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Public Private Partnership in Malaysia: The Differences in Perceptions on the Criticality of Risk Factors and Allocation of Risks between the Private and Public Sectors

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ABSTRACT

Public private partnership (PPP) was introduced in Malaysia in the 1980s. Malaysian government used this tool for the provision of infrastructure and public services efficiently. However, a few PPP arrangements are under-achieved due to problems in risk identification and management. Therefore, this paper aims to rank risk factors based on criticality. Apart from ranking of risks, this paper provides preferred allocation of critical risk factors. In addition, this study aims to assess the difference of perceptions about the criticality of the risks between contracting parties. First, a few interviews were conducted to screen the risk factors provided in literature and then a set of questionnaires was served upon both private and public sector for the ranking and allocation of risks. To rank risks, a matrix was provided to the respondents and the percentage method was used to allocate the risks. The results of study suggest that 31 out of 44 risk factors are critical and out them 5 critical risk factors should preferably be allocated to private sector. However, a significant difference in perceptions of private and public sector about critically of risks has been identified. The results conclude that the construction and operation stages are critical and for the success of PPP projects both public and private sectors have to improve risk communication to avoid the difference in perception about criticalities of risks.

Keywords: Public Private Partnership, Infrastructure, Risk Factors, Policymakers and Private Sectors
JEL Classifications: D81, G32, L33

1. INTRODUCTION

The provision of infrastructure is the prime responsibility of a government but these days governments are finding it difficult to meet infrastructure requirements due to budgetary pressure. However, economic growth is correlated with infrastructure development (Takim and Akintoye, 2002). In order to cope with this situation governments are seeking involvement of the private sector in different forms and one of them is public private partnership (PPP). PPP project is a long-term contract that involves public sector party and private sector party to build a facility, however, private sector design, finance, construct and operate the project but ownership remains with public sector or revert to public sector party after certain time (Yescombe, 2011). Governments adopt PPP for better value for money and to share risks in delivering public services (Li et al., 2005).

The base of private sector involvement in infrastructure development was set by "Malaysia incorporated policy" in 1981 followed by "privatization policy" established in 1983. Government of Malaysia invites private sector in public projects to meet growing demand of infrastructure and as strategy to save money for other public services (Ismail et al., 2012). Since 1983, Government of Malaysia launched 500 projects with the assistance of private sector under PPP arrangements and saved capital expenditure of RM 161 billion (UKAS, NA).

However, Markom and Ali (2012) postulated three reasons for the underachievement of the light rail transit (LRT) projects. First, they had not achieved the projected cash flows due to lower number of actual passengers. Second, budgeted high construction cost led to high percentage of debt and the third was the lack of parking facilities at LRT stations. All these problems have been

associated with risks of demand, financial viability, cost of debt and technical design which were not properly hedged in LRT projects in Malaysia. Similarly, the Malaysian highway projects Kulim-Butterworth highway and Guthrie corridor expressway faced problems because of bad identification and allocation of risks (Markom et al., 2012). Beh (2010) also claimed that the issues of underperformance and underachievement for Malaysian PPP arrangements are highly related to poorly managed risks by any of the contracting party, inadequate framework, control system and accountability system. All these problems highlight two major questions. What are the critical risks for PPP projects in Malaysia and which contracting party should bear those critical risks?

However, there is dearth of literature concerning the risks preferences for PPP projects in Malaysia. Although Li et al. (2005) and Hwang et al. (2013) have postulated the critical risks for PPP projects in UK and Singapore respectively but those results are not applicable for Malaysian PPP projects. The main reason for non-application of those results is diversity of Malaysian PPP projects. Li et al. (2005) have selected some construction projects for his study in UK and the same as Hwang et al. (2013) have selected some build operate transfer (BOT) projects in Singapore. However, in Malaysia, many types of PPP projects have been implemented like build lease maintain and transfer (BLMT), BOOT, build own operate (BOO), land transfer and BOT. In different parts of the world, risks have been ranked but some researchers either consider one type of PPP or take PPP as overall for risk identification. This study aims to consider the all types of PPP projects in Malaysia.

In Malaysian PPP projects, the problem of trust and coordination deficit also exists. For the success of the PPP projects, performance of both public and private sector and coordination of both are essential factors (Rahman et al., 2014). According to Soomro and Zhang (2013), in PPP projects neither public nor private sector cause problems to each other but their actions towards hedging a risk does cause problems and this happens due to their difference in perception about the criticality of the risks. As all contracting parties in PPP have different roles (Ismail, 2013) and different risks may pose different meanings to different people or even one risk may mean differently to one person at different stage of project. Therefore, it is very important to know the difference of perception between contracting parties about risks (Akintoye et al., 2003). This gives another dimension to the current study to ascertain the difference in perception of special purpose vehicle (SPV)/private sector and public sector about the criticality of the risks.

2. LITERATURE REVIEW

2.1. Risk

Edwards and Bowen (2003) quoted Royal Society report and defined risk as "the probability that a particular adverse event occurs during a stated period of time." This definition draws the attention of all practitioners as it highlights the risk elements: "Chances of occurrence," "unfavorable impact" and "duration of exposure to risk." Traditionally, Li et al. (2005) and Hwang et al. (2013) claimed the risk as "uncertain event which can impact the success." Therefore, normally risk has been measured by its "impact" and "chance of occurrence." ISO 31000 defines risk as uncertainty that affects the objectives (ISO, 2009).

2.2. Risks in PPP Projects

Edwards et al. (2003) concluded that in PPP projects, risk depends on decision making process of all stakeholders, however, perception and impact of these risks vary from stakeholder to stakeholder and project to project. Hwang et al. (2013), Ke et al. (2010), Li et al. (2005) identified different risks for PPP projects. The Table 1 shows all the identified risks for PPP projects in different regions. The Table 1 shows that most of the risks have been explored for BOT projects and for infrastructure projects, however, in Malaysia other types of PPP have been practiced widely in almost all sectors including health and education (Ukas, NA).

2.3. Risk Perception

Akintoye et al. (2003) suggested that the meaning of risks varies from practitioner to practitioner indicating that difference in risk perception is natural. Likewise, Demirag et al. (2010) also postulated that in UK PPP projects, for different stakeholders different risks are important. For example, for public sector most important risks is contractor failure and demand risk, for financer the insolvency of debtor and for contractor design risk is important (Fischer et al., 2010). This diversity of risk perception affects the risk assessment process in PPP projects (Demirag et al., 2010) so difference in risk perceptions should be identified and solved by stockholders through risk communication. The current research aims to highlight the differences in perception about the criticality of risks.

3. METHODOLOGY

This study adopts a set of questionnaire by Li et al. (2005) and Hwang et al. (2013). However, some interviews have been conducted with directors and mangers of the Prime-Minster PPP Department Malaysia to discuss the risks before distributing the questionnaires. In interviews, first of all, the identified risks in literature (Table 1) are discussed. After interviews, four risks: Lack of tradition of private provision of public services, poor quality of workmanship, scope variation and the third party tort liability, have not been considered viable and thus they are removed.

The first part of questionnaire consisted of questions used for developing profiles of the respondents. The second part examined the risks criticality and preferences of risk allocation. The matrix of table (Appendix A) was provided to the respondents to rate the risks factors.

A 5-degree rating scale (Lowest = 1; Low = 2; Moderate = 3; High = 4 and Extreme = 5) is used to gauge the criticality of risk then the mean score ranking technique is used for analysis which is also employed by Hwang et al. (2013). However, the same technique of Hwang et al. (2013) calculating percentage of respondents is used to allocate the risk to public sector, private sector or to be shared in both sectors.

Moreover, 150 questionnaires were emailed as well as posted by ordinary mail to public and private sector. Finally, 47 from

Table 1: Risks for PPP projects

References	Kumaraswamy and Zhang (2001)	Grimsey and Lewis (2002)	Li et al. (2005)	Shen et al. (2006)	Ng and Loosemore (2007)	Estache et al. (2007)	Medda (2007)	Zou et al. (2008)	Thomas et al. (2003)
Type of PPP	BOT	Overall PPP	All types	Overall PPP	Overall PPP	Overall PPP	Overall PPP	Overall PPP	BOT
Country	Hong Kong	UK	Hong Kong	Australia	US		Australia, China	India
Sector	Infrastructure	Transport	All sectors	Infrastructure	Infrastructure	Transport	Transport	Infrastructure	Transport
Risk for PPP projects in Malaysia									
Availability of finance			*	*				*	*
Change in tax regulation	*		*		*	*	*		
Construction cost overrun			*						*
Construction time delay			*		*	*			*
Corruption and bribery	*		*					*	
Delay in project approvals and permits			*	*	*				
Design deficiency			*	*			*	*	
Differences in working method and know-how between partners			*						
Environment		*	*						
Excessive contract variation			*						
Expropriation or nationalization of assets	*		*		*	*	*		
Financial attraction of project to investors			*						
Force majeure	*	*	*		*	*			
Geotechnical conditions			*		*				
High finance costs			*				*		
Inadequate distribution of authority in partnership			*						
Inadequate distribution of responsibilities and risks			*						
Inadequate experience in PPP/PFI			*	*	*		*		
Industrial regulatory change	*		*						
Inflation rate volatility	*		*	*		*		*	
Influential economic events			*						
Insolvency/default of sub-contractors or suppliers			*						
Interest rate volatility	*		*		*	*	*	*	
Lack of commitment from either partner			*		*				
Lack of tradition and knowledge of PPP			*						
Land acquisition (site availability)			*		*				*
Late design changes			*						
Legislation change	*	*	*	*	*	*			
Level of demand for project	*	*	*			*	*	*	*
Level of public opposition to project		*	*			*		*	
Low operating productivity			*						
Maintenance costs higher than expected			*						
Maintenance more frequent than expected			*						
Material/labor availability	*		*	*	*	*			

(Contd...)

Table 1: *(Continued)*

References	Kumaraswamy and Zhang (2001)	Grimsey and Lewis (2002)	Li et al. (2005)	Shen et al. (2006)	Ng and Loosemore (2007)	Estache et al. (2007)	Medda (2007)	Zou et al. (2008)	Thomas et al. (2003)
Operation cost overrun		*	*		*	*			
Operational revenues below expectation			*						
Organization and co-ordination risk			*	*	*				
Poor financial market			*					*	
Poor public decision-making process			*						
Poor quality of workmanship*			*						
Residual risks			*		*				
Scope variation*		*		*					
Staff crises*			*						
Strong political opposition/ hostility	*		*	*	*		*		
Third party tort liability*			*						
Unproven engineering techniques			*		*	*			
Unstable government			*					*	
Weather			*		*				

PPP: Public private partnership, BOT: Build operate transfer, PFI: Private finance initiative

public sector and 42 from private sectors responded. The target respondents were middle and top management personals from both public sector (Prime-Minster PPP department) and private sector.

4.1. Data Analysis

4.1.1. Demographic analysis

Table 2 illustrates the number of respondents from both public and private sectors. All respondents from both sectors are classified according to the nature of the projects i.e. transportation, housing, education and health. Most of the respondents belong to transportation sector as in Malaysia PPP projects are mostly for transportation and housing as mentioned by Markom et al. (2012) but other sectors are in significant number as well.

Table 3 indicates the experience of the respondents that is very important for reliability of data and perceived ranks (scores). Almost 92% of respondents from public sector have experience of more than 5 years while in 67% respondents from private sector have experience of more than 5 years.

Table 2: Project type of survey respondents

Type of PPP project	Frequency (%)	
	Public sectors respondents	Private sector respondents
Transportation	18 (38.30)	17 (40.48)
Housing	13 (27.66)	8 (19.05)
Education	9 (19.15)	9 (21.43)
Health	7 (14.89)	8 (19.05)
Total	47 (100.00)	42 (100.00)

PPP: Public private partnership

Table 3: Experience of survey respondents

Experience of respondents	Frequency (%)	
	Public sectors respondents	Private sector respondents
Less than 5 years	4 (8.51)	14 (33.33)
6-8 years	15 (31.91)	6 (14.29)
8-10 years	9 (19.15)	9 (21.43)
10-12 years	12 (25.53)	5 (11.90)
More than 12 years	7 (14.89)	8 (19.05)
Total	47 (100.00)	42 (100.00)

4.1.2. Ranking of risk factors

Table 4 explains the criticality of risk factors. Mean rank technique (Hwang et al., 2013) has been used to rank the risks, risks with scores 4 or above are considered extreme, below 4 but greater than 3 are considered high, risks with score below 3 but greater than 2 are moderate and risks with scores less than 2 but more than 1.5 are low and while scores with 1.5 or less have been considered negligible. "Construction cost overrun" is the most critical and extreme risk factor for Malaysian PPP arrangements with overall mean of 4.21 which contradicts with Hwang et al. (2013) who claimed the "construction cost overrun" as the 8th most critical risk for Singapore. Availability of finance, maintenance costs higher than expected, operational revenues below expectation, construction time delay and level of demand for project are among the top 5 risks for Malaysia PPP projects. These values confirm the findings Markom et al. (2012) who suggested the cost of operation and level of demand are the reasons of failure of LRT projects and other infrastructure projects in Malaysia. These risk ranks differ from the results of Hwang et al. (2013) which suggest that risk criticalities vary from region to region.

Level of public opposition to project is the 6th highly ranked risk with mean values more than 3.63. "Unstable government," "environment," "staff crises," "weather" and "land acquisition (site availability)" are the five negligible/rare risk factors having

Table 4: Ranks of risk of PPP projects

Risks	SPV				Government				Overall	
	N	Mean	SD	SE	N	Mean	SD	SE	Mean score	Ranks
Construction cost overrun	42	4.12	0.739	0.114	47	4.30	0.587	0.086	4.21	1
Availability of finance	42	4.05	0.697	0.108	47	3.68	0.695	0.101	3.85	2
Maintenance costs higher than expected	42	4.26	0.497	0.077	47	3.26	0.82	0.12	3.73	3
Operational revenues below expectation	42	4.24	0.79	0.122	47	3.28	0.649	0.095	3.73	4
Construction time delay	42	3.12	1.109	0.171	47	4.23	0.52	0.076	3.71	5
Level of demand for project	42	3.69	0.68	0.105	47	3.72	0.772	0.113	3.71	6
Level of public opposition to project	42	3.88	0.504	0.078	47	3.40	0.648	0.095	3.63	7
Insolvency/default of sub-contractors or suppliers	42	3.81	0.671	0.104	47	3.36	0.529	0.077	3.57	8
Delay in project approvals and permits	42	4.48	0.505	0.078	47	2.74	0.82	0.12	3.56	9
Operation cost overrun	42	3.69	0.563	0.087	47	3.43	0.5	0.073	3.55	10
Maintenance more frequent than expected	42	3.9	0.431	0.067	47	3.21	0.72	0.105	3.54	11
Low operating productivity	42	3.24	0.484	0.075	47	3.64	0.605	0.088	3.45	12
Material/labor availability	42	3.52	0.505	0.078	47	3.11	0.375	0.055	3.30	13
Interest rate volatility	42	3.55	0.772	0.119	47	3.06	0.673	0.098	3.29	14
Late design changes	42	3.62	0.623	0.096	47	2.96	0.806	0.118	3.27	15
Influential economic events	42	3.67	0.786	0.121	47	2.81	0.613	0.089	3.21	16
Inflation rate volatility	42	3.38	0.795	0.123	47	3.00	0.722	0.105	3.18	17
Change in tax regulation	42	3.71	0.774	0.119	47	2.66	0.6	0.088	3.16	18
High finance costs	42	3.98	0.78	0.12	47	2.15	0.659	0.096	3.01	19
Poor public decision-making process	42	3.76	0.726	0.112	47	1.98	0.872	0.127	2.82	20
Inadequate experience in PPP/PFI	42	1.86	0.718	0.111	47	3.45	0.88	0.128	2.70	21
Design deficiency	42	2.43	0.737	0.114	47	2.89	0.667	0.097	2.67	22
Organization and co-ordination risk	42	2.74	0.627	0.097	47	2.60	0.851	0.124	2.66	23
Strong political opposition/hostility	42	2.98	0.749	0.116	47	2.36	1.009	0.147	2.65	24
Expropriation or nationalization of assets	42	2.86	0.751	0.116	47	2.43	0.617	0.09	2.63	25
Lack of commitment from either partner	42	2.79	0.565	0.087	47	2.36	0.942	0.137	2.56	26
Excessive contract variation	42	3.12	0.593	0.091	47	2.02	0.794	0.116	2.54	27
Differences in working method and know-how between partners	42	3.1	0.726	0.112	47	2.02	0.872	0.127	2.53	28
Corruption and bribery	42	2.74	0.701	0.108	47	2.32	0.726	0.106	2.52	29
Poor financial market	42	3.71	0.864	0.133	47	1.45	0.503	0.073	2.52	30
Financial attraction of project to investors	42	3.45	0.889	0.137	47	1.53	0.654	0.095	2.44	31
Residual risks	42	2.38	0.539	0.083	47	2.13	0.741	0.108	2.25	32
Inadequate distribution of responsibilities and risks	42	2.43	0.63	0.097	47	1.98	0.766	0.112	2.19	33
Industrial regulatory change	42	2.52	0.671	0.104	47	1.60	0.496	0.072	2.03	34
Force majeure	42	1.79	0.645	0.1	47	2.04	0.658	0.096	1.92	35
Legislation change	42	2.43	0.703	0.109	47	1.30	0.462	0.067	1.83	36
Geotechnical conditions	42	1.86	0.472	0.073	47	1.70	0.462	0.067	1.78	37
Inadequate distribution of authority in partnership	42	2.05	0.539	0.083	47	1.53	0.62	0.09	1.78	38
Unproven engineering techniques	42	1.67	0.57	0.088	47	1.55	0.503	0.073	1.61	39
Unstable government	42	1.57	0.501	0.077	47	1.36	0.486	0.071	1.46	40
Environment	42	1.55	0.593	0.091	47	1.26	0.441	0.064	1.39	41
Staff crises	42	1.19	0.397	0.061	47	1.30	0.462	0.067	1.25	42
Weather	42	1.17	0.377	0.058	47	1.13	0.337	0.049	1.15	43
Land acquisition (site availability)	42	1.1	0.297	0.046	47	1.11	0.312	0.045	1.10	44

SE: Standard error, SD: Standard deviation, PPP: Public private partnership, SPV: Special purpose vehicle, PFI: Private finance initiative

mean scores <1.5. The lowest rank of "unstable government" is biggest contrast with Hwang et al. (2013) findings for Singapore as it ranked 5th highest risk factor for Singapore PPP projects. The reason of this contrast is the stable policy of the Malaysian government to use PPP as tool for provision of public services for the last three decades and PPP practices are more mature in Malaysia as compared to Singapore.

4.1.3. Allocation of risk factors

Having discussed the criticality of the risks, the most important step is allocation of risks. Clear and accountable risk allocation is key of success for PPP projects (Cooper et al., 2005). Fischer et al. (2010) and Li et al. (2005) posited that "risk should be borne by the party, best able to assess, manage and control; but shifting risk to a party not able to manage that particular risk cost more and additionally creates even more risk in a project" Table 5 describes the allocation of preferred risk allocation for Malaysian PPP projects. Hwang et al. (2013) evaluated the percentages of the respondents' choices for allocation of risk for PPP projects in Singapore and the current study is employing the same for the preferred allocation of risks. The results demonstrate that 25 out of 44 risks should be managed by private sector, 10 should be allocated to government and the remaining should be shared between both public and private sectors.

The results suggest that the first 5 most critical risks

Table 5: Preferred risk allocation in Malaysian PPP projects

Risks	Public sector (%)	Private sector (%)	Shared (%)	Preferred allocations
Availability of finance	13.48	59.55	26.97	Private
Change in tax regulation	10.11	52.81	37.08	Private
Construction cost overrun	0.00	88.76	11.24	Private
Construction time delay	1.12	96.63	2.25	Private
Environment	7.87	70.79	21.35	Private
Financial attraction of project to investors	29.21	55.06	15.73	Private
Geotechnical conditions	15.73	80.90	3.37	Private
High finance costs	3.37	83.15	13.48	Private
Inadequate experience in PPP/PFI	3.37	77.53	19.10	Private
Inflation rate volatility	3.37	82.02	14.61	Private
Influential economic events	3.37	88.76	7.87	Private
Insolvency/default of sub-contractors or suppliers	0.00	94.38	5.62	Private
Interest rate volatility	5.62	79.78	14.61	Private
Legislation change	13.48	75.28	11.24	Private
Low operating productivity	0.00	94.38	5.62	Private
Maintenance costs higher than expected	6.74	88.76	4.49	Private
Maintenance more frequent than expected	1.12	93.26	5.62	Private
Material/labor availability	4.49	93.26	2.25	Private
Operation cost overrun	4.49	91.01	4.49	Private
Operational revenues below expectation	25.84	66.29	7.87	Private
Poor financial market	7.87	88.76	3.37	Private
Residual risks	6.74	88.76	4.49	Private
Staff crises	10.11	83.15	6.74	Private
Unproven engineering techniques	0.00	95.51	4.49	Private
Weather	13.48	50.56	35.96	Private
Design deficiency	55.06	20.22	24.72	Public
Excessive contract variation*	50.56	8.99	40.45	Public
Expropriation or nationalization of assets	64.04	10.11	25.84	Public
Land acquisition (site availability)	93.26	0.00	6.74	Public
Late design changes*	87.64	1.12	11.24	Public
Level of demand for project*	42.70	39.33	17.98	Public
Level of public opposition to project	88.76	0.00	11.24	Public
Poor public decision-making process	95.51	0.00	4.49	Public
Strong political opposition/hostility	98.88	0.00	1.12	Public
Unstable government	94.38	3.37	2.25	Public
Corruption and bribery	25.84	16.85	57.30	Shared
Delay in project approvals and permits*	22.47	14.61	62.92	Shared
Differences in working method and know-how between partners	11.24	8.99	79.78	Shared
Force majeure	4.49	0.00	95.51	Shared
Inadequate distribution of authority in partnership	4.49	3.37	92.13	Shared
Inadequate distribution of responsibilities and risks	13.48	24.72	61.80	Shared
Industrial regulatory change	25.84	15.73	58.43	Shared
Lack of commitment from either partner	0.00	0.00	100	Shared
Organization and co-ordination risk	4.49	5.62	89.89	Shared

PFI: Private finance initiative

"construction cost overrun," "availability of finance," "maintenance costs higher than expected," "operational revenues below expectation" and "construction time delay" should be managed by private sector as Hwang et al. (2013) also suggested the same allocation for these risk factors for Singapore PPP projects, however, the criticality of these risks is different in Singapore and Malaysia.

Moreover, interviews with practitioners revealed that allocations of "excessive contract variation," "late design changes" "level of demand for project" and "delay in project approvals and permits" may vary project to project.

Likewise, for "excessive contract variation" and "late design change" the risk cost will be paid by the party that proposes change as sometimes parties share the cost of such variations. However, in the case BLMT and BOO "level of demand for project" belongs to government but in BOT and BOOT arrangements SPV take this risk. Normally "Delay in project approvals and permits" is caused due to government's red-tapism and resultantly government increases the concession period of SPV.

4.1.4. Difference in perception

According to Soomro et al. (2013) and Edwards et al. (2003), in PPP arrangements there may be a difference of perceptions about the criticality of the risks which results in failure of the projects. This is why, this study has applied two samples independent T-test to know the difference of perception between SPV and government/public sector about the criticality of the risk.

In order to apply the two samples independent T-test, first of all, normality of the data has been determined. According to Kim (2013), for respondents less than 50 ($n < 50$) in each group, if the absolute z-scores for either skewness or kurtosis lies between −1.96 to +1.96, the data has been considered normal. For all risks, except the weather and staff crises, the z-scores for both skewness and kurtoses lie within the mentioned range. However, for weather and staff crises, most of the values were "1" (rare risk) which result in abnormality of the risks.

Furthermore, T-test results, under Levene's test for assumption of equal variance have indicated that there is significant difference of perception for the criticality of 35 risks out of 44. In high ranked risks, only "construction cost overrun" is the risk for which both SPV and government do not have any significance difference (Appendix B).

The extreme difference in perception about the criticalities has been found in "change in tax regulation," "construction time delay," "delay in project approvals and permits," "difference in work method," "financial attraction of project to investors," "high finance costs," "maintenance costs higher than expected," "maintenance more frequent than expected" and "operational revenues below expectation" which have been ranked high previous section of ranking. All these risks are categorized as financial, construction, operational categories and most of them are allocated to SPV (Li et al., 2005; Hwang et al., 2013).

5. CONCLUSION

This study has ranked the 44 risk factors on the basis of criticalities. 19 out of 44 risks associated with PPP arrangements in Malaysia have scores in range of 3.01 to 4.35 and considered highly critical. Out these 19 the extreme risk are; construction cost overrun, availability of finance, maintenance cost more than expected, operational revenues below than expectations and delay belongs to construction and operational stages of PPP projects (Li et al., 2005; Fischer et al., 2010) which suggests that these stages are critical for PPP project success. Although, most of these high risks have been allocated to SPV on the basis of practitioner's intuitions but it explains the important role of SPV in risk management or in other words SPV needs to improve the risk management for these risks in order to achieve success of PPP projects.

However, in criticality of all high ranked risks factors there is substantial difference of perception among both sectors. Although all critical risks are transferred to SPV which is the main purpose of PPP arrangements (Akintoye et al., 2003), but it is an alarming sign for PPP practitioners in Malaysia. Risk communication is the only solution to avoid difference in perception about the criticality of risks (Edwards et al., 2003). Therefore, in order to muddle through the situation SPV and government agencies need to improve the coordination and risk communication. This study has implication for the policymakers and bidders to get better understanding of the risk factors in order to hedge these risks factors for achieving desired level of success for PPP arrangements.

REFERENCES

Abdul Rahman, I., Memon, A.H., Zulkifli, M., Sheda, N. (2014), Failure reasons of PPP infrastructure projects: Case study of Kuala Lumpur LRT Project. Life Science Journal, 11(7), 238-246.

Akintoye, A., Beck, M., Hardcastle, C., editors. (2003), Public Private Partnerships. Oxford: Blackwell Science.

Beh, L.S. (2010), Development and distortion of Malaysian public private partnerships-patronage, privatised profits and pitfalls. Australian Journal of Public Administration, 69(s1), S74-S84.

Cooper, D.F., Grey, S., Raymond, G., Walker, P. (2005), Project Risk Management Guidelines: Managing Risk in Large Projects and Complex Procurements. West Sussex, England: John Wiley & Sons.

Demirag, I., Khadaroo, I., Stapleton, P., Stevenson, C. (2010), Public Private Partnership Financiers Perceptions of Risks. Edinburgh: The Institute of Chartered Accountants of Scotland.

Edwards, P., Bowen, P. (2003), Risk perception and communication in public-private partnerships. Public-Private Partnerships–Managing Risks and Opportunities. London: Blackwell Science.

Estache, A., Juan, E., Trujillo-Castellano, L. (2007), Public-Private Partnerships in Transport. World Bank Policy Research Working Paper Series.

Fischer, K., Leidel, K., Riemann, A., Alfen, H.W. (2010), An integrated risk management system (IRMS) for PPP projects. Journal of Financial Management of Property and Construction, 15(3), 260-282.

Grimsey, D., Lewis, M.K. (2002), Evaluating the risks of public private partnerships for infrastructure projects. International Journal of Project Management, 20(2), 107-118.

Hwang, B.G., Zhao, X., Gay, M.J.S. (2012), Public private partnership projects in Singapore: Factors, critical risks and preferred risk allocation from the perspective of contractors. International Journal of Project Management, 31(3), 424-433.

Ismail, S. (2013), Critical success factors of public private partnership (PPP) implementation in Malaysia. Asia-Pacific Journal of Business Administration, 5(1), 6-19.

Ismail, S., Yusof, A.M., Han, W.S. (2012), Elements of relational contract in the delivery of public infrastructure in Malaysia. IBIMA Business Review, 2012, 1-11.

Ke, Y., Wang, S., Chan, A.P., Lam, P.T. (2010), Preferred risk allocation in China's public–private partnership (PPP) projects. International Journal of Project Management, 28(5), 482-492.

Kim, H.Y. (2013), Statistical notes for clinical researchers: Assessing normal distribution (2) using Skewness and kurtosis. Restorative Dentistry and Endodontics, 38(1), 52-54.

Kumaraswamy, M.M., Zhang, X.Q. (2001), Governmental role in BOT-led infrastructure development. International Journal of Project Management, 19(4), 195-205.

Li, B., Akintoye, A., Edwards, P.J., Hardcastle, C. (2005), The allocation of risk in PPP/PFI construction projects in the UK. International Journal of Project Management, 23(1), 25-35.

Markom, R., Ali, E. R. A. E (2012), A legal analysis of sucessful and problematic build operate and transfer (BOT) projects in Malaysia. International Journal of Business and Society, 13(2), 133-150.

Medda, F. (2007), A game theory approach for the allocation of risks in transport public private partnerships. International Journal of Project Management, 25(3), 213-218.

Ng, A., Loosemore, M. (2007), Risk allocation in the private provision of public infrastructure. International Journal of Project Management, 25(1), 66-76.

Shen, L.Y., Platten, A., Deng, X.P. (2006), Role of public private partnerships to manage risks in public sector projects in Hong Kong. International Journal of Project Management, 24(7), 587-594.

Soomro, M.A., Zhang, X. (2013), Failure links between public and private

sector partners m transportation public private partnerships failures. Journal of Traffic and Logistics Engineering, 1(2), 116-121.

Takim, R., Akintoye, A. (2002), Performance indicators for successful construction project performance. In: 18th Annual ARCOM Conference, Association of Researchers in Construction Management, Ulster. RWS. p545-555.

Thomas, A.V., Kalidindi, S.N., Ananthanarayanan, K.A.B. (2003), Risk perception analysis of BOT road project participants in India. Construction Management and Economics, 21(4), 393-407.

Yescombe, E.R. (2011), Public-Private Partnerships: Principles of Policy and Finance. London: Butterworth-Heinemann.

Zou, P.X., Wang, S., Fang, D. (2008), A life-cycle risk management framework for PPP infrastructure projects. Journal of Financial Management of Property and Construction, 13(2), 123-142.

APPENDICES

Appendice Tables

Appendix A: Criticality of risk matrix

Level of occurrence	Level of impact				
	Negligible	Minimal	Minor	Serious	Catastrophic
Certain	Moderate	High	High	Extreme	Extreme
Likely	Moderate	Moderate	High	High	Extreme
Possible	Low	Moderate	Moderate	High	Extreme
Unlikely	Low	Moderate	Moderate	Moderate	High
Rare	Low	Low	Moderate	Moderate	High

Appendix B: Difference in perception for criticality of risk factors

Independent samples test											
Risks in Malaysian PPP Project	Levene's test for equality of variances		T-test for equality of means								Interpretation of difference in perception
			Sig.	T	df	Sig. (2-tailed)	Mean difference	Standard error difference	95% confidence interval of the difference		
									Lower	Upper	
Availability of finance	Equal variances assumed	1.62	0.21	2.48	87.00	0.0150	0.367	0.148	0.073	0.660	Significant difference
	Equal variances not assumed			2.48	85.83	0.0150	0.367	0.148	0.073	0.661	
Change in tax regulation	Equal variances assumed	3.74	0.06	7.22	87.00	0.0000	1.055	0.146	0.765	1.345	Significant difference
	Equal variances not assumed			7.12	77.03	0.0000	1.055	0.148	0.760	1.350	
Construction cost overrun	Equal variances assumed	0.20	0.66	−1.27	87.00	0.2073	−0.179	0.141	−0.459	0.101	Not significant difference
	Equal variances not assumed			−1.25	78.09	0.2135	−0.179	0.143	−0.463	0.105	
Construction time delay	Equal variances assumed	17.40	0.00	−6.18	87.00	0.0000	−1.115	0.180	−1.474	−0.756	Significant difference
	Equal variances not assumed			−5.96	56.73	0.0000	−1.115	0.187	−1.490	−0.740	
Corruption and briber	Equal variances assumed	0.10	0.75	2.76	87.00	0.0070	0.419	0.152	0.118	0.720	Significant difference
	Equal variances not assumed			2.77	86.46	0.0069	0.419	0.151	0.118	0.720	
Delay in project approvals and permits	Equal variances assumed	0.89	0.35	11.82	87.00	0.0000	1.732	0.146	1.440	2.023	Significant difference
	Equal variances not assumed			12.13	77.68	0.0000	1.732	0.143	1.447	2.016	
Design deficiency	Equal variances assumed	4.36	0.04	−3.12	87.00	0.0024	−0.465	0.149	−0.761	−0.169	Significant difference
	Equal variances not assumed			−3.11	83.23	0.0026	−0.465	0.150	−0.763	−0.167	
Difference in work method	Equal variances assumed	4.08	0.05	6.27	87.00	0.0000	1.074	0.171	0.734	1.414	Significant difference
	Equal variances not assumed			6.34	86.59	0.0000	1.074	0.170	0.737	1.411	
Environment	Equal variances assumed	13.68	0.00	2.66	87.00	0.0094	0.292	0.110	0.074	0.511	Significant difference
	Equal variances not assumed			2.61	75.17	0.0108	0.292	0.112	0.070	0.515	
Excessive contract variation	Equal variances assumed	4.60	0.03	7.32	87.00	0.0000	1.098	0.150	0.800	1.396	Significant difference

(Contd...)

Appendix B: ***(Continued)***

Independent samples test											
Risks in Malaysian PPP Project	**Levene's test for equality of variances**		**T-test for equality of means**								**Interpretation of difference in perception**
			Sig.	**T**	**df**	**Sig. (2-tailed)**	**Mean difference**	**Standard error difference**	**95% confidence interval of the difference**		
									Lower	**Upper**	
	Equal variances not assumed			7.44	84.44	0.0000	1.098	0.148	0.804	1.391	
Expropriation or nationalization of assets	Equal variances assumed	0.05	0.83	2.97	87.00	0.0038	0.432	0.145	0.143	0.720	Significant difference
	Equal variances not assumed			2.94	79.53	0.0043	0.432	0.147	0.140	0.724	
Financial attraction of project to investors	Equal variances assumed	3.07	0.08	11.69	87.00	0.0000	1.92	0.16	1.59	2.25	Significant difference
	Equal variances not assumed			11.49	74.71	0.0000	1.92	0.17	1.59	2.25	
Force majeure	Equal variances assumed	0.69	0.41	−1.86	87.00	0.0670	−0.26	0.14	−0.53	0.02	Not significant difference
	Equal variances not assumed			−1.86	86.23	0.0667	−0.26	0.14	−0.53	0.02	
Geotechnical conditions	Equal variances assumed	2.59	0.11	1.56	87.00	0.1216	0.16	0.10	−0.04	0.35	Not significant difference
	Equal variances not assumed			1.56	85.44	0.1221	0.16	0.10	−0.04	0.35	
High finance costs	Equal variances assumed	1.04	0.31	11.97	87.00	0.0000	1.83	0.15	1.52	2.13	Significant difference
	Equal variances not assumed			11.86	80.67	0.0000	1.83	0.15	1.52	2.13	
Inadequate distribution of authority in partnership	Equal variances assumed	11.53	0.00	4.16	87.00	0.0001	0.52	0.12	0.27	0.76	Significant difference
	Equal variances not assumed			4.197	86.937	0.0001	0.52	0.12	0.27	0.76	
Inadequate distribution of responsibilities and risks	Equal variances assumed	0.02	0.89	3.004	87.000	0.0035	0.45	0.15	0.15	0.75	Significant difference
	Equal variances not assumed			3.037	86.441	0.0032	0.45	0.15	0.16	0.74	
Inadequate experience in PPP	Equal variances assumed	5.615	0.020	−9.269	87.000	0.0000	−1.59	0.17	−1.93	−1.25	Significant difference
	Equal variances not assumed			−9.375	86.322	0.0000	−1.59	0.17	−1.93	−1.25	
Industrial regulatory change	Equal variances assumed	5.603	0.020	7.469	87.000	0.0000	0.93	0.12	0.68	1.18	Significant difference
	Equal variances not assumed			7.345	74.883	0.0000	0.93	0.13	0.68	1.18	

(Contd...)

Appendix B: ***(Continued)***

Independent samples test											
Risks in Malaysian PPP Project	**Levene's test for equality of variances**		**T-test for equality of means**								**Interpretation of difference in perception**
			Sig.	**T**	**df**	**Sig. (2-tailed)**	**Mean difference**	**Standard error difference**	**95% confidence interval of the difference**		
									Lower	**Upper**	
Inflation rate volatility	Equal variances assumed	2.302	0.133	2.369	87.000	0.0201	0.38	0.16	0.06	0.70	Significant difference
	Equal variances not assumed			2.356	83.372	0.0208	0.38	0.16	0.06	0.70	
Influential economic events	Equal variances assumed	6.414	0.013	5.775	87.000	0.0000	0.86	0.15	0.56	1.15	Significant difference
	Equal variances not assumed			5.695	77.308	0.0000	0.86	0.15	0.56	1.16	
Insolvency of sub-contractors or suppliers	Equal variances assumed	0.096	0.758	3.515	87.000	0.0007	0.45	0.13	0.19	0.70	Significant difference
	Equal variances not assumed			3.468	77.744	0.0009	0.45	0.13	0.19	0.70	
Interest rate volatility	Equal variances assumed	6.232	0.014	3.161	87.000	0.0022	0.48	0.15	0.18	0.79	Significant difference
	Equal variances not assumed			3.136	81.921	0.0024	0.48	0.15	0.18	0.79	
Lack of commitment from either partner	Equal variances assumed	16.623	0.000	2.536	87.000	0.0130	0.42	0.17	0.09	0.76	Significant difference
	Equal variances not assumed			2.605	76.527	0.0110	0.42	0.16	0.10	0.75	
Land acquisition	Equal variances assumed	0.119	0.731	−0.172	87.000	0.8637	−0.01	0.06	−0.14	0.12	Not significant difference
	Equal variances not assumed			−0.173	86.623	0.8634	−0.01	0.06	−0.14	0.12	
Late design changes	Equal variances assumed	0.016	0.898	4.293	87.000	0.0000	0.66	0.15	0.36	0.97	Significant difference
	Equal variances not assumed			4.356	85.277	0.0000	0.66	0.15	0.36	0.96	
Legislation change	Equal variances assumed	15.278	0.000	9.051	87.000	0.0000	1.13	0.12	0.88	1.38	Significant difference
	Equal variances not assumed			8.849	69.525	0.0000	1.13	0.13	0.88	1.39	
Level of demand for project	Equal variances assumed	0.752	0.388	−0.212	87.000	0.8323	−0.03	0.16	−0.34	0.28	Not significant difference
	Equal variances not assumed			−0.214	86.987	0.8311	−0.03	0.15	−0.34	0.27	
Level of public opposition to project	Equal variances assumed	10.421	0.002	3.841	87.000	0.0002	0.48	0.12	0.23	0.72	Significant difference

(Contd...)

Appendix B: ***(Continued)***

Independent samples test											
Risks in Malaysian PPP Project	**Levene's test for equality of variances**		**T-test for equality of means**								**Interpretation of difference in perception**
			Sig.	**T**	**df**	**Sig. (2-tailed)**	**Mean difference**	**Standard error difference**	**95% confidence interval of the difference**		
									Lower	**Upper**	
	Equal variances not assumed			3.895	85.421	0.0002	0.48	0.12	0.23	0.72	
Low operating productivity	Equal variances assumed	6.783	0.011	−3.417	87.000	0.0010	−0.40	0.12	−0.63	−0.17	Significant difference
	Equal variances not assumed			−3.460	86.002	0.0008	−0.40	0.12	−0.63	−0.17	
Maintenance costs higher than expected	Equal variances assumed	9.080	0.003	6.901	87.000	0.0000	1.01	0.15	0.72	1.30	Significant difference
	Equal variances not assumed			7.085	76.975	0.0000	1.01	0.14	0.72	1.29	
Maintenance more frequent than expected	Equal variances assumed	19.748	0.000	5.417	87.000	0.0000	0.69	0.13	0.44	0.95	Significant difference
	Equal variances not assumed			5.564	76.474	0.0000	0.69	0.12	0.44	0.94	
Material or labor availability	Equal variances assumed	34.957	0.000	4.455	87.000	0.0000	0.42	0.09	0.23	0.60	Significant difference
	Equal variances not assumed			4.382	75.060	0.0000	0.42	0.10	0.23	0.61	
Operation cost overrun	Equal variances assumed	0.012	0.914	2.353	87.000	0.0209	0.26	0.11	0.04	0.49	Significant difference
	Equal variances not assumed			2.337	82.603	0.0218	0.26	0.11	0.04	0.49	
Operational revenues below expectation	Equal variances assumed	0.519	0.473	6.295	87.000	0.0000	0.96	0.15	0.66	1.27	Significant difference
	Equal variances not assumed			6.226	79.577	0.0000	0.96	0.15	0.65	1.27	
Organization and co-ordination risk	Equal variances assumed	8.767	0.004	0.889	87.000	0.3763	0.14	0.16	−0.18	0.46	Significant difference
	Equal variances not assumed			0.904	84.058	0.3683	0.14	0.16	−0.17	0.46	
Poor financial market	Equal variances assumed	11.192	0.001	15.335	87.000	0.0000	2.27	0.15	1.97	2.56	Significant difference
	Equal variances not assumed			14.910	64.322	0.0000	2.27	0.15	1.96	2.57	
Poor public decision-making process	Equal variances assumed	0.240	0.625	10.412	87.000	0.0000	1.78	0.17	1.44	2.12	Significant difference
	Equal variances not assumed			10.520	86.590	0.0000	1.78	0.17	1.45	2.12	

(Contd...)

Appendix B: ***(Continued)***

Independent samples test											
Risks in Malaysian PPP Project	**Levene's test for equality of variances**		**T-test for equality of means**								**Interpretation of difference in perception**
			Sig.	**T**	**df**	**Sig. (2-tailed)**	**Mean difference**	**Standard error difference**	**95% confidence interval of the difference**		
									Lower	**Upper**	
Residual risks	Equal variances assumed	1.660	0.201	1.826	87.000	0.0713	0.25	0.14	−0.02	0.53	Not significant difference
	Equal variances not assumed			1.858	83.690	0.0667	0.25	0.14	−0.02	0.52	
Staff crises	Equal variances assumed	5.701	0.019	−1.168	87.000	0.2459	−0.11	0.09	−0.29	0.08	Not significant difference
	Equal variances not assumed			−1.178	86.880	0.2419	−0.11	0.09	−0.29	0.07	
Strong political opposition	Equal variances assumed	16.544	0.000	3.230	87.000	0.0017	0.61	0.19	0.24	0.99	Significant difference
	Equal variances not assumed			3.284	84.250	0.0015	0.61	0.19	0.24	0.99	
Unproven engineering techniques	Equal variances assumed	0.136	0.714	0.998	87.000	0.3211	0.11	0.11	−0.11	0.34	Not significant difference
	Equal variances not assumed			0.991	82.316	0.3247	0.11	0.11	−0.11	0.34	
Unstable government	Equal variances assumed	1.460	0.230	2.004	87.000	0.0482	0.21	0.10	0.00	0.42	Significant difference
	Equal variances not assumed			2.000	85.220	0.0486	0.21	0.10	0.00	0.42	
Weather	Equal variances assumed	1.064	0.305	0.515	87.000	0.6078	0.04	0.08	−0.11	0.19	Not significant difference
	Equal variances not assumed			0.512	82.834	0.6101	0.04	0.08	−0.11	0.19	

PPP: Public private partnership