causes carryover moments to develop at the far end of the members, which can easily be evaluated by using the member carryover factors. The joint, which is now in equilibrium, is re-clamped in its rotated position. Next, another joint with unbalanced moment is selected and is released, balanced, and re-clamped in the same manner. The procedure is repeated until the unbalanced moments at all the joints of the structure are obtained by algebraically summing the fixed-end moment and all the distributed and carryover moments at each member end. This iterative process of determining member end moments by successively distributing the unbalanced moment at each joint is call the moment distribution process.

3. The Application of MDM in PPP Risk Allocation

For the established firm, corporate entrepreneurship as expressed through entrepreneurial projects represents the potential “engine of progress” through which new products can be created, new markets can be entered, new technologies can be explored, and new businesses can be built (Zahra et al., 1999). It can be easy to assume that the business society is established basically as a structure (more suitably as a dynamic structure, or network), in which the enterprise would be considered as a member, while a project is the joint connecting to the project participants. Risk is like the bending moment applying on

the project, and will be distributed to the project participants by respective distribution factor. The enterprise will suffer from the project risk by a carryover factor; on the other hand, risks from other projects will automatically pass to the enterprise and in certain degree will affect this project, such as resource consuming, priority etc. This model is shown in Figure 1. The advantage of this assumption is that the theory of enterprise risk management (ERM) are captured more research attention and better suit into a statistical solution.

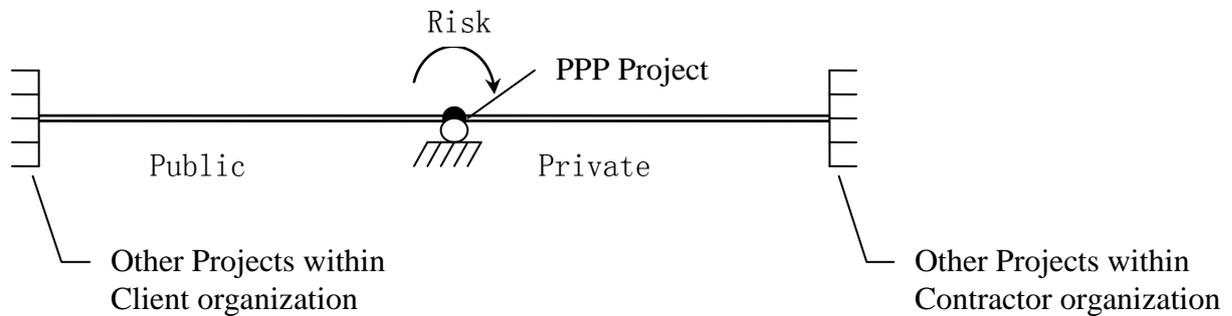


Figure 1: Risk distribution model with client and contractor

3.1 Definitions and Terminology

Before we can develop the moment distribution method, it is necessary to adopt a sign convention and define the various terms used in the analysis.

3.1.1 Risk Management Stiffness

Consider an organization has a Project A and other projects at the same time. If there is a risk arises within the Project A, the organization must response, and usually through spending some money Crisk to cover the risk, the extra Project A’s risk cost will impact the organization in a certain degree, causing other project’s resource consuming requirements, thus producing resource risk in other projects.

$$R = \frac{EI}{P} \theta \tag{Equation 1}$$

- Where R is denoted as the risk;
- E denoted as the capability in managing risk
- I denoted as the industrial capability in managing risk
- P denoted as the importance of the Project A within the company
- θ is denoted as a unit cost of risk

Like the concept of Member Bending Stiffness, an organization’s risk management stiffness K, is defined as the risk that must be applied at the project to cause a unit resource consumption on that project, it is normally associated with the enterprise’s risk management capacity and the industrial risk.

Thus $K=EI/P$ Equation 2

3.1.2 Distribution Factors

When analysis a project by the distribution method, an important question that arises is how to distribute a risk applied at a project among the various members connected to the project. We state that, in general, the distribution factor (DF) for the project A member that is “rigidly” connected to the project A equals to the ratio of the relative risk management capacity (RM) of the member to the sum of the relative RMC of all the members involving into the project A; that is

$$DF = \frac{K}{\sum K} \quad \text{Equation 3}$$

Furthermore, the risk distributed to a “rigidly” connected member equals to the distribution factor for that project times the negative of the risk applied to the project.

3.1.3 I Value and the CAMP Model

The I has different value from CAMP model, according to Grout’s (1997) assumption and the capital asset pricing model (CAPM), the equilibrium expected rate of return for asset j is given by:

$$R_j = R_f + \beta * (R_m - R_f) \quad \text{Equation 4}$$

where R_j is the expected return on asset j , R_f is the risk free rate of return on asset j , R_m is the market risk premium, β is the ratio of the covariance between return on the asset j and the return on the market portfolio. β would be obtained from financial report by different industries (Pollio, 1999).

3.1.4 The Enterprise Risk Management Capacity

ERM can also be described as a risk-based approach to managing an enterprise, integrating concepts of strategic planning, operations management, and internal control. ERM is evolving to address the needs of various stakeholders, who want to understand the broad spectrum of risks facing complex organizations to ensure they are appropriately managed. According to COSO (2008), an organization’s internal risk management capacity can be established as the mandate, governance and decision-making structures, planning processes, infrastructure, and human and financial resources. Furthermore, the following factors are considered key in assessing an organization's current risk management capacity: individual factors (knowledge, skills, experience, risk tolerance, propensity to take risk); group factors (the impact of individual risk tolerances and willingness to manage risk); organizational factors (strategic direction, stated or implied risk tolerance); as well as external factors (elements that affect particular risk decisions or how risk is managed in general).

Financial risk management is the practice of creating economic value in a firm by using financial instruments to manage exposure to risk, particularly Credit risk and market risk. The risk modeling uses a variety of techniques including market risk, Value-at-Risk (VaR), Historical Simulation (HS), or Extreme Value Theory (EVT) in order to analyze a portfolio and make forecasts of the likely losses that would be incurred for a variety of

risks. In a PPP risk investigation a few years ago, it is discussed that some financial risk are as important as non-financial risks. Therefore, it is wisely to divide risk management into financial risk management, which can be modeled by economic value; and non-financial risk management, used some kind of rating system.

The assessment of Enterprise risk management capacity, which is short listed as RMC, can mainly divide into two parts, one is financial indicator and, the other is non-financial indicator. So the process of assessing the value of RMC turns into the process of determining the indicators values of F and N, which is more specific. There are six main steps in determine the value, stated as follow:

- 1、 List relevant facts which can affect the value of F and N as possible, for example, the financial indicator is affected by financial internal rate of return (FIRR), financial net present value, payment redemption date, economic internal rate of return (EIRR), economic net present value, payback period etc. Non-financial indicator, otherwise, may affect by whole industry environment, cooperation personnel structure, capacity and tools that chief managers use in risk management, the degree that individual pays attention to risk, etc.
- 2、 Reduce the complex, relevant factors into minority, irrelevant ones by factor analysis. Most factors listed in former step are either has less effect on explain the indicators, or share an main joint factor, in other words, the listed factors, by using the factor analysis method, can abstract into a few minority and irrelevant each other, but with strong connection to risk controlling capacity ones. The maximum quantity of chosen factors is usually decided by totting-up attribution ratio to the entire factors, 80% or 85%, for instance. Presumed we have gotten m treated factors for F, and n for N, which is arrayed according to priority of attribution ratio, then we get the coefficients of F and N by the normalize these factors, marked as k_i , l_j ; the subscript i represent an random value from 1 to m, while value j range from 1 to n. Of course k_i , l_j ; satisfied the conditions: $k_1+k_2+\dots+k_m=1$; $l_1+l_2+\dots+l_n=1$.
- 3、 Eliminate the variables' dimension. The strong influence on risk control affected by order of magnitude among those variables makes the coefficient become meaningless, so the process of variables' dimension elimination is necessary for latter analysis. Considered the variables of financial indicator have free-flowing access to quantitative data, elimination is enough to them, the formula illustrate as follow:

$$F_{ii} = \frac{\pm(F_{ii} - \overline{F_{ii}})}{S_{FI}}, \quad F_{III} = \frac{\pm(F_{III} - \overline{F_{III}})}{S_{FII}}; \quad i = 1, 2, \dots, m. \quad \text{Equation 5}$$

For non-financial variables, otherwise, mostly subjective factors, need to evaluate through appropriate qualitative methods, traditional experts marking methods or Delphi method is competent here, to mark relative quality for both parties of cooperation, then to eliminate variables' dimensions by using the formula below.

$$N_{ij} = \frac{\pm(N_{ij} - \overline{N_{ij}})}{S_{NI}}, \quad N_{Iij} = \frac{\pm(N_{Iij} - \overline{N_{Iij}})}{S_{NII}}; \quad j = 1, 2, \dots, n. \quad \text{Equation 6}$$

The symbol I represent to the party of government while II is his partner --- contractor; F means their financial value and N non-financial value, the subscript i is the ordinal number of indicator F_{ii} , as well as the subscript j. For example, F_{ii} means the indicator

i of government's financial value. S and \bar{F} are standard deviation and the means of financial value, respectively. For a given factor, if high value indicate well factor performance, then, choose “+” before the formula, and vice versa.

- 4、 Obtain both F and N value for each party respectively. After we got every single value of all needed factors, the components of financial and non-financial indicator satisfied the formulas illustrated below:

$$F = k_1F_1 + k_2F_2 + \dots + k_mF_m, \quad N = l_1N_1 + l_2N_2 + \dots + l_nN_n \quad \text{Equation 7}$$

- 5、 Induce each party's RMC. As stated earlier, the following equations lead to specific value of the RMC.

$$L_I = K_1F_I + K_2N_I, \quad L_{II} = K_1F_{II} + K_2N_{II} \quad \text{Equation 8}$$

4. Example

The municipal authority decided to use BOT procurement method to develop a sewage project in a middle size city in China. The concession contract was assigned to a private company with 20 years operation period, and a NPV of 100 million RMB. Disposed scale is 80 thousand ton per day. The treated sewage reaches Standard B of National Class A, and is discharged into deep sea through pipeline. The risks was identified and classed as financial risk such as interest rate, exchange rate, project operation cost, etc. and a non-financial package risk, such as reputation, quality, environment, change of law, corruption, the authority interruption, etc. Based on expert's assessment, the RMC of each party are also listed in the two tables.

Table 1: RMC and financial package indicators

Risk	utility function	private RMC	Public RMC
	(million)	(1-9)	(1-9)
Interest rate	0.125	9	1
Exchange rate	0.075	9	1
Project operation cost	0.015	8	1
Price	5	6	4

To non-financial package, an easier solution is to adopt credit theory, and using score rating to obtain an “algebra” answer. For example, the local government was given a credit ranking as BBB, as 6 in a 9 scale; while the private contractor was given a credit ranking as A, as 7 in a 9 scale. Thus, we assume that there is $\beta=1.17$ when comparing the private contractor to the public client.

Table 2: Non-financial risk management capacity indicators

Risk	frequency	impact	result	Private RMC	Public RMC
	(1-9)	(1-9)		(1-9)	(1-9)
Corruption	4	4	16	1	8
The authority interruption	5	4	20	2	8
Change of law	4	4	16	2	7
Force majeure	2	2	4	5	5
Quality risk	3	4	12	9	1
Environmental risk	2	2	4	9	3

Thus, the public client and the private contractor's RMC is determined as

$$RMC_{client} = \left\{ \begin{matrix} F_I \\ N_I \end{matrix} \right\}; RMC_{contractor} = \left\{ \begin{matrix} F_{II} \\ N_{ii} \end{matrix} \right\} \quad \text{Equation 9}$$

The Distribution Factor (DF) would be expressed as

$$DF_{client} = \frac{RMC_{client}}{RMC_{client} + RMC_{contractor}} \quad \text{Equation 10}$$

$$DF_{contractor} = \frac{RMC_{contractor}}{RMC_{client} + RMC_{contractor}} \quad \text{Equation 11}$$

It can be obtained the "Price" risk as

$$DF_{contractor} = \frac{6\beta}{4 + 6\beta} = \frac{6 \times 1.17}{4 + 1.17 \times 6} = 0.64 \quad \text{Equation 12}$$

Thus, the private contractor was assigned "price" risk at $0.64 \times 5 = 3.2$ million RMB level, and the government would provide 1.8 million RMB for its risk responsibility once the risk appeared as in the planning and costing 5 million.

5. Conclusion

This paper has discussed the general characteristics of risk allocation by risk management capacity (RMC), based on the assumption that projects and companies just like joints and members in an engineering structure. It described the moment distribution method in structural mechanics, presented the implementation of the moment distribution approach using an assumed example. The definition of E, I, θ , RMC, financial capacity and non-financial capacity needs to be improvement, and the carryover factor which is associated with the PPP project and its mother company has to be considered. However, given the advantages and flexibility of MDM, there is considerable potential for MDM to be further

applied to other fields (e.g. collaborative design, joint management, joint ventures) to solve the fragmentation problem of the industry. Risk allocation based on RMC greatly enhances the efficiency of a partnership system and makes these systems suitable for complex and dynamic environments.

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THE MALAYSIAN PRIVATE FINANCE INITIATIVE AND VALUE FOR MONEY

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Abstract

The concept of value for money (VFM) is the fundamental reason for most Private Finance Initiative (PFI) projects to be attractive in many developed and developing countries. The concept encourages governments to deliver Mega projects by using PFI procurement method. The aims of this paper are first, to investigate the notion of VFM for PFI projects by different countries (i.e. UK, Australia and Japan) and second, to discover the detailed components of Public Sector Comparator (PSC) protocol to evaluate VFM.

Based on the consideration of these models, the paper proposes a framework of VFM assessment for PFI projects in Malaysia. In this framework, VFM assessment is designed to embrace the four phases of project life cycle (programme, project, procurement, and project construction phases). The implementation of VFM across project phases is needed to achieve project effectiveness (optimal risk sharing, cost saving, time saving, quality improved, client satisfaction and benefit to public) and to establish PSC guideline in the evaluation of VFM.

Keywords: Malaysia, private finance initiative, public sector comparator, value for money

1. Introduction

PFI was originated in England in 1992 under the United Kingdom's Tory-led government of John Major (Williams, 2005). PFI is one type of Public-Private Partnerships (PPP) where project financing rests mainly with the private sector (Akintoye et al. 2003). The rationale of PFI is to combine the resources of the public and private sectors for the purpose of providing more efficient public services. In some cases, the capital invested in a project is financed, constructed and leased back to the private sector over a pre-determined period of between 25 and 30 years. This is in line with a number of empirical studies by various researchers (Akintoye et al., 2003; Zhang, 2005; and Pitt et al., 2006) indicating that PFI is a method in which project delivery rests mainly with the private sector, which includes designing, constructing, financing and operating the asset. The basic idea of PFI as noted by

Shinohara (1998) is based on the concept that public sector purchases “public services provided by private sector to increase the quality and deliver value for money”.

PFI in Malaysia was officially implemented by the Malaysian Government through the Ninth Malaysia- Plan (2006-2010) under the National Privatization Plan (EPU, 2006). It is among the effort by the Malaysian Government to encourage private participation in the local development projects and to reduce government’s expenditure in providing public infrastructure and services. Despite PFI being perceived by most governments as the most cost effective means of procuring public infrastructure projects, a debate about the nature and method of achievement of VFM in PFI project is still disparaging (ACCA Survey, 2002). The probable reason for this predicament is due to the difficulty of measuring project outcomes because of the complexities in PFI projects (Broadbent et al., 2003; Heald, 2003; Shoul, 2005 and Khadaroo, 2007). Studies conducted by Shoul (2005) and Leigland & Shugart (2006) claimed that the complexities of most PFI projects lead to the difficulties to measure VFM for the outcomes. To a certain extent, only one percent of the respondents strongly agreed that PFI generally provides value for money as reported by the ACCA Survey.

The core test of VFM for PFI project is determined through a comparative analysis of the benefits, risks and costs by using both quantitative and qualitative analysis (Grimsey & Lewis, 2005). According to them, there are four main alternative approaches to provide the core test of VFM. These could be done by using full cost benefit analysis, Public Sector Comparator-Public Private Partnership (PSC-PPP) comparison, UK style PSC –PPP, and competitive bidding. Among others, the UK style PSC- PPP comparison has been adopted by many countries such as Australia, Hong Kong, Japan, and Canada. Nevertheless, the method has come under growing criticism, in terms of whether PSC calculation is the most appropriate way to evaluate VFM due to the ambiguity and complexity problems.

Hence, this study investigates two fundamental issues: first, the notion of VFM for PFI projects undertaken in different countries such as UK, Australia and Japan, and second, to examine PSC as a tool in VFM assessments. The research findings will then form the basis for a proposed model that targets PFI projects in Malaysia.

2. PFI in Malaysia

Since 1983, the Malaysian Government has advocated many new forms of PFI modalities such as Built, Operate and Transfer (BOT), Built and Operate (BO), Built Lease Transfer (BLT) for new projects and outright sale, lease, management buy-out and corporatisation for existing projects (Abdul Rashid, 2007). The main aim of PFI is to encourage private participation in the local construction development and to reduce government’s expenditure in providing public infrastructure and services. The Government sectors that are responsible for establishing the PFI Central Unit include the Ministry of Finance (MoF), Economic Planning Unit (EPU), and National Implementation Directorate (NID). In order to facilitate the implementation of PFIs, the Ministry of Finance Malaysia has acquired a substantial amount of funds to facilitate the first wave of PFI implementation in Malaysia (Jayaselan and Tan, 2006).

The Employee Provident Fund (EPF) Department has agreed to invest RM 20 billion in terms of loan to facilitate PFI projects under the Ninth Malaysia-Plan (EPU, 2006). The structure of PFI in Malaysia starts by establishing PFI project agreement which is entered into between the Public sector (represented by various government ministries) and the Special Purpose Vehicle (SPV) Company (private consortium). The PFI Sdn Bhd, a specific government body is set up to administer the Malaysian PFI procurement process. PFI Sdn Bhd borrows money from EPF to finance selected projects under the Ninth Malaysia-Plan. The commitment of PFI Sdn Bhd is to design, construct, operate, manage and maintain the facility throughout the concession periods (Tan et al. 2006). Therefore, the risks associated with the project include the risk of construction, management, and maintenance of the assets. In return, the Government is contracted to pay for the services based on performance and standard provided. Future tariff revisions are also to be subjected to a Reward-and-Penalty system (Express et al., 2006 and Kok et al., 2006). The evaluation of a project proposal is done through a bidding process and all proposals will be evaluated on the basis of VFM which evaluates its costs and benefits. The bidding proposal is compared against the PSC of each project, which acts as a checker to the items and costs stipulated in the tender document. The capital expenditure and the maintenance costs of the project must be less than the PSC benchmark before a PFI project could be awarded to a private partner.

3. VFM in PFI Projects

VFM is defined as the ‘optimum combination of whole-life costs, benefit, risks, and quality (fitness for purpose) to meet user’s requirements at the lowest possible price’ (HM Treasury, 2003; Grimsey and Lewis, 2005; English, 2006 and Hong Kong PPP Guide, 2006). It is usually associated with three Es, i.e. Economy, Efficiency and Effectiveness (English & Guthrie, 2003; Grimsey and Lewis, 2005 and Shoul, 2005). Therefore, in seeking VFM for PFI projects, three initial strategies should be deployed by most governments. These are: effective evaluation mechanism, viability of PFI contractor, and commitment to VFM. It is important that VFM assessment should take place at the earliest practical stage of any decision making process. The process to confirm VFM within PFI procurement is gradual. VFM is assessed by comparing a cost of PFI bids against a PSC. Theoretically, the project considers VFM if the net present value (NPV) for PFI bids is lower than the PSC. The baseline cost of the PSC is usually based on historical costs for services and adjusted based on project future demand, demographical changes and political consideration. Long-term forecasting requires assumptions to be made about the future. Once the NPVs of both PSC and SPV have been prepared and adjusted to a comparable basis, then a simple comparison of both will be undertaken.

4. Methodology

Initially, this study is purely based on literature review. It reviews theoretically VFM assessment models applied in the UK, Australia and Japan. The aims as stated previously, are to investigate the notion of VFM for PFI projects by these countries and to discover whether PSC protocol is the most appropriate way to evaluate VFM with a view to propose a model that targets PFI projects in Malaysia. Further, a comprehensive empirical research in the form of a triangulation approach (questionnaires and case studies), followed by validation of framework are planned for future work.

5. VFM Assessment Models

Table 1 shows the VFM assessment models for PFI projects adopted by the UK, Australia, and Japan. These models were chosen in this study due to their long period of establishment i.e. since 1990's and their good track records in terms of performances that could be learned, in particular from the VFM point of view. Indeed, the UK is the pioneer of PFI and the inventor in the form of the VFM assessment approach. These models are discussed in turn:

5.1 The UK VFM Assessment Model

The UK VFM assessment model of PFI project by Grimsey & Lewis (2005) and Pit et al. (2006) outlines a process which starts by looking into key assessment criteria of VFM assessment. These are affordability, risk sharing and competition. Affordability means the appropriately allocation of resources, cost distribution and within the budget; risk sharing refers to the optimum allocation of risk between private and public sectors; and competition means contestability in the market (i.e. in the bidding and in the operation processes). The UK model has adopted PSC as a tool when assessing VFM. In making a robust assessment of PFI projects, VFM appraisal takes into consideration of the financial element (NPV) and qualitative factors (merit base). The VFM testing of the PFI option and the PSC should employ economic appraisal principles which include: identification of costs and benefits, calculation of NPV, analysis of uncertainties, weighting of other factors and presentation of performance result. The performance result of VFM is demonstrated when the project shows a reduction in cost, innovation in quality and appropriate level of project risk. However, there are some barriers identified in implementation of PSC such as: being too subjective, simplistic and the presence of unquantifiable and risky elements. In addition, Pit et al. (2006) also reckon several VFM drivers in the UK model and these drivers are needed to drive PFI projects to the effectiveness of a project outcome.

Table 1: VFM assessment for the UK, Australia and Japan

Variables	UK VFM Model <i>(Grimsey and Lewis, 2005 and Pit et al. 2006)</i>	Australian VFM model <i>(Partnership Victoria, 2006)</i>	Japanese VFM model <i>(Mori, 2006 and Kajita, 2007)</i>
Key assessment criteria	<ul style="list-style-type: none"> • Affordability • Risk Sharing • Competition 	<ul style="list-style-type: none"> • Affordability • Risk Sharing • Competition 	<ul style="list-style-type: none"> • Affordability • Risk Sharing • Competition
VFM Tools	<ul style="list-style-type: none"> • PSC 	<ul style="list-style-type: none"> • PSC • PIT 	<ul style="list-style-type: none"> • PSC
VFM Appraisal	<ul style="list-style-type: none"> • Financial (NPV) • Qualitative (merit base) 	<ul style="list-style-type: none"> • Financial (NPV) • Qualitative (merit base) 	<ul style="list-style-type: none"> • Financial (NPV) • Qualitative (merit base)
Barriers	<ul style="list-style-type: none"> • Subjective • Simplistic • Risk 	<ul style="list-style-type: none"> • Inaccuracy • Omitted risks • Manipulation • High cost 	<ul style="list-style-type: none"> • Complexity of procedures • Bureaucracy • Lack of a transparency
VFM Drivers	<ul style="list-style-type: none"> • Risk allocation • Output specification • Competition • Contract duration • Innovation • Borrowing cost • Management skills • Performance measurement • Contract flexibility 	<ul style="list-style-type: none"> • Measurable service output. • Whole life costing • Integration of design, operation and maintenance • Innovation • Risk transfer • Greater asset utilisation • Market capability 	<ul style="list-style-type: none"> • Government support • Deregulation • Private sector capability and expertise • Risk • Capacity of financial markets
Comprehensive VFM concept	<ul style="list-style-type: none"> • Economy • Efficient • Effectiveness <p><u>Achieving :</u></p> <ul style="list-style-type: none"> • Optimal risk transfer • Efficient public services • Innovative design • Leveraging private sector 	<ul style="list-style-type: none"> • Economy • Efficient • Effectiveness <p><u>Achieving :</u></p> <ul style="list-style-type: none"> • Optimal risk transfer • Efficient public services • Innovative design • Leveraging private sector 	<ul style="list-style-type: none"> • Economy • Efficient • Effectiveness <p><u>Achieving :</u></p> <ul style="list-style-type: none"> • Optimal risk transfer • Efficient public services • Innovative design • Leveraging private sector

Source: Grimsey and Lewis (2005); Pit et al. (2006); Partnership Victoria (2006); Mori (2006) and Kajita (2007)

The assessment of VFM concept in this model can be regarded as complex. It involves the preparation of a hypothetical set of costs of a project, evaluation of risks and financial benefits. To assess VFM therefore, it requires an ability to define, estimate its related outcome and to compare it against a PSC. Thus, the project will achieve VFM in terms of comprehensive costing, quality, performance and risk allocation. Nevertheless, the absence of capital funds in PSC calculation is a weakness of the model.

5.2 The Australian's VFM Assessment Model

The Australian VFM assessment model is quite similar to the UK model which also takes into consideration the key assessment criteria, VFM appraisal, PSC, drivers and barriers. However, the dissimilarity is by having an additional assessment tool i.e., public interest test (PIT) apart from public sector comparator (PSC). The primary purpose of the PSC is to provide a quantitative benchmark against which to judge VFM of bids. The use of PIT on the other hand, is to ensure that a broader assessment of the public interest is to be taken into account before they can be offered as Private Finance Project (PFP). Essentially a checklist is needed by PIT and the components of the list include project effectiveness, impact to stakeholders, public access and equality, consumer rights, security, privacy and other associated non-economic costs and benefits (English & Guthrie, 2003).

5.3 The Japanese's VFM Assessment Model

Following the perceived success of PFI efforts in the UK, the 'PFI Law of Japan' was enacted in 1999 (Japan PFI Association, 2007). Since then, more than 200 PFI projects have been launched involving various sectors, i.e., public facilities, official facilities and public utilities. The Japanese PFI utilizes the concept of the UK PFI modified to include the Japanese styled subsidies. Construction and application of PSC is an integral component in the VFM assessment. VFM is demonstrated by comparing private sector bids with a detailed PSC. The calculation and confirmation of VFM is required from project planning stage. The business period of PFI projects usually lasts for 25-30 years and hence, the NPV method is used for the assessment of VFM. The total incomes and costs of a PFI project (including running costs) are converted into NPV to assess the value for the PFI project. The assessment for VFM considers both the quantitative and qualitative factors, which are identical to the UK and Australia practices. There are some forms of government support specified as key drivers under VFM Japanese model including interest free loan from the government finance institution and tax measures.

5.4 VFM in Malaysia for PFI Projects

In the context of Malaysia, a PSC approach is used to measure VFM for PFI projects. The tender bids will be benchmarked against the PSCs which remain confidential. It is likely that the Public Works Department will play a key role in drawing up the PSCs for most of the standard construction projects. The formation of PSC is fundamental to the success of PFI projects and appears to be used as a test to achieve VFM. For genuine efficiency and value for money, it is essential to ensure that contracts are awarded on the basis of capability and ability of the PFI contractor. Typically, the involvement of government is essential in particular, at project planning stage. A set of performance standard is incorporated, while modes of payment are also stipulated. Nevertheless, the establishment of a PSC guideline with regards to VFM for PFI contracts is yet to be established (Jayaseelan and Tan, 2007). This is vital for the fact that PSC is subjected to limitations, while VFM is a problematic concept which is hard to operationalise in PFI contracts.

6. A Proposed Framework of VFM Assessment for PFI Projects in Malaysia

Based on the preliminary literature review and the understanding of VFM assessment models adopted by various countries (the UK, Australia and Japan), a proposed framework for VFM assessment is developed as illustrated in Figure 1. In this framework, VFM assessment is designed to embrace the four phases of project life cycle (programme, project, procurement, and project construction phases). The implementation of VFM across project phases is needed to achieve project effectiveness (optimal risk sharing, cost saving, time saving, quality improvement, clients' satisfaction and benefits to the public). The three assessment criteria (affordability, risk sharing and competition) are prime factors for the assessment to begin with. In addition, a VFM assessment tool by using PSC is used as a benchmark against the tender bids before and after bidding.

Further, the procuring process should consider the evaluation factors from the quantitative (financial elements), qualitative elements (i.e., bidder's background, design etc), non-financial benefit analysis (social obligation) and long term analysis to be formulated into a robust assessment approach. The inclusion of social effect is based on the high commitment of the government on its role as a caretaker of the public at large and the social obligation that are naturally attached to it. VFM drivers in terms of supports from the Government and financial institutions and contract flexibility (Pitt et al., 2006 and Nisar, 2007) are seen to be vital to achieve the ultimate effectiveness of project outcome. The remarkable modification of this framework from those suggested by Grimsey and Lewis (2005), Pitt et al. (2006), Partnership Victoria (2006), Mori (2006) and Kajita (2007) is that it recognises the need for the client to assess VFM at various project phases. A more extensive empirical study on the proposed framework is proposed for future work, in particular to validate the effectiveness of the proposed framework.

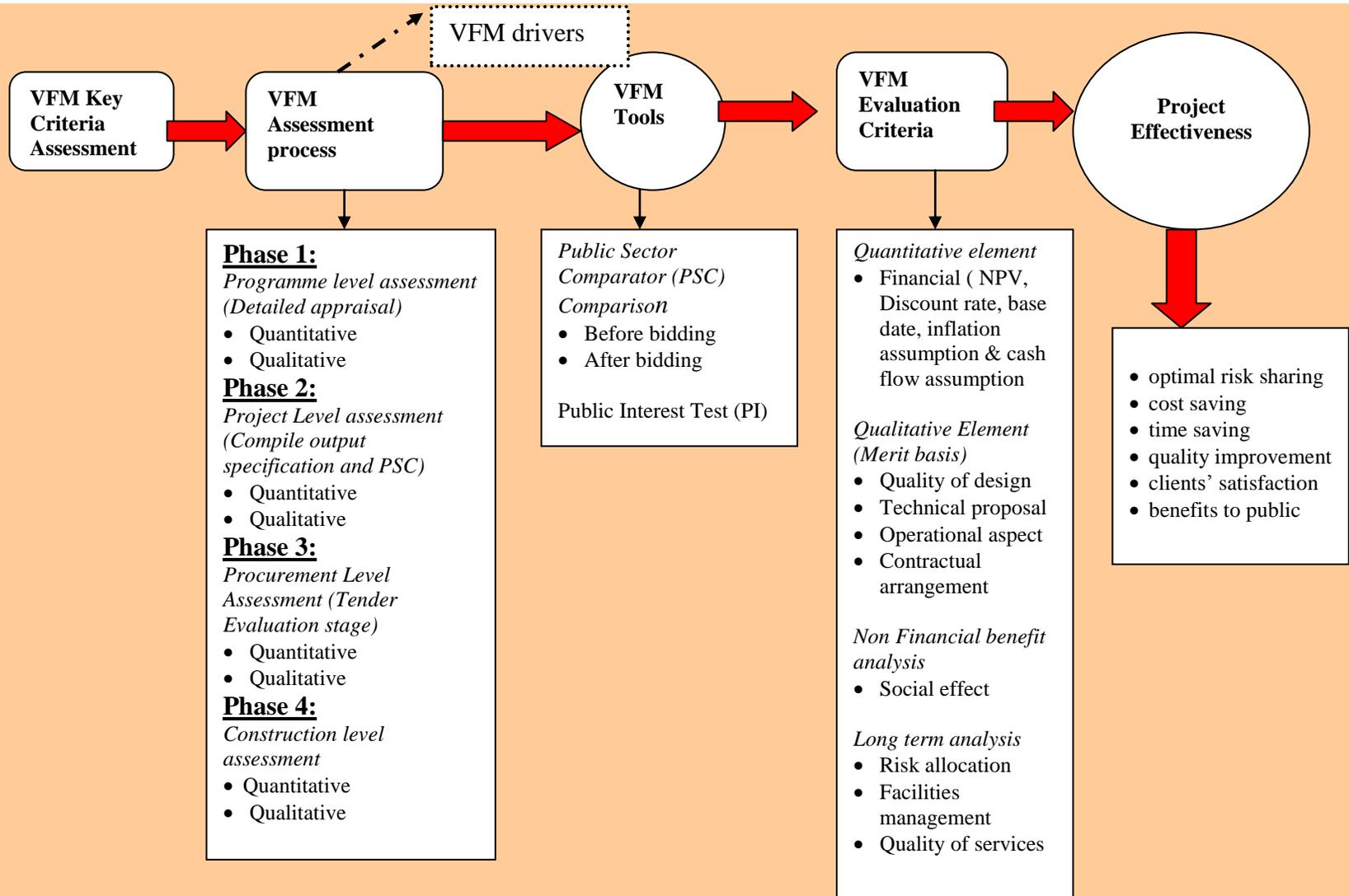


Figure 1: A conceptual framework of VFM assessment for PFI projects across project phases

7. Conclusion

This paper attempts to review, synthesize and develop a framework of VFM assessment for PFI projects in Malaysia based on the notions of VFM assessment models from the UK, Australia and Japan. It also attempts to investigate the components of PSC as a tool to evaluate VFM. It appears that the majority of the countries are using PSC mechanism as VFM assessment tool in procurement, evaluation and quantification risks. However, there is no one best way of establishing VFM for the fact that assessment of VFM in a PFI contract is usually hindered by the lack of transparency and public accountability in the processes. Therefore, it is imperative for the Malaysian Government to establish a PSC guideline in the evaluation of VFM for PFI projects at various project phases. Due to high social obligation placed on PFI projects in Malaysia, the proposed framework of VFM assessment for PFI in Malaysia also includes non-financial benefit analysis as integral components of the VFM evaluation criteria.

The research presented in this paper is part of an ongoing PhD research at the Faculty of Architecture, Planning and Surveying, UiTM to develop a framework of VFM assessment for PPP projects. The results of the study would provide an insight into the Malaysian construction project development and forms the basis of a valuable guideline, especially to public and private sectors in Malaysia.

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CRITICAL FACTORS THAT MAKE KNOWLEDGE TRANSFER SUCCESSFUL IN PFI ENVIRONMENTS

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Abstract

Although PPP/PFI projects play an important role in the UK construction industry, there is still considerable debate on several aspects concerning PFI. The complexity of the PPP/PFI structure, different number of stages involved and the length of the PPP/PFI project (usually it spans across 25 – 40 years) make it difficult for the parties involved to make it successful and profitable. One way of improving PFI performance is to transfer knowledge from previous projects on to future projects and to other PFI teams. The main aim of the paper is, therefore, to study the process of knowledge transfer in PFI environments. The findings presented in the paper mainly focus on identifying the factors that can make process of knowledge transfer successful in PFI projects. This is achieved using a robust case study methodology. Altogether four case studies were conducted using semi-structured interviews. A broad range of factors that can influence the success of knowledge transfer was identified from the case study findings. Out of the range of factors, avoiding cost overruns, avoiding time overruns, communication and collaboration and strategic planning were identified as critical in all four case studies. Further analysis of these factors illustrated notable relationships between and within each of the CSFs, which meant that all CSFs, either directly or indirectly, influence one another. This gives the notion the coordination between each of these CSFs (also the non-critical factors) is very significant to make a knowledge transfer successful.

Keywords: Communication, collaboration, critical success factors, knowledge transfer, public finance initiatives

1. Introduction

Although PPP/PFI projects play an important role in the UK construction industry, there is still considerable debate on several aspects concerning PFI. The complexity of the PPP/PFI structure, different number of stages involved and the length of the PPP/PFI project (usually it spans across 25 – 40 years) make it difficult for the parties involved to make it successful and profitable, unless they have a clear set of strategies to collaborate and communicate with each other. One of the strategies could be to introduce appropriate mechanisms for capturing and transferring expertise and lessons learned in order to facilitate innovation. As Carrillo et al. (2006) affirm both government and the construction industry recognise that there is tremendous scope for improvement in the

execution of PFI projects. One way of improving PFI performance is to transfer knowledge from previous projects on to future projects and to other PFI teams. Since PFI is a costly commitment, any mistake made because of lack of current knowledge can be critical for the length of the service period of the contract. Therefore, as Carrillo *et al.* (2006) suggests, knowledge transfer will, as the PFI matures, make the organisations better equipped to cope with the increased and more complex demands expected from PFI projects. Knowledge transfer could also be an effective mechanism for mitigating risks, a key issue in an increasingly complex PFI environment.

The main aim of the paper is to study the process of knowledge transfer in PFI environments. This paper is based on an empirical research, which was set up to investigate the process of knowledge transfer in PFI environments. The research is titled as ‘**Procurement for Innovation and Knowledge Transfer (ProFIK)**’. The findings presented in the paper mainly focus on identifying the factors that can make process of knowledge transfer successful in PFI projects.

2. Knowledge Transfer and Critical Success Factors

The transfer of knowledge within organisations is widely considered to be a key to effective management of knowledge, and an enabler of the innovation that is necessary to enhance organisational capability (Nonaka, 1998). However, successful knowledge transfer is considered difficult (Nonaka, 1998); and the sharing of knowledge is perceived as risking a loss of power by some individuals (Scmetz, 2002; as cited in Cranefield and Yoong, 2005). For these reasons, organisations need to actively work to create a knowledge sharing culture, and to facilitate practices and processes that promote effective knowledge transfer. In order to do this, it is necessary for them to understand the factors that are critical for a knowledge transfer process that apply to their organisational context (Cranefield and Yoong, 2005).

According to Jefferies (2006), 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. Rowlinson (1999) states that CSFs are those fundamental issues inherent in the project, which must be maintained in order for team working to take place in an efficient and effective manner. They require day-to-day attention and operate throughout the life of the project (Jefferies, 2006). Saraph *et al.* (1989) viewed them as those critical areas of managerial planning and action that must be practised in order to achieve effectiveness. In terms of knowledge transfer, as Wong (2005) describes, CSFs can be viewed as those activities and practices that should be addressed in order to ensure its successful implementation. These practices would either need to be nurtured if they already existed or be developed if they were still not in place. Based on the above definition, CSFs in this study are treated as those internal factors which are controllable by an organisation. External factors such as environmental influences are not taken into account since organisations have little control over them when implementing knowledge transfer (Wong, 2005).

There can be a number of factors that can influence the success of knowledge transfer in general. For example, an attractive approach to foster knowledge transfer and knowledge sharing is to develop communities of practice within companies (Disterer, 2001). As

Wong (2005) states, training and education is another important consideration for successful knowledge transfer. In a basic sense, organisational members need to be aware of the needs to manage knowledge and to recognise it as a key resource for the viability of a company. Another central aspect for knowledge transfer is the development of an appropriate organisational infrastructure. This implies establishing a set of roles and teams to perform knowledge-related tasks (Davenport *et al.*, 1998). One of the other means for driving the success of knowledge transfer related activities is to have a clear and well-planned strategy. This provides the foundation for how an organisation can deploy its capabilities and resources to achieve its KM goals (Liebowitz, 1999). Mutual trust is also necessary among all organization members to openly share. Trust results in common expectations of reliability, consistency, and plausibility. Trust reduces the fear that others will act opportunistically (Disterer, 2001). Likewise, a broad range of critical factors that can lead to the success of a knowledge transfer exercise has been mentioned in the literature. Concern and trust (Davenport and Prusak, 1998; Disterer, 2001), Management and leadership (Davenport *et al.*, 1998; Disterer, 2001; Holsapple and Joshi, 2000; Liebowitz, 1999; Skyrme and Amidon, 1997), Rewards and incentives (Davenport *et al.*, 1998; Disterer, 2001; Liebowitz, 1999), to name a few.

Apart from the factors described above, a different type of CSFs can also be found in the literature. These factors are embedded in the knowledge and/or in the knowledge transfer process itself and, therefore, are highly 'knowledge specific' and incline more towards theoretical aspects of knowledge transfer. Knowledge distance (Cummings and Teng, 2003; Libing and Rong, 2007) is one such example. According to Libing and Rong (2007), when there is knowledge distance between the knowledge source and the knowledge receiver, it will obviously increase steps of learning and difficulty of knowledge transfer since the knowledge source is unable to understand the knowledge receiver's demands and barriers in the knowledge transfer process. Few other examples for 'knowledge specific' critical factors are: Absorptive capacity of the recipient (Cohen and Levinthal, 1990; Khamseh and Jolly, 2008), Retentive capacity (Cohen and Levinthal, 1990), Knowledge articulability (Cummings and Teng, 2003), and Knowledge transferability (Libing and Rong, 2007).

Similarly, there are many research studies that present different critical success factors affecting knowledge transfer. Nevertheless, what should not be forgotten here is any of the factors mentioned above vary according to different settings, from industry to industry (Kobetich, 1987), according to different strategy types (Jenster, 1985) and even according to the types and personal traits of the people involved in the knowledge transfer process (den Hertog and Brouwer, 2001). Therefore, the idea of this paper is to identify the CSFs of knowledge transfer in PFI settings in construction.

3. Empirical Study and Analysis

The findings presented in this paper are based on a case study approach. The sample for the case studies was chosen from on-going Private Finance Initiatives (PFI). Altogether four case studies were chosen and semi-structured interviews were carried out as the mode of data collection (refer to Table 1 to identify the type of projects chosen and their current status). The four case studies were chosen from different types of PFI projects, i.e. hospital, military, school and transport. All four cases were some of the largest PFI

projects in the UK and the total duration of projects span across 30 – 40 years. Two of the case studies were at the maintenance stage whilst construction was still on-going in the other two cases. The SPV of the PFI schemes of the four cases generally consisted of a main contractor, an FM contractor and financial institutions (i.e. banks).

Case studies from the four PFI projects inevitably yielded a large amount of data, which was arranged into segments of material, based on the interview schedule and an organising system derived from the issues raised in the interviews. Due to the size of data collected, it was relatively easy to code data using a computer based method (NVivo - QSR7) rather than using a manual method.

Content analysis was used as the method of data analysis during the case study approach. During the content analysis of data, initially, any factor that can affect a knowledge transfer process, either positively or negatively, were identified. Using these factors, the critical factors that influence the success of knowledge transfer were then deduced. Herein, the use of 'content analysis' proved to be more helpful to identify the 'criticality' of the factors rather than just using 'textual analysis'. The content analysis method offers a more rigorous approach based on the clarification and formalisation of how the text is read and codified, according to preconceived or built in categories (Belerson, 1954), whereas the purpose of textual data analysis is to analyse the text as a set of words, to make a statistic of their (i.e. the set of words) utterance and of their relationship within the text (Moscarola, 2002).

During content analysis of data, if an interviewee has talked about an issue more number of times compared to other issues, it was identified 'critical'. However, irrespective of the frequency of statements, if an interviewee has specifically mentioned a factor as 'critical', then it was straight away taken as a CSF. To ensure 'reliability' of these, interviewees' confirmation on overall findings was taken by sending a summary of the results to them.

As the case study findings reveal, there are several critical factors that make a knowledge transfer process successful (Table 1: Caption). Interestingly, none of the factors identified in Table 1 appear to be highly 'knowledge specific'. The case study participants' lack of unawareness of theoretical aspects of 'knowledge' may be a reason for this. According to Table 1, altogether, 15 success factors were identified as critical for knowledge transfer in PFI. Even though the interview participants have mentioned PFI specific factors such as 'avoiding risks involved in the PFI scheme', 'partnering arrangement of the SPV' and 'long term nature of the project' as factors that could influence a knowledge transfer process, results of the in-depth analysis did not portray them as 'critical'. Therefore, of the 15 critical factors, only one was related specifically to the PFI context. Therefore, the CSFs identified above can easily be generalised to other types of procurement systems in construction as well.

Amongst the 15 factors, four factors were unanimously identified as 'critical' in all four case studies. They are: avoiding cost overruns; avoiding time overruns; communication and collaboration; and strategic planning. Following quotes taken from the interviews explain the importance of the aforementioned four factors:

"When it comes to deciding things we sometimes have to say, well hang on, the budget does not permit us to do that. It (knowledge transfer) may be a good idea, but

we have to see whether it is within our cost plan? The same thing goes to our work programme, no matter how good the idea is, if it delays our work, then sorry it's a No No, especially because we have penalties for any kind of delays. "

Project Manager, Contractor – Case Study2

"We have multidisciplinary teams in this PFI, or in any PFI I should say. So there are all engineers and architects sitting together. But one thing for sure is you can't assume things are going smooth because they are all sitting together. We have to make sure they are communicating. You do have to bring them together often and have regular meetings to get their views and to know what is going on in the project..."

Project Coordinator – Case Study 1

"Every process you have to plan strategically... we have to spot everything very early on, we have to decide what we are going to do at very early stages.... and you think of different ways and try to weigh the pros and cons like you can do this way because of X, Y, Z and you cannot because of these.."

Project manager – Case Study4

Table 1: Critical success factors for knowledge transfer in PFI

Critical Success Factors	CS1	CS2	CS3	CS4
Avoid cost overruns	✓	✓	✓	✓
Avoid time overruns	✓	✓	✓	✓
Communication and collaboration	✓	✓	✓	✓
Strategic planning	✓	✓	✓	✓
Win-win situation for all parties involved	-	✓	✓	✓
Achieve already set quality targets	✓	✓	-	-
Support from the others partners in the PFI	-	-	-	✓
Support from the client	-	-	-	✓
Client satisfaction		✓		
Meet requirements set out in the legislations	-	✓	-	-
Achieve required project specifications	-	-	-	✓
Adopt tried and test techniques	-	-	✓	-
Good judgement and evaluation	-	-	✓	-
Identify benefits that are worth risking	-	-	✓	-
Evaluate all aspects of an issue (commercial, political, technical, etc)	-	-	-	✓

The importance of the aforementioned factors has also been mentioned widely in construction and knowledge transfer related literature. For instance, there has been a wealth of research discussing the significance of avoiding time and cost overruns in construction in general (Bromilow *et al.* 1988; Chan & Kumaraswamy, 1995; Majid & McCaffer, 1998; Morris & Hough, 1989; Nkado, 1995).

Further analysis of the CSFs uncovered that the CSFs, either directly or indirectly, influence one another. This was evident from separate cognitive maps developed for all of the CSFs based on the case study data. The cognitive maps showed notable relationships

between and within each of the factors (Figure 1: Caption, Figure 2: Caption). According to Figures 1 and 2, 'strategic planning' and 'communication and collaboration' relate to many of the other factors such as 'win-win situation for all involved', 'client satisfaction', 'support from the client', 'support from other partners in the PFI', 'identify benefits that are worth risking' and evaluate all issues', etc. This gives the notion that identification of CSFs and development of suitable settings to improve CSFs is not sufficient to make a knowledge transfer successful. The coordination between each of these CSFs (also the non-critical factors) is also significant to make it happen. This was also affirmed by one of the interviewees:

"Coordination is very critical. It is like a clock actually... there are certain big cogs, and there are smaller cogs... every cog has to be turning on the right ways for the clock to work properly.... if one tiny cog breaks down, it doesn't matter how well the others are working, the clock isn't going to work."

Project Manager – Case Study 3

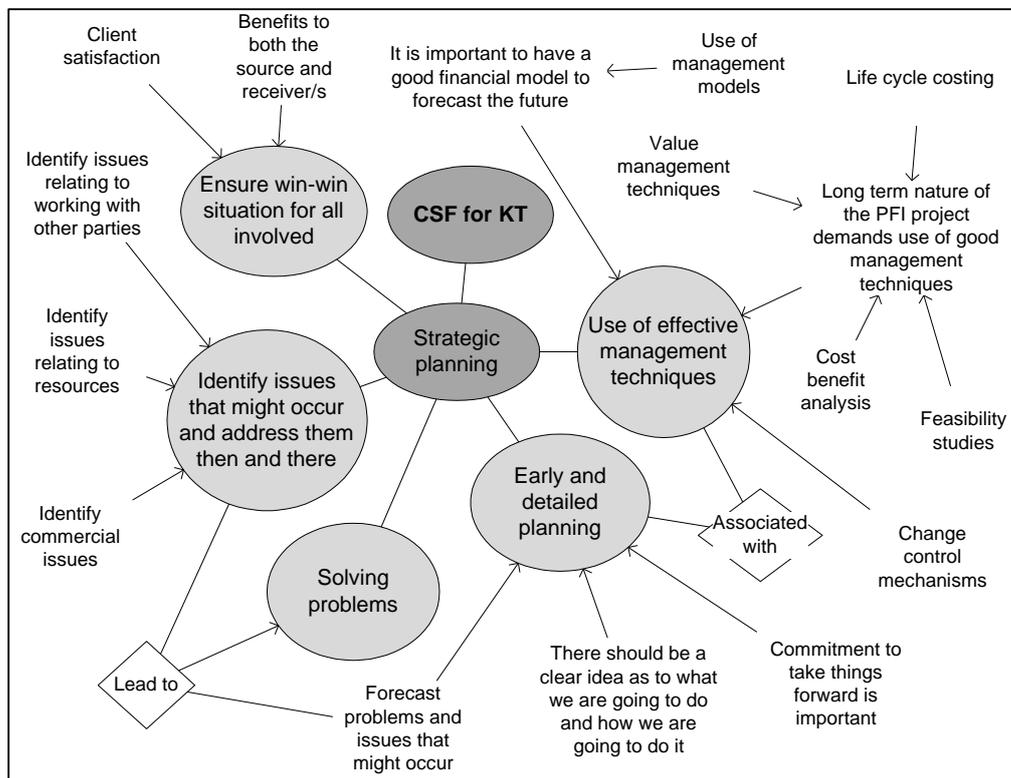


Figure 1: Cognitive map for the critical success factor 'strategic planning'

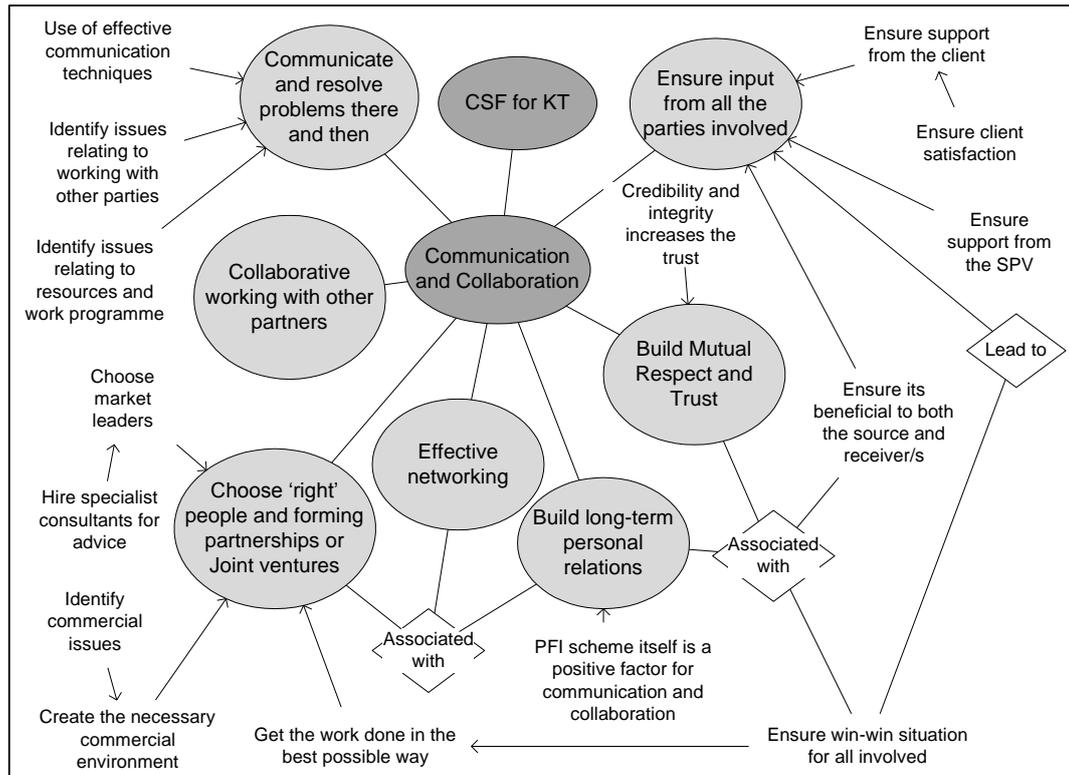


Figure 2: Cognitive map for the critical success factor ‘communication and collaboration’

4. Discussions and Conclusions

Although organisations in PFI projects can realise remarkable benefits by transferring knowledge from one unit to another (as mentioned above) successful knowledge transfer can be difficult to achieve. A key to understanding the success of a knowledge transfer process also depends on the identification of factors that could make an impact on the process. Ignorance and oversight of the necessary important factors will likely hinder an organisation’s effort to realise its full benefit.

A broad range of factors (precisely 15 CSFs) that can influence the success of knowledge transfer was identified from the case study findings. Even though the interview participants have mentioned PFI specific factors such as ‘avoiding risks involved in the PFI scheme’, ‘partnering arrangement of the SPV’ and ‘long term nature of the project’ as factors that could influence a knowledge transfer process, results of the in-depth analysis did not portray them as ‘critical’. Therefore, of the 15 critical factors, only one was related specifically to the PFI context. Therefore, the CSFs identified above can easily be generalised to other types of procurement systems in construction as well.

Out of the 15 CSFs, four factors were unanimously identified as critical in all four case studies. They are: avoiding cost overruns, avoiding time overruns, communication and collaboration and strategic planning. Further analysis of these CSFs based on the development of separate cognitive maps uncovered another significant finding. The cognitive maps showed notable relationships between and within each of the CSFs, which

meant that all CSFs, either directly or indirectly, influence one another. This gives the notion that identification of CSFs and development of suitable settings to improve CSFs is not sufficient to make a knowledge transfer successful. The coordination between each of these CSFs (also the non-critical factors) is also significant to make it happen. Failing to do so, will eventually lead to the breakdown of knowledge transfer.

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PUBLIC PRIVATE PARTNERSHIPS: A STRATEGIC PARTNERING APPROACH

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Abstract

Governments' principle arguments in favor of Public Private Partnerships (PPPs) are the achievement of value for money through the transfer of risks to the private sector and the leverage of public funds using private capitals. While PPPs have demonstrated benefits, there also have been criticisms. Mixed judgments concerning their feasibility have surfaced as the current global financial situation has resulted in reported setbacks in PPP progress. Changes in the economic situation call for research of more suitable PPP paradigms. In this preliminary study, the public-private partnering structure in the lieu of the new economic context is analyzed and the potential of mutual benefits of the partnership is re-considered. As a result, a strategic partnering approach is proposed. To this end, a framework methodology is presented, which employs well established business strategy tools (PEST and SWOT analysis) combined with theory on strategic alliances. The proposed methodology is considered as an additional tool to evaluate the feasibility of a PPP for all key parties involved (i.e. the public sector, construction companies and lenders). A demonstrative application is carried out on the transport sector with respect to the current credit crunch. Finally, possible improvements on the methodology are discussed.

Keywords: PPP, partnerships, strategic alliances, SWOT analysis, PEST analysis

1. Introduction

A Partnership is a dynamic relationship among diverse actors, based on mutually agreed objectives, pursued through a shared understanding of the most rational division of labor on the respective comparative advantages of each partner (Brinkerhoff, 2002). The definition compared to Public Private Partnerships (PPPs) bears analogies and shortcomings. The public and private sector are "diverse actors" contractually bound to deliver "mutually agreed objectives". Value for money for the public sector (a key to the political and social acceptance of the scheme) is achieved through the exploitation of private financing, management skills and risk transfer (Grimsey and Lewis, 2005; Akintoye et al., 2003; Debande, 2002). Two PPP approaches have been widely used by governments for the development of infrastructure systems: a finance-based approach that aims to use private financing to satisfy infrastructure needs, and a service-based approach that aims to optimize the time and cost efficiencies in service delivery (Aziz, 2007). For the private sector, the undertaking has to demonstrate acceptable financial returns. Hence, a PPP project is seen as a contractual transaction incorporating the respective costs of an

incomplete contract and setting the grounds for potential opportunistic behavior (Martimort and Pouyet, 2008; Maskin and Tirole, 1999; Rouboutsos, 2008). This approach limits the benefits of a PPP, as it is seen as purely from a transaction point of view. Evidence of this shortcoming is the fact that the current global economic crisis, along with its unordinary credit crunch, has had a negative impact on PPP progress. In addition, it also indicates the limited emphasis that has been placed on the “partnership” term per se, neglecting the advantages that a performing partnership may bring to the project and its participants, respectively.

To this end and given the need to focus on the current potential of PPPs and the whether they constitute under the current economic situation a sustainable alternative for both the private and public sectors, a framework methodology has been devised and is proposed herewith. Its initial scope is to identify the existence of perquisites for the formation of a strategic alliance between the public and the private sector, therefore supporting the potential of a PPP. When applied to a particular project, the methodology may be used to identify the candidate most suitable to form a partnership with the public contracting authority. The framework methodology, presented in the following section, stems from strategic alliance theory, and exploits well established business strategy tools. An illustrative case study of the transport sector vis-à-vis the credit crunch is made in the third section to demonstrate the applicability of the methodology. Finally, conclusions on the concept, the methodology and possible advances are discussed at the end.

2. Partnership Potential Methodology

In order to identify the Partnership potential, PPP project partners may be analyzed with respect to their individual and mutual strategic interest in an undertaking. Theory on alliances is considered to be relevant in this endeavor as an alliance can be defined as a working partnership in which there is mutual recognition and understanding that the success of each party depends on the other. A number of theories and models have been proposed to describe the emergence and operation of strategic alliances. These include transaction cost economics, game theory, the strategic behavior model, the strategic decision model, social exchange theory, the power dependence theory as reviewed in Gray and Wood (1991) and Smith et al (1995) and more recently the resource-based theory as proposed by Das and Teng (2000). Transaction economics is the dominant theory and has also been used to describe PPPs, however it falls short in explaining the success of alliances when internalization (example acquisitions) is more cost efficient but constrains of various kinds prohibit full internalization (Das and Teng, 2000). This would, as well, describe a PPP. The resource based theory suggests two motives for the formation of strategic alliances: (1) gaining access to additional resources possessed by others (e.g. in PPPs the public sector aims at accessing additional funds and managerial expertise) and (2) retaining one’s own resources and identity (e.g. in PPPs in the current financial situation the private sector may wish to retain experienced personnel etc.). In both cases, the alliance is based on the expectation that the result of the alliance will produce an outcome far greater than anything that each party could produce independently. The pooled advantages can stem from each party’s strengths compensating from each other weaknesses or from amplifying or enhancing their combined strengths. Hence, in brief, an alliance or partnership will tend to perform when:

1. Goals are aligned with clear advantages for all parties
2. The alliance structure/ partnership framework/ contractual agreement builds on the assets of potential partners
3. Capacity is enhanced by compensating for each party's weaknesses

In order to identify items (2) and (3) above for the key parties involved in a PPP (i.e. the public sector, the private sector and the lenders) a methodology was devised based on the principal tool used in strategic analysis, the SWOT (Strengths – Weaknesses – Opportunities- Threats) analysis. As in typical strategic analysis, the PEST (Political, Economic, Social, and Technological) analysis was employed to state the overall potential of the endeavor. Hence, the framework methodology schematically shown in figure 1:

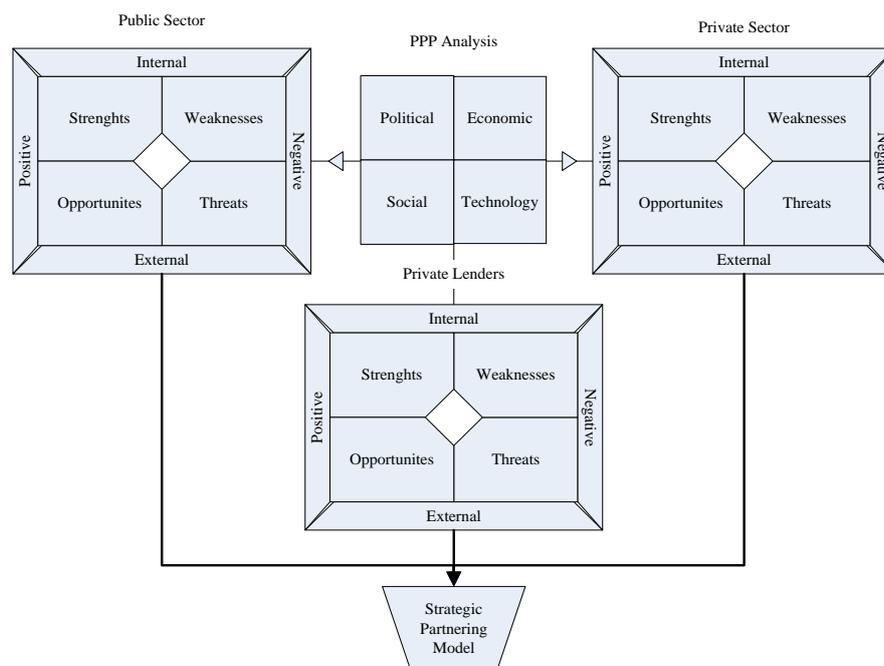


Figure 1: Methodological framework

The framework may have multiple applications. It may be used to identify the potential in specific sectors by governments, to estimate the change in potential (as in the illustrative case study presented herewith following), to select candidates in a PPP procurement procedure, to include clauses in a PPP contract which would enhance the potential of a successful partnership. Its main aim is to identify the strategic issues for each party individually and in partnership. The strategic analysis tools included in the framework are well known and may be easily applied or enhanced as presented following.

PEST Analysis: The PEST - Political, Economic, Social, and Technological - analysis describes a framework of macro-environmental factors used in the environmental scanning component of strategic management. It is widely considered to be a useful strategic tool for understanding market growth or decline, business position, potential and direction for operations. Factors included in each sector of analysis may be weighted or

presented hierarchically in order to represent their respective importance. However, this remains a qualitative tool and static in the sense that it does not reflect change or ability to benchmark against the status quo. In order to address this element, the variables of past/current and current/future may be introduced to the analysis.

Key Players SWOT Analysis: Each of the key participating parties/players, i.e. the public sector, the private sector – relevant business (eg. construction companies, specialized operators etc.) and the lenders seek to materialize different principle goals. Simultaneously, all parties seek to share and minimize risk in such a way so as to achieve minimum exposure through the contractual agreement(s). The use of the SWOT – Strengths, Weaknesses, Opportunities and Threats - weighted analysis is proposed to analyze each key participant’s position towards the project(s) based on the findings of the PEST analysis. As in the PEST analysis described before, the proposed SWOT analysis may be equally adapted to take into account and map two situations the current/future (the same as in the PEST Analysis) and the “potential future”.

Partnering Potential: The above analysis contributes to the identification of the key factors that: (1) justify the potential of a specific partnership or (2) justify the continuing interest for PPPs in a specific sector or (3) support the selection of a candidate in a procurement procedure or (4) should be included in the partnership agreement (PPP contract) in order to secure performance. The principle idea is to identify or create/develop a win-win situation where through the overall goal, which in this situation is the development/improvement of public infrastructure or service; player goals including secondary goals are met. The combination of the positive aspects in the key parties SWOT analysis allows for incorporation of all positive aspects to be compared and joint in order to develop on the assets each party may bring to the partnership. Finally, in order to enhance the capacity to implement a partnership the basic items that must be addressed are those that figure under “Weaknesses” and “Threats”.

The methodology as proposed at present may use the brainstorming technique to identify items in the PEST and SWOT analysis. It can be used in a purely qualitative approach to suggest assets that may be combined and capacities that may be enhanced by compensating for weaknesses and threats. The introduction of scores and their weights for the identified items of the PEST and SWOT analysis may provide the grounds for a more quantitative approach. The brainstorming technique applied to a focus group of experts, or a Delphi or a questionnaire survey at various levels of sophistication (for example with the application of fuzzy analysis and the analytical hierarchy process) may be used in anticipation of varying levels of accuracy in the obtained estimates of partnering potential.

However, it is estimated that the devised methodology should be used with levels of accuracy dependent on the particular application or need. For example when applied to a procurement process, candidates may be requested to produce their SWOT analysis vis-à-vis the PEST analysis of the project to be compared to the SWOT analysis of the public contracting authority and the lenders. In contrast, a government seeking to establish the feasibility and the advantages of a PPP in a particular sector under particular socio-economic conditions would vouch for a quantitative approach based on a large scale questionnaire survey. The construction of the questionnaire may be based on a preliminary application of the methodology through small scale brainstorming exercise, in

order to identify possible outcomes. The illustrative case study in the following section constitutes such an attempt for the transport sector carried out by the authors.

3. Case Study: Transport Sector PPPs and the Credit Crunch

Based on statistics, the transport sector has been the most favoured by the PPP scheme (DLA Piper, 2007; HM Treasury site; EIB, 2004). Investments in the transport sector bear multiple benefits: they support economic development by facilitating mobility and reducing the cost of travel (see Levy (2008) for USA statistics). However, they involve large sunk costs; the life of these investments is in the 50-year range; in many cases transport infrastructure proceeds demand rather than serves it. Enhancing the “user pays” principle, concession toll roads have been favored, as this PPP model was, in general, well suited. The present economic crisis brings about two major problems to PPPs in the transport sector: (1) higher borrowing costs and an inability to syndicate debt between banks and (2) reduced demand for mobility. Hence, two principle risks have manifested: financial and revenue risks. This constitutes the transport sector an interesting test bed for the proposed methodology.

When considering the transport sector and the three key parties involved in a PPP arrangement, each party’s goals have to be stated. Table 1 lists the perceived goals/priorities under the current situation. Tables 2 to 6 represent findings of the PEST and SWOT analysis carried out. The factors identified were retrieved from literature on PPPs and complimented through brainstorming. The values, on a Likert scale of 1 to 5, assigned to each factor were derived through a brainstorming exercise, describing perceived past/current (PC), current/future or potential future (CF or PF) estimates, their change (CF or PF - PC), the relative importance of the factor (weight) and the overall rated score.

Table 1: Key party goals vis-à-vis PPPs in the transport sector

Public Sector	Private Sector	Lenders
1. Greater response to transport infrastructure needs	1. Avoid folding	1. Safe investments
2. Provision of support to the economy by initiating productive market activities	2. Maintain returns on equity (ROE) in the range 12-15%.	2. Receive interest rates in the order of 8-10%
3. Combating unemployment on all levels of the workforce.	3. Minimize risk	3. Minimize risk

Notably, the parties have complementary goals (Table 1) since the private sector and the lenders want to develop/pursue their business the public sector seeks to strengthen the economy and secure employment opportunities. The PEST analysis indicates that on a macroeconomic level there is a continuing support for PPP projects in transportation. Driving forces are principally political and, hence, any lesser support would lead to the dismissal of efforts in this sector. The review of the obtained SWOT analysis for each party makes it evident that the present situation corresponds to greater advantages for the public sector while the private sector and the lenders find marginal, if any, advantages.

Assets to be combined are “strengths” and “opportunities” which have remained the same, if not reinforced by the public sector seeking even more funds, the private sector looking for more work to avoid folding and the lenders searching for safer investments. It is interesting to note that public sector “strengths”, which have been compromised due to the volatility of the economic situation, are enhanced “strengths” for the private sector and the lenders, while “opportunities” for the public sector are described as “strengths” in the SWOT analysis of the private sector and the lenders. Along the same lines, the public sector holds one very important “Strength”: that of legislator/regulator; this, in combination with the public sector’s “ability to absorb risk”, proves to be the greatest asset as it bears the potential of creating a safe investment environment.

Enhancing capacity by compensating for each others weaknesses may be the key driving force of the partnership under the current situation. The fundamental “Threats” that figure under all parties are those connected to financial and revenue risks. Here, the public sector, as the partner most capable to absorb risks (see Strengths) has to foresee which arrangement may reduce these risks. Revenue risks have been addressed in applied PPP models in the form of either availability fees (fixed price contracts), or through securities fees (flat rate contracts) or subsidies. However, one of the “weaknesses” the public sector has to address is poor public opinion, which leads to the need to foresee levels of safeguarding against revenue risk. The reduction of financial risk provides an opportunity to the public sector to materialize an “opportunity factor”: that of public sector entrepreneurship, by which the public sector may enter into a financial partnership with the private sector by offering part of the equity gap and receiving respective returns on its equity. In this case there might be a public sector “ROE”, perhaps smaller than that shot by the private sector or the lenders. At this point the public sector may have to exercise its legislative “strength” to regulate the anticipated returns of all parties on a PPP transport project.

Table 2: PEST scoring board for PPP transport projects

Factor	PC	CF	CF-PC	Weight	Rated Score	Factor	PC	CF	CF-PC	Weight	Rated Score
Political						Technology					
Government support	4	5	1	30%	0.3	Technology innovation	4	4	0	10%	0
Political stability	4	4	0	20%	0	Financial innovation	4	5	1	10%	0.1
Transport infrastructure needs	4	5	1	30%	0.3	Performance output specifications	4	4	0	20%	0
Legislation	2	4	2	20%	0.4	Life cycle costing	4	5	1	30%	0.1
Public sector entrepreneurship	0	3	3	10%	0.3	Risk transfer	4	4	0	<u>30%</u>	<u>0</u>
Environmental concerns	1	4	3	<u>10%</u>	<u>0.3</u>	Total				100%	0.2
Total				100%	1.6	Social					
Economic						Employment	4	2	-2	10%	-0.2
Public budgetary constrains	3	4	1	40%	0.4	Procurement transparency	4	4	0	10%	0
Credit availability	4	1	-3	20%	-0.6	Market competition	4	4	0	10%	0
Low Cost of money	4	2	-2	10%	-0.2	Value for money	5	5	0	10%	0
Low Inflation	4	2	-2	5%	-0.1	Quality of service	5	5	0	10%	0
GDP growth	2	0	-2	10%	-0.2	Confidence in private sector competence	4	2	-2	20%	-0.4
Spending power (toll rates)	4	2	-2	5%	-0.1	Transport demand	4	3	-1	10%	-0.1
Investors seeking safe returns	2	5	3	<u>10%</u>	<u>0.3</u>	Public sector entrepreneurship	3	4	1	<u>10%</u>	<u>0.1</u>
Total				100%	0.4	Value of time	4	3	-1	10%	-0.1
						Total				100%	-0.7
Overall											
		Political	1,6	25%	0.4						
		Economic	0,4	30%	0.12						
		Social	-0,7	20%	-0.14						
		Technology	0,2	<u>25%</u>	<u>0.05</u>						
		Total	100		0.43						

Table 3: Public sector SWOT scoring table

Factor	CF	PF	PF-CF	Weight	Rated Score
Strengths					
Ability to absorb risk	3	2	-1	20%	-0.2
Lower interest rates	3	2	-1	40%	-0.4
Legislator/Regulator	4	5	1	<u>40%</u>	<u>0.4</u>
Total				100%	-0.2
Opportunities					
Use of private funds	4	5	1	15%	0.15
Entrepreneurship	3	5	2	10%	0.2
Employment	2	3	1	20%	0.2
GDP growth	0	1	1	10%	0.1
Life cycle costing	5	5	0	5%	0
Technology innovation	4	4	0	5%	0
Financial innovation	5	5	0	5%	0
Performance output specifications	4	4	0	10%	0
Risk transfer	4	4	0	<u>5%</u>	<u>0</u>
Total				100%	0.8
Weaknesses					
Transport infrastr. needs	4	5	1	15%	0.15
Budgetary restrictions	4	3	-1	50%	-0.5
Public Opinion	4	4	0	<u>50%</u>	<u>0</u>
Total				100%	-0.5
Threats					
Inflation	3	2	-2	10%	-0.1
Interest rates	3	4	1	10%	0.1
Revenue risk	3	2	-1	40%	-0.4
Financial Risk	3	2	-1	20%	-0.1
Investors seeking high returns	5	4	-1	<u>20%</u>	<u>-0.2</u>
Total				100%	-0.7

Table 6: Overall SWOT scoring

Strengths	-0,2	positive	-0.2
Opportunities	0,8	positive	0.8
Weaknesses	-0,5	negative	0.5
Threats	-0,7	negative	0.7
Total Public Sector			1.8
<hr/>			
Strengths	0,4	positive	0.4
Opportunities	1,5	positive	1.5
Weaknesses	1,0	negative	-1.0
Threats	1,0	negative	<u>-1.0</u>
Total Private Sector			-0.1
<hr/>			
Strengths	0,7	positive	0.7
Opportunities	1,5	positive	1.5
Weaknesses	1,0	negative	-1.0
Threats	1,0	negative	<u>-1.0</u>
Total Lenders'			0.2

Table 4: Private sector SWOT scoring table

Factor	CF	PF	PF-CF	Weight	Rated Score
Strengths					
Construction & operating risks	4	4	0	20%	0
Life cycle costing	5	5	0	10%	0
Technology innovation	4	4	0	10%	0
Financial innovation	5	5	0	10%	0
Private Equity	4	5	1	20%	0.2
Employment	2	3	1	20%	0.2
Managerial skills	3	3	0	<u>15%</u>	<u>0</u>
Total				100%	0.4
Opportunities					
Investment opportunities	4	5	1	50%	0.5
Avoid folding	3	5	2	<u>50%</u>	<u>1.0</u>
Total				100%	1.5
Weaknesses					
Inability to control revenue risk	4	5	1	50%	0.5
Credit crunch	4	5	1	<u>50%</u>	<u>0.5</u>
Total				100%	1.0
Threats					
Inflation	3	4	1	10%	0.1
Interest rates	3	4	1	10%	0.1
Revenue risk	3	4	1	50%	0.5
Financial Risk	3	4	1	<u>30%</u>	<u>0.3</u>
Total				100%	1.0

Table 5: Lenders' SWOT scoring table

Factor	CF	PF	PF-CF	Weight	Rated Score
Strengths					
Equity	4	5	1	70%	0.7
Monitoring	4	4	0	<u>30%</u>	<u>0</u>
Total				100%	0.7
Opportunities					
Safe Investments	3	5	2	50%	1.0
Business development	4	5	1	<u>50%</u>	<u>0.5</u>
Total				100%	1.5
Weaknesses					
Inability to control revenue risk	4	5	1	50%	0.5
Credit crunch	4	5	1	<u>50%</u>	<u>0.5</u>
Total				100%	1.0
Threats					
Inflation	3	4	1	10%	0.1
Interest rates	3	4	1	10%	0.1
Revenue risk	3	4	1	50%	0.5
Financial Risk	3	4	1	<u>30%</u>	<u>0.3</u>
Total				100%	1.0

Consequently, PPPs may continue to be an alternative for transport sector project delivery. Key risks (financial and revenue) may be addressed by the public sector participating in project financing and project returns. This might limit the scope of PPPs to those anticipated to generate returns.

Finally, the reader should be aware that the intention of this illustrative case study is purely demonstrative and its results, at this stage, represent only the perspective of the authors. More general insights are expected to emerge when the authors will complete the undergoing data collection.

4. Conclusions

A strategic partnering approach is proposed to complement existing methodologies of evaluating the PPP alternative for public infrastructure and service delivery. To this end a methodology exploiting well known strategic decision tools is proposed based on strategic alliance theory. The illustrative case study shows how to apply the proposed methodology to assess the effectiveness of PPP arrangements under the current credit crunch.

Further research in the methodology is required and underway on three levels: (1) the tools used in the framework (for example if improved results would be achieved by substituting the SWOT analysis by a BOCR (Benefits – Opportunities-Costs-Risks) analysis); (2) the ability to investigate failed PPP projects using this methodology and (3) methods of application.

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DEVELOPING A DECISION SUPPORT SYSTEM FOR CONCESSION PERIOD DETERMINATION

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Abstract

A variety of construction and market risks can significantly affect the financial performance of a PPP project. Experience of built-operate-transfer infrastructure projects in Hong Kong has indicated that traditional practices of pre-setting the concession period can lead to financial, social and economic problems. The determination of an appropriate concession period is crucial to the financial viability of a PPP project. This paper introduces an improved concession period determination methodology and a web-based concession period analysis system based on this methodology, with an aim to improve governmental decision-making in this regard.

Keywords: Concession period, decision support system, internet, public private partnership, simulation

1. Introduction

Public-private partnerships (PPPs) are contractual relationships governing a long-term public sector acquisition and private sector provision of public works and services. There are two main partners in PPPs: the public sector client and the private sector concessionaire. A PPP infrastructure project usually involves a large amount of financial capital (equity and debt) to be arranged by the concessionaire to build the facilities associated with the project. This huge capital construction cost will be recovered through revenues from the service/product provided by the project in the concession period defined in the PPP project agreement. A variety of construction and market risks in the concession period can significantly affect the financial performance of a PPP project. Therefore, the determination of an appropriate concession period is crucial to the financial viability of a PPP project. This paper introduces a web-based concession period analysis system (WCPAS) with an aim to improve governmental decision-making in this regard.

2. Experience and Lessons in Hong Kong

Five large build-operate-transfer (BOT) tunnel projects have been developed in Hong Kong since the 1960s. They are Cross Harbour Tunnel (CHT), Eastern Harbour Crossing (EHC), Tate's Cairn Tunnel, Western Harbour Crossing (WHC), and Route 3 Country Park Section (Zhang and Kumaraswamy, 2001).

2.1 Preset Fixed Concession Period

The five BOT tunnels have been going well in general so far. Nonetheless, there are still some financial, economic and social problems. These problems are partly because of the practice of presetting the concession period without sufficient financial and economic justification. In particular, all of the five tunnels have been fixed at the same duration of 30 years even though the physical length, design capacity, traffic demand, construction time, construction cost, complicity of construction, and financial instruments deployed are quite different one tunnel from another. These problems are discussed in the following based on the experience of the three alternative harbor crossings, CHT, EHC and WHC.

2.2 Contrasting Financial Status

The CHT was financially very successful and the concessionaire had obtained huge profits over the concession period. One indicator is that it had paid all debt off within five years of operation whereas it was predicted that the debt would be paid off by a time between the 10th and 19th year of the concession. In contrast, the actual annual toll revenue of the EHC has been less than the predicted values since its opening in 1989 due to the lower-than-expected traffic flow. Two toll increases were implemented in 1998 and 2005, which had improved the financial situation. However, as of the end of 2006, the internal rate of return on equity (IRRE) is only 11.3%, still much lower than the perceived “reasonable” rate of 15-17% (New Hong Kong Tunnel Company Ltd., 2006 and 2007). The financial status of the WHC has been much worse than that was predicted. There has been an annual net revenue shortfall from 1998 to 2007 of the minimum net annual revenue required for the concessionaire to obtain a reasonable IRRE. The total cumulative net revenue shortfall over this period is HK\$4,983 million (Western Harbor Tunnel Company Ltd., 2007). The WHC concessionaire has decided to increase tolls for different categories of vehicles with effect from January 2008 although the Hong Kong Government has urged it to take into account the public interests, affordability and the acceptability in adjusting the tolls.

2.3 Uneven Traffic Distribution

The three harbor crossings compete with one another for users. The traffic distribution among them has been seriously uneven. For example, the 2004 – 2006 three-year average daily traffic (ADT) of the CHT strongly contrasts to that of the EHC and to that of the WHC over the same period. The ADT of the CHT is 123,000 vehicles (36.67% higher than its design ADT) whereas that of the EHC is only 66,000 vehicles (26.67% less than its design ADT) and that of the WHC is only 41,333 vehicles (65.56% less than its design ADT).

2.4 Economic and Social Problems

The uneven traffic distribution creates problems of congestion at the CHT and on its adjacent roads and junctions. In addition, the EHC and WHC have been underutilized. Toll increases at the EHC and WHC have further worsened this situation. These also have caused social problems of public affordability and acceptability, and affected people’s livelihoods. Some legislators even called on the Hong Kong Government to take full

control of all tunnels in the future rather than relying on the private sector, claiming that the toll variation mechanisms of the EHC and WHC have worked against the public interest (Ng, 2005).

3. Concession Period Determination Methodology

3.1 Mathematical Definition of Concession Period

PPPs are a principal-agent maximization problem, in which the principal is the public client and the agent is the concessionaire. As any other principal-agent maximization problem, two constraints need to be satisfied for a PPP project to be successful. One is the participation constraint, which requires that the PPP arrangement allow the concessionaire to obtain a reasonable IRRE. Otherwise, the concessionaire will withdraw from this project and turn to other more profitable opportunities. The other is the incentive compatibility constraint, which requires that the concessionaire act in the interest of the public client in terms of efficient and cost-effective project development and management. This is essentially a public-private win-win principle.

Zhang (2008) provides a mathematical definition of the concession period, which takes into account the financial characteristics of PPP infrastructure projects and the win-win principle:

$$T = T_c + T_o \quad \text{Equation (1)}$$

where T_c , T_o and T should satisfy the following conditions:

$$T_c \leq T_c^{\max} \quad \text{Equation (2)}$$

$$T_o \leq T_o^e \quad \text{Equation (3)}$$

$$R_T = R \quad \text{Equation (4)}$$

where T_c = the construction period of the project; T_o = the operation period; T_c^{\max} = the maximum allowable project completion time; T_o^e = the designed economic operation life of the project; R_T = the IRRE of the concessionaire, which is calculated based on the cash flows over the concession period (T); and R = the reasonable IRRE as agreed on by the client and concessionaire in the bidding and negotiation stage.

3.2 Basic Ideas to Determine Concession Period

According to the above definition, the concession period is divided into two phases, construction period and operation period. The construction period is dependent on the construction durations of various work activities of the project and their schedule logic (e.g., the preceding and following activities of each activity). The basic procedures to determine the construction period are as follows:

1. Developing the work breakdown structure (WBS) of the project, which divides the project into N work activities;
2. Building a schedule network (either activity on node or activity on arrow) based on the WBS;
3. Estimating the construction duration of work activity i , D_i (for $i = 1, 2, \dots, N$);
4. Conducting a schedule analysis using the critical path method (CPM) to determine the construction period.

Assuming that there is no revenue during the construction period (actually this is the usual case), then the operation period is essentially the operation time in which the concessionaire collects an amount of revenues that is just enough for it to obtain a reasonable IRRE. The following are the basic procedures to determine the operation period:

1. Estimating the construction cost of work activity i , C_i (for $i = 1, 2, \dots, N$);
2. Determining the start time (ST_i) and finish time (FT_i) of work activity i (for $i = 1, 2, \dots, N$);
3. Calculating the construction cost of the project in each day of the construction period, PC_j (for $j = 1, 2, \dots, T_c$);
4. Calculating the net present value (NPV) of the total project construction cost:

$$NPV_c = \sum_{j=1}^{T_c} \frac{PC_j}{(1+R)^j};$$

5. Calculating the net cash flow (NCF) in each day of the operation period: $NCF_k = P_k \times Q_k - OM_k$ (for $k = T_c+1, T_c+2, \dots, T_c+T_o$), where P_k, Q_k, OM_k are the daily unit price, market demand, and operation and maintenance cost;
6. Calculating the NPV of the net revenues in the operation period,

$$NPV_o = \sum_{k=T_c+1}^{T_c+T_o} \frac{NCF_k}{(1+R)^k};$$

7. Solving the equation $NPV_o = NPV_c$ to determine the operation period.

3.3 Simulation Approach to Risk Quantification

As discussed in the above, the concession period T is a function of construction variables (C_i, T_i for $i = 1, 2, \dots, N$) and market variables (P_k, Q_k, OM_k for $k = T_c+1, T_c+2, \dots, T_c+T_o$). Construction variables are influenced by factors such as weather conditions, design changes, and fluctuations in labor, material and equipment costs. This is referred to as the construction risk. Market variables are influenced by economic conditions, market competition, inflation, technological advancements, substitute services/products, and change of the public needs. This is referred to as the market risk. To quantify these risks, the Monte Carlo simulation technique is deployed to model the construction and operation processes as stochastic ones that follow certain statistical distributions (e.g., uniform, triangular, normal, trapezoid and exponential).

In each computer iteration, random values of C_i, T_i, P_k, Q_k and OM_k are generated. These random values allow the calculation of T_c, T_o and other variables for this iteration

using the procedures discussed in the above. The statistical distribution of T_c, T_o and other variables can be established by a large number of iterations, and their values at a particular percentile can be derived from these distributions.

4. Web-based Concession Period Analysis System

4.1 Three-tier Structure

A three-tier (user interface, web server and database) structure of the WCPAS is shown in Figure 1. This is briefly discussed in the following:

1. User Interface: This system uses active server pages (ASP) as user interface, which enables users to conduct concession period analysis for their PPP projects. The Web Browser sends http requests to the Web Server, which consequently handles these requests and sends back appropriate responses.
2. Web Server and Application Logic: The application logic stored in the Web Server helps users achieve their objectives based on the basic data stored in the database.
3. System Database: The database stores the day-to-day operations and historical data using a relational database management system, such as Oracle, Microsoft SQL Server, and DB2. The database contains tables, views, functions and stored procedures.

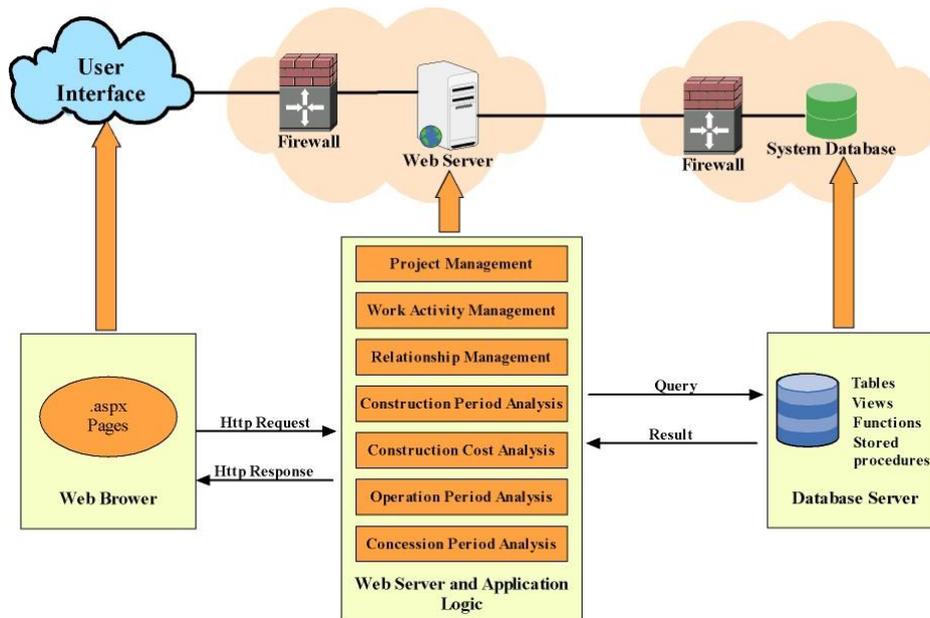


Figure 1: Three-tier structure of the Web-based concession period analysis system

4.2 Sample Screenshots of the WCPAS

Some sample screenshots of the WCPAS are shown in Figures 2-8. Figure 2 is the login interface. Figure 3 is the project information interface, through which users can input and modify project information. Figure 4 is the interface showing the cost and duration of each work activity of a project. D , U , T_g and T_r represent a deterministic value, uniform distribution, triangular distribution and trapezoid distribution, respectively. Figures 5-8 shows the results of the simulation-based concession analysis, including construction period, construction cost, operation period and concession period.

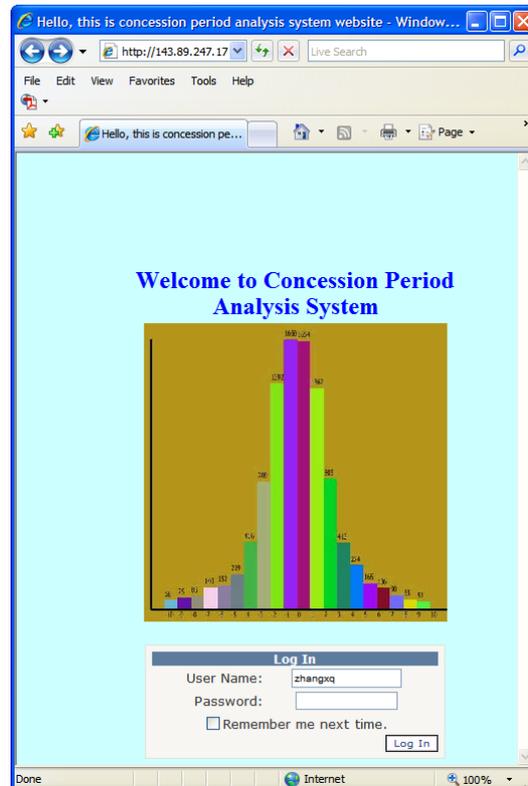


Figure 2: Login interface

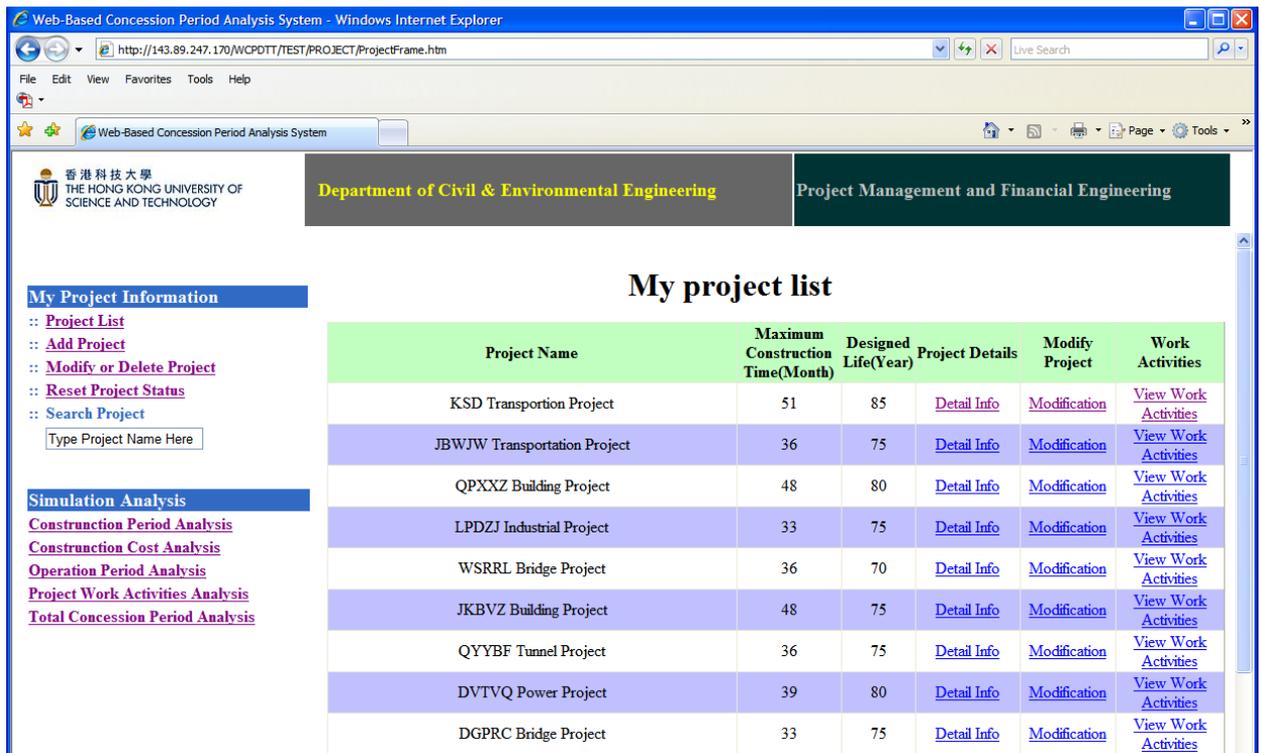


Figure 3: Sample screenshot of project information

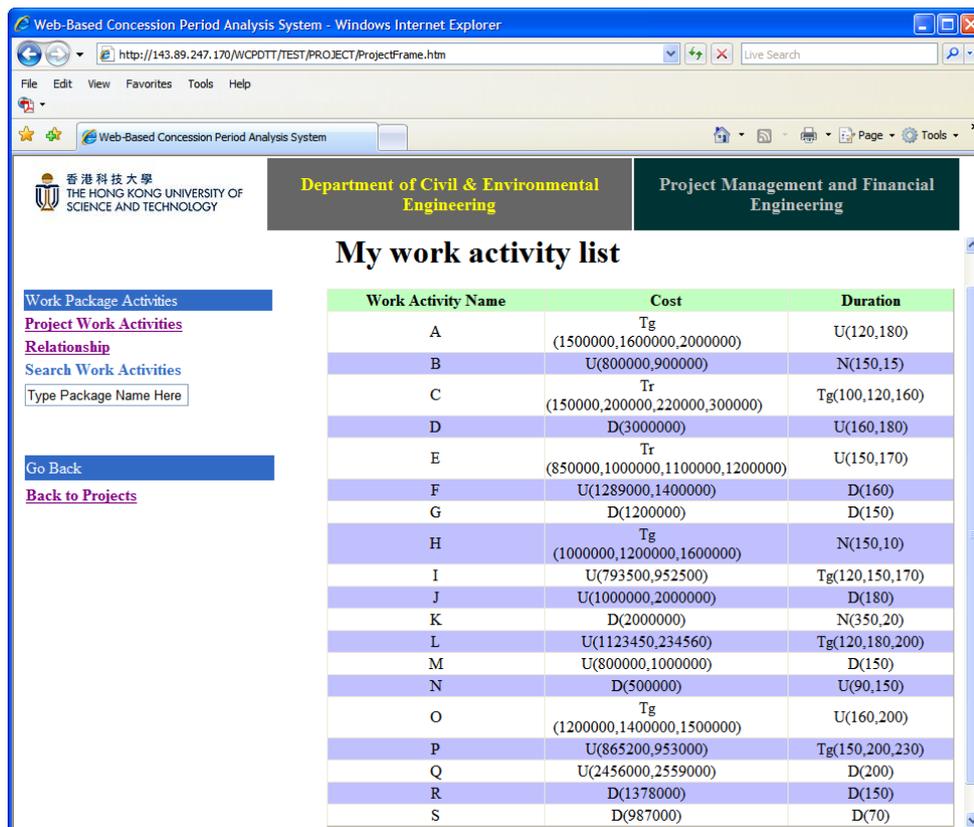


Figure 4: Sample screenshot of construction activity information

Construction Period Analysis Result

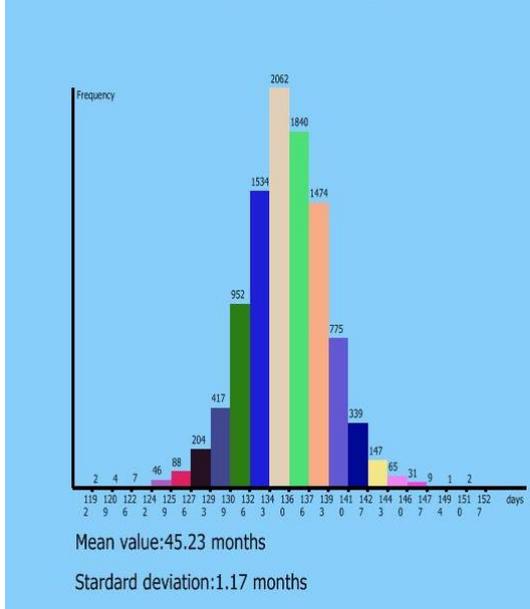


Figure 5: Construction period analysis

Construction Cost Analysis Result

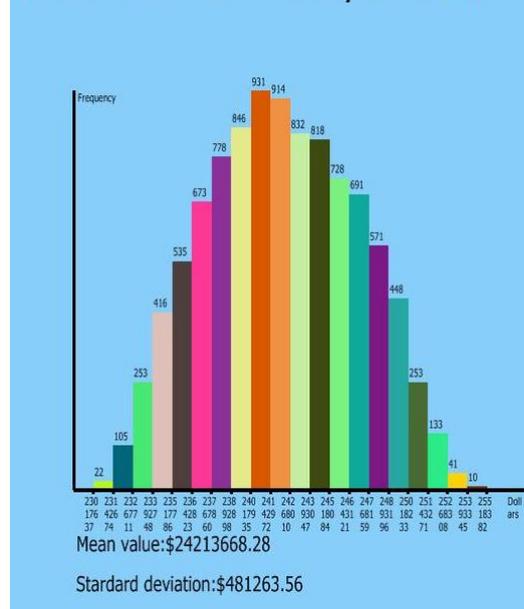


Figure 6: Construction cost analysis

Operation Period Analysis Result

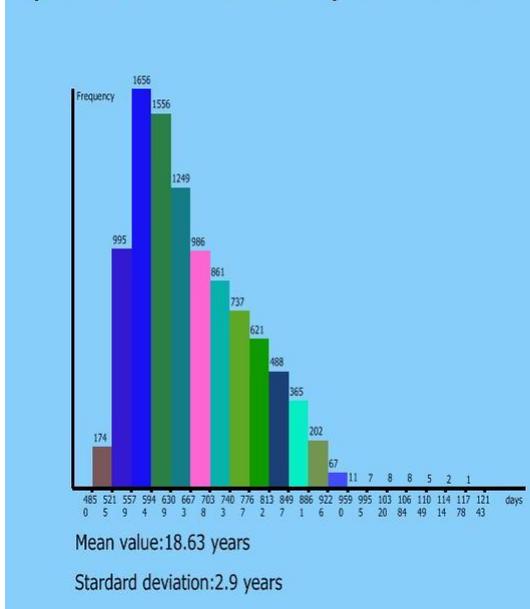


Figure 7: Operation period analysis

Total Concession Period Analysis Result

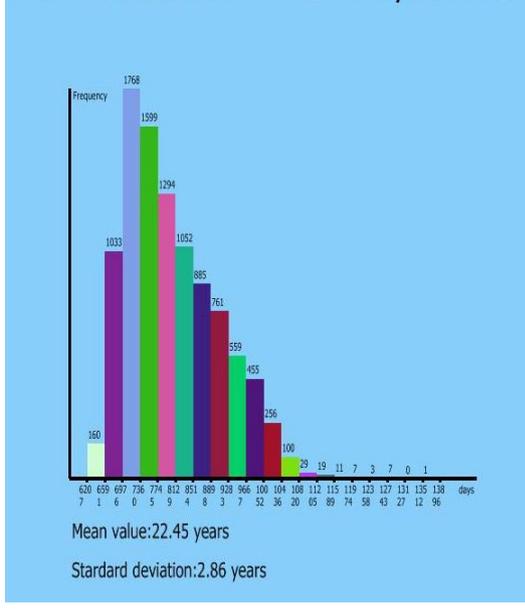


Figure 8: Concession period analysis

5. Conclusion

This paper introduces an innovative methodology for the definition and determination of the concession period and develops a Web-based decision support system for concession period analysis. This system facilitates public clients in reasoning and quantifying construction and market risks in order to determine an appropriate concession period and consequently minimize the potential social, economic and financial problems associated with it.

Acknowledgement

The writer acknowledges the kind help of Yashuai Li in the development of the WCPAS.

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PPP'S AS TEMPORARY ORGANIZATIONS

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Abstract

Serving the community is the domain of public entities, making a profit is the *raison d'être* for a private entity. There can, of course, also be non-government agencies, and not-for-profit agencies that have aspects of both public and private. Many public private partnerships (PPP) involve long-term relationships that blend the strengths, and weaknesses, of the so-called “players” or entities. PPP's must address the sociological, environmental, governance, and financial considerations for the project. They must also address the risk, and often must assemble globalized teams to deliver the product.

This paper will explore the use of a temporary project organization (TPO) concept in creating the required culture, processes, and structures to build and lead the PPP. It will also provide ideas on the appropriate types of contracting strategies for PPP's to improve the chances of success.

Keywords: PPP, TPO, cross-cultural leadership, strategic project management

1. Introduction

Structuring and leading PPP's can be a serious challenge for a variety of reasons. First, the organizations will likely have quite different capabilities, and appetites for risk (Grisham and Srinivasan 2008). No single organization could undertake the project, so the temporary project organization (*TPO*) would have to be formed to merge the abilities of each organization. For information on TPO's see: Mintzberg (1983); Toffler (1997); Grisham and Srinivasan (2007); Winter et al. (2006); DeFillipi and Arthur (1998); Grabher (2004); Brown and Duguid (1996); Turner and Mueller (2003); Jensen et al. (2006); Hastings (1995).

Second, the *strategy* and *time horizon* of the organizations that are participating can be quite different: the government agency charged with public welfare, the NGO charged with the transparent efficient use of donor money, the private firm charged with making return on investment for its shareholders, and banks with the need to carefully price and assess risks. Even two private firms may have completely different attitudes regarding their charge. Some may consider corporate social responsibility (CSR) as required behavior, others may think only of profits as a goal. The *time horizon* of the organizations will be different: government agencies wanting a long-term horizon, NGO's wanting to

maintain their reputation long-term, and private firms and banks needing to provide a short-term return on investment and/or cash flow. In this case the dilemma is to synchronize the clocks of each organization. The government agency may have a short-term budgetary restriction (bonds for example), and a long-term need to have the project meet the pro forma criteria. The same could be said of the NGO's. Private firms could also have a mix of very short-term goals (meeting quarterly metrics), and the need to enhance their long-term reputation.

Third, the organizations may have *restrictions* on how they enter into a PPP: government agencies are often prohibited from negotiating contracts to avoid graft and corruption, NGO's often can only enter into negotiated arrangements, and private firms and banks may have corporate restrictions of projects that exceed a certain size.

This paper will suggest some ideas on how to build these issues into a PPP agreement by approaching a PPP as a TPO.

2. Temporary Project Organization (TPO)

The largest two international project management groups both recognize program management as a professional activity. Both the Project Management Institute (PMI), and International Project Management Association (IPMA), offer credentials in program management. Each has a slightly different definition but the general idea is the same: a program is a group of related projects managed as such. The PMI (PMBOK 2008) and IPMA (IPMA 2006) guidelines describe in great detail how to manage a project, not a program.

Imagine we have a project in South Africa to construct a new toll road – the TPO is shown in Figure 1. The shareholder/customer is a financial consortium lead by an investment group in London, with a bank in both London and Dubai. The government of South Africa has agreed to guarantee the loan in return for a share of the project.

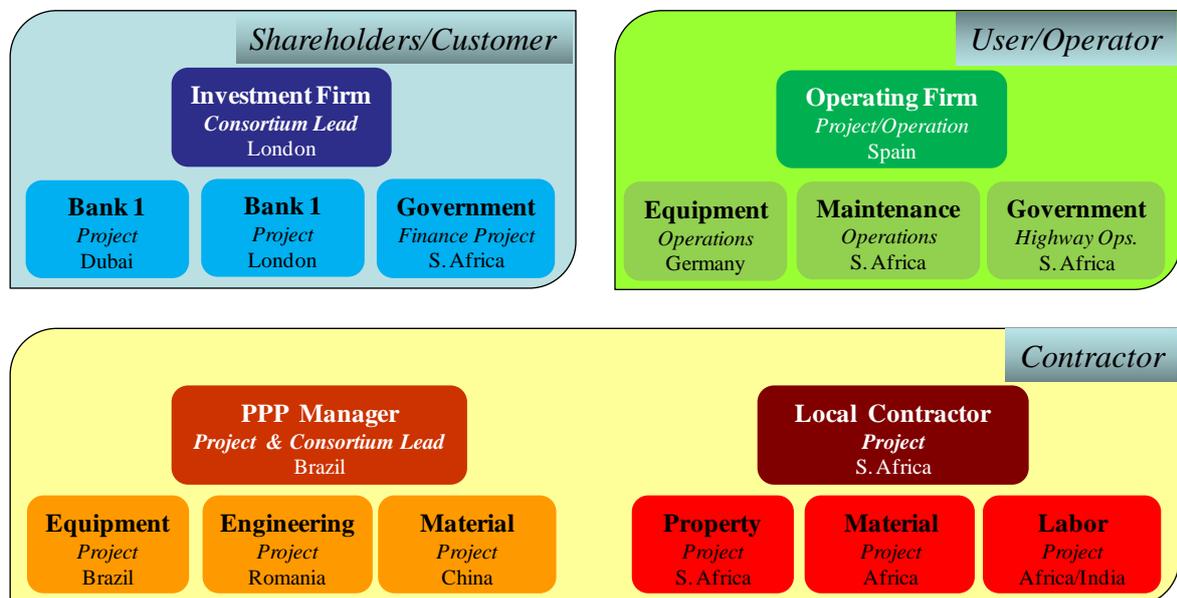


Figure 1: Temporary project organization (TPO)

The user/operator will be a toll road operations firm based in Spain, with equipment maintenance and upgrades to computer systems by a German firm, maintenance of the highway and facilities by a South African firm, and oversight by the South African government highway department. The TPO manager, and consortium lead is an international engineering and construction firm from Brazil, the design work is being done in Romania, and the materials will be procured in China. The consortium partner is a South African firm who will do the property acquisition, using another South African firm, some of the construction using labor from Africa and India, and of some material procurement from Africa.

The IPMA and PMBOK consider that box represents a project. So from those perspectives the entire project would be a program with the lead firm being the program manager. Figure 1 also represents a TPO, whose chief operating officer is the lead manager for the Brazilian firm. Think of the TPO, or program, as being a single multinational entity, created to do this one project. The reason for the connection to program management is that the IPMA and PMI have promulgated standards for international projects that provide a foundation for processes in managing such an undertaking. To lead a successful TPO however, there are far more requirements and skills required of the lead manager.

Each of the firms listed will have its own corporate culture, developed within a societal culture. Each individual will have a personal culture constructed from his/her family, village, peers, society, and experience. The TPO will also have a culture. The TPO culture will either be inculcated by the lead manager, or it will evolve. We know, from experience, that the path to more frequent success is found through leadership, not ad hoc evolution. To imbue a culture in a TPO requires what we call cross-cultural leadership intelligence, or XLQ (Grisham 2005) - you can find the details of the XLQ model at www.thomasgrisham.com. The hub of the model (a wheel) is trust, with the lubricant being the ability to manage conflict. The spokes of the wheel are communication, empathy, power, and transformation, and the rim of the wheel cultural intelligence.

The primary goal for a lead manager is to create a TPO culture that is built on a foundation of trust, and a deep respect and knowledge of the other organizations. Leading a TPO is very similar to leading an international business. It requires a lead manager that is capable of bringing empathy, transformation, power, communication, and conflict management skills to each of the following challenges. Others have pointed to the need for strategic project management (Green 2005) and intrapreneurship (Saetre 2001) in general. We argue that both of these skills and cross-cultural leadership intelligence (XLQ) must be combined and extended to a new level when undertaking PPP's.

3. Strategy and Time Horizon

Shareholder/customer - Using our example, the strategy of the South African government shareholder/customer might be to provide more efficient transportation, with resulting improvements in productivity and quality of life for its citizens. It is likely that the government has turned to a privatization approach because of a lack of resources, or perhaps a desire to tap into private expertise. Their goals might be no tax increases,

minimize public inconvenience, and enhance the political capital of the ruling government. The shareholder/customer would have a long-term perspective over the life of the highway (perhaps 30 years). The lead manager will need to recognize and manage this potential conflict within the government.

The strategy of the other shareholders/customers (banks and investment firm) would be to make a profit. While they would also have a goal of creating a happy South African government, to use them as a reference for other development projects, they must not sustain a loss. The reputation of the shareholders/customer would likely only be defined by the initial portion of the project, and not necessarily connected to the operations. The profitability of the project however will be realized during operations, or the revenue side of the ledger. Changes in political administrations could result in more pressure to build more roads and decrease the revenue stream, or worse could result re-nationalization of the asset, like in Zimbabwe. The banks and investment firm would likely have a medium term perspective through the end of the pro forma (perhaps 15 years). The lead manager needs to understand the political trajectory and anticipate such concerns from the shareholder/customer.

User/Operator - The South African government user/operator may not be favorably disposed toward an outside firm creating an asset that they will have to maintain, and be blamed for if the highway is not durable – increased maintenance costs possibly leading to increased taxes. Their strategy might be to avoid or diminish the probability that they will have to confront a hostile public at some time in the future as a result. So it is possible the government would have a long-term time horizon (perhaps 30 years). The German and South African firms in the user/operator value chain (we prefer the term value chain rather than supply chain) would have profit and reputation goals, but their scope would be far smaller. Their strategy would be more towards a short-term profit goal (perhaps 5 years).

Contractor - The contractors, would also strive for a profit on the project, and would definitely want to maintain their reputation in the international market place. However, unlike the investors, these firms would be equally concerned about operations and the construction of the highway. Their concern would be a long-term one with emphasis on the earlier years (perhaps 30 years). A similar set of profit goals would likely be the case for the German, South African, Romanian, and Chinese firms. These firms and their value chains would probably not be as concerned about reputation, and would likely be focused on the short-term profits (perhaps 5 years).

Contracting Strategy

Figure 2 provides a graphical view of contracting strategies available for consideration.

Fixed price (FP) adversarial contracts are those that are competitively bid with customers dictating the terms and conditions, and those that have a fixed lump sum price. Cost reimbursable (CR) adversarial contracts are those where the costs are reimbursed plus some profit and overhead. The FP and CR contracts can vary widely on terms and conditions, but a detailed discussion of these is well beyond the scope of this paper. The quasi-adversarial and quasi-collaborative options depend upon the contract hierarchy, as shown in Figure 3.

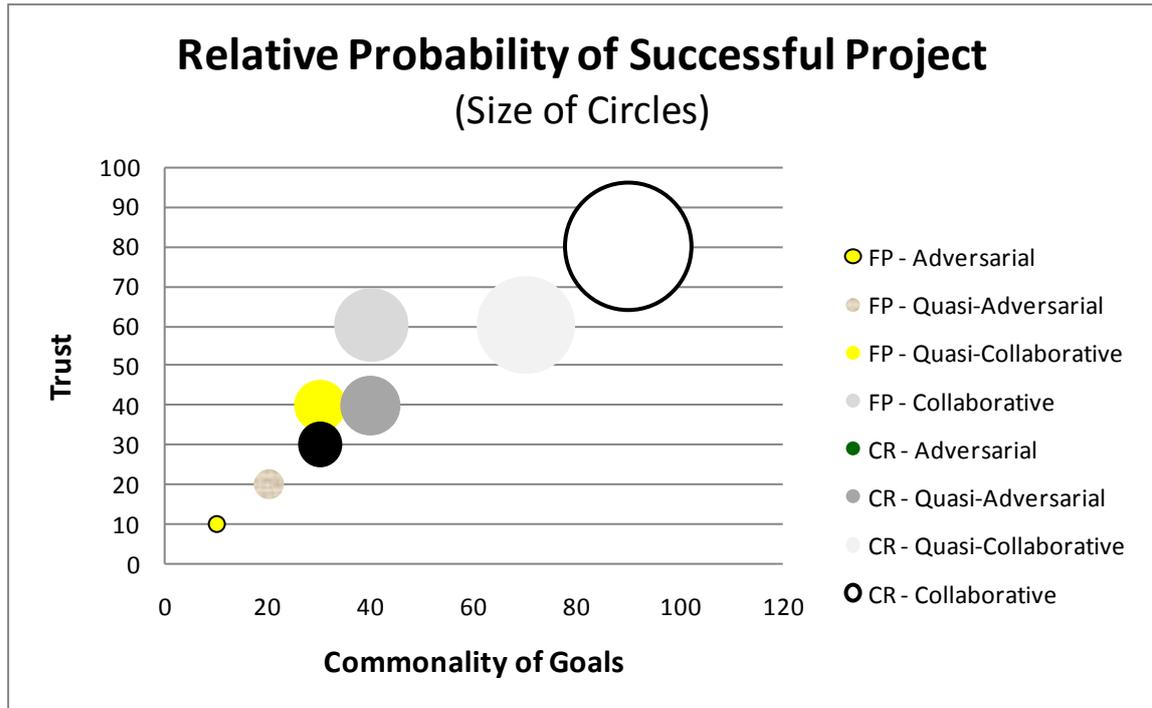


Figure 2: PPP contracting strategies (FP = Fixed Price and CR = Cost Reimbursable)

We strongly favor the use of CR – collaborative structures for a few basic reasons. The first is that it requires all of the members of the TPO to negotiate prior to signing an agreement, and this enables people the time to get to know one another, and permits the lead to start the process of building trust without the day-to-day pressures of running a project. It also facilitates buy-in on such items as risk, time, cost, communication, quality, and procurement. Each organization gets to add their opinions and value into the discussions that will design the TPO's culture and processes – to use a metaphor you choose your wedding partner. The opposite approach is the adversarial one, where your wedding partner is chosen by someone else, and you do not meet them until the signing ceremony. In our South African example, one can well imagine the outcome by choosing an adversarial approach.

Figure 2 and Figure 3 are excerpted from a book currently being written by the lead author that is due to be published in 2009 titled "Leading International Projects."

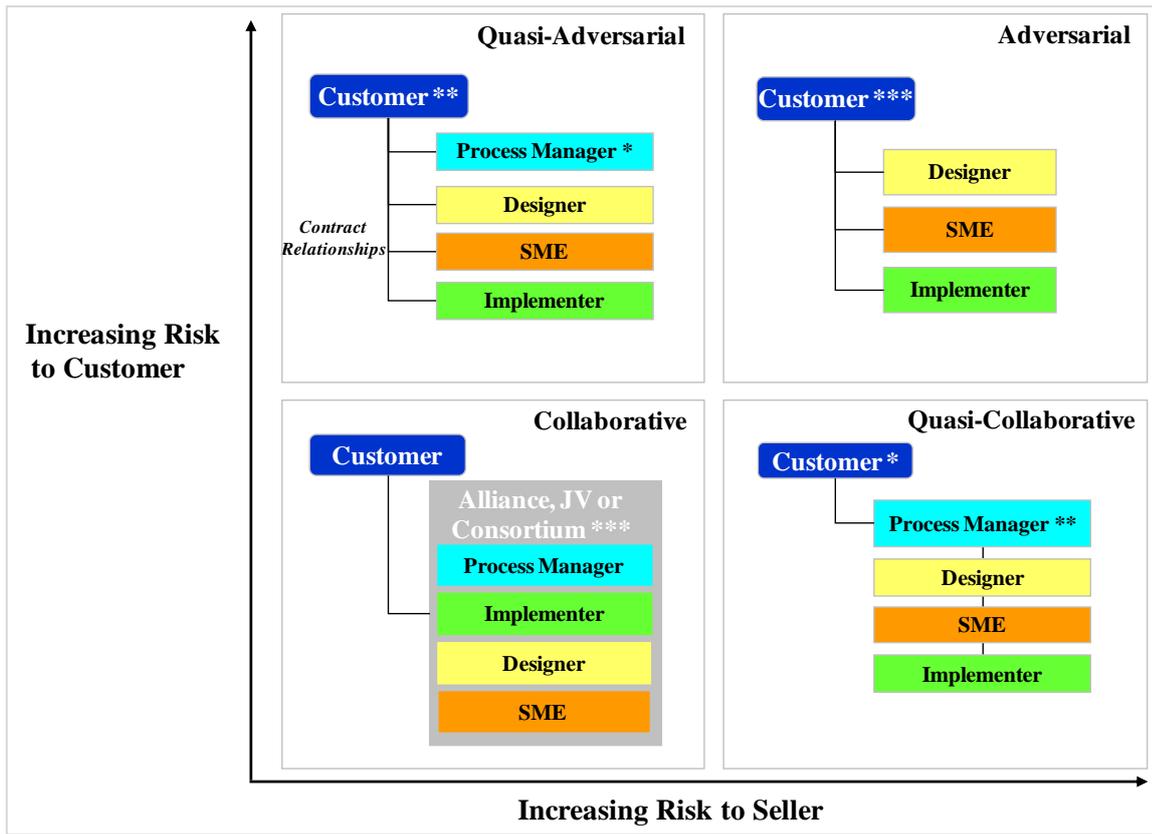


Figure 3: Contract Structures

4. Restrictions

For the private organizations shown in Figure 1, negotiations will be a viable option. For the public organizations this may or may not be an option. Currently South African law requires open competitive public bidding is the standard, and negotiated contract processes are possible, but by no means certain. The financial firms may have similar transparency issues in today's markets. With the failure of the rating firms to properly assess risk, governmental agencies are crying for more regulation, and banks are looking for ways to better determine the riskiness of their portfolios. More transparency means less latitude in negotiations. That is not to imply that under-the-table negotiations are recommended, quite the contrary. It means that transparency is demanded, but at the right time to the right audience. What we mean is that governmental agencies and banks may insist upon regular disclosure of meetings. This would not be conducive to open discussions because anything said or discussed could become a matter of public record.

We are absolutely in favor of full transparency, but we are not in favor of making a transcript of every discussion for publication on the front page of the Wall Street Journal. Competitive advantage, proprietary information, emotional entreaties, and brainstorming need to occur, at least for creativity sake, in a protected environment. When decisions are

taken those should be made public, and if there is a genuine need for knowledge of the detailed creative discussions, there are courts and legal proceedings that can be utilized for those with a genuine right so see the details. For PPP's this is a serious concern. In many countries, especially those with "sunshine laws," all such negotiations are a matter of public record. In such venues, we recommend that the PPP engage the legal system initially to describe the nature of the creative discussions, and determine if there is a legal way to keep these as proprietary. It is a very fine balance indeed, but one that must be struck if the unfettered exchange of ideas is to occur. It will likely also be necessary for all participants to sign a confidentiality document before engaging in the negotiations.

Another serious challenge is that of knowledge, and its value. If the Brazilian firm has developed the knowledge on how to maximize profits by utilizing an algorithm that they have developed, they may not want to share this with the customer/owner as it would give them an advantage on future projects. In this case initial trust may be insufficient to enable the parties to evolve the best pro forma for the project. If so a confidentiality agreement would help. But this same concept percolates down to means-and-methods, procurement practices, local knowledge, political knowledge, and much more. If the recipient of knowledge can be trusted not to abuse it, knowledge is likely flow between the parties. If trust does not exist, knowledge will not flow; if knowledge does not flow the TPO will be dysfunctional.

So the first challenge is to find a way to negotiate the agreement for the PPP rather than relying on a competitive public bidding format (Grisham and Walker 2005). The second challenge is to build trust, through cross-cultural leadership intelligence and/or through the use of confidentiality agreements. The lead for the PPP can make a very large contribution to the success of a project by showing the way, setting the standard, and imbuing a culture of trust in the PPP organizations. The third challenge is that the lead manager MUST have a broad view of the project, the organizations, and the challenges. We prefer those who have practiced strategic and entrepreneurial project management, for they know the processes and they have the skills, both intra-organizational and inter-organizational.

5. Conclusion

PPP's involving multi cultural organizations from different parts of the world is fast becoming a reality especially in large investment infrastructure projects. These have social requirements (mostly government participation in some way or the other), at the same time by virtue of the huge investments needed private participation is also a must. With divergent work culture approaches and also the return on investment (ROI) expectations of the two entities it would seem that such projects are doomed for failure. However the success to such project management lies in forging a unified TPO culture which takes care of the varied interests and cultural spread of the participants. The TPO should address the ROI needs of private participants without diluting the socio economic obligations of the public entities.

As clearly brought out in the paper this is only possible if the stakeholders understand or at least have an empathetic attitude to understand each other's culture (both at

organization as well as at personnel/team level) and provide necessary accommodations to bring about a significantly high level of trust. By the same token effective communication and transparent functioning (to the extent possible without compromising key organizational interests) especially in the sensitive areas of contract and quality management will go a long way in ensuring appropriate unified TPO culture which the first and vital step to success in these projects. Adequate attention by the leadership/management to understand the interpretations of these factors in the respective cultural backdrop of the different organizations is essential to bring about some sort of unification to the TPO functioning. To sum up the leadership (both the lead organization as an entity as also the respective leadership of each of the participants) should be culturally and mentally mature to be able to start and progress the relationship on an empathetic platform of trust.

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REVAMPING PUBLIC PRIVATE PARTNERSHIPS (PPPs): A SYSTEMIC APPROACH THROUGH ESTABLISHMENT AND MANAGEMENT OF REGIONAL PPP PROJECT MANAGEMENT OFFICES (PMOs)

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Abstract

Background – The PPP procurement approach has undergone various stages of development since its inception. The ever increasing demand for infrastructure development and service delivery, both in developed and developing countries requires a well planned and management approach for PPP projects. One such approach is the introduction of ‘systems thinking’ in the PPP delivery cycle. Systems thinking strategy holds the potential for addressing fundamental issues affecting the holistic success of PPP projects. Systemic models are important tools which provide clear roadmaps for PPP planning and management. Various elements of a typical PPP systemic model include elements such as: the PPP Project Management Office (PMO); the PPP project team; the legal and regulatory framework; the PPP project systems (social, political, economic, financial, information). The focus of this paper is the systemic element of the PPP PMO. One of the key tasks of the TG 72 PPP task group is to establish a thriving international research and practice community. Establishment of ‘virtual’ or ‘physical’ PMOs will be a key driver of the process.

Purpose of this paper - The purpose of this paper is to disseminate findings of a desk based study relative to the systemic element of PPP PMOs during the forthcoming conference on: ‘Revamping PPPs’ scheduled to be held at the University of Hong Kong, on 28 February 2009. The aim of the research is to: contribute to the PPP Body of knowledge (PPPBOK); further understanding of the systemic planning and management of PPP projects; promote the use of systems approach in the implementation of PPP projects and recommend the establishment of regional PPP PMOs for Africa, Middle East, Asia, Far East, Europe, Latin America, Caribbean and North America.

Methodology / Scope - A desk based study and doctoral thesis form the basis of this paper. The study was limited to the establishment and management of PPP PMOs and how that fits in the broader context of a PPP system. Data abstracted from existing records has been analysed to portray trends over the period under study.

Findings - Findings from the research is reported in aggregate. Furthermore, based on the findings, appropriate recommendations have been made for policy changes, decision making and improvements.

Value – Systems thinking approach and the study of the ‘elements’ thereof present a great opportunity for creating sustainable changes in the way we plan and implement PPP projects. Furthermore, the systems approach broadens our understanding of the interrelationships of: social; political; economic; financial; information, and management systems within the PPP environment.

Keywords: Systemic, projects, project management office, public private partnerships.

1. Introduction

The PPP procurement approach has undergone various stages of development since its inception. The ever increasing demand for infrastructure development and service delivery, both in developed and developing countries requires a well planned and management approach for PPP projects. One such approach is the introduction of ‘systems thinking’ in the PPP delivery cycle. Systems thinking strategy holds the potential for addressing fundamental issues affecting the holistic success of PPP projects. Systemic models are important tools which provide clear roadmaps for PPP planning and management. Various elements of a typical PPP systemic model include elements such as: the PPP Project Management Office (PMO); the PPP project team; the legal and regulatory framework; the PPP project systems (social, political, economic, and financial & information). The focus of this paper is the systemic element of the PPP PMO.

A PPP PMO may be defined as ‘a virtual or physical office with the relevant infrastructure and resources for facilitating the planning, operation and management of PPP projects in a given region’. Specific objectives for establishing a PPP PMO include: building capacity at regional and national levels on the preparation and development of PPP investment projects; assisting member countries in the preparation of necessary documentation, regulatory and institutional frameworks; organising and facilitating promotion of PPPs; organising workshops to bring together public and private sector investors; monitoring; control; coordinating research and publications, and reporting on PPP projects.

According to Anderson (2003), major constraints to PPP investment in poorer developing countries include:

- An inappropriate enabling environment;
- High up-front costs of project development;
- A shortage of long-term debt, both in hard and local currencies;
- High and uninsurable country risks;
- The need for subsidies if many projects targeted on the poor are to be financially viable at the outset i.e. affordable, and

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- The need to strengthen public capacity to negotiate and implement private infrastructure projects.

Other issues which are impediments to PPP development include:

- High bidding cost;
- Refinancing;
- Value-for-money;
- Design;
- Contractual relationships, and
- Concession agreements.

According to Farrington (2000), over the past 5 years the debate relating to PPPs has focused on:

- The potential contribution of various forms of PPPs to sustain social / economic progress;
- The need to create PPP knowledge and facilities within various government organizations;
- The possibility of identifying promising PPP structures and opportunities;
- The requirements for implementing PPP structures;
- The possibility of extending PPPs to smaller, regional and poverty-focused projects, and
- The management of expectations concerning PPPs.

However, Ramaema (1997) cites the following reasons for seeking the involvement of the private sector in the delivery of public services:

- Injection of technical / managerial expertise into the sector, and transfer of technological innovations;
- Improvement in the economic efficiency of the sector, in terms of both operating performance and use of capital investment;
- Injection of large-scale investment capital into the sector, or the creation of access to private capital markets;
- Reduction in the level of public subsidies to the sector, and / or the reduction of these subsidies from the groups currently served to the poor and those not currently served;
- Distancing of the public sector from short-term political intervention in the operation of a 'utility' and a reduction of opportunities for intervention by powerful vested interests;
- Public sector that is more responsive to consumer needs and preferences, and
- Supplementing capacity, currently not available in the public sector.

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Table 1: Types of PPP projects by region and type (1984-2005)

PPP Type	East Asia and Pacific	Europe and Central Asia	Latin America and the Caribbean	Middle East and North Africa	South Asia	Sub-Saharan Africa
Concession	28	13	8	6	0	16
Divestiture	75	192	171	1	15	6
Greenfield project	285	33	279	20	101	32
Management and Lease Contract	3	6	20	0	0	15
Grand Total	391	244	478	27	116	69

Data Source: World Bank and PPIAF, PPI Project database.

Table 1 provides a snapshot of infrastructure projects in low and middle-income countries, by region and by type. Projects include management or lease contracts, concessions, green-field projects, and divestitures. The database contains projects dating from 1984 to 2005. In sub-Saharan Africa, there are a total of 69 PPP projects, of which 12 (17%) reached financial closure by the end of 2005 in South Africa. Furthermore, a robust regulatory system exists for PPP development (Government of South Africa, 2002). The results provide a valuable reference tool for those interested in developing PPP projects. They demonstrate what other nations have done, or are doing, in the field of PPP development. Table 2 indicates the costs involved with PPP projects that have been planned and funded worldwide between 1985 and 2000.

Table 2: Planned and funded PPP projects by geographical area

Geographical Area	Projects		Cost	
	No.	%	US\$B	%
North America	396	18.9	93	10.3
Latin America	474	22.6	125	13.8
Europe	371	17.7	216	23.8
Africa and Mid-East	125	6.0	40	4.4
Asia and Far East	732	34.9	433	47.7
Worldwide	2 098	100.0	907	100.0

Data source: KPMG LLP, Canadian Forum on Public Procurement, 2001.

Table 2 shows that PPPs are widely used all over the world, with over 30% of the PPP projects located in Asia, the far East and a mere 6% in Africa.

Table 3: World planned and funded PPP projects by sector

Sector	Projects	Cost	
	No.	US\$ B	%
Roads and Rail	699	443	33.3
Airports and Sea Ports	280	103	13.4
Water and Wastewater	422	58	20.1
Power	697	303	33.2
Total	2098	907	100.0

Data source: KPMG LLP, Canadian Forum on Public Procurement, 2001.

Table 3 indicates that over 46% of the world's funded PPP projects were relative to the transportation sector, compared to 33% in the power sector, and 20% relative to the water sector.

2. Systems Thinking for PPPs

2.1 Purpose

The purpose of adopting systems thinking is to define systemic processes that can be used to implement PPP projects; clarify complexity of the causal interrelationships within the PPP system, and provide direction for the current and future researchers into new discoveries (Andrew, 1999).

2.2 Historical Context

The idea of using a system to understand a phenomenon is attributed to work conducted in the 1930's by Ludwig von Bertalanffy, a German biologist, who gave the name general systems theory to a discipline that has gained wide application in different spheres. Systems thinking studies how the individual components interact with each other. Senge (2006) has played a major role in popularising the concept.

2.3 Definition of a System and Models

Systems-thinking embraces the concept of a system. A system may be defined as a collection of things or components that are inter-related through defined relationships. In nature we are surrounded by systems namely: biological systems (digestive & central nervous); solar systems; social systems; political systems; economic systems; financial systems; information systems, cultural and management systems.

Furthermore, a systemic model is a highly visual graphical method of demonstrating relationships between project resources, activities, outputs, and outcomes. Systemic models are planning, implementation and monitoring tools that indicate the resources a PPP project will employ to conduct activities that are intended to produce specific, describable, and measurable changes or results in people, organisations, or the broader physical and social environment (Senge, 2006).

Systems' thinking, if successfully applied, is likely to produce expected outcomes-assets and or services through injection of private sector expertise (Ramaema, 1997). Finally as a result of successful outcomes, the end user / community would enjoy a better quality of life and feel empowered (Khosa, 2000).

2.4 Why a Systemic Model for PPPs?

Systemic models can be useful tools to demonstrate integrated, systemic planning in relation to the achievement of goals and expected outcome. Often PPP project proposals may not clearly specify the relationship shared among resources, planned activities / outputs, and the benefits expected from the PPP project. The systemic model helps to crystallize the extent to which the PPP project has made a difference or how it can make a difference.

A model provides a common vocabulary to describe elements of project work in a way that encourages deeper understanding over a variety of projects. Once internalized within the PPP sector, this approach can transform the mindset of PPP managers in the way of solving PPP related problems.

According to MacNamara (2006), systemic modelling is a tool that helps to organize the relationship between major project activities and anticipated outcomes. It can be effective in planning a PPP project design, implementing project activities, and evaluating project success. It should be noted that while a systemic model demonstrates the relationships shared by PPP project elements such as expected results, changes, or effects derived through project activities, a systemic model does not take the place of performance indicators within a PPP project context.

3. PPP Project Management Office (PPP PMO)

3.1 Background

Municipalities and other government project implementing agencies in Africa have experienced a rapid increase in the level of investment in infrastructure in the last two years relative to various sectors. Unique projects such as the FIFA World Cup 2010 and other legacy projects have stretched the resource capacity of some implementing agencies to the limit. The increase in project portfolio has resulted in a corresponding increase in demand for technical and management services. However, this rapid increase in demand for services cannot be met through the existing staffing levels. Furthermore, OECD (2004) indicates there is no formal framework for the application of PPPs in place right now in Africa. Each country is left to set its own rules and regulations. The risk on non-regulated PPP development is high. The gap created due to increasing demand needs to be filled for continued service delivery. Therefore, there is an urgent need to build capacity within the municipalities and other implementing agencies so as to facilitate service delivery and meet strict deadlines for completion of facilities and infrastructure. Three key options exist for addressing the above problem: recruitment, training, staff retention; appointment of external consultants, and or a combination of the two.

In order to implement projects effectively and efficiently, there is need to use proven tools and methodologies that have been tested successfully in projects of similar nature. Project Management offers a structured approach to managing projects. The success of most projects is determined by an organisation's ability to develop fully integrated information and control system to: plan; instruct; monitor; control and report on projects.

Processing of large amounts of data quickly and accurately is necessary to facilitate problem solving and decision making process. To achieve these objectives a project manager needs a comprehensive toolset, which includes the following: clear project definition; project framework; project office, project systems and effective project risk models (Boisjoly & DeMichiell, 1994).

A key problem facing most municipalities and implementing agencies is low project throughput due to human resource capacity constraints and project management skills training. As a result of capacity and subsequent inadequate planning, large sums of allocated funds are returned to the National Treasury each financial year. The PPP PMO provides the 'golden key' for unlocking potential and improving service delivery within the public sector.

3.2 The Project Management Office (PMO)

A project management office, also called: programme management office; portfolio management; centre of excellence and many other synonyms, is an organizational entity comprising of specialist individuals and resources, is normally established to assist project managers, teams, project sponsors and various management levels on strategic matters. In an organisation a PMO can be either a corporate department or directorate responsible for the practice and discipline of project management.

3.3 PMO Models

There are two main models of PMOs: One that acts in a consultancy capacity, providing project managers in business units with: training; guidance, and best practice. The centralized version consists of project managers who are loaned out to business units to work on projects. There are three basic organizational styles for a project management office, each embodying unique functions that define their role within the project environment: enterprise; repository and coach model. The functions of a PMO may vary, but generally fall into three categories: development; support and control. There are key roles for a PMO that must be incorporated in its design: standards and methodology; planning and evaluation; project management; review and analysis. The recommended functions and services provided by a fully implemented PMO for both the short and long-term include: project delivery; monitoring; reporting and mentoring.

3.4 The Need for a PMO Approach

The establishment of PPP PMO at regional level will help to harmonise PPP activities throughout the regions by providing standards and procedures. The PPP PMOs will also provide pivotal project administration support relative to: decision making; approvals; regulation; liaison with PPP actors; research and development; stakeholder management and tracking action items.

3.5 Establishment of PMO: Step-by-Step Procedure

Based on her experience in a number of industries, Levin (2006) suggests the following steps in implementing a PMO: determine the goals for the PMO and the functions it will perform; establish a charter for the PMO; determine where it will be placed in the company; prepare a plan for the PMO activities; staff the PMO; prepare a work breakdown structure; develop a schedule for implementation; prepare a cost estimate; establish roles and responsibilities; prepare a communication plan; determine organisational interfaces; provide an orientation as to the PMO's functions to those affected, and once operational review PMO activities, track, monitor and report.

3.6 Benefits of a PMO

Short – term : fast tracking and supporting implementation ‘backlog projects’, and long - term: unlocking the capital resources and improving service delivery through structured implementation of development projects for various departments within the municipalities and other government departments.

4. Conclusions and Recommendations

4.1 Conclusions

The conclusions from the above analysis are:

- PPP projects should be understood in the broader context as systems;
- There is need to evolve a more integrative approach in dealing with PPP issues;
- The PPP procurement approach has undergone various stages of development since its inception;
- The ever increasing demand for infrastructure development and service delivery, both in developed and developing countries requires a well planned and management approach for PPP projects;
- One such approach is the introduction of ‘systems thinking’ in the PPP delivery cycle;
- Systems thinking strategy holds the potential for addressing fundamental issues affecting the holistic success of PPP projects, and
- Systemic models are important tools which provide clear roadmaps for PPP planning and management.

4.2 Recommendations

It is recommended as follows:

- All world regions should introduce ‘systems thinking’ in the PPP delivery cycle;
- Systems thinking strategy holds the potential for addressing fundamental issues affecting the holistic success of PPP projects;
- Use should be made of systemic models as important tools which provide clear roadmaps for PPP planning and management;
- Promote the use of systems approach in the implementation of PPP projects, and
- Recommend the establishment of regional PPP PMOs for Africa, Middle East, Asia, Far East, Europe, Latin America, the Caribbean, and North America.

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- Agenda 21 for Sustainable Construction in Developing Countries
- The Construction Sector System Approach: An International Framework (CIB 293)
- Red Man, Green Man: A Review of the Use of Performance Indicators for Urban Sustainability (CIB 286a)
- Benchmarking of Labour-Intensive Construction Activities: Lean Construction and Fundamental Principles of Working Management (CIB 276)
- Guide and Bibliography to Service Life and Durability Research for Buildings and Components (CIB 295)
- Performance-Based Building Regulatory Systems (CIB 299)
- Design for Deconstruction and Materials Reuse (CIB 272)
- Value Through Design (CIB 280)



An example of a recent major CIB collaborative activity is the Thematic Network PeBBu Performance Based Building: a four-year programme that included 50 member organisations, that was co-ordinated by CIB and that was funded through the European Commission Fifth Framework Programme.

Themes: The main thrust of CIB activities takes place through a network of around 50 Working Commissions and Task Groups, organised around four CIB Priority Themes:

- Sustainable Construction
- Clients and Users
- Revaluing Construction
- Integrated Design Solutions

CIB Annual Membership Fee 2007 – 2010

Fee Category		2007	2008	2009	2010
FM1	Fee level	10526	11052	11605	11837
FM2	Fee level	7018	7369	7738	7892
FM3	Fee level	2413	2534	2661	2715
AM1	Fee level	1213	1274	1338	1364
AM2	Fee level	851	936	1030	1133
IM	Fee level	241	253	266	271

All amounts in EURO

The lowest Fee Category an organisation can be in depends on the organisation's profile:

- FM1** Full Member Fee Category 1 | Multi disciplinary building research institutes of national standing having a broad field of research
- FM2** Full Member Fee Category 2 | Medium size research Institutes; Public agencies with major research interest; Companies with major research interest
- FM3** Full Member Fee Category 3 | Information centres of national standing; Organisations normally in Category 4 or 5 which prefer to be a Full Member
- AM1** Associate Member Fee Category 4 | Sectoral research & documentation institutes; Institutes for standardisation; Companies, consultants, contractors etc.; Professional associations
- AM2** Associate Member Fee Category 5 | Departments, faculties, schools or colleges of universities or technical Institutes of higher education (Universities only)
- IM** Individual Member Fee Category 6 | Individuals having an interest in the activities of CIB (not representing an organisation)

Fee Reduction:

A reduction is offered to all fee levels in the magnitude of 50% for Members in countries with a GNIpc less than USD 1000 and a reduction to all fee levels in the magnitude of 25% for Members in countries with a GNIpc between USD 1000 – 7000, as defined by the Worldbank. (see <http://siteresources.worldbank.org/DATASTATISTICS/Resources/GNIPC.pdf>)

Reward for Prompt Payment:

All above indicated fee amounts will be increased by 10%. Members will subsequently be rewarded a 10% reduction in case of actual payment received within 3 months after the invoice date.

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