Drivers for Adopting Public Private Partnerships—Empirical Comparison between China and Hong Kong Special Administrative Region

Albert P. C. Chan[1]; Patrick T. I. Lam[2]; Daniel W. M. Chan, M.ASCE[3]; Esther Cheung[4]; and Yongjian Ke[5]

Abstract: The private sector has long been involved in delivering public sector projects, whether its role has been as a partner or just as a contractor for the government. Over recent years the interest in adopting public private partnerships (PPPs) has increased internationally. Many research studies have presented positive reasons for the governments and the private sector to welcome this form of procurement, rather than continue adopting the traditional options. This paper aims to explore and compare the key drivers for adopting PPP in China and the Hong Kong Special Administrative Region (referred to as Hong Kong from here onwards). An empirical questionnaire survey was conducted in both of these administrative systems and survey respondents were invited to rate their perceptions on the importance of 15 different drivers identified. Eighty-seven completed survey questionnaires were returned for analysis. The findings indicated that respondents from China rated economy-related drivers higher, whereas Hong Kong respondents tended to rate efficiency-related drivers higher. China's demand for more public infrastructure and services has imposed great pressure on the government's budget, and therefore economic drivers were rated higher. On the other hand, with adequate financial reserve in hand and budget surplus over recent years, Hong Kong has tended to prefer paying for projects upfront, and hence efficiency was regarded more significantly. Among the 15 drivers, both of the respondents from China and Hong Kong selected, "provide an integrated solution (for public infrastructure/services)" and "solve the problem of public sector budget restraint" to be within the top three drivers. Despite the general agreement on the ranking pattern, the results of independent two-sample t-test showed that China and Hong Kong shared very different views on the driver "reduce the total project cost." This driver was ranked rather high by the mainland Chinese respondents, but much lower by the Hong Kong respondents. This finding can be construed that economic drivers are in general rated higher in China as compared to that in Hong Kong.

DOI: 10.1061/(ASCE)CO.1943-7862.0000088

CE Database subject headings: China; Hong Kong; Infrastructure; Partnerships; Private Sector; Procurement; Contractors.

Introduction

Although Hong Kong is part of China, under the "one country, two systems" policy, the practice and experience of conducting public private partnership (PPP) projects in these places are quite different. Hong Kong has been governed by the British for a long duration. Moreover, during this time the western practices of running projects proactively have been assimilated by the local government. China on the other hand has always adopted a more conservative Asian approach to procuring projects. One major similarity between the two administrative systems is that both have had a strong interest in procuring more public projects by the PPP model.

Stepping into the 21st century, the bottleneck effect of infrastructure shortage for the Chinese economy emerged and imposed budgetary pressure on the mainland Chinese government. The investment in infrastructure development could not be completed by the Chinese government alone (Sachs et al. 2007) which provides a good business opportunity for the private investors. In Beijing alone, some of the recently implemented PPP projects include Metro Line 4 Project, Lugouqiao Sewage Treatment Plant Phase 1 Project, Gaoantun Waste-to-Energy Plant, National Stadium Project, and the Concession Project of Natural Gas in the East New District of Yizhuang Road (Beijing Municipal Commission of Development and Reform 2006a).

Hong Kong has secured a long history of launching PPP projects. The first and most famous PPP project in Hong Kong is the Cross Harbour Tunnel which was delivered by Build-Operate-Transfer model in the late 1960s (Chan et al. 2007a). Although this project experienced immediate success, a few other less successful attempts suggested that this model was not easy to follow. Hence the government slowed down as there was never any desperate urge to adopt PPP anyway. In recent years, PPP has been popularly used worldwide. Apart from the obvious financial ad-

[1]Professor and Associate Head, Dept. of Building and Real Estate, Hong Kong Polytechnic Univ., Hung Hom, Kowloon, Hong Kong Special Administrative Region, China. E-mail: bsachan@polyu.edu.hk

[2]Associate Professor, Dept. of Building and Real Estate, Hong Kong Polytechnic Univ., Hung Hom, Kowloon, Hong Kong Special Administrative Region, China. E-mail: bsplam@polyu.edu.hk

[3]Assistant Professor, Dept. of Building and Real Estate, Hong Kong Polytechnic Univ., Hung Hom, Kowloon, Hong Kong Special Administrative Region, China. E-mail: bsdchan@polyu.edu.hk

[4]Research Associate, Dept. of Building and Real Estate, Hong Kong Polytechnic Univ., Hung Hom, Kowloon, Hong Kong Special Administrative Region, China (corresponding author). E-mail: bsesther@polyu.edu.hk

[5]Ph.D. Candidate, Dept. of Construction Management, Tsinghua Univ., Beijing 100084, China. E-mail: kyj05@mails.tsinghua.edu.cn

Note. This manuscript was submitted on April 2, 2008; approved on May 4, 2009; published online on October 15, 2009. Discussion period open until April 1, 2010; separate discussions must be submitted for individual papers. This paper is part of the ***Journal of Construction Engineering and Management***, Vol. 135, No. 11, November 1, 2009. ©ASCE, ISSN 0733-9364/2009/11-1115–1124/$25.00.

vantages of adopting PPP, other drivers of this relatively new approach were also observed. As such, the Hong Kong SAR government has been increasingly more interested in pursuing public projects via PPP scheme. Recently, a number of massive public sector projects have already been confirmed that the PPP model would be used for their procurement. These projects include the cross-delta bridge linking Hong Kong, Zhuhai and Macau (Note: The project was originally planned to be procured by PPP but this is no longer the case. It has been confirmed that the three governments will finance the project.) (Lam 2008). The idea for this bridge was first proposed 25 years ago. It will span 29.6 km and shorten the normally one hour journey to approximately 15 min. Another recent project is the Shatin to Central rail link and the Kwun Tong rail extension. The new Metro line will consist of nine stations. Construction will start in 2010 and the two phases of the line will be completed by 2015 and 2019 (Information Services Department 2008).

The interest over PPP proves that it has its own attractiveness. The findings presented in this paper examine specifically those drivers for adopting PPP instead of traditional procurement in both China and Hong Kong. This study is part of a research study looking at developing a best practice framework for PPPs in Hong Kong (Chan et al. 2007b).

Literature Review of Drivers of PPP

A comprehensive literature review was conducted to study the drivers of PPP to the public sector. Sixteen pieces of relevant published literature including textbooks, research reports, journal articles, conference papers, and internet materials were reviewed thoroughly. Table 1 shows a summary of the analysis of these pieces of literature. From the literature review, 11 key drivers of PPP to the public sector were identified. For each driver identified the number of times it was mentioned among the 16 pieces of literature was recorded. The results found that the identified drivers could be grouped under five principal headings:

1. Equitable risk sharing.
   a. Achieving substantial risk transfer.
2. Cost savings and value for money.
   a. Cost savings;
   b. Value for money; and
   c. Cost certainty.
3. Enhanced asset quality and service levels.
   a. Time savings;
   b. Time certainty;
   c. Innovations in public services; and
   d. Better maintenance of assets.
4. Reduced public financing.
   a. Reduced public funding.
5. Catalyst for the economy.
   a. Encouraging cooperation and
   b. Enhancing social development and business opportunities.

Equitable Risk Sharing

The private sector is in general more efficient in asset procurement and service delivery and as a result it is to the government's advantage to share the associated risks with the private sector. In line with widely accepted principles, Hong Kong government's Efficiency Unit (2003) advocated that the most ideal situation is to allocate the risk to the party most able to manage/control that risk. For example, the contractor would take up the construction risk, the designer would take up the design risk, and the government would take up environmental approval risks, land acquisition risks, etc. (Corbett and Smith 2006; Chan et al. 2006; Grimsey and Lewis 2004; Boussabaine 2007; Akintoye et al. 2003; Li et al. 2005; So et al. 2007; Li 2003; Efficiency Unit 2003; Ingall 1997; New South Wales Government 2006; European Commission 2003; Efficiency Unit 2002; United Nations Economic Commission for Europe 2004; British Columbia 1999).

Cost Savings and Value for Money

Cost savings refer to the reduction in price as a result of delivering a project by PPP instead of traditional methods. The savings could be a result of the private sector's innovation and efficiency which the public sector may not achieve (Corbett and Smith, 2006; Environment, Transport and Works Bureau 2004; Grimsey and Lewis 2004; Akintoye et al. 2003; Li et al. 2005; So et al. 2007, Li 2003; Efficiency Unit 2003; European Commission 2003; United Nations Economic Commission for Europe 2004; British Columbia 1999). Private sector generally achieves higher operational efficiency in asset procurement and service delivery by applying their expertise, experience, innovative ideas/technology (e.g., using durable materials to reduce future maintenance cost), and continuous improvements. Overall cost savings to the project can be achieved by striving for the lowest possible total life cycle costs while maximizing profits.

Value for money, defined by Grimsey and Lewis (2004) as the optimum combination of whole life cycle costs, risks, completion time, and quality in order to meet public requirements, is another important consideration especially for the public sector (Chan et al. 2006; Grimsey and Lewis 2004; Boussabaine 2007; Li et al. 2005; Li 2003; Efficiency Unit 2003; Ingall 1997; New South Wales Government 2006; European Commission 2003; Efficiency Unit 2002). "Public sector comparator" is the most common tool used by the public sector to show how much it would cost the government to build the asset through public funding, which is then used to compare with how much it would cost to build it as a PPP (Farrah 2007).

Enhanced Asset Quality and Service Levels

Innovation is another important advantage that the private sector can bring to public services. Generally speaking, the public sector may not be as innovative as in the private sector. The private sector on the other hand is continuously searching for new products and services to increase their competitive edge and to save costs (Chan et al. 2006; Environment, Transport and Works Bureau 2004; Akintoye et al. 2003; Li et al. 2005; Li 2003; Efficiency Unit 2003; New South Wales Government 2006; Efficiency Unit 2002; British Columbia 1999).

Private sector is made responsible for ensuring that the asset and service delivered meet preagreed quality benchmarks/standards throughout the life of the contract. Sometimes, private consortium would only receive payment upon meeting certain requirements of the project; or it is motivated by the incentive payments to reward the high quality of service to be provided.

In a PPP project the consortium is also responsible for the long-term maintenance of the facility/service. The concession period may range from a few years to decades. Therefore the consortium is keen to design and construct the service/facility to ensure better maintainability (Chan et al. 2006; Environment, Transport and Works Bureau 2004; Grimsey and Lewis 2004;

Table 1. Drivers of PPP from Published Literature

	Drivers of PPP											
	Equitable risk sharing	Cost savings and value for money			Enhanced asset quality and service levels				Reduced public funding	Catalyst for economy		
Literature	Achieving substantial risk transfer	Cost savings	Value for money	Cost certainty	Time savings	Time certainty	Innovations in public services	Better maintenance of assets	Reduced public funding	Encouraging cooperation	Enhancing social development and business opportunities	Total number of drivers identified from each publication
Corbett and Smith (2006)	x	x		x								3
Chan et al. (2006)	x		x	x		x	x	x				6
Environment, Transport and Works Bureau (2004)		x		x	x		x	x		x		6
Grimsey and Lewis (2004)	x	x	x		x			x		x		6
Boussabaine (2007)	x		x	x				x		x		5
Akintoye et al. (2003)	x	x	x		x		x					5
Li et al. (2005)	x	x					x					3
So et al. (2007)	x	x	x					x			x	5
Li (2003)	x	x			x		x	x	x		x	7
Efficiency Unit (2003)	x	x	x		x		x	x			x	7
Ingall (1997)	x		x									2
New South Wales Government (2006)	x		x				x					3
European Commission (2003)	x	x	x							x		4
Efficiency Unit (2002)	x		x				x		x			4
United Nations Economic Commission for Europe (2004)	x	x								x	x	4
British Columbia (1999)	x	x					x				x	4
Total number of citations for a certain driver	15	11	10	4	5	1	9	7	2	5	5	74

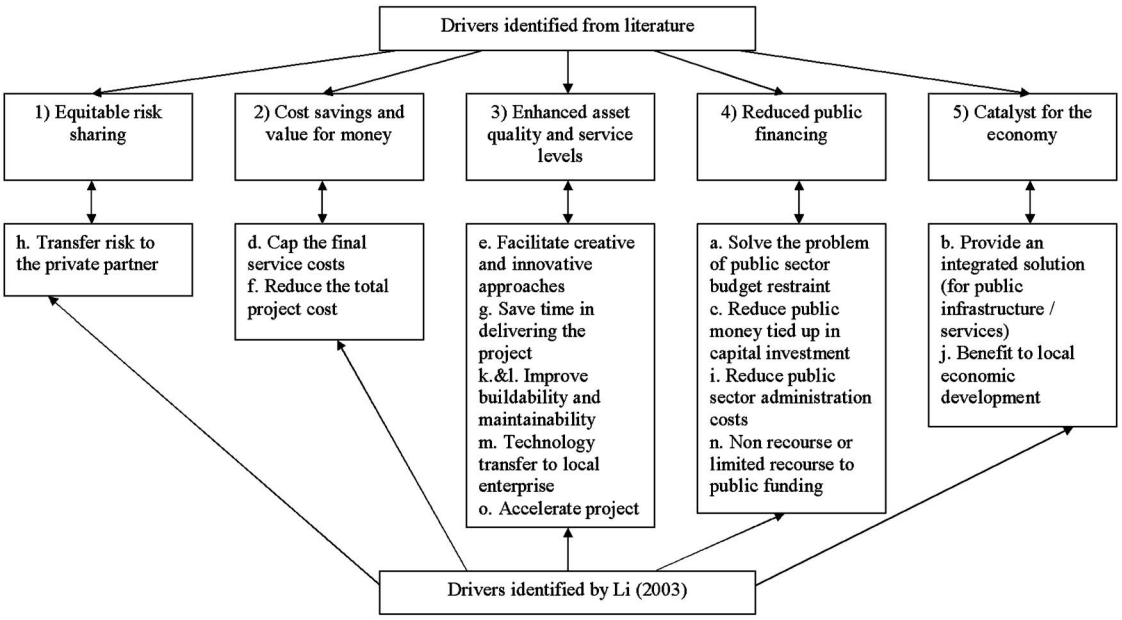

Fig. 1. Summary of drivers for adopting PPP as identified from literature and by Li (2003)

Boussabaine 2007; So et al. 2007; Li 2003; Efficiency Unit 2003), at least within the concession period if not beyond.

Reduced Public Financing

To the government, PPP frees up fiscal funds for other areas of public service, and improves cash flow management as high up-front capital expenditure is replaced by periodic service payments and provides cost certainty in place of uncertain calls for asset maintenance and replacement. Consequently, the public funding required for public services can be reduced and redirected to support sectors of higher priority, e.g., education, healthcare, community services, etc. (Li et al. 2005; Efficiency Unit 2002).

Catalyst for the Economy

To the private sector participants, PPP provides access to public sector markets. If priced accurately and costs managed effectively, the projects can provide reasonable profits and investment returns on a long-term basis. Also, these projects tend to be large and therefore expertise from many areas is required. Hence cooperation among different collaborating parties is encouraged (Environment, Transport and Works Bureau 2004; Grimsey and Lewis 2004; Boussabaine 2007; European Commission 2003; United Nations Economic Commission for Europe 2004). Business opportunities are also created, due to the large scope of works that can benefit different sectors (So et al. 2007; Li 2003; Efficiency Unit 2003; United Nations Economic Commission for Europe 2004; British Columbia 1999).

Previous Research on Drivers of PPP

The drivers identified from reported literature (as discussed previously in this paper) were compared to those researched by Li (2003). The results in Fig. 1 show that all drivers identified by literature compliment those sought by Li (2003). Although the writers could have developed their own research questionnaire, there were advantages foreseeable to adopt the survey questionnaire of Li (2003) rather than designing a new template. First, the value of Li's 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. Also, by administering Li's questionnaire again but in different administrative systems would be of interest for comparison purposes in the future. Therefore Li's questionnaire was adopted for the survey as presented in this paper with prior permission obtained from the writer Dr. Li Bing and his doctoral research supervisor, Professor Akintola Akintoye who is currently the Head of the School of Built and Natural Environment, University of Central Lancashire, United Kingdom.

Research Methodology

Collection of Research Data

An empirical questionnaire survey was undertaken in both China and Hong Kong from October 2007 to December 2007, to compare and contrast the drivers for adopting PPP in these two similar and yet different administrative systems. In this study, the target survey respondents of the questionnaire included all industrial practitioners from the public, private, and other sectors. These respondents were requested to rate their degree of agreement against each of the identified drivers 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 in PPP projects. Survey questionnaires were sent to 103 target respondents in China and 95 target respondents in Hong Kong. It was anticipated that some of these target respondents would have colleagues and personal connections that would be knowledgeable in the area of PPP to participate in this research study as well; hence some of the respondents were dispatched five blank copies of the survey form. A total of 53 completed questionnaires from China and 34 from Hong Kong were returned representing response rates of 52 and 36%, respectively.

The higher response rate in China compared to Hong Kong

was anticipated. There has not been that many PPP projects in Hong Kong hence the number of people involved in PPP projects would be less. China on the other hand has been involved in more PPP projects recently in comparison with Hong Kong. Also, the population size in China is much higher than Hong Kong. China has a booming population size of 1.32 billion as recorded in March 2008 (China Population Development and Research Center 2008), and although Hong Kong is densely populated for a city of its size, its population is much smaller than China at only 6.96 million at the end of 2007 (Census and Statistics Department 2008).

Tools for Data Analysis

Mean Score Ranking Technique

Chan and Kumaraswamy (1996) adopted the "mean score" (MS) method to establish the relative importance of reasons for delay in civil engineering projects in Hong Kong as suggested by the clients, consultants, and contractors. The data collected from the current questionnaire survey was also analyzed using the same technique, within various groups as categorized according to the origin of the respondents (China and Hong Kong). The five-point Likert scale described previously was used to calculate the MS for each driver, which was then used to determine their relative rankings in descending order of importance. These rankings made it possible to cross-compare the relative importance of the drivers to the respondents from China and Hong Kong. The MS for each driver was computed by the following formula:

$$\text{MS} = \frac{\Sigma(f \times s)}{N}, \quad (1 \leqslant \text{MS} \leqslant 5) \tag{1}$$

where s=score given to each driver by the respondents and ranging from 1 to 5 (1=least important and 5=most important); f=frequency of response to each rating (1–5), for each driver; and N=total number of responses concerning that driver.

Kendall's Concordance Analysis

The survey respondents were based on two groups: China and Hong Kong. Kendall's concordance analysis was conducted to measure the agreement of different respondents on their rankings of drivers based on mean values within a particular group. If the Kendall's coefficient of concordance (W) was statistically significant at a predefined significance level of say 0.05, a reasonable degree of consensus among the respondents within the group on the rankings of drivers was indicated. The W for the drivers was calculated by the following formula (Siegel and Castellan 1988):

$$W = 12\frac{\sum_{i=1}^{n}(R_i - R)^2}{p^2(n^3 - n) - pT} \tag{2}$$

where n=number of drivers being ranked; R_i=ranks assigned to the ith driver; R=mean value of the R_i values; p=number of respondents; and T=correction factor for the tied ranks. 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 further achieved by referring to the table of critical values of chi-square distribution, which can also be found in Siegel and Castellan (1988).

Spearman Rank Correlation Test

The relationship between the two respondent groups (China and Hong Kong) on their rankings of drivers was measured by the Spearman rank correlation coefficient (r_s). If r_s was statistically significant at a 0.05 level of significance; then the null hypothesis that there is no relationship between the two ranks can be rejected. It means that the two rankings have correlation in certain way, either positive correlated or negative correlated (Chen and Popovich 2002; Higgins 2004). The Spearman rank correlation coefficient (r_s) for the drivers was computed by the following formula [Statistical Package for Social Sciences (SPSS) 2002]:

$$r_s = 1 - \frac{6\Sigma d^2}{N(N^2 - 1)} \tag{3}$$

where d=difference in rank of the two groups for the same driver and N=total number of responses concerning that driver. The analysis procedures described have also been used by other similar research survey studies such as Chan (2000) and Chan et al. (2003).

Independent Two-Sample t-Test

Independent two-sample t-test is used to test for a difference between two independent groups on the means of a continuous variable (SPSS 2002). If the test result was significant at the 0.05 level of significance, then the null hypothesis that the samples come from the same population, that is to say $\bar{\mu}_1 = \bar{\mu}_2$ can be rejected. (Chen and Popovich 2002; Higgins 2004). Several assumptions are made:

1. Two independent random samples have been extracted from each population;
2. The two populations are both normally distributed; and
3. The two populations have a common (equal) variance (if the number of cases in each of the groups is similar, then the equality-of-variance assumption is not so important).

The t-statistic can be defined in the following way (Keller 2005):

$$t = \frac{(\bar{x}_1 - \bar{x}_2) - (\bar{\mu}_1 - \bar{\mu}_2)}{\sqrt{s_p^2\left(\frac{1}{n_1} + \frac{1}{n_1}\right)}} \tag{4}$$

$$s_p^2 \frac{(n_1 - 1)s_1^2 + (n_2 - 1)s_2^2}{n_1 + n_2 - 2} \tag{5}$$

where n_1=number of observations for Group 1; n_2=number of observations for Group 2; $\bar{x}_1$=mean of Group 1; $\bar{x}_2$=mean of Group 2; $\bar{\mu}_1$=population mean for Group 1; $\bar{\mu}_2$=population mean for Group 2; s_1^2=sample variance for Group 1; and s_2^2=sample variance for Group 2.

Discussion of Survey Results

The drivers for adopting PPP were assessed from different perspectives of the China and Hong Kong respondent groups. The means for each administrative system were calculated and ranked in descending order of importance, as shown in Table 2 and Fig. 2. Also, the results were further compared to those findings derived from the study of Li (2003) conducted in the United Kingdom.

Table 2. MSs and Rankings for the Drivers of PPP

	United Kingdom (Li 2003)			China and Hong Kong			China			Hong Kong		
	N [a]	Mean	Rank	N [a]	Mean	Rank	N [a]	Mean	Rank	N [a]	Mean	Rank
A. Solve the problem of public sector budget restraint	61	3.86	2	85	3.82	2	51	3.94	2	34	3.65	3
B. Provide an integrated solution (for public infrastructure/services)	61	3.05	8	86	3.88	1	53	3.94	1	33	3.79	1
C. Reduce public money tied up in capital investment	61	3.58	4	86	3.67	3	53	3.79	3	33	3.48	6
D. Cap the final service costs	61	3.56	5	87	3.32	9	53	3.36	8	34	3.26	10
E. Facilitate creative and innovative approaches	61	3.36	7	87	3.55	5	53	3.43	7	34	3.74	2
F. Reduce the total project cost	61	2.97	10	85	3.51	6	52	3.77	4	33	3.09	14
G. Save time in delivering the project	61	2.75	12	87	3.24	12	53	3.26	10	34	3.21	13
H. Transfer risk to the private partner	61	3.98	1	87	3.38	8	53	3.21	11	34	3.65	4
I. Reduce public sector administration costs	61	2.53	14	86	3.43	7	53	3.45	6	33	3.39	8
J. Benefit to local economic development	61	2.62	13	87	3.66	4	53	3.72	5	34	3.56	5
K. Improve buildability	61	3.03	9	85	3.07	14	52	2.96	14	33	3.24	11
L. Improve maintainability	61	3.36	6	86	3.17	13	52	3.08	13	34	3.32	9
M. Technology transfer to local enterprise	61	1.82	15	87	2.93	15	53	2.92	15	34	2.94	15
N. Nonrecourse or limited recourse to public funding	61	3.61	3	87	3.26	11	53	3.30	9	34	3.21	12
O. Accelerate project development	61	2.95	11	87	3.30	10	53	3.19	12	34	3.47	7

[a]N=number of survey respondents.

Ranking of Drivers of PPP

The mean values for the drivers as rated by Chinese respondents ranged from 2.92 to 3.94. For those rated by respondents from Hong Kong the mean values ranged from 2.94 to 3.79. This observation has reflected that the variations in their responses are relatively small, only 1.02 and 0.85 for China and Hong Kong, respectively. In contrast, the British respondents rated the drivers from 1.82 to 3.98; the variation in their responses was 2.16. Another observation which can be made from the mean calculation is that 9 out of the 15 drivers were rated slightly higher by respondents in China compared to those in Hong Kong and vice versa for the remaining ones. As such, it must be noted that the means were interpreted directly. The differences observed do not indicate that the drivers were statistically significant. Categorically speaking, those nine drivers rated higher by respondents in China were economy-related drivers including:

1. Solve the problem of public sector budget restraint;
2. Provide an integrated solution (for public infrastructure/services);
3. Reduce public money tied up in capital investment;
4. Cap the final service costs;
5. Reduce the total project cost;
6. Save time in delivering the project;
7. Reduce public sector administration costs;
8. Benefit to local economic development; and
9. Nonrecourse or limited recourse to public funding.

For those six drivers observed to be higher for Hong Kong respondents, they were generally efficiency-related drivers covering:

1. Facilitate creative and innovative approaches;
2. Transfer risk to the private partner;
3. Improve buildability;
4. Improve maintainability;
5. Technology transfer to local enterprise; and
6. Accelerate project development.

With the rapid growth of the Chinese economy, the desperate demand for infrastructure development emerged in early 2000. Infrastructure investment could not be funded completely by the government alone (Sachs et al. 2007). Taking Beijing as an example, there will be about 2,400 infrastructure projects to be developed during 2006–2010 with a total investment of over RMB 470 billion, which may impose budgetary pressure on the government (Beijing Municipal Commission of Development and Reform 2006b). Therefore, economy-related drivers were scored higher by those respondents from China.

Efficiency-related drivers were rated higher by Hong Kong

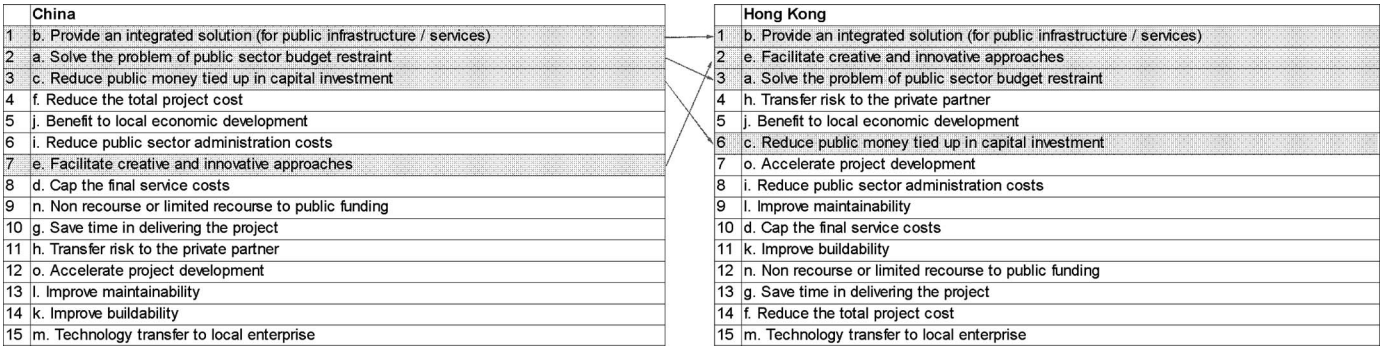

Fig. 2. Rankings of drivers for adopting PPP in China and Hong Kong

respondents according to direct observation. Although financial drive in general is a major reason for adopting PPP, respondents from Hong Kong did not rank it as the top driver. Since Hong Kong has enjoyed abundant financial reserve in hand and budget surplus over the past few years, these have allowed Hong Kong to pay for their public works projects upfront. The government officials generally did not see the need to borrow money when they could provide the cash cheaper. Hence efficiency drivers could really induce Hong Kong to adopt PPP.

The top three drivers selected by the Chinese respondents included: (1) provide an integrated solution (for public infrastructure/services); (2) solve the problem of public sector budget restraint; and (3) reduce public money tied up in capital investment. The first and second drivers mentioned were also selected by those respondents from Hong Kong in the top three ranks. The first driver "Provide an integrated solution" (for public infrastructure/services) was also positioned first in the ranking for Hong Kong but ranked much lower by the British respondents at the eighth position. The rankings have demonstrated that this driver was regarded similarly by respondents from China and Hong Kong.

PPP is an integrated solution in that a private consortium is responsible for all the functions of design, building, financing, operation, and maintenance. This bundling can allow the partners to take advantage of a number of efficiencies and increase economies of scale and scope (European Commission 2003). For instance, the contractor's detailed knowledge of the project design and the materials used allows it to develop a tailored maintenance plan over the project life that anticipates and addresses needs as they occur, thereby reducing the risk that issues will go unnoticed or unattended and then deteriorate into much more costly problems.

The second driver rated by the Chinese respondents "solve the problem of public sector budget restraint" was also positioned highly at the third place in the ranking of Hong Kong respondents and the second for the British ranking. Therefore, both administrative systems perceived this driver as highly important for launching PPP projects. The financing of public sector projects has been recognized as one of the key initial driving forces for implementing PPP schemes internationally. Many experienced practitioners in PPP believe that PPP brings about many other attractions besides financing, and that financial motivations should not be taken as the sole reason for adopting PPP. However, financial reasons are frequently the initial drivers for administrative systems adopting PPP. This financial driver is undoubtedly very attractive for governments across the world especially when public money is to be spent among competing needs. Therefore, it is not surprising that both groups of respondents have rated this driver highly, but with a subtle difference in emphasis.

The third driver ranked by the Chinese respondents was "reduce public money tied up in capital investment." This driver was ranked the sixth place by the Hong Kong respondents and the fourth place by the British respondents. This result is logical as traditionally China has a lot more investments and involvement in public projects compared to Hong Kong and the United Kingdom. The Chinese government is continuing to invite foreign companies and domestic private capital to participate in infrastructure development and public services. In the 11th Five-Year Plan on foreign capital utilization, foreign investments will be actively used to speed up the construction of transportation projects such as highways, ports, and railways, as well as urban infrastructure construction such as rail traffic, water supply, gas supply, heat supply, sewage, and garbage treatment, etc. In particular, investments in urban infrastructure construction in the old industrial bases in the central and western regions and those in northeastern regions, and in the development of the succeeding industries in resource-scarce cities are strongly encouraged (The National Development and Reform Commission 2006).

Table 3. Results of Kendall's Concordance Analysis for the Drivers of PPP

	China and Hong Kong	China	Hong Kong
Number of survey respondents	79	49	30
Kendall's coefficient of concordance (W)	0.074	0.108	0.071
Chi-square value	81.852	74.312	29.907
Critical value of chi-square	23.680	23.680	23.680
Degree of freedom (df)	14	14	14
Asymptotic significance	0.000	0.000	0.008

The second driver in the Hong Kong ranking, "facilitate creative and innovative approaches," was positioned the seventh among the 15 drivers in the China ranking. The rankings show that although Hong Kong rated this driver high the respondents from China only rated it averagely. The findings of Li (2003) also found that this driver was rated the seventh place among 15 drivers for PPP, agreeing with those respondents in China for this survey. This observation manifests that Hong Kong has a much larger urge for having creativity and innovation in PPP projects compared to China and the United Kingdom. Practitioners in Hong Kong have also expressed in public the need and importance for creativity and innovation in PPP projects (Kwan 2005; Ho 2005).

As the respondents were asked to rate the 15 drivers according to a Likert scale, a value greater than 3 would represent that the driver is of importance. There were two drivers in the China ranking that were less than the mean value of 3. These included "technology transfer to local enterprise" and "improve buildability" with MSs of 2.92 and at 2.96, respectively. The first of these drivers was also less than a value of 3 in the Hong Kong ranking. The MS for this driver was 2.94. Respondents from all three administrative systems (China, Hong Kong, and the United Kingdom) have rated "technology transfer to local enterprise" bottom of their ranks. This is probably because the immediate results of this driver could not be seen and therefore the other 14 drivers were relatively more attractive.

Agreement of Respondents within China and Hong Kong

As shown in Table 3, the Kendall's coefficient of concordance (W) for the rankings of drivers was 0.074, 0.108, and 0.071 for China and Hong Kong, China, and Hong Kong, respectively. The computed W's were all significant with $p=0.000$.

As the number of attributes considered were greater than 7, 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 23.680. For all three groups (China and Hong Kong, China, and Hong Kong) the computed chi-square values were all greater than the critical value of chi-square (81.852, 74.312, and 29.907 for China and Hong Kong, China, and Hong Kong, respectively). Therefore the assessment

Table 4. Results of Independent Two-Sample t-Test for Drivers of PPP as Identified by Chinese and Hong Kong Respondents

			Levene's test for equality of variances		t-test for equality of means		
			F	Significance	t	Degree of freedom	Significance (two-tailed)
A	Solve the problem of public sector budget restraint	Equal variances assumed	1.304	0.257	−1.272	83	0.207
		Equal variances not assumed			−1.250	66.642	0.216
B	Provide an integrated solution (for public infrastructure/services)	Equal variances assumed	2.730	0.102	−0.692	84	0.491
		Equal variances not assumed			−0.714	74.952	0.477
C	Reduce public money tied up in capital investment	Equal variances assumed	3.296	0.073	−1.207	84	0.231
		Equal variances not assumed			−1.138	55.554	0.260
D	Cap the final service costs	Equal variances assumed	7.759	0.007	−0.355	85	0.723
		Equal variances not assumed			−0.384	84.456	0.702
E	Facilitate creative and innovative approaches	Equal variances assumed	2.325	0.131	1.435	85	0.155
		Equal variances not assumed			1.485	78.123	0.142
F	Reduce the total project cost	Equal variances assumed	8.581	0.004	−2.835	83	0.006
		Equal variances not assumed			−3.060	82.046	0.003
G	Save time in delivering the project	Equal variances assumed	0.537	0.466	−0.258	85	0.797
		Equal variances not assumed			−0.268	79.149	0.789
H	Transfer risk to the private partner	Equal variances assumed	0.711	0.402	1.897	85	0.061
		Equal variances not assumed			1.945	76.149	0.055
I	Reduce public sector administration costs	Equal variances assumed	0.333	0.566	−0.285	84	0.776
		Equal variances not assumed			−0.289	70.975	0.774
J	Benefit to local economic development	Equal variances assumed	1.368	0.245	−0.641	85	0.523
		Equal variances not assumed			−0.623	63.799	0.535
K	Improve buildability	Equal variances assumed	1.048	0.309	1.128	83	0.263
		Equal variances not assumed			1.098	62.274	0.276
L	Improve maintainability	Equal variances assumed	0.265	0.608	1.009	84	0.316
		Equal variances not assumed			1.032	75.838	0.305
M	Technology transfer to local enterprise	Equal variances assumed	0.303	0.583	0.063	85	0.950
		Equal variances not assumed			0.065	75.268	0.949
N	Non recourse or limited recourse to public funding	Equal variances assumed	2.883	0.093	−0.340	85	0.735
		Equal variances not assumed			−0.358	81.454	0.721
O	Accelerate project development	Equal variances assumed	0.283	0.596	1.146	85	0.255
		Equal variances not assumed			1.193	79.345	0.236

by the respondents within each group on their rankings of drivers is proved to be consistent. This finding ensures that the completed questionnaires are valid for further analysis.

Relationship of Respondents between China and Hong Kong

The next stage of the analysis was to test whether there is any substantially similar relationship among the respondents between the two places which is determined by the Spearman rank correlation coefficient (r_s) again using the SPSS statistical package. The correlation coefficient of the rankings on drivers was 0.515 which is statistically significant at a 0.05 level. From these results we rejected the null hypothesis of mutual independence between the rankings of PPP drivers of the PRC respondents and the Hong Kong respondents. The r_s value of 0.515 indicates that the two sets of rankings are positively correlated to a certain extent.

Furthermore, the independent two-sample t-test was undertaken to examine if there was any significant difference in mean value responses between the two respondent groups for each of the 15 PPP drivers discussed. Differences were found by visual observation of the ranked factors; the findings from this test will further verify which drivers are statistically significant. When the calculated significance level is less than the allowable value of 0.05 for a certain driver, a large variation is detected between the views of the respondents from China and Hong Kong. A significance level less than 0.05 was used because this degree of significance has been commonly used by other researchers in similar studies. The population means are unknown as it would be impossible to know exactly how many industrial practitioners are involved with PPP projects in China and Hong Kong. Among the t-test results for the fifteen drivers between China and Hong Kong respondents, only one driver had a significance level less than 0.05 (Table 4), the others were not statistically significant. For the driver "reduce the total project cost," the significance levels showed that the respondents from China and Hong Kong shared very different views on their importance. The significance calculated by Levene's Test for Equality of Variances was considered. This significance was 0.004, also less than 0.05, and hence equal variances are not assumed. The significance for this driver is therefore 0.003 meaning that both administrative systems shared very different perspectives on the importance of this particular driver.

Referring back to Fig. 2 again "reduce the total project cost" was ranked the fourth in China whereas in Hong Kong this driver

was ranked the 14th. This manifests that the financial element and importance is regarded much more highly by mainland Chinese respondents than by Hong Kong respondents. This yet again reinforces the previous assertion that the Hong Kong government is financially more comfortable to deliver public works projects out of its own pocket.

In addition, it must be noted that according to the independent two-sample t-test results only one driver was found to be statistically significant, therefore the null hypothesis was rejected for this one driver only. No significant differences were found for the remaining 14 drivers, although in general the Chinese respondents were observed to have rated economic drivers higher than their Hong Kong counterparts did. Common variance was also assumed for the drivers in general.

Conclusions

This paper has looked at the perceptual differences between respondents from China and Hong Kong on the drivers for adopting PPP instead of traditional procurement. Although Hong Kong is part of China, the views of respondents between these two administrative systems were found to be quite different from this research survey. The major differences observed were the views of the respondents toward the drivers. Since China is currently undergoing rapid urban development and construction, this has placed tremendous economic pressure on the government's budget. On the other hand the Hong Kong Special Administrative Region government is not overburdened by the lack of economic resources to provide for the necessary public infrastructure and services. As a result the findings revealed that the drivers rated higher by Chinese respondents were economy-related, whereas the Hong Kong respondents rated efficiency-related drivers higher.

Respondents from both China and Hong Kong rated "provide an integrated solution (for public infrastructure/services)" the highest. Ranked second place by Chinese respondents and third place by Hong Kong respondents was "solve the problem of public sector budget restraint." The third driver ranked by respondents in China was "reduce public money tied up in capital investment;" this driver was ranked the sixth by respondents in Hong Kong. The second driver in the Hong Kong ranking, "facilitate creative and innovative approaches," was positioned the seventh among the 15 drivers in the China ranking. Therefore, two out of the top three drivers ranked by respondents in China were also similarly ranked by those respondents in Hong Kong.

The assessment by the respondents within each group on their rankings of drivers was proven by the Kendall's coefficient of concordance to be statistically consistent. The null hypothesis that there is no association of PPP drivers between the Chinese and Hong Kong respondents was rejected by the Spearman rank correlation test. Hence, the two sets of rankings between two administrative systems are positively correlated to a certain extent. An exception to the agreement as identified by the independent two-sample t-test was noted for "reduce the total project cost." This driver was ranked the fourth in China but the 14th in Hong Kong. This significant difference confirms that the respondents from China rate economic factors much higher than Hong Kong respondents.

Acknowledgments

The work described in this paper was fully supported by a grant from the Research Grants Council of the Hong Kong Special Administrative Region, China (RGC Contract No. PolyU 5114/05E). Sincere thanks go to Dr. Bing Li and Professor Akintola Akintoye for permitting the research team to adapt their survey questionnaire template. Special gratitude is also extended to those industrial practitioners from both China and Hong Kong, who have kindly participated in the questionnaire survey reported in this paper from October 2007 to December 2007. This paper forms part of the research project entitled "Developing a Best Practice Framework for Public Private Partnerships (PPP) in Hong Kong," from which other deliverables have been produced with different objectives/scope but sharing common background and methodology.

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