

## **MEASURES THAT ENHANCE THE ACHIEVEMENT OF VALUE-FOR-MONEY IN PUBLIC PRIVATE PARTNERSHIP (PPP) PROJECTS**

Albert P.C. Chan, The Hong Kong Polytechnic University  
email: bsachan@polyu.edu.hk

Patrick T.I. Lam, The Hong Kong Polytechnic University  
email: bsplam@polyu.edu.hk

Daniel W.M. Chan, The Hong Kong Polytechnic University  
email: bsdchan@polyu.edu.hk

Esther Cheung, The Hong Kong Polytechnic University  
email: bsesther@polyu.edu.hk

Yongjian Ke, Tsinghua University  
email: kyj05@,ails.tsinghua.edu.cn

### **Abstract**

**A research project looking at implementing a best practice framework for Public Private Partnerships (PPPs) in Hong Kong is currently being conducted. This research project draws from the successful experiences of using PPPs in the U.K. and aims to derive suitable skills and mechanisms for Hong Kong. As part of this research project an empirical questionnaire survey was conducted. The survey questionnaire was adapted from profound researchers in the U.K., with their permission, to compare PPP practices in different jurisdictions. Value-for-money (VFM) is one of the main initial drivers motivating Governments around the world to adopt PPPs. Respondents of the questionnaire survey were asked to rate the importance of eighteen possible measures that would enhance the achievement of value-for-money in PPP projects. In the U.K. survey conducted by previous researchers they found that the top five most important VFM measures included: (1) Efficient risk allocation (allocating the risk to the party best able to manage it), (2) Output based specification, (3) Long-term nature of contracts, (4) Early project service delivery and (5) Risk transfer (transferring a substantial amount of risk from the public to the private). For this research project, the results conducted in Hong Kong were similar. The top two most important value-for-money measures were the same as those rated in the U.K. The other measures rated highly included: (3) Competitive tender, (4) Private management skill and (5) Private sector technical innovation.**

**Keywords:** Value-For-Money; PPP; Hong Kong; U.K.

### **Introduction**

Public Private Partnership (PPP) was first introduced in the United Kingdom in 1992 in the form of Private Finance Initiative (PFI) as a way of procuring public infrastructure by getting the private

sector to finance, build and operate it under contracts typically lasting 25 to 30 years (Tieman 2003). Since its introduction, PFI has been the government's preferred method of public infrastructure procurement (Handley-Schachler and Gao 2003). As a result, PFI now accounts for between 10 to 14 percent of Britain's total annual investment in public services. In 2003, total investment under PFI was forecast to reach £4.6 billion (Tieman 2003). After almost 50 studies, the National Audit Office (NAO) had concluded that when PFI functioned properly, it delivered both better value and better infrastructure. Furthermore, according to an NAO review in 2003, 78% of PPP/PFI projects were delivered within budget and 76% on time (Tieman 2003). However, Maltby (2003) asserted that PFI should be abolished for smaller projects and for information technology schemes. It is clear that PPP is not a panacea to solve all problems and may not be suitable for all project settings. It is therefore important to explore the successful ingredients for delivering PPP projects.

Hong Kong is not completely new to the idea of PPP. In actual fact, the city was probably one of the first to utilize resources from the private sector back in the sixties (Chan et al., 2007). Build Operate and Transfer (BOT) model has become a well-known procurement option locally, particularly for large economic infrastructure projects. PPP, on the other hand, is a less familiar term in Hong Kong. In recent years, the Efficiency Unit of the Hong Kong Special Administrative Region Government has been heavily involved in PPP research. The Government's interest in utilizing PPP is obvious. The approaches they have taken mainly involve gaining international experience, from Europe and Australia in particular. As a result, a number of publications have been produced to educate civil servants on the process of conducting PPP projects (Efficiency Unit 2001; 2003; 2007; 2008). To continue the recent interest of PPPs in Hong Kong, this research study investigates the measures that enhance the achievement of Value-for-Money (VFM) in PPP projects locally, by way of an empirical questionnaire survey.

### **Development of the empirical survey questionnaire**

The questionnaire template designed by Li (2003) was adopted for this study. Although the authors could have developed their own research questionnaire, there were several foreseeable advantages to adopting Li's (2003) survey questionnaire rather than designing a new template. Firstly, the value of Li's (2003) questionnaire has already been recognized by the industry at large. His publications, as a result of the research findings derived from the questionnaire, are evidence of its worthiness. Secondly, there would be no added advantage to reinvent the work that was previously done by other researchers. Thirdly, by administering Li's (2003) questionnaire in different administrative systems, it would be of interest for comparison purposes. Therefore Li's (2003) questionnaire was adopted for the survey, as presented in this paper, with prior permission obtained from the author, Dr. Bing Li, and his doctoral research supervisor, Prof. Akintola Akintoye. Prof. Akintoye is currently Head of the School of Built and Natural Environment at the University of Central Lancashire, United Kingdom.

### **Research methods**

The methods for data collection and data analysis for the research work presented in this paper are described in detail in this section.

#### **Research hypothesis:**

- Measures enhancing the achievement of Value-for-Money in PPP projects are repeatable irrespective of geographical differences.

## Collection of research data

An empirical questionnaire survey was undertaken in Hong Kong from October 2007 to December 2007 to study the VFM measures of PPP under this administrative system. In this study, the target survey respondents of the questionnaire included all industry practitioners from public, private and other sectors. These respondents were requested to rate their degree of agreement with each of the identified VFM measures according to a five-point Likert scale (1 = Least Important and 5 = Most Important).

Target respondents were selected based on their direct hands-on involvement with PPP projects. Survey questionnaires were sent to 95 of these target respondents in Hong Kong. It was anticipated that some of the target respondents would have colleagues and personal connections knowledgeable in the area of PPP and could participate in this research study as well; hence some of the respondents were dispatched five blank copies of the survey form. A total of 34 completed questionnaires from Hong Kong were returned, representing a response rate of 36%.

## Tools for data analysis

### *Mean score ranking technique*

Chan and Kumaraswamy (1996) adopted the 'mean score' method to establish the relative importance of causes of delay in building construction projects in Hong Kong as evaluated by clients, consultants and contractors. The data collected from the current questionnaire survey was analyzed using the same technique within various groups categorized according to the origin of the respondents (i.e. mainland China and Hong Kong). The five-point Likert scale (1 = Least Important and 5 = Most Important), as previously described, was used to calculate the mean score for each VFM measure, which was then used to determine its relative ranking in descending order of importance. These rankings made it possible to isolate the relative importance of VFM measures to the respondents from Hong Kong. The mean score (MS) for each VFM measure was computed using the following formula:

$$MS = \frac{\sum (f \times s)}{N}, (1 \leq MS \leq 5) \quad (1)$$

Where  $s$  = Score given to each VFM measure by the respondents, ranging from 1 to 5  
(1 = Least Important and 5 = Most Important);  
 $f$  = Frequency of each rating (1-5) for each VFM measure; and  
 $N$  = Total number of responses concerning that VFM measure.

### *Kendall's concordance analysis*

Kendall's concordance analysis was conducted to measure the agreement of different respondents on their rankings of VFM measures based on mean values within a particular group. If the Kendall's coefficient of concordance ( $W$ ) is significant at a pre-defined allowable significance level of, say 0.05, a reasonable degree of consensus amongst the respondents within the group on the rankings of VFM measures was indicated. The  $W$  for the VFM measures was calculated by the following formula (Siegel and Castellan 1988):

$$W = \frac{\sum_{i=1}^n (\bar{R}_i - \bar{R})^2}{n(n^2 - 1)/12} \quad (2)$$

Where  $n$  = Number of VFM measures being ranked;

$\bar{R}_i$  = Average of the ranks assigned to the  $i$ th VFM measure; and

$\bar{R}$  = The average of the ranks assigned across all VFM measures.

According to Siegel and Castellan (1988),  $W$  is only suitable when the number of attributes is less than or equal to 7. If the number of attributes is greater than 7, chi-square is used as a near approximation instead. The critical value of chi-square is obtained by referring to the table of critical values of chi-square distribution, which can be found in Siegel and Castellan (1988).

#### **Research Objectives:**

- Analyze and rank the eighteen VFM measures of PPP projects in Hong Kong.
- Compare the rankings in Hong Kong with those from the U.K.
- Highlight the most important measures to enhance the achievement of VFM in PPP projects for Hong Kong.

### **Research results**

#### **Ranking of VFM measures of PPP projects**

The eighteen VFM measures ranked by Hong Kong respondents were compared to those ranked by respondents from Li's (2003) U.K. study. As shown in Table 1 the results showed that the top five VFM measures ranked by Hong Kong respondents included: (1) Efficient risk allocation (allocating the risk to the party best able to manage it), (2) Output based specification, (3) Competitive tender, (4) Private management skill and (5) Private sector technical innovation. Amongst these top five VFM measures ranked by Hong Kong respondents, two were ranked the same by respondents from the U.K. These identically ranked VFM measures were the top two, ranked as such by both Hong Kong and U.K. respondents. The other three top-five VFM measures ranked by Hong Kong respondents did not appear in the top-five rank in the U.K. Ranked third, fourth and fifth in the U.K. were: (3) Long-term nature of contracts, (4) Early project service delivery, and (5) Risk transfer (transferring a substantial amount of risk from the public to the private).

Since the respondents were asked to rate the eighteen VFM measures according to a Likert scale from 1 - 5 (1 = Least Important and 5 = Most Important), a value above '3' would represent that the VFM measure is of importance. The findings showed that more VFM measures were ranked below '3' by respondents from the U.K. (five) compared to those from Hong Kong (two).

The results showed that, in general, Hong Kong respondents rated the VFM measures higher than U.K. respondents. The VFM measures rated by Hong Kong respondents ranged from 2.82 to 4.18, whereas those ranked by U.K. respondents ranged from 2.49 to 4.02.

Amongst the eighteen VFM measures, a majority (fourteen) were rated higher by respondents from Hong Kong, these included:

- a. Competitive tender
- b. Efficient risk allocation (allocating the risk to the party best able to manage it)
- c. Risk transfer (transferring a substantial amount of risk from the public to the private)
- f. Improved and additional facilities to the public sector
- g. Private management skill

- h. Private sector technical innovation
- i. Optimal use of asset/facility and project efficiency
- k. Low project life cycle cost
- l. Low shadow tariffs/tolls
- m. Level of tangible and intangible benefits to the Users
- n. Environmental consideration
- o. Profitability to the private sector
- q. Reduction in disputes, claims and litigation
- r. Nature of financial innovation

Three of the VFM measures were rated higher by the U.K. respondents, these were as follows:

- e. Long-term nature of contracts
- j. Early project service delivery
- p. "Off the public sector balance sheet" treatment

Only one VFM measure was rated equally by the two sets of respondents:

- d. Output based specification

Finally, it was also observed that the VFM measures "l. Low shadow tariffs/tolls" and "n. Environmental consideration" were ranked lowest by both groups of respondents. It could therefore be interpreted that these measures were considered equally unimportant irrespective of the geographical locations.

**Table 1.** Mean scores and rankings for the VFM measures of PPP projects

VFM measures	Hong Kong			U.K. (Li, 2003)	
	N	Mean	Rank	Mean	Rank
b. Efficient risk allocation (allocating the risk to the party best able to manage it)	33*	4.18	1	4.02	1
d. Output based specification	34	3.91	2	3.91	2
a. Competitive tender	34	3.91	3	3.5	6
g. Private management skill	34	3.82	4	3.41	7
h. Private sector technical innovation	33	3.82	5	3.28	9
i. Optimal use of asset/facility and project efficiency	34	3.68	6	3.31	8
e. Long-term nature of contracts	34	3.65	7	3.78	3
c. Risk transfer (transferring a substantial amount of risk from the public to the private)	34	3.59	8	3.57	5
r. Nature of financial innovation	34	3.56	9	3.25	10
k. Low project life cycle cost	34	3.47	10	3.24	11
j. Early project service delivery	34	3.35	11	3.72	4
f. Improved and additional facilities to the public sector	34	3.35	12	3.16	13
o. Profitability to the private sector	34	3.18	13	2.84	14
p. "Off the public sector balance sheet" treatment	34	3.15	14	3.23	12
q. Reduction in disputes, claims and litigation	34	3.09	15	2.81	16
m. Level of tangible and intangible benefits to the Users	34	3.00	16	2.83	15
n. Environmental consideration	34	2.97	17	2.38	18
l. Low shadow tariffs/tolls	34	2.82	18	2.49	17

\* Only 33 responses out of the 34 collected were suitable for the analysis.

### Agreement of respondents within Hong Kong

As shown in Table 2, the Kendall's coefficient of concordance (W) for the ranking of VFM measures was 0.199 in Hong Kong. The computed W was all significant at 0.000.

If the number of attributes considered were above seven, as mentioned previously, the Chi-square value would be referred to rather than the W value. According to the degree of freedom, the critical value of Chi-square was 27.590. The computed Chi-square value (108.189) was well above the critical value of Chi-square. Therefore the assessment by the respondents within the group on their rankings of VFM measures is proven to be consistent. This finding ensures that the completed questionnaires were valid and therefore further analysis could be performed.

**Table 2.** Results of Kendall's concordance analysis for the VFM measures of PPP projects

<b>N</b>	32*
<b>Kendall's W(a)</b>	0.199
<b>Chi-Square</b>	108.189
<b>Critical Value of Chi-Square</b>	27.590
<b>df</b>	17
<b>Asymp. Sig.</b>	0.000

\* Only 32 responses out of the 34 collected were suitable for the analysis.

## Discussion and conclusions

The results showed that the VFM measures 'Efficient risk allocation (allocating the risk to the party best able to manage it)' and 'Output based specification' were regarded as the top two measures ranked by respondents from both Hong Kong and the U.K. These VFM measures were therefore applicable to PPP projects irrespective of geographical differences. These findings coincide with the responses achieved from interview surveys conducted for this study (Chan et al., 2008) and guidelines produced by the Efficiency Unit of Hong Kong (Efficiency Unit 2001; 2003; 2007; 2008). Other VFM measures ranked highly by Hong Kong respondents included: 'Competitive tender', 'Private management skill' and 'Private sector technical innovation'. These three measures were ranked third, fourth and fifth respectively. The U.K. respondents, on the other hand, ranked these VFM measures of medium importance at sixth, seventh and ninth place amongst the total number of eighteen measures studied. The results found were thought to be logical given the U.K.'s experience in conducting PPP projects. The U.K. has conducted many more PPP projects compared to Hong Kong; as a result many procedures, resources and skills are already readily available. Therefore, those VFM measures that are important to Hong Kong may not be viewed as important by U.K. respondents. Instead, the respondents from the U.K. rated measures that were related to time and risk as more important. These measures could also be considered to be important for projects that are not procured PPPs. Other possible reasons for the difference in responses between the two respondent groups may include:

- Differences in the legal system between Hong Kong and the U.K.;
- Different interpretations of the VFM measures by the respondents;
- Differences in economic environments between Hong Kong and the U.K. and
- The experience and background of the respondents.

In general the results showed that Hong Kong is less experienced in undertaking PPP projects and therefore the focus is strongly on those measures that are different to traditionally procured projects. The U.K., on the other hand, is extremely familiar with the implementation of PPP projects already; hence, the measures ranked by them could be applicable to all projects.

### Key Lessons Learned:

- Measures enhancing the achievement of Value-for-Money in PPP projects are repeatable irrespective of geographical differences.
- The top-two VFM measures ranked by UK and Hong Kong respondents are 'Efficient risk allocation (allocating the risk to the party best able to manage it)' and 'Output based specification'

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## Author's Biography



**Professor Albert P. C. Chan**, MSc (Aston), PhD (S. Aust.), FCIQB, FAIB, FHKICM, FHKIE, MAIPM, MIEAust, AAIQS, MRICS, RPE(Bldg), had 5 years hands-on experience in the field of construction project management before changing to an academic career in 1987. He is a Chartered Builder, Engineer, Project Manager and Surveyor by profession. He has been commissioned by numerous organisations to provide consultant services in project management and construction economics. Prof. Chan holds an MSc in Construction Management and Economics from the University of Aston in Birmingham and a PhD in Project Management from the University of South Australia. He is currently Associate Head of the Department of Building and Real Estate at the Hong Kong Polytechnic University and an Adjunct Professor at: the Queensland University of Technology, the Bond University in Australia and the University of South Australia. Prof. Chan is a Founding Director of the Construction Industry Institute, Hong Kong. His current research interests are construction industry development, construction safety and project procurement including PPPs.



**Dr. Patrick T. I. LAM**, PhD, MSc, Associateship (HKPoly), Dip.Finance, MHKIS, MHKIE, MHKICM, MSISV, MSIArb, MRICS, MCIQB, RPE, RPS, CCE, has gained rich professional and academic experiences since graduating from Hong Kong Polytechnic in 1981. As a professional, he has practised for 10 years in multi-disciplinary design offices, consultant quantity surveyors and as a contractor/developer both in Hong Kong and Singapore. As an academic, he has obtained substantial experience lecturing in undergraduate and postgraduate programmes at universities and polytechnics, both locally and overseas. While teaching, Patrick is active in research and consultancy projects.



**Dr. Daniel W. M. Chan**, BEng(Hons), PhD, MAPM, MHKICM, MASCE, ICIOB, AMAIB, is currently an Assistant Professor in Construction Management and Engineering at the Department of Building and Real Estate, The Hong Kong Polytechnic University. He is a project manager and construction manager by profession. He obtained his BEng(Hons) degree in Civil and Structural Engineering and PhD degree in Construction Project Management from the Department of Civil Engineering at The University of Hong Kong. His current research interests include construction procurement systems, project partnering and strategic alliancing, construction safety management, public private partnership and target cost contracting. Furthermore, Dr. Chan has been appointed as the Editor of the CII-HK Newsletter "The Innovator" and has been a Member of the CII-HK Editorial Board since July 2003. He has also served on the Committee of the

Association for Project Management (Hong Kong Branch) responsible for student membership recruitment and university education since November 2005.



**Miss Esther Cheung**, *BEng(Hons), MPhil*, obtained her BEng (Hons) degree in Environmental Engineering at The University of Nottingham in England. After several years of working in waste management research, she further her studies with an MPhil degree looking at the photocatalytic behaviour of recycled products. She successfully obtained her MPhil degree from the Department of Civil Engineering at The Hong Kong Polytechnic University. She is currently a Research Associate and has been working on a construction safety project and a public private partnership project for the Department of Building and Real Estate at The Hong Kong Polytechnic University. At the same time, she is studying public private partnerships while registered as a PhD student at the School of Built Environment, Queensland University of Technology, Australia.



**Mr. Yongjian Ke**, *BSc*, obtained his BSc degree in Construction Management at Tsinghua University, Beijing, China. He is currently pursuing a PhD degree in the same university. His research topic is the development of an equitable risk allocation framework for Public-Private Partnership (PPP) projects in China. He is currently a Research Assistant responsible for the comparative study of PPP features between Mainland China and Hong Kong SAR at the Department of Building and Real Estate, Hong Kong Polytechnic University.

