

RISK ALLOCATION IN PUBLIC-PRIVATE PARTNERSHIP (PPP) PROJECT: A REVIEW ON RISK FACTORS

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ABSTRACT

It is important for the public and private sectors to establish effective risk allocation strategies for Public-Private Partnership (PPP) projects. According to Malaysia's PPP Guideline, one of the key feature or characteristics is to optimal sharing of risk whereby risk is allocated to the party who is the best able to manage. This mean that in PPP itself, it emphasis risk allocation in construction project. This paper presents on reviewing the risk factors of PPP construction project by mapping previous research works on PPP project around the world. The matrix of the mapping gives the frequency of factors that are considered the risk allocation of PPP project. The risk factors are clustered into 10 groups namely: Political, Construction, Legal, Economic, Operation, Market, Project selection, Project finance, Relationship and Natural factor. Result shows that the highest score frequency factors are *change in law, delay in project approvals & permits and land acquisition*. By knowing the risk factors gives better understanding in allocating them to parties/stakeholders involved.

Keywords: *Public Private Partnership, Risk Management, Risk Allocation*

1.0 INTRODUCTION

According to A. Kartam, risk analysis and management are important parts of the decision making process in a construction company. The construction industry and its clients are widely associated with a high degree of risk due to the nature of construction business activities, processes, environment and organization [1]. In reality, there are many projects failing to meet deadlines, cost, quality and targets. Not surprised if we consider there are no perfect engineers, perfect designer and even the nature not behave perfectly [18]. The truth is the changes cannot be eliminated but the risk can be managed [13].

As stated previously, risk is a nature process that cannot be eliminated in construction and can be managed [1, 19, 13]. By referring to risk management word, it refers to the architecture that is used to manage risk [8]. In order to manage the risk, Ng and Loosemore et.al [13] said risk management in project is about proactively working with project stakeholders to minimize the risks and maximize the opportunities associated in project decision. One of the architecture in risk management is risk management process [8], there are four logical process of risk management which is identification of risks, analysis of the implications, respond to minimize risk and allocate appropriate contingencies [17].

According to Malaysia's PPP Guideline [15]: "One of the key feature or characteristics is to optimal sharing of risk whereby risk is allocated to the party who is the best able to manage". This mean that in PPP itself, it emphasis risk allocation in construction project. Put simply, a public private partnership (PPP) is an arrangement between a public sector organization and private sector organization for provision of public sector activity which will provided, owned by the public organization for a special period before reverting to the public body [22] whereas the term risk allocation refers to a primary measure of assignment between the project direct participants that is between public and private sector [9].

Moreover, in June 2010 Prime Minister Datuk Seri Najib Razak had presented the 10th Malaysia Plan. The five year development plan, with a total expected investment of RM230 billion aims to increase private sector participation in the Malaysian economy through a variety of means including public-private partnerships. This proves that Malaysia government emphasis PPP for economy development [10]. Hence the effective risk allocation strategies and framework of PPP projects should be established and developed to achieve a more efficient process of contract negotiation.

2.0 PPP MODEL

During Malaysia's 8th plan, Malaysia has adopted various form of PPP of Malaysia's government from the distinct modes of privatization or public private partnership (PPP) [4]. There are many forms of PPP and may incorporate some or all of the following features [14]:

- The public sector entity transfers facilities controlled by it to the private sector entity (with or without payment in return) usually for the term of the arrangement;
- The private sector entity builds, extends or renovates a facility;
- The public sector entity specifies the operating features of the facility;
- Services are provided by the private sector entity using the facility for a defined period of time usually with restrictions on operations and pricing); and
- The private sector entity agrees to transfer the facility to the public sector with or without payment) at the end of the arrangement.

As simplify by UNESCAP [20], the PPP models can be classified into five broad categories [20]. The five broad categories and their characteristic are shown in Table 1. Each of the models are different in term of ownership of capital assets, responsibility for investment, assumption of risk and duration of contract.

Table 1: Classification of PPP models [Source: UNESCAP] [20]

Broad category	Main variants	Ownership of capital assets	Responsibility of investment	Assumption of risk	Duration of contract (years)
Supply and management contract	Outsourcing	Public	Public	Public	1-3
	Maintenance management	Public	Public/Private	Public/Private	3-5
	Operational management	Public	Public	Public	3-5
Turnkey		Public	Public	Public/Private	1-3
Affermage/Lease	Affermage	Public	Public	Public/Private	5-20
	Lease *(BLT)	Public	Public	Public/Private	5-20
Concessions	Franchise	Public/Private	Public/Private	Public/Private	3-10
	*BOT, BTO, BOOT, BROT	Public/Private	Public/Private	Public/Private	15-30
Private ownership of assets and PFI type	*BOO/DBFO	Private	Private	Private	Indefinite
	*PFI	Public/Private	Private	Public/Private	10-20
	Divesture	Private	Private	Private	Indefinite

3.0 PPP IN MALAYSIA

There are many established PPP project carried out in Malaysia recently. This is due to the rapid development in Malaysia. Several case studies being discussed on Malaysian experience [9,10,16]. The example of PPP project studied is the medical City @ Enstek case. The project is joint ventures effort which takes place between two parties that are TH Properties Sdn Bhd and Negeri Sembilan State Development Corporation. This effort allows both parties to share the burden and the resulting profits of the project. This PPP's social infrastructure project was financed through Private Finance Initiative (PFI) model. TSR Capital Bhd together with TH Properties Sdn Bhd is the Special Purpose Vehicle that finances the Medical City Development. Special Purpose Vehicle (SPV) is an entity responsible for raising funds, make payment, deliver the agreed service, ensuring the assets well maintain through the concession period [15]. The framework of PPP for Medical City @ Enstek is shown in Figure 1. The figure clearly shows the bonding between public agency and private agency. This project provides the equal beneficial which is public agency tend to increase the infrastructure development for Malaysia and private sector as a delivered entity for the project. The success or failure depends on how these key players effectively integrate in delivering the PFI project.

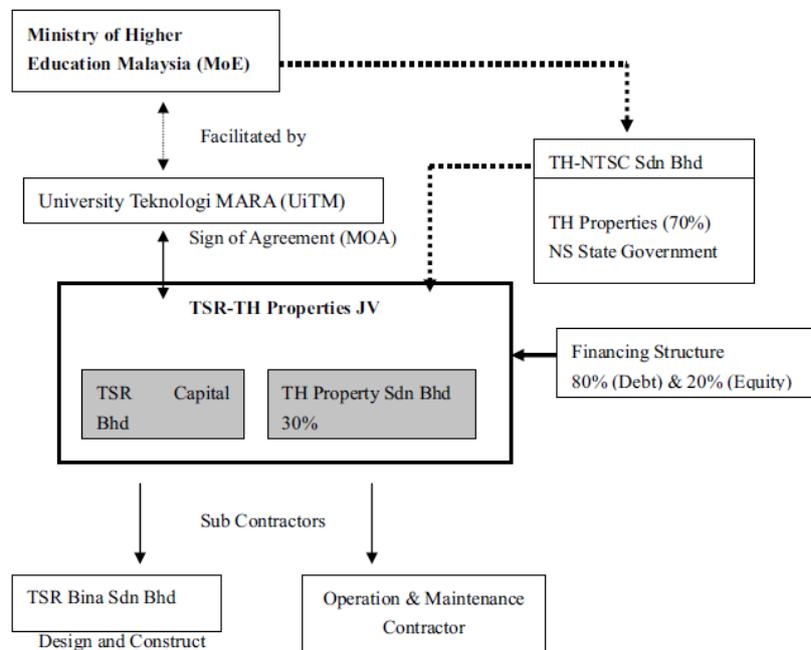


Fig. 1: The framework of PPP for Medical City project [Adopted from Jayaseelan and Tan (2006)] [9]

Secondly is the case study of Batu Pahat Bus Station. The station was badly disorganized, unclean and not attractive to the user. Batu Pahat Municipal Council (BPMC) decided to resolve the issue by redevelop the existing facilities through PPP direct negotiation approach between the BPMC and confidential private developer. Even though the project was completed but it was considered failed [10] because of disputes between the parties involved. The failure in negotiation between the two parties involved (BPMC and confidential private developer) and the selection of the developer was not done via an open tender. The failures mainly came from the improper negotiation and lack of management skill. This indicates that in order to develop the relationship between public and private sector is important to have a good and clear negotiation skill.

Through the review of these case studies, it is necessary to find the suitable model which suits the financial, technical features of the projects and sectors concerned. The failure of Batu

Pahat bus station case requires more adequate experience personnel in handling PPP project. This is a good example of how risks can involve in any project and sharing the risks is crucial feature in the success of PPP project [9].

4.0 RISK MANAGEMENT

Malaysia is rapidly growth with construction project. These positive growths tend government sector to provide more development project but the issue is Malaysia's government seeking new way to finance project, build infrastructure and deliver service. As been discussed in "Round Table Consultative Forum for the Government Sector" by CIDB [5] construction industry is among of the important contributor to Malaysia's growth with activities ranging from constructing building, roads, electricity or other transmission lines or towers, pipelines, oil refinery to other specific civil engineering projects. One of the Malaysian researcher stated on his research, PPP being considered as the fastest and viable route, as it cut down the government's capital expenditures for the development of infrastructure [4]. Prime minister also had announced during 9th Malaysia plan one of the way is through Public private partnership [10]. As said by Grimsey and Lewis [6], one of the beneficial of PPP is it able to transfer from government to competent private partner. In order to provide a better risk transfer, one of the proper ways is allocate the risk. Li et al. [9] also mentioned among the key factor of PPP from his study is appropriate risk allocation. In order to allocate the risk, risk management is the key factor to provide a better risk allocation. There are four logical process of risk management which is identification of risks, analysis of the implications, respond to minimize risk and allocate appropriate contingencies [19]. On Yusuhan et.al [29] studied, she found that there are a few number of construction practitioners in Malaysia who practicing risk management. It's proving that risk management in Malaysia still not being practice well. This is the reason why this paper concern about the risk and risk management.

4.1 RISK FACTORS

Risk factor have to be determined before the risk being allocated, they have to anticipate the risk so it will be more organize and prepared. In order to achieved this stage, a study based on same research objective being used to develop idea for this study. The risk factor were generated based on extensive literature review especially the work of Yongjian [27], Abednego [2], Li [11], Shen [17], Ibrahim [7], Yuan [28], Yelin [26], Xiao [25], Zhang [30], Singh [18], Wibowo [24], Ng and Loosemore [13] and VDTF [21]. As a result the risk factors are clustered into 10 groups namely: Political, construction, legal, economic, operation, market, project finance, project selection, relationship and natural factor (Refer to Table 2).

Basically, the purpose of the mapping is to get the ranking of factors that are considered in the risk allocation of the PPP project. The frequency of these risk factors appeared in the research articles worldwide were determined and tabulated as in **Table 2**. It was found the highest frequency occur in political and construction groups. The factors in these groups are *change in law*, *delay in project approvals & permits* and *land acquisition*. Legal risk group 3 factors had the highest score that are *change in tax regulation*, *corruption & lack of respect for law and legislation change or inconsistencies*. For Economic risk group, the highest is the *interest rate volatility*; Operation risk group is *operation cost overrun*; Market risk group is *tariff change*; Project selection group is *public opposition to projects*; Relationship risk group is *different working methods*, Project finance risk group is *financial attraction of project to investors* and Natural risk group is *force majeure* as the highest frequency risk factor.

Table 2 Mapping from previous study

Risk attribute from Public Private Partnership project	[27]	[2]	[11]	[17]	[7]	[28]	[26]	[31]	[25]	[30]	[18]	[24]	[13]	[21]	Frequency
Political															
Change in law	*			*		*	*			*	*	*	*	*	9
Delay in project approvals and permits	*	*	*	*	*				*		*		*	*	9
Expropriation/nationalization of assets	*		*	*	*	*						*	*	*	7
Poor public decision making process	*		*	*	*	*	*								6
Inconsistencies in government policies	*	*			*	*									4
Strong political opposition/hostility	*		*		*				*						4
Unstable government			*		*					*					3
Government intervention	*						*								2
Government reliability	*									*					2
Inability of concessionaire							*								1
Construction															
Land acquisition	*	*	*		*	*	*				*		*	*	9
Availability of appropriate labour/material	*		*		*	*	*					*	*	*	8
Availability of finance			*	*		*	*			*	*		*	*	8
Construction cost overruns	*		*	*	*	*					*		*	*	8
Design deficiency			*	*	*	*		*	*					*	8
Construction time delay	*		*	*	*	*	*		*	*	*	*			8
Excessive contract variation / contractual risk	*		*	*	*	*	*		*	*					8
Geotechnical conditions/ground condition	*		*		*		*						*	*	6
Late design changes			*	*	*								*	*	5
Contractor failure / Capability of SPV		*		*		*			*				*		5
Project delay		*		*		*			*						4
Completion risk						*							*	*	3
Consortium inability	*					*			*						3
Unproven engineering technique						*								*	2
Resettlement and rehabilitation											*			*	2
Quality risk													*	*	2
Insolvency/default of subcontractors and suppliers			*		*										2
Poor quality of workmanship			*		*										2
Change of scope											*				1
Legal															
Change in tax regulation	*	*	*		*		*								5
Corruption and lack of respect for law	*				*	*	*			*					5
Legislation change/inconsistencies			*		*		*		*	*					5
Industrial regulatory change			*		*				*					*	4
Import/export restrictions					*										1
Rate of returns restrictions					*										1
Economic															
Interest rate volatility	*	*	*		*	*	*			*		*			8
Inflation rate volatility	*	*	*		*	*	*						*		7
Foreign exchange and convertibility	*				*	*	*				*	*			6
Poor financial market			*		*			*							3
Operation															
Operation cost overrun	*		*		*	*	*			*		*			7
Residual value (after concession period)			*		*		*					*	*	*	5
Maintenance cost higher than expected			*		*	*								*	4
Operation financial risk			*		*	*				*					4
Low operating productivity			*		*	*									3
Risk regarding pricing of product/service				*	*		*								3
Operator default													*	*	2
Quality of operation													*	*	2
Project/operation change						*		*							2
Supporting facilities risk/necessary infrastructure risk	*												*		2
Technology risk						*									1
Waste of material													*		1

Risk attribute from Public Private Partnership project	[27]	[2]	[11]	[17]	[7]	[28]	[26]	[31]	[25]	[30]	[18]	[24]	[13]	[21]	Frequency
Market															
Tarriff chage	*	*								*		*	*	*	6
Market demand	*						*	*					*	*	5
Fluctuation of material cost (by government)													*	*	2
Fluctuation of material cost (by private)													*	*	2
Project selection															
Public opposition to projects			*		*	*	*						*		5
Uncompetative tender	*						*		*	*					4
Level of demand for the project			*		*	*									3
Competition risk	*				*										2
Relationship															
Different working methods/know-how between partners	*		*	*	*				*	*					6
Inadequate experience in PPP			*	*	*	*			*	*					5
Lack of commitment from public/private partner	*		*	*	*				*	*					4
Organisation and coordination risk			*	*	*	*	*								4
Third party tort liability	*	*	*	*	*	*	*								4
Inadequate distribution of responsibility and risk			*	*	*					*					3
Inadequate negotiation period prior to initiation				*	*										2
Staff crises			*	*	*										2
Cultural differences between main stakeholders					*										1
Non-involvement of host-community					*										1
Project finance															
Financial attraction of project to investors			*	*	*	*			*	*					5
High finance cost	*		*	*	*				*	*					4
Lack of creditworthiness					*	*			*	*					3
High bidding costs					*				*	*					2
Delay in financial closure									*	*					2
Inability to service debt					*										1
Lack of government guarantees					*										1
Delay in payment of anuity										*					1
Financiers unwilling to take high risk									*	*					1
Natural															
Force majeure	*	*	*		*	*	*			*		*	*		8
Environment	*	*	*		*	*	*								6
Weather	*	*	*		*	*	*								5

4.2 RISK ALLOCATION

Risk allocation is one of the crucial factors for risk management and PPP. The importance of it is, it would help the public and private sectors achieve a balance distribution of responsibilities. Ref [11] said risk allocation refers to a primary measure of assignment between the public and private sector. It is important that risk allocation is clearly communicated and understood between the parties. This statement has been proven by [17] which is risk allocation is one of the advantage of PPP because public and private sector enable to share the risk. Moreover risk allocation in public private partnership is correlated with contract negotiation; the result of the allocation is an important prerequisite to the successful development of PPP projects [23]. Ref [23] mentioned in his study there are three principle in structuring PPP projects which are the public sector sponsor must (1) identify the key risks (2) evaluate the level of acceptability of each risk (3) allocate risk to the party involved.

Furthermore, there are numbers of research regarding on risk allocation in public private partnership studied world widely had achieved the outcome such as the risk allocation in UK, Australia, Hong Kong, China, Nigeria, Indonesia and etc. Almost all the researchers conclude the same thing. They agreed the public and private sector partners need to accept risk allocation scheme before the contract is awarded in order to reach value for money objective [9, 6, 7 and 2].

5.0 DISCUSSION OF SIGNIFICANT RISK FACTOR

The significant risk factors for each of the groups that were determined earlier are elaborated further as below:

- *Political risk*, due to legal changes and unsupportive government policies [6]. The significant risk factors obtained from this group are change in law, delay of project approval & permit. Change in law occur when the local governments inconsistent for application of new regulations and laws. Delay of project approval & permits is the scenario when there is a delay or refusal of project approval by local government [27].
- *Construction risk*, due to faulty construction techniques, cost escalation and delays in construction [6] besides that land acquisition is also one of the factors. In this group, land acquisition is identified significant from the mapping. It normally occurs when the project land is unavailable or unable to be occupied at the required time [27].
- *Legal risk*, mainly due to government regulations. The significant risks factors are change in tax regulation, corruption and lack of respect for law and legislation change /inconsistencies. Change in tax regulation indicates the scenario when local government inconsistent when apply the tax regulation [27]. Corruption and lack of respect of law is the behavior of the corruption of government officials that will increase the relationship between government and the project company [27]. Lastly legislation change/inconsistence is occurred when there is a change of law and regulation that will cause the increase of project costs and decrease the revenue [27].
- *Economic risk*, due poor financial market and inflation [9]. The significant risk factor is interest rate volatility. It is occurring when local interest rate unanticipated due to immature local economic and banking system [27].
- *Operation risk*, due to higher operating and maintenance cost [6]. The significant factor is cost overruns. It is resulting from improper measurement, ill planned schedule or low operation efficiency of when operating or maintenance [9].
- *Market risk*, due to the demand or price for a service which vary from forecast levels, generating less revenue than user expectation [21]. The significant factor is tariff change. It occurs when improper tariff design or inflexible adjustment framework leading to the insufficient income [27].
- *Project selection risk*, due to the demand of project [9]. The significant factor is public opposition to project. It is the prejudice and demand from public due to different local living standards, values, culture, social system and etc.
- *Relationship risk*, mainly due to organization, coordination, responsibilities and commitment [9]. The significant risk is different working method. This risk factor may increase the transaction cost or dispute because of improper organization and coordination.
- *Project finance risk*, due to arising from inadequate hedging of revenue streams and financing costs [6]. The significant risk is financial attraction of project to investors. It is occur when the investor not satisfied with the revenue and financing.
- *Natural risk*, due to adverse environmental impacts and hazards. Significant risk factor is force majeure [6]. Force majeure is the circumstances that are out of control of both foreign and local partners such as flood, fires, storms, epidemic diseases, war, hospitality and embargo [27].

6.0 CONCLUSION

The identification of risk factor one of the most important stages in order to allocate the risk. The findings from this reviewed study is that the risk factors are clustered into 10 groups namely Political, Construction, Legal, Economic, Operation, Market, Project selection, Project finance, Relationship and Natural factor. Meanwhile the most frequent factors are *change in law, delay in project approvals & permits and land acquisition*. This review work is the baseline to

develop the questionnaire for taking the opinion from Malaysia's construction practitioner in the order of importance. The survey will be further carried out to Malaysia's stakeholder in allocating the risk factors.

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