CONTRACTORS' PERSPECTIVE OF PREFERRED RISK ALLOCATION IN PUBLIC-PRIVATE PARTNERSHIP (PPP) PROJECTS IN PAHANG

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SUPERVISOR'S DECLARATION

I hereby declare that I have checked this thesis and in my opinion, this thesis is adequate in term of scope and quality for the award of the Bachelor of Project Management with Honours.

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STUDENT'S DECLARATION

I hereby declare that the work in this thesis is my own except for quotations and summaries which have been fully acknowledged. The thesis has not been accepted for any degree and is not concurrently submitted for award of other degree.

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Dedicated to Project Management's Lecturers and Students

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ABSTRACT

Public private partnership (PPP) procurement was introduced into Malaysia through the Ninth Malaysia Plan in March 2006. PPP capable to transfer risk away from public sector to private sector. Therefore, it is important for the public and private parties to understand the risks through the whole project lifecycle prior the risk allocation agreement is made. This study aims to identify the critical risk factors of PPP projects in Pahang and to examine the preferred risk allocations for PPP projects in Pahang. Data were collected by using a set of survey questionnaire among the contractors (one representative) in each company in Grade 7 of Construction Industry Development Board (CIDB) in Pahang. Results from the study indicated that top five risk factors in Pahang are: construction time delay", "land acquisition", "delay in project approvals and permits", "design deficiency" and "inflation rate volatility". Lastly, on risk allocation preferences, this study indicated that 7 risks out of 46 risks would be preferably allocated to the public sector while 25 risks could be assigned to private sector. 11 risks were preferred to be shared by both public and private parties and the remaining of 3 risks depended on project circumstances. The results provided sufficient insight and understanding into the process of PPP as well as look deeply into the critical risks associate in the PPP projects and the contractors' preferred risk allocation for ensuring success of PPP projects.

ABSTRAK

Perolehan Public Private Partnership (PPP) telah diperkenalkan ke dalam Malaysia melalui Rancangan Malaysia ke-9 pada Mac 2006. PPP mampu untuk memindahkan risiko dari sektor awam kepada sektor swasta. Oleh itu, ia penting bagi pihak-pihak awam dan swasta untuk memahami risiko melalui kitaran hayat projek keseluruhan sebelum perjanjian peruntukan risiko dibuat. Kajian ini bertujuan untuk mengenal pasti faktor-faktor risiko kritikal projek PPP di Pahang dan untuk mengkaji peruntukan risiko pilihan untuk projek PPP di Pahang. Data telah dikumpulkan dengan menggunakan satu set soal selidik kajian di kalangan kontraktor (seorang wakil) dalam setiap syarikat dalam Gred 7 daripada Lembaga Pembangunan Industri Pembinaan (CIDB) di Pahang. Hasil daripada kajian ini menunjukkan bahawa lima faktor risiko di Pahang adalah: pembinaan kelewatan masa " , " pengambilan tanah " , " kelewatan dalam kelulusan dan permit " , " kekurangan reka bentuk " dan " kadar inflasi turun naik " projek . Akhir sekali , kepada pilihan peruntukan risiko , kajian ini menunjukkan bahawa risiko 7 daripada 46 risiko akan sebaik-baiknya untuk sektor awam manakala 25 risiko boleh diserahhakkan kepada sektor swasta . 11 risiko telah memilih untuk dikongsi oleh kedua-dua pihak awam dan swasta dan baki 3 risiko bergantung kepada keadaan projek . Keputusan memberikan pandangan dan pemahaman yang mencukupi ke dalam proses PPP serta melihat jauh ke dalam syarikat bersekutu risiko kritikal dalam projek-projek PPP dan peruntukan risiko pilihan kontraktor untuk memastikan kejayaan sesuatu projek-projek PPP.

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CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

Following the introduction to this study, problem background, problem statement, scope of study, significance of study, research terms and definition, and also the limitation of the study soon will be emphasized in chapter one. The findings will give the both private and public sectors to have a good understanding of importance of Public Private Partnership (PPP) projects as well as risk allocation and risk factors which will provide useful info for companies that plan to join PPP projects in Malaysia.

1.2 PROBLEM BACKGROUND

Over few decades, there has been an increased attention on the delivery of infrastructure and construction in developing countries. The evolution of public infrastructure requires a vast act of investment funds involves enabling it to as a separate asset class with stable income over the long time. Due to this reason, it increased the interest on the part of private parties and other financial investor to invest. It also matched by the demand for new infrastructure by developing countries as well as developed countries (Hodge and Greve, 2005). Therefore, PPP model are suitable in form of collaboration between both public and private parties. The government is highly concerned that those PPP infrastructure projects will provide enough and continually benefits to the general public. However, infrastructure projects naturally tend to be quasi monopolies.

In view of this consideration, a PPP form of projects will guarantee to be successfully implemented and needed for highly regulated so as to assure the private parties do not make undue advantage at the expense of the general public. Thus, the PPP contractual system will set off properly the benefits and responsibility between the both public and private parties.

PPP is a form of procurement or contractual agreement between a public and private partners which has been not only well-known in infrastructure development but also other construction management, refurbishment, maintenance and etc in Asia (Hwang et al., 2013). It is considered as an effective way of delivering infrastructure projects or service to achieve best Value For Money (VFM) (Ke et al., 2010). VFM is one of the public procurement principles which stress on the government procurement should yield the best returns for every Malaysian Ringgit spent in terms of quality, quantity, timeliness, price and source (Ministry of Finance Malaysia, 2010).

Moreover, PPP pursues to combine the benefits of flexible negotiation and competitive tendering, and allocate risk between the public and private partners in an agreed basis (Li et al., 2005). The motif for implementing PPP was natural to have a breakthrough in the financial situation. Some countries adopted PPP to improve operational efficiency, technology innovation, and more dynamic participation of private parties in public sectors. The factors of deficit in fiscal, pressure in budgetary, supply-demand gap, and lack of public services to infrastructure push some countries to adopted PPP (Chowdhury et al., 2011; Hwang et al., 2013).

The design of every PPP contractual structure shows how public and private partners can value and allocate risks optimally between themselves. Next, the design of a PPP contract needs to be carefully considered the assessment of risk and the parties who best manage it. So, the degree to which risk is genuinely transferred from the public to the private sector and shared optimally contribute to the success of PPP projects (Hodge and Greve, 2005). Appropriate risk allocation is crucial in PPP project success. Optimal risk allocation therefore pursues to risk minimization to the project such as individual risk premiums and the overall project cost, by allocating to the party in the best position to

manage them (Hayford, 2006). This implies that the risks should be apportioned to the parties which best manage it with the lowest price and highest confidence.

1.3 PROBLEM STATEMENT

Public private partnership (PPP) procurement was introduced into Malaysia in through the Ninth Malaysia Plan in March 2006. PPP contains the transfer of responsibility to the private sector in managing and finance a package of capital investment and services including the construction, management, maintenance, refurbishment and replacement of public sector assets such as buildings, infrastructure, equipment and other facilities, which creates a standalone business (PPP Unit Prime Minister Department, 2009).

The implementation of PPP must be able to make government projects more efficient where the risks and rewards are optimally shared between the two parties. Many researchers noted that one of the advantages of PPP it is capable to transfer risk from public companion to proficient private companion. In order to allocate the risk, risk management is the crucial factor to deliver a well risk allocation. According to Malaysia's PPP Guideline (2009), optimal sharing of risk is one of the key feature where the party who has the best capability to manage risk will bear the risk.

A Malaysia researcher stated that some of the PPP projects in Malaysia involved many risks which are not optimally share between the parties, which might cause them constantly facing failure or delay in project completion, over budget, and failed to meet quality standards or operational requirements. Even though the risk management process has been introduced in the construction industry, a big percentage of them are not well organized and not being implemented in a systematic structure (Zaini et al., 2010). This is the reason why this research concerns about the critical risks and the most appropriate risk allocation that concern about VFM for each party. VFM means the optimal use of resource combination of benefits and costs, to achieve intended outcomes.

There is the need to identify and allocate all risk factors associated with PPP projects. There are many factors of event that involved risk may give negative impact to

project objectives. Therefore, the risk factor has to be identified before the risk being allocated. The risks should be determine so it will be more prepared and organize. After the risk is identified, allocation of the risk to the private, public or shared should be determined. This is because the risk allocation is crucial for both public and private parties in PPP projects to achieve their aims. Therefore, risk allocation is essential to equalize the rewards and risks of private and public sectors in PPP projects. Confirmation of VFM for the public sector and revenue flows for the private sector is being concerned. The identification of stakeholders' risk allocation preferences is needed and important as the input for project procurement and contract negotiation.

The research outcomes will lead to both the practice and research in risk management for Malaysia's PPP projects and also provide valued information for the private sector to join the PPP projects in Malaysia.

1.4 RESEARCH OBJECTIVES

i) To identify the critical risk factors of PPP projects in Pahang.

ii) To examine the preferred risk allocations for PPP projects in Pahang.

1.5 RESEARCH QUESTIONS

i) What are the critical risk factors for PPP projects in Pahang?

ii) What is the preferred risk allocations for PPP projects in Pahang?

1.6 SCOPE OF THE STUDY

This study will be carried out by using questionnaire survey. The scope of study will limited to how contractors' perspective of preferred risk allocation on PPP project in Pahang. Due to time constraints, no model is developed to assess the preferred risk allocation of different PPP projects model. Responses from survey conducted are limited to contractors Grade 7 that registered with the Construction Industry Development Board (CIDB). Besides that, it is suitable to focus because there are many PPP projects located in Pahang.

1.7 SIGNIFICANCE OF THE STUDY

It is significant for both public and private sectors to understand the possible risks associated with PPP projects throughout the project life cycle, the criticality of risks and how well to allocate them to promise enduring success of partnerships. The results can be used to assist contractual parties to take appropriate way to manage the risks by adding mitigation strategies on them. Thus, this can prevent their interests being affected when the risk existence.

Furthermore, this thesis is also to evaluate the risk allocation between parties involved in PPP contract in contractor' perspective. The outcomes of this work can also be a reference for contractual parties to see their obligations in certain risk events. Furthermore, this will likewise be a good recommendation for contractors when valuing the risks. This research is anticipated to offer sufficient penetration and intellect into the cognitive operation of PPP as well as look deeply into the critical risks associate in the PPP projects and the contractors' preferred risk allocation for ensuring success of PPP projects.

1.8 LIMITATION OF STUDY

The goodness of the data may be affected due to the time constraint in collecting data within 1 month. The result of the research is applicable within Malaysia due to the scope restriction which is the data collection only focus within Pahang area. A little or none of formal documentation and experience on the public and private partnership, with the construction company which contribute to high difficulties in data access

1.9 EXPECTED RESULTS

This research is expected to provide sufficient insight into the entire process of PPP as well as look into the critical risk factors and preferred risk allocation between the public and private sectors. This research will also provide responses and comments from the stakeholders associated with PPP projects. This will include views of individuals in the public and private sectors. All responses will be analyzed for common parameters. This will help provide the need for concern on the critical risks and the standard risk allocation schemes for Malaysia PPP projects.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

Basically, this literature review is focused on obtaining inclusive background knowledge about the various critical risk factors associated with PPP projects, different categories, classifications of these risks, risk allocation preferences of contracting parties. For this purpose, various current and previous research papers were reviewed.

2.2 RISK MANAGEMENT IN CONSTRUCTION INDUSTRY

The construction industry has become one of the sectors that significantly contribute to Malaysia's economy with rapid growth. However construction project in Malaysia contains high risk. The construction risk level during the construction phase is recognized higher risk than in other types of economic sector. Risk can be easily found in the process of the project management in construction. One researcher described that risk is inherent in any construction industry, whether is predictable or unpredictable (Hamimah, 2008). According to the Project Management Institute (PMI) (2008), risk is an ambiguous condition or event which will give a positive and negative impact on a project objectives if happens. Further explained by this affirmation, the construction project is complex and fill with the abandon of negative consequences, the aim of project management is to cut the negative event's occurrence and increase the positive event occurrences.

A statement made by some researchers, risks will cause the contractor fail to complete the project on time, which can lead to insufficient fund and the project may be terminated (Zaini et al., 2010). The contractors that face with construction works are higher probability to deal with risk events which may bring negative impact on all other project performance, such as delays, poor quality, loss of productivity, loss of morale, and cost overruns. The risks are generally presumed by the owner of the project unless it's relocated to or presumed by another party for fair compensation and reimbursement. Hamid also expressed about the principle, standard in defining whether the risk can be transferred is determined by the receiving party both the expertise to control or minimize it and ability of competency to access the risks (Hamimah, 2008). Therefore, risk management should be stressed and applied in every size of construction projects, to ensure the achievement of project objectives (Hwang, et al., 2014).

Mills (2001) and Tang et al. (2007) mentioned that risk management has become a main part and vital component of the process in decision making in construction project. Some other researchers also stated that risk management is an active decision-making process, which includes accepting an expected and known risk and or choose ways to alleviate the impact and probability of the risk occurrence, maximize the opportunities and minimize the threat (Loosemore et al., 2006). In other words, risk management is formed to control and mitigate the risks which will affect the project performance success. Besides that, risk management is objectively to enhance the project performance and increase the effectiveness of the project. Its influence, enhance and increase the probability of advantageous project performance in terms of quality, cost, and time of a construction project if risk management is fully and implemented systematically (Lee and Azlan, 2012).

Moreover, many researchers mentioned that risk management is not only a set of tools and methods, but integrated with the project management process (Tang et al., 2007; Hamimah, 2008). The project team use risk management to clearly identifies the risks and uncertainties, analysis and evaluate the identified risks based on the sufficient information, and then with a mitigation plan. The activities included integrated with project management process group such as a planning process group, executing process group, monitoring and controlling process group. It can be conclude that the risk management is

not a one day of activity, it need to be carried out all ways through the project life cycle and also in organization.

In the situation in Malaysia, many contractors apply uncomplicated, rational, easy and low cost approaches during risk identification such as brainstorming and checklist methods. The risk identification method is unlike in each project and depending on the organizational policies, resource allocated, project type, characteristics and so on. Risk analysis includes software, training, experienced personnel and specialist advice to carry out the activities with come out effective response. Besides that in risk response, contractors prioritized and focused on risk factors with greater impact and probability. Yet, less number of companies apply sufficient process of reviewing, recording and checking the ongoing risk management activities (Norazian et al., 2008). Many organizational awareness on the importance and benefits of risk management is comparatively low. Though, it is supported by Norazian et al. (2008) that companies in the operation of construction activities implemented risk management, even though the number of recognizable and effective risk management framework users in Malaysia is only a low percentage. Yet, the formal risk management culture in big companies has already strongly imbedded with great reputation, strong financial and which normally involved in major projects only. Mills (2001) suggests that to improve the management of risk in projects throughout the delivery of a project, a systematic approach must be taken to manage risks.

In conclusion, risk management still a newly management concept in the Malaysian construction industry. It requires a long period for the practitioner to adopt and fully implemented and accepted in this industry. This is because most of them are unwilling to change and go for the new concept; they are even enjoying their comfort zone, which still use the traditional culture without notice that this risk management will eventually realize their task easier and less hazardous.

2.3 RISK MANAGEMENT PROCESS

Despite several risk management processes proposed in the literature (Flanagan & Norman, 1997; Loosemore et al., 2006; PMI, 2008; Hwang et al., 2014), generally, the 5 crucial steps in the risk management process are risk management plan, risk identification, risk analysis, risk response, and risk monitoring and control. The process is illustrated in Figure 2.1.

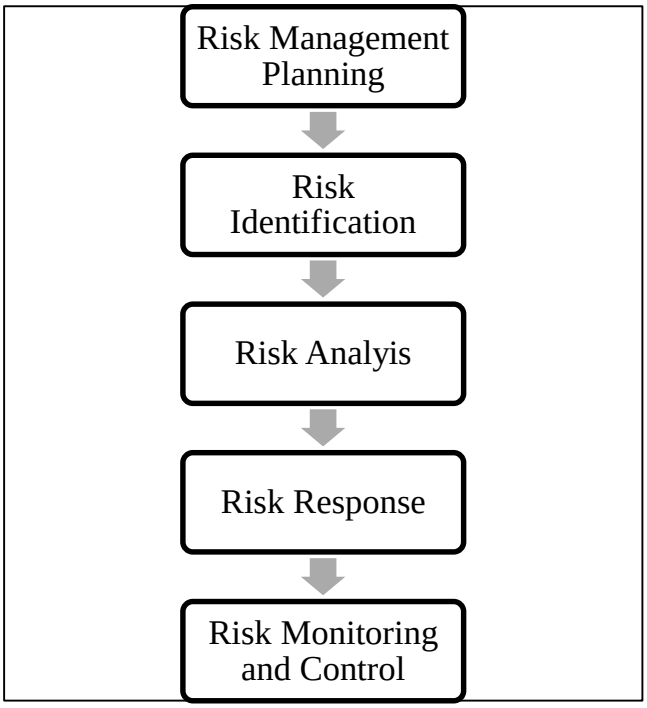

Figure 2.1: Risk Management Process

The first step in the risk management process, risk management planning, includes the planning of the risk management approach and perform. This is done to ensure that the level, type and visibility of risk management are proportionate with both the risk size and the project importance (Cheng and Hamzah, 2013). Planning and context establishment integrate in this stage to understand the background and environment.

Risk identification, the second stage of risk management, recognize, filter and rank the risks in a risk outline with identifying the risks (Cheng and Hamzah, 2013). Some researchers describe that it requires understanding and determining the potential

unsatisfactory outcomes likely to affect a project (Kululululanga and Witness Kuotcha, 2010). Risk classification is an integral part in risk identification with arranging the identified risks in different category of risk group according their characteristics.

The third stage in risk management is risk analysis, it is regarding the effect quantification of the identified risks. It requires the appraisal of the probability and impact of risks to settle their severity in order that the seriousness that could create an opposing effect are identified, the assets that could be involved are known, the features that increase the risk probability are recognized and the extent to which the risk manifest itself (Kululululanga and Witness Kuotcha, 2010). There are generally two methods to assess the risks, which are quantitative analysis and qualitative analysis (Loosemore et al., 2006; PMI, 2008; Lee and Azlan, 2012). Risk is quantified as a mathematical form in terms of quality, cost and time in quantitative risk analysis.

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The forth step is risk response, is the creation of an approach to maximize the potential opportunities and mitigate the potential threats (PMI, 2008). Lee and Azlan (2012) noted that risk response, also known as risk treatment which include the steps of choosing and finding protective measure to change the project risks. There are many literatures describe the way of risk response which include 6 types of approaches which are, risk reduction, risk transference, risk control, risk retention, risk sharing and risk avoidance (Cheng and Hamzah, 2013; Kululululanga and Witness Kuotcha, 2010; Loosemore et al., 2006; PMI, 2008; Lee and Azlan, 2012). The selection of appropriate risk response approaches, it must be efficient and effective for the organization (Lee and Azlan, 2012) and with withe cost effective and agreed by others involved parties (Cheng and Hamzah, 2013).

In the last stage, risk monitoring and control in risk management, it is vital to make sure that the anticipated effects of the risk responses implementation are achieved throughout the project life cycle (Cheng and Hamzah, 2013). Risk monitoring and control includes the process of identification, analyzing, and planning for risk, tracking of identified risks, and reanalyzing existing risks, monitoring risk symptoms and triggers,

and reviewing the execution of risk response strategies while evaluating their effectiveness (CDC Unified Process, 2006).

2.4 MODEL OF PUBLIC PRIVATE PARTNERSHIP (PPP)

Public Private Partnership is a method where the public and private sector collaborate to produce a public service or infrastructure. In this form of cooperative approach, both public and private sector will normally perform their own expertise, contribute resources and share the risks and responsibility involved (Tolani, 2013). In simple words, PPP is any arrangement and or agreement which will require the risks sharing, rewards, resources and responsibilities for actions and outcomes on a long-term basis.

There are many forms of PPP model which would be different in every project where it is been determined by the type of development project and intentions of government agencies and private parties' partnership to a variable degree. Therefore, it needs further verification on the most appropriate model before continuing to the next stage (Nur Nasiha, et al., 2013). According to UNESCAP (2011), the PPP models can be classified into 5 wide categories which are Supply and Management Contracts, Afferimage/ Lease, Concessions, Turnkey Contracts, and Private Finance Initiative (PFI) and Private Ownership. Each of the models is different in few degree variables which are the main variants, responsibility for the investment, ownership of capital assets, duration of contract and assumption of risk.

Table 2.1: Classification of PPP models

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	2-30
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		
	Divestiture	Private	Private	Private	Indefinite

* Build-Lease-Transfer (BLT)

** Build-Operate-Transfer (BOT), Build-Transfer-Operate (BTO), Build-Own-Operate-Transfer (BOOT), Build-Rehabilitate-Operate-Transfer (BROT)

*** Build-Own-Operate (BOO) / Design-Build-Finance-Operate (DBFO)

Source: UNESCAP (2011)

Each model in Table 2.1 has its own advantages and disadvantages which can be desirable for accomplishing the major aims of public private partnership to a varying level. Public and private partners should consider the suitability of each model due to some important factors such as, maturity of PPP market, socioeconomic, rules and regulations, technological condition, and political condition about the services in a sector.

2.5 PUBLIC PRIVATE PARTNERSHIP (PPP) IN MALAYSIA

In Malaysia, the participation of the private sector in providing and assisting with the provision of public services and facilities is not new. Malaysia has implemented PPP

for almost three decades. It has existed since the mid-1980s, when Malaysia was faced with the fiscal and debt crisis. The government began cutting down the expenses by reducing the public sector involvement in business and introduced measures to reduce Malaysia's budget deficits (Khairuddin, 2014). Therefore, the government seeks help from the private sectors for the development and economies activities of the country which consistent with the worldwide trend in economic liberalization. In simple words, Malaysia government have a cost reduction on public projects by collaborate with private sectors on the delivery of projects.

According to the Ninth Malaysia Plan report (2006), the implementation of public projects using the PPP or Private Finance Initiative (PFI) scheme were officially announced by the fifth Prime Minister of Malaysia, Datuk Seri Abdullah Ahmad Badawi. The PPP is formally defined in the Ninth Malaysia Plan report (2006) as:

'The transfer to the private sector the responsibility to finance and manage a package of capital investment and services including the construction, management, maintenance, refurbishment and replacement of the public sector assets which creates a standalone business. The private sector will create the asset and deliver a service to the public sector client. In return, the private sector will receive payment commensurate with the levels, quality and timelessness of the service provision throughout the concession period' (Ninth Malaysia Plan, 2006)

The beginning of PPP in Malaysia is marked when the government introduced the Malaysia Incorporated concept in 1981 (Khairuddin, 2014) and followed by the Privatization Policy 1983, Guidelines on Privatization 1985 and Privatization Master Plan 1991. These strategies of economic liberalization are announced to increase the participation of the private sector (Suhaiza & Ajija, 2011). The Malaysian government's objectives in the implementation of PPP include (Khairuddin, 2014):

- Improve productivity and efficiency,
- Reduce their financial and administrative loads,
- Cut down the magnitude and involvement of the public sector in the economic,
- Enable economic growth
- Assist to encounter the targets of countrywide economic policy.

Thus, the objectives of the above will give the benefits and enhance the projects values if the objectives are achieved.

For additional information of PPP in Malaysia it review in Tenth Malaysia Plan. It indicates the government plan budgeted RM20 billion to facilitate fund in effort into attracting the private sectors involve into delivering public services. Moreover, the objectives of this fund assist bridge the financial viability gap for private investment which expected worth at least RM200 billion in areas given priority by the government such as tourism, infrastructure, and education projects. At current, the government identified and undertaken fifty two PPP projects with high-impacts worth RM 63 billion, which includes seven highway projects, two coal electricity generation plants, five public universities, privatization of the seaport, redevelopment of media city, and one development land project (Tenth Malaysia Plan, 2010).

As the implementation of PPP in Malaysia are growing extremely, the Malaysian government constantly reviewed and revised the PPP arrangements and effectiveness to enhance the existing practice of PPP implementation to make sure the accomplishment of its critical objective.

2.6 RISK IN THE CONTEXT OF PUBLIC PRIVATE PARTNERSHIP (PPP)

The existing risks will affect the success of PPP projects, but the private sector still actively to take over the traditional role of the public sector in financing, procuring and managing such assets (Ng and Loosemore, 2007). Thus, the risk in PPP projects must be managed properly. It is known that risk transfer is a vital element of PPP, and it's always been debated that it also brings additional benefits for the public sector, including improved project delivery and maintenance of public infrastructure, elimination of over-specification and better delivery of public services (Dixon et al., 2005). Therefore, risk management is a critical element of PPP.

The intention of the public sector is to transfer the risk to the private sector, but in practice some risks cannot be transferred and some risks must be shared (Demirag et al., 2010). Thus, an agreement must work together between both public and private sectors

regarding how risks are to be transferred and managed. Abednego and Ogunlana (2006) found that organizations make unclearly in achieving such agreement in practice. Each party normally has different perceptions of proper allocation of risk, and private party tends to be unwillingly bear certain risks (Ke et al., 2010). So, Ng and Loosemore (2007) claim that the public sectors wants to be more stress on risk transfer strategies, for the success of PPP projects. Hence, a proper risk model in deciding the risk allocation must be clearly defined in order to enhance the project success.

Public sectors procuring a PPP project would state its preference as to how the project risks should be shared. The private sectors will assess their capability and propose a bidding price which fit to public sectors preferences (Ng and Loosemore, 2007). This creates a concern on the public sector are unsophisticated in risk management processes which lead to the standard form of a PPP contract does not generally offer an optimal risk allocation (Dixon et al., 2005). In addition, current research has shown that risk management practices, especially in risk allocation are greatly variable, intuitive, subjective and unsophisticated (Ng and Loosemore, 2007). Therefore, in this study, one of the aim is to examine the preferred risk allocation between both public and private sectors on PPP projects.

2.7 RISK IDENTIFICATION IN PUBLIC PRIVATE PARTNERSHIP (PPP) PROJECTS

Risk identification is an important phase in project risk management process. The risk factor has to be identified as early as possible during the planning stage of project management before the risk being allocated. Abundances of the PPP project risk derived from the complexity and uncertainty of the arrangement structure in terms of market conditions, taxation, financing, technical details, etc. and changes over the duration of the project (Shen et al., 2006).They have to predict the risk so it will be more comprehensive, organized and prepared (Nur Alkaf, 2011) and with the help of a simple but effective method is the development of a risk checklist (Li et al., 2005). In order to achieve this phase, a comprehensive study on the literature review to generate the idea for this study based on the same research objectives.

The risk factors were developed based on the 10 sources extracted from literature review by past, researchers (Ke et al., 2010; Li et al., 2005; Jin and Zhang, 2011; Wibowo and Sherif, 2010; Shen et al., 2006; Abednego and Ogunlana, 2006; Xu et al., 2009; Ng and Loosemore, 2007; Medda, 2007; Estache et al., 2007). The risk factors included unstable government, expropriation or nationalization of assets, poor public decision-making process, strong political opposition/hostility, poor financial market, inflation rate volatility, interest rate volatility, influential economic events, legislation change, change in tax regulation, industrial regulatory change, lack of tradition of private provision of public services, level of public opposition to project, force majeure, geotechnical conditions, weather, environment, land acquisition, level of demand for project, availability of finance, financial attraction of project to investors, high finance costs, residual risks, delay in project approvals and permits, design deficiency, unproven engineering techniques, construction cost overrun, construction time delay, material/labour availability, late design changes, poor quality workmanship, excessive contract variation, insolvency/default of sub-contractors or suppliers, operation cost overrun, operational revenues below expectation, low operating productivity, maintenance costs higher than expected, maintenance more frequent than expected, organization and co-ordination risk, inadequate experience in ppp, inadequate distribution of Responsibilities and risks, inadequate distribution of authority in, differences in working method and know-how between partners, lack of commitment from either partner, third party tort liability, staff crises. The list of risk factors is displayed in **Table 2.2** below.

Table 2.2: Risk Factors of PPP projects

Risk Meta Level	**Risk Factor Category Group**	**Risk Factor**	**References**										**Frequency**
			A	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	
Macro level risks	Political and government policy	Unstable Government	*		*				*				3
		Expropriation or nationalization of assets	*	*			*	*	*		*	*	7
		Poor public decision-making process	*						*				2
		Strong political opposition/hostility	*	*		*	*		*	*	*		7
		Poor financial market	*	*						*			3

	Macroeconomic	Inflation rate volatility	*		*	*	*		*			*	6
		Interest rate volatility	*	*	*		*		*		*	*	7
		Influential economic events	*					*					2
	Legal	Legislation change	*	*		*	*	*		*		*	7
		Change in tax regulation	*	*	*		*	*			*	*	7
		Industrial regulatory change	*			*				*			3
	Social	Lack of tradition of private provision of public services	*				*						2
		Level of public opposition to project	*				*					*	3
	Natural	Force majeure	*	*	*		*					*	5
		Geotechnical conditions	*	*			*		*				4
		Weather	*	*	*		*						4
		Environment	*		*		*						3
Meso level risks	Project Selection	Land acquisition	*		*		*		*			*	5
		Level of demand for project	*				*				*	*	4
	Project Finance	Availability of finance	*			*	*						3
		Financial attraction of project to investors	*										1
		High finance costs	*						*		*		3
	Residual Risk Design	Residual risks	*	*			*						3
		Delay in project approvals and permits	*	*	*	*	*		*	*			7
		Design deficiency	*			*				*	*		4
		Unproven engineering techniques	*				*					*	3
	Construction	Construction cost overrun	*						*				2
		Construction time delay	*	*	*		*	*	*	*		*	8
		Material/labour availability	*	*		*	*	*	*			*	7
		Late design changes	*										1
		Poor quality workmanship	*	*									2
		Excessive contract variation	*			*	*		*	*			5
		Insolvency/default of sub-contractors or suppliers	*						*				2
	Operation	Operation cost overrun	*	*			*		*			*	5
		Operational revenues below expectation	*										1
		Low operating productivity	*										1
		Maintenance costs higher than expected	*										1
		Maintenance more frequent than expected	*										1
Micro level risks	Relationship	Organization and co-ordination risk	*	*		*	*						4
		Inadequate experience in PPP	*			*							2
		Inadequate distribution of responsibilities and risks	*	*		*					*		4

		Inadequate distribution of authority in partnership	*			*							2
		Differences in working method and know-how between partners	*						*	*			3
		Lack of commitment from either partner	*	*					*				3
	Third Party	Third Party Tort Liability	*										1
		Staff Crises	*										1

The sources of the table used the reference of A, B, C, D, E, F, G, H, I and J, which A= Li et al. (2005); B= Ng and Loosemore (2007); C=Abednego and Ogunlana (2006); D=Shen et al. (2006); E=Xu et al. (2009); F=Wibowo and Sherif (2010); G=Ke et al. (2010); H=Jin and Zhang (2011); I=Medda (2007); J=Estache, et al. (2007).

2.8 RISK CLASSIFICATION IN PUBLIC PRIVATE PARTNERSHIP (PPP) PROJECTS

Risk classification is an integral part in risk identification with arranging the identified risks in different category of risk group according their characteristics. There are many types of risk categorization analyzed in the several literatures. Normally, there are two major types of risk categorization can be derived from literature (Xenidis and Angelides, 2005): the first is risk occurs associating to the project lifecycle stage during the project period; and the second is according to the source of each risk. Tolani (2013) further explained that risk factors in project life cycles of PPP projects: Design, Engineering and Construction phase, start-up phase and operations phase associated with different levels of risk level as Design, Engineering and Construction phase is typically matter to the highest risk level, while the operation phase is normally with the least risk.

In the more current study, Ng and Loosemore (2007) proposed that the massive range of potential risks which can influence the objectives can be divide into two main groups which are project risks and general risks. Project risks arise from events in its immediate microenvironment. While general risks have significant impact on the results, although the risks are indirectly linked with project strategies. Ke et al. (2010) categorized

the 37 identified risks associated with China's PPP projects into market, project and country risks.

Furthermore, Li et al. (2005) proposed a 3 levels meta classification approach based on the risk factors associated with PPP project. The 3 levels include: macro, meso and micro level risks. The macro level of PPP risk consists risks sourced exogenously and external to the system boundaries of the project itself. The macro level of PPP risk include risk category group of political and government policy, macroeconomic, legal, social, and natural.

The meso level of PPP risk comprises risks sourced endogenously, example, risk events and their consequences occurring within the system boundaries of the project. The meso level of PPP risk include risk category group of operation, construction, residual risk design, project finance, and project selection. The micro level of PPP risks represents the risks, the inherent differences between the public and private sectors in contract management cause the initiate in the stakeholder relationships formed in the procurement process. These are also endogenous risks, but vary from meso risks in that they are relation-related rather than project-related. The micro level of PPP risk include risk category group of relationship, and third party.

In conclusion, this risk classification approach is used in this study because it can provide a comprehensive outline of risk factors in PPP projects as showed in **Table 2.2**.

2.9 RISK ALLOCATION IN PUBLIC PRIVATE PARTNERSHIP (PPP) PROJECTS

Every party involved in PPP projects has their own perception of risks. Tolani (2013) stated that risk perception often seen differently by the project participants based on their involvement, management capability and level of return on investment for a project. Risk perception will eventually affect the preferred risk allocation among the parties. Risk allocation preferences deal with the perceptions and decision made by participants in terms of risky events they are willing to manage in PPP projects or extent

of risks that should be transferred by the government to the private sector participants in PPP (Tolani, 2013). It is simply saying that the preference of private sector participants to take over the risks they are willing to accept from the government in order to optimize their rewards through PPP projects; while public sectors would prefer to transfer as many commercial risks as possible to the private sectors and tend to minimize the risk impact that are within the public control.

According to Roumboutsos and Anagnostopoulos (2008), it is important that the preference of risk allocation should be identify before the contract negotiation and procurement of project. This is because it can confim the VFM for the public sector and continuous cash flow for private sector. Ng and Loosemore (2007) concluded that in the context of PPP project investing, private sector companies aim to attain a return on their investment in making adequate future cash flows to exceed and fund the initial capital costs and finance charges, thus provide sufficient profit to invest in future project development and pay shareholder dividends. In the other hand, the public sector aims to ensure a service level to the community which is appropriate, more effective in costing and higher quality than if public sector had retained responsibility (Ng and Loosemore, 2007). Therefore, risk allocation is vital in balancing private and public rewards and risks in PPP projects.

Risk allocation is one of the vital elements of risk management of PPP projects. The significance of risk allocation is it would assist the balancing between public and private sectors in the distribution and assignment of risks and responsibilities. Risk allocation in PPP projects refers to a primary measure of risk assigned to project direct participants, which are the public and private sector. If both participants bear a certain risk result together, that is a shared risk allocation mechanism (Li et al., 2005). Roumboutsos and Anagnostopoulos (2008) describe risk allocation as the determination of which parties should accept the consequences of project risks; how risk is shared or allocated between the parties involved is essential to the PPP arrangement in terms of definition, contract negotiation, achievement of value-for-money, and overall project success. Thus, it is important that risk allocation should be clearly communicated and reach a common understanding between the involved parties. It is important that the public and private sector partners need to reach a mutually consensus of the acceptable

risk allocation scheme before the contract is awarded in order to achieve the value for money objectives for both public and private partners.

Furthermore, risk allocation in PPP is correlated with contract negotiation, as the outcome of the allocation is a critical prerequisite or requirement to the PPP project's development success (Wang and Dai, 2009). A schematic process of negotiation for risk allocation is presented in Figure 2 below.

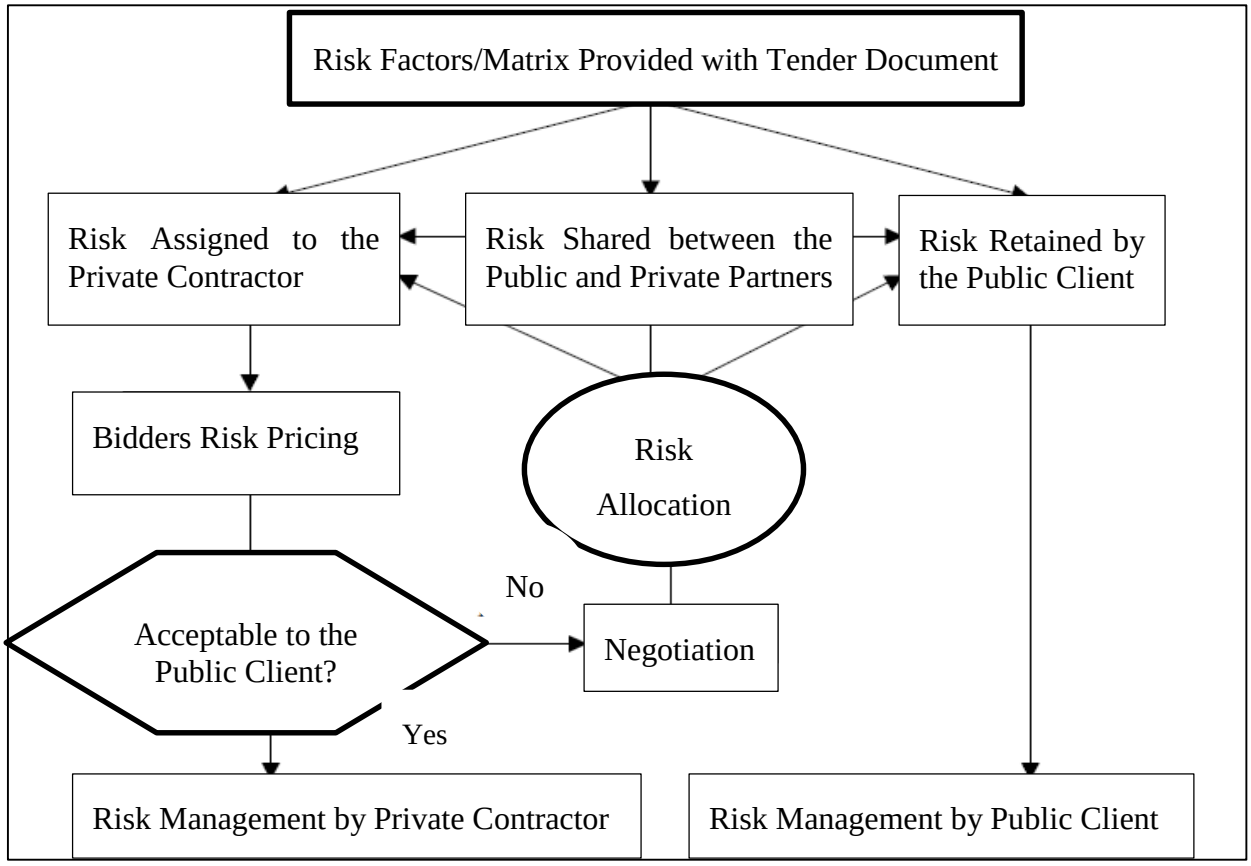

Figure 2.2: Risk Allocation Process in PPP

Source: Li et al. (2005)

Loosemore et al. (2006) established a rule to follow in order to achieve optimal risk allocation. An optimal risk allocation explained that a specific risk should only be given to the party who:

a. Has best able to assess, control, and manage the risk effectively and efficiently.

b. Has the best access to hedging instruments (expertise, authority, capability and resource).
c. Has the greatest ability to differentiate the risk.
d. Has the lowest assumption of lowest cost of risk (lowest risk premium).
e. Possesses the necessary risk appetite to want to manage the risk.

If the simple rules not followed, it will affect negatively to the achievement and effectiveness of the project since it will produce larger amount of risk premiums than necessary, and thus add up the risks arising and the consequences chance if they get along. Besides that, public sector is simply gaining the risk transfer illusion, since it is possible that the risk will be transferred back to them in the context of higher risks, risk premiums and project problems (Ng and Loosemore, 2007).

A number of research regarding have been investigated to gain risk-sharing schemes in PPP projects in various countries such as Australia, Hong Kong, China, Nigeria, Greece, Indonesia and etc. For example, Wibowo (2008) found out the central tendency of risk allocation as measured by the mode value confirms the intuition and theory that risk must better rest with the party who has control or better manage in terms of the water supply projects in Indonesia. In India, researchers explored risk allocation in road projects (BOT) and discovered the norm that the highest capability of party in managing risk would undertake it as often not followed due to the perception difference of risk management capabilities between project participants (Thomas et al., 2003). However, Li et al. (2005) conducted a questionnaire survey to explore preferences in risk allocation in the UK and discover that some risks cannot straightforwardly be allocated to a particular party, nor shared, it should be handled on a case-by-case basis.

Besides that, Shen et al. (2006) did a case study on the Hong Kong Disneyland theme park to establish how various major risks in committing to a PPP project are allocated or shared effectively between the government and private partner; Abednego and Ogunlana (2006) use a case study of toll way project in their research in Indonesia, but successfully produced a proper eisk allocation in PPP toll way projects and with better; Ng and Loosemore (2007) discover a case study of a railway project in Sydney, Australia and identified the rationale behind decision about risk allocation between public and

private sectors and their consequences; In Greece, Roumboutus and Anagnostopoulos (2008) conducted questionnaire survey on the stakeholders' preferred risk allocation of the PPP projects and compared the outcomes with the UK researchers which seen as a mature PPP market; more current study in China about the risk allocation in PPP project. Researchers in China established a fuzzy risk allocation model and also discovered the preferred risk allocation through a two round Delphi survey (Xu et al., 2009; Ke et al., 2010).

Lastly, in Malaysia there are little effort working on the research on the risk allocation preferences in PPP projects. This research attempts to fill this knowledge gap based on the opinions of the private contractors.

2.10 SUMMARY

In this chapter, a comprehensive review of recent literature searched for documentation of all aspects of public private partnership agreements is conducted. A review of literature concerning the Malaysian construction industry and PPP history was also studied. A selected number of journal articles relating to PPP were also examined. Sources of literature include online textbooks, journal articles, conference reports, seminar presentation, and dissertation paper.

The results of literature review provided a wide knowledge of PPP around the world in many regions such as Hong Kong, China, India, Indonesia, Greece, UK, Singapore and etc. There are also similar objectives with this study conduct at other region, but many of it comes with different preference results and model. This is due to the uniqueness of each project and cultural difference and legislation. The literature review provided a comprehensive estimate for taking the research methodology, method for data analysis and to underpin the development of the questionnaire.

CHAPTER 3

METHODOLOGY

3.1 INTRODUCTION

This chapter will define the methodology used in doing this study. The research methodology is a necessary in providing a guide to the researchers to achieve the purpose and the objectives of the study. This chapter commences with the rationale for the research method, design and procedures, including the population, sample, and instruments. In addition to these, data collection, analysis of the data, validity and reliability are discussed.

3.2 RESEARCH DESIGN

This research is conducted by following the stated research process flow in Figure 3.1. It starts with the first step, problem identification. This research moves to the second step, identifying the valid sources. The author has identified the sources and collected all the information in the logical manner. All articles or journals were tangible proof to support the research problem. Therefore, the answer for the research problem was conceptualized and tested.

Next, this research moves to the research objectives step. In here, the research objectives are formulated to conduct the study. Later, plan the research method, population and sampling. The participants of the study are identified. The population of the study remains in the construction industries with Grade 7 in Pahang.

The development of questionnaire is the next step. The quantitative is chose to conduct the study. The developed questionnaire is aimed to achieve the research objectives. A pilot study is conducted to verify the questionnaire. If the reliability test of Cronbach's Alpha value is below 0.70, some items should be deleted to increase the value. Modification of questionnaire will be conducted.

The eighth step is data analysis which will analyze all the available valid data received from the respondents. The purpose of data analysis is to examine whether the research objectives have been achieved and the solution for the research is found. At last, the conclusion is produced. In this step, recommendation, limitation and summary of results of the research problem will be discussed.

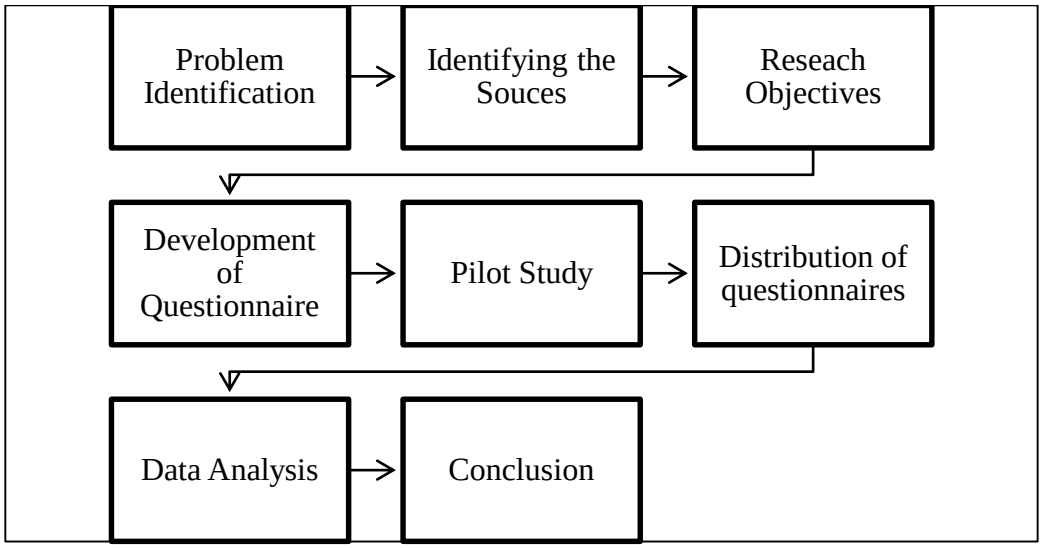

Figure 3.1: Research Process Flow

3.3 RESEARCH METHOD

According to Cavana et al. (2001), there are two research methods used to conduct a research which are quantitative and qualitative research. Quantitative research method is identifying the research hypothesis or expected solution for the research problem. It includes the questionnaires method. In the other hand, the qualitative research method

roots out how human construct meanings in their contextual setting. It includes the focus group and interview method (Cavana et al., 2001).

In this study, the quantitative research method is applied. Hwang et al. (2014) stated that questionnaire survey is the most common research method used to obtain a risk-allocation scheme in PPP. For example, Li et al. (2005) developed a preferred risk allocation scheme for PPP projects in the UK based on an opinion survey with 53 suitable responses; Roumboutos and Anagnostopolus (2008) conducted a similar survey using the same questionnaire in Greece and compared the findings to those in the UK; Hwang et al (2013) uses questionnaire survey to gather the data to test the theoretical framework for understanding risk allocation practice on PPP projects in Singapore.

Questionnaire is used to retrieve respondents' opinion on rating the risk probability and impact. From the results it can determine the mean of each risk factors. The mean can answer the first objective of the risk criticality in PPP project. For the second objective, respondent is asked to allocate which parties should be bear the risks. The answer is based on their preference opinion, expertise and experience.

The questionnaire is the simplest tool for collecting and recording information from the respondent (Kirklees, 2014). The lists of questions which related to the study is formed and the instructions and details is prepared, so that the respondent will clearly understand the ideas and concepts. The reason to using the questionnaire is because it helps to contact large number of people at a relatively lower cost compared to others.

3.4 DATA COLLECTION TECHNIQUES

The subjects of this study are contractors for the construction industry in Pahang. Data are collected and gathered by using a questionnaire survey with valid respondent. The questionnaires will be distributed through emails and personally administered. Survey questionnaires can be carried out in many ways and different mode of administration of the data brings effects on the quality of data obtained (Ann , 2005). Ann also mentioned that the different mode of administration of the data has significant impact

on the validity of the results of a study. This is supported by (Zhang, 2004), a quality questionnaire survey is an effective tool for gathering data and sampling the opinions of respondents. Moreover, the survey questionnaire method is less time-consuming and skill required to conduct the questionnaires rather than interview method.

3.5 POPULATION AND SAMPLING

According to Latham (2007), there are two types of sampling which included probability sampling and non-probability sampling. Simple random sampling will be used in this study because it is a good method to use when conducting a pilot study especially when attempting to question the group who sensitive to the question. The objective using probability sampling is to select sample from the population such that each sample has an equal chance of being selected.

The target population for this study is contractor in the PPP sector in the different construction company in Pahang, Malaysia. Furthermore, the simple random sampling is applied due to the research want to focus on the PPP experienced of Grade 7 construction companies. There have around 113 companies registered members as Grade 7 in Construction Industry Development Board (CIDB) database, which is an agency under the Ministry of National Development in Malaysia for Pahang State (CIDB, 2006). Category of Grade 7 means, the grade tendering capacity is no limit, and the model needed is not less than RM 750,000. The target respondents included middle and top management, who assumed the responsibility of risk management of projects.

For the sample of the study, the simple random sampling can ensure the selected respondents are normal distributed and enhance the goodness of data. The sample size of this study is 85 Grade 7 construction companies in Pahang. The sample size was determined by using sample size table which provided by the research advisors (The Research Advisors, 2006). According to The Research Advisors (2006), 85 Grade 7 construction companies is a sufficient number to generate a 95% confidence interval and a Margin of Error within plus or minus 4.5% for the population proportion. Simple random samples were used to select 85 from the 113 companies. Simple random sampling is a sampling method where items in the research population are uniform and have an equal probability of being included in the sample (Cavana et al., 2001)

3.6 DEVELOPMENT OF MEASURES: DESIGN OF QUESTIONNAIRE

The survey questionnaire will be used to collect the data regarding the risk factors and preferred risk allocation in the PPP projects. This measuring instrument contains two sections. The first section geared towards collecting general demographic data of the participants. The second section will focused on two research question in this thesis. These included the risk factors, their measurement and allocation preferences. The question is referred and modified from a review of literature and also the questionnaire from (Tolani, 2013). It is close-ended questions and provided a set of answers for the respondent to choose. A total of 46 risk factors developed in Li et al. (2005) were used for the quantitative aspect of this study.

The criticality of risk factor was measured as the product of likelihood of risks and with potential impact on the PPP project. For each risk factor identified, the respondents were requested to: 1) Assign an estimated probability of occurrence and expressed in a 0 to 6 qualitative Likert scale (where the probability of occurrence is nil = 0, 1= remote, 2= occasional, 3= probable, 4= frequent and 5= very frequent) and; 2) Estimate the impact of each risk factor described on a scale of 0 to 6 (where 0- the impact is nil, 1= impact is negligible with no serious influence on the project, to 5= where impact is catastrophic, where the project would be aborted).

For the preferred allocation of risks, respondent was also asked to select a party to which each risk should be allocated to either the private or the public sector, or describe it as preferably 'shared' between the public and private sector. (Where PB = public sector, PV = private sector, SH = shared)

To deal with the general problem of non-response in survey administration, the following measures were taken by the researcher to have reasonable and acceptable survey returns: A brief explanation of the purpose of the study was done. Follow up phone calls will made to survey participants after one week of non-response.

3.7 VALIDITY AND REALIBILTY OF STUDY

Participants were asked to indicate the level of their knowledge or experience or interest with PPP to ensure the validity of the survey instrument. Next, the respondents which involve in management in their organizations were invited to participate in the survey as they are better equipped to answer questions relating to strategic matters such as project risk management. They were equally asked to show their level in management: low level, middle level and high level management. To testing the stability and consistency of the variables, the Cronbach's Alpha coefficient of reliability been used for each variable.

Besides that, the respondents needed to meet two criteria before being invited to participate in the survey, which include (1) having extensive working experience within the construction industry in Malaysia, and (2) having been involved in the management of PPP projects in Malaysia or at least have some knowledge and/or interest in the topic of PPP as practitioners. To be sure the participants are knowledgeable and have some experience in PPP, all respondents were required to currently hold or to have held management position in the past. The varied practical working experience and relevant organization of the identified practitioner as analyzed below indeed uphold and reinforce the validity of this study.

3.8 DATA ANALYSIS

The analysis of the survey results is obtained by using Statistical Package for the Social Science (SPSS) software program. The respondent's demography variables, which include sector, working experience, knowledge or experience with PPP, level in the organization will be analyzed through descriptive statistic. The frequency, mean and standard deviation on the respondents' profile will be presented in the table and histograms.

The data will be analyzed by using descriptive statistics. Descriptive statistics involved transformation of raw data into word description to describe a set of factors in a

situation, the description data can be obtained through manipulation of collecting raw data by SPSS software which can be in the form of frequencies, mean, median, mode, range, variance and standard deviation.

With the application of SPSS, the data can be analyses the complicated statistical and mathematical procedures and therefore can increase the speed of data analyzing process compared to the manual data analysis process. In advance, the data generated from SPSS can be displayed in graphics and an instant report can be created from it. In this study, for the data evaluation, measure of central tendency is used.

3.8.1 Mean Analysis for Critical Risk Factor

From the frequencies it will illustrated the mean, median and mode can be useful measures of central tendencies, depending on the type of available data. The mean is a measure of central tendency that offers a general picture of the data without unnecessarily inundating one with each of the observation in a data set.

The ranking of mean score technique was used to rank the probability of occurrence and impact of risks in PPP projects. The product of probability of risk occurrence and the impact given rating from respondents acted as the scores used to calculate the mean score for each factor. The risk criticalities are represented as: Risk criticalities = probability of occurrence (mean) X Impact of risk (mean). The individual risk factors are ranked in descending order of the mean scores on the risk criticality (i.e. the product of the risk probability and risk impact) to identify the critical risk factor. The top 5 rank risk factor will be discussed.

3.8.2 Risk Allocation Preference Analysis

As for the analysis of risk allocation preferences, the percentage of the respondents who believed that a risk should be allocated to a party was analyzed. There will be 4 categories identified: (1) risks to be allocated to the public sector; (2) risks to be allocated to the private sector; (3) risks to be shared between the public and private sectors;

and (4) risks to be negotiated based on projects circumstances. The analysis is based on the majority opinion (>50%).

3.8.3 Reliability

Assessment of the goodness of ensuring developed is very important. To test the stability and consistency of the variables, the Cronbach's Alpha coefficient of reliability been used for each variable. Besides that, the Cronbach's Alpha coefficient range can hold a value of zero to 1. The closer the Cronbach's alpha coefficient values gets to 1, the higher is the internal consistency reliability (Gliem, J and Gliem, S., 2003). The acceptable level of Cronbach's Alpha coefficient value is 0.70. From the internal consistency tests, which items are not significant will be deleted in order to achieve the highest reliability of the measurement.

3.9 PILOT STUDY

For this study, a pre - test questionnaire will be conducted before the questionnaire given to the respondent for gathering the actual data needed. Cronbach's Alpha coefficient of reliability is used to determine the consistency of variable. In this study, 15 sets of questionnaire have been distributed among estimator who employed by the contracting firm that categorized in Grade 7 in Pahang to test for reliability of the questionnaire. SPSS 22 is used to test the collected questionnaire results. Few researchers stated, the closer the Cronbach's Alpha coefficient value is to 1, the higher the internal consistency reliability (Gliem. J and Gliem. S, 2003).

The analysis of the pilot test in this study declared that the Cronbach's Alpha coefficient value range from 0.840 to 0.904. The Cronbach's Alpha coefficient value for probability of occurrence to the risks for PPP project is 0.904. While for the impact of the risks of PPP project is 0.874. For the risk allocation preference, the Cronbach's Alpha coefficient value is 0.840. The Cronbach's Alpha coefficient for these three groups were in the acceptance level. The Cronbach's Alpha coefficient value is above 0.7, thus the element would continue to analysis without any variable is deleted.

Table 3.1: Cronbach's Alpha for Pilot Test

Variable	No of items	Cronbach's Alpha value
Probability of occurrence of the risks of PPP project	46	0.904
Impact of risks of PPP project	46	0.874
Risk allocation preference	46	0.840

3.10 SUMMARY

Overall, this chapter outlined the research method, the research design and sampling, including the population and instruments. It also presented the procedures for data collection, analysis of the data. It equally showed the validity and reliability of the study.

CHAPTER 4

RESEARCH FINDING AND ANALYSIS

4.1 INTRODUCTION

This chapter presents the quantitative findings of this study. The purposes of this study are to identify the critical risk factors of PPP projects in Pahang and to examine the preferred risk allocations for PPP projects in Pahang.

Since the study is designed to answer the two research questions, descriptive analysis was performed to measure the profiles of the respondents followed by the reliability of the variables in this study. The first section asks about background information from the respondents such as: sector, experience with PPP, management level and etc.

The second section solicits information on probability of risk, impact of risk and risk allocation preferences of the 46 risk factors by the respondents. The average mean is used to analyze the degree of criticality of risk factors in PPP projects which consists of the product of the average mean of probability and impact of the risk factors. Besides that, the average mean was used to rank these factors in order to produce the most critical risk factors. Regarding the risk allocation preference, the respondents were asked to rate the 46 risk factors are in the position of public, private or shared responsibility.

4.2 QUESTIONNAIRE DISTRIBUTION

The closed ended questionnaires were distributed to the targeted respondents in order to collect data for analysis. The targeted respondents of this study are the representative of the Grade 7 companies that located in Pahang.

As determined in Chapter 3, the population of the study is 113 and they are those representatives of the companies in different positions. According to The Research Advisors (2006), 85 Grade 7 construction companies are a sufficient number to generate a 95% confidence interval and a Margin of Error within plus or minus 4.5% for the population proportion. Cavana et al (2001) stated that the return rate of mail questionnaire is quite low and approximately 30 percent will be receives and the 30 percent is considered acceptable. Table 4.1 showed that 20 questionnaires were distributed using mail and only 6 responded, which shows a return rate of 32.43 percent which is considered acceptable. In the meantime, 20 questionnaires were distributed by email and get back 6 valid responded which indicates 30.00%. Besides that, there are 44 questionnaires are distributed by hand and face-to-face. 21 questionnaires were collected which shows a return rate of 47 percent.

Table 4.1: Distribution of questionnaire

Data collection method	Total distributed	Total collected	Return Rate (%)
Fax	31	6	19.35
E-mail	20	6	30.00
Hand distributed	44	21	47.00
Total	**95**	**33**	**34.73**

Table 4.1 indicated the various distribution methods of the distribution of questionnaires. Out of about 81 questionnaires administered to respondents between June and October 2014, 33 responded. Although only 34.73 percent of responding rate, the number of samples is acceptable and representative when compared with other similar studies on risk management in PPP projects which was higher compared with the norm

of 20 – 30percent with most questionnaire surveys in the construction industry (Hwang, et al., 2014). For example, Li et al (2005) done the similar research in the UK, which get 11% of respond rate. On the other hand, the number of samples is greater than Roumboutos and Anagnostopoulos (2008) in Greece with similar research, but slightly lower than Ke et al (2010) in China.

4.3 RESPONDENT PROFILES

Information in the respondent's profile is obtained from the Section A. In determining the profile of respondents, seven demographic variables were included in the questionnaire. However, the demographic variables are significant to know the background of the respondents which have the validity to become the targeted respondent. Meanwhile, the respondent profile is explained by demographic analysis is carried out via descriptive statistics with percentages presented.

Table 4.2: Sector

Sector	Frequency	Percentage (%)
I. Public	1	3.0
II. Private	32	97.0

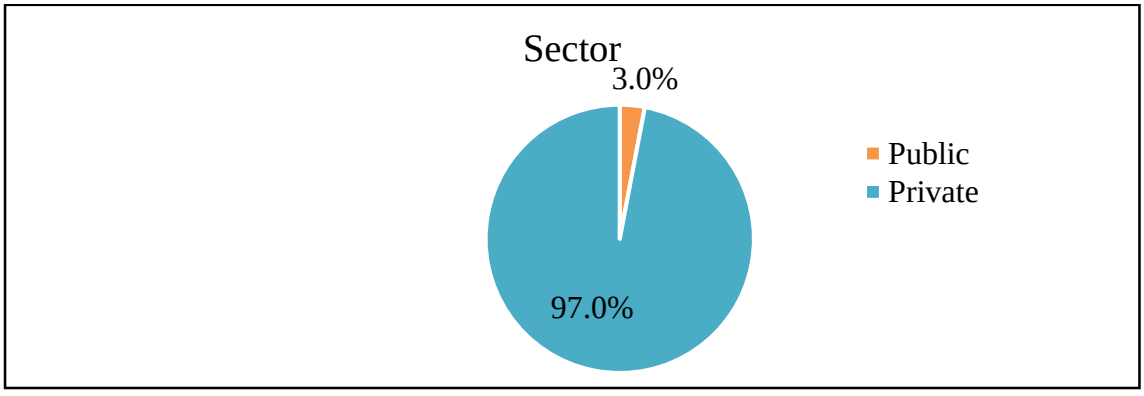

Figure 4.1: Sector

In figure 4.1, the respondents comprise 97% of private sector and 3% of the respondent are in the public sector. This means that the Grade 7 companies, mostly are privately based.

Table 4.3: Knowledge Experience

Knowledge Experience		Frequency	Percentage (%)
I.	Present practical experience	6	18.2
II.	Past practical experience	4	12.1
III.	No experience, but knowledge and interested	23	69.7

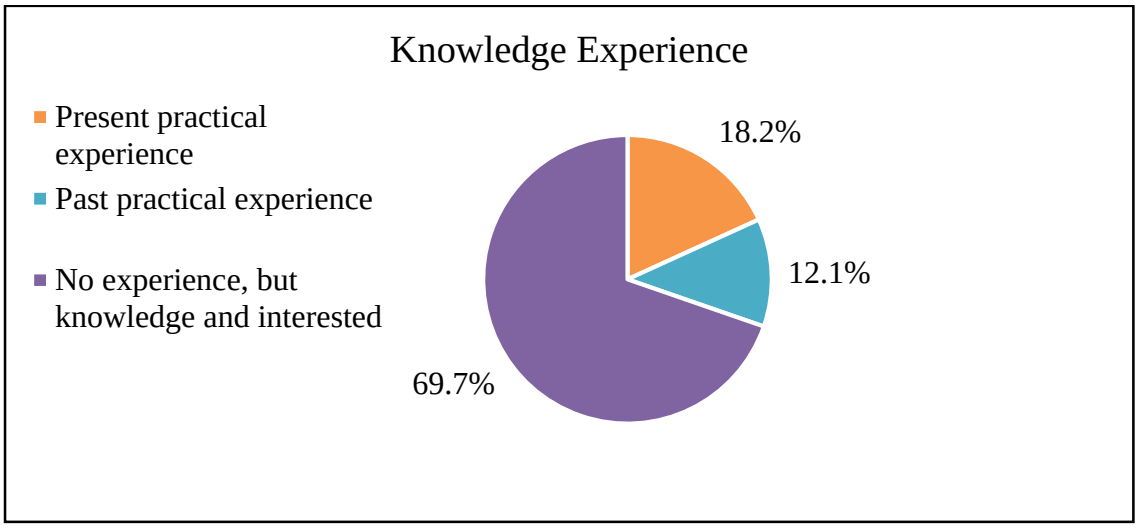

Figure 4.2: Knowledge Experience

From the responses as shown in Figure 4.2, it was discovered that 6 respondents (18.2%) of the 33 have current practical experience in PPP, 4 respondents (12.1%) have been involved in PPP, 23 respondents (69.7%) have no practical experience in PPP and their interest and knowledge is at the beginner's level. From here, it can be analyzed that more than half of the respondents have no involved in PPP project before.

Table 4.4: Working Experience Years

Working Experience Years		Frequency	Percentage (%)
I.	0 - 5	5	15.2
II.	6 - 10	11	33.3
III.	11 - 15	13	39.4
IV.	16 - 20	4	12.1

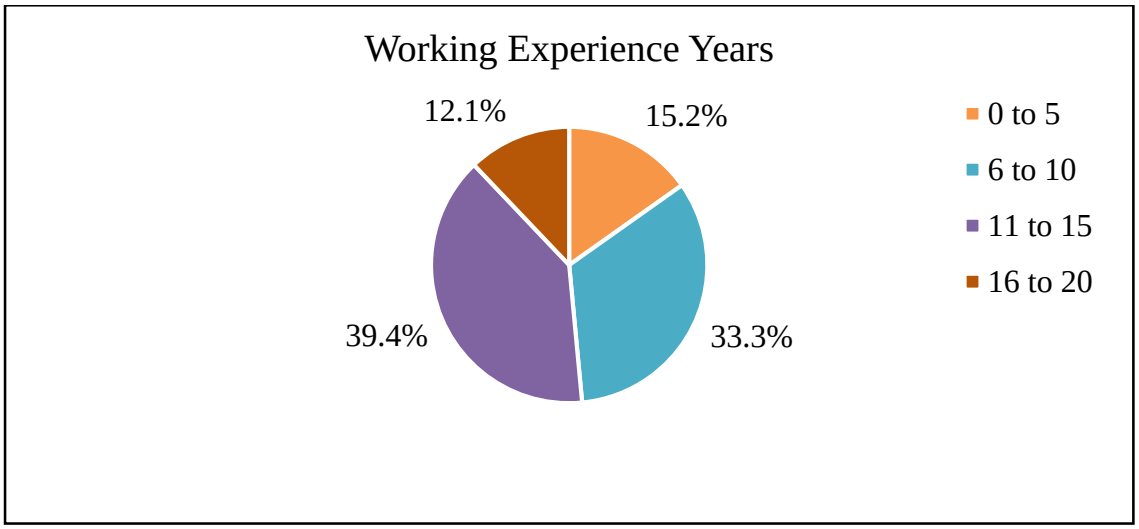

Figure 4.3: Working Experience Years

Referring to Figure 4.3, most of the respondents have 11 to 15 working experience years with the percentage 39.4%. Meanwhile, 33.3% of the respondents have 6 to 10 working experience years, followed by 15.2% respondents are 0 to 5 working experience years. Remaining 12.1% of the respondents was 16 to 20 years of experience. Most of the respondents are drown into working life more than 5 years and their answer is more valid as they are experienced in the field.

Table 4.5: Position Level

Position Level		Frequency	Percentage (%)
I.	Top level management	13	39.4
II.	Middle level management	19	57.6
III.	Low level management	1	3.0

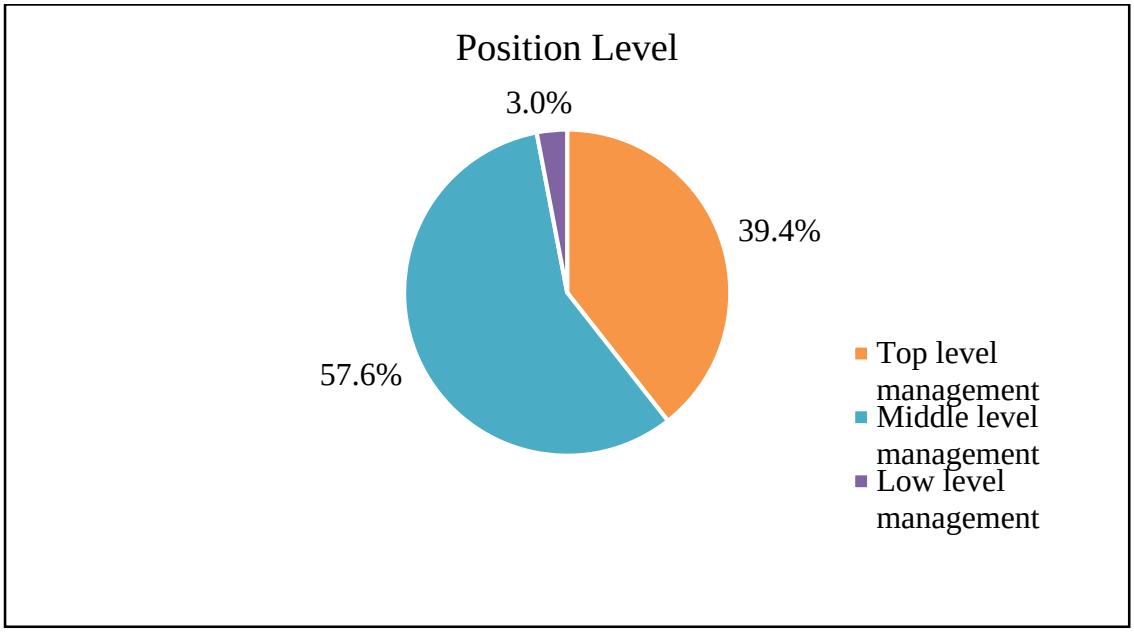

Figure 4.4: Position Level

Referring to Figure4.4, the analysis of the managerial experience of various PPP stakeholders indicates that 39.4% of the total respondents have top level management experience, 57.6% middle level management, and 3.0% have low level management experience. From here, it can be concluded that all respondents currently hold or have held high management position which enhance the validity of the data.

Table 4.6: Years of Company Establishment

Years of Company Establishment		Frequency	Percentage (%)
I.	Before 1980	2	6.1
II.	1981 – 2000	20	60.6
III.	2001 - 2014	11	33.3

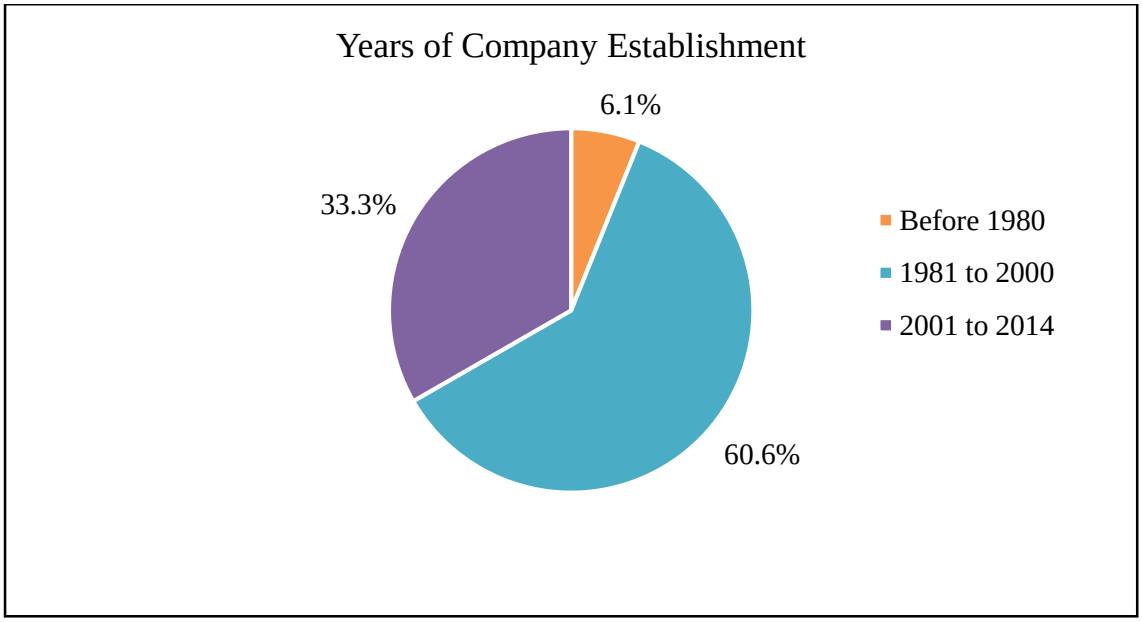

Figure 4.5: Years of Company Establishment

For the respondent company profiles, it's indicated by with the company establishment year, number of employees, and average annual turnover. Figure 4.5 showed company establishment year, there were 6.1% companies established before 1980, followed by 60.6% companies established between 1981 and 2000. For the remaining companies established between 2001 and current year with 33.3%.

Table 4.7: Number of Employee

Number of Employee		Frequency	Percentage (%)
I.	Less than 100	26	78.8
II.	101 – 500	7	21.2
III.	More than 500	0	0.0

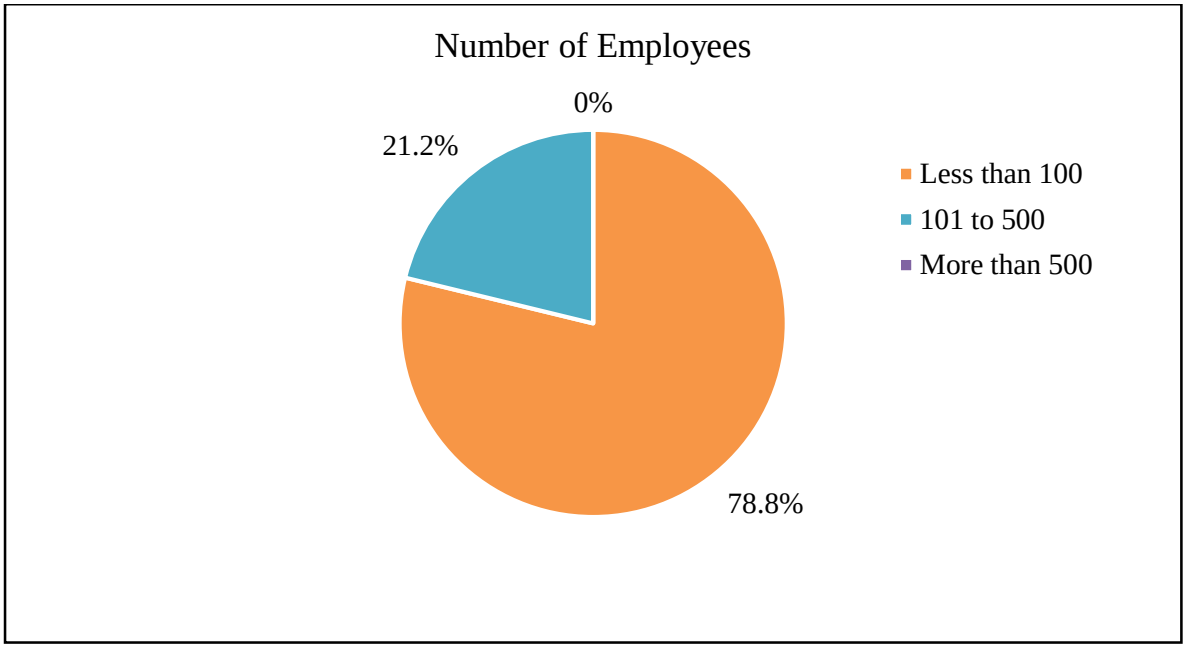

Figure 4.6: Number of Employees

From 33 companies that the research study shown in Figure 4.6, 78.8% of them have less than 100 employees, 78.8% have 101 to 500 employees and not one of them have more than 500 employees. In terms of organizational structure, most of the Grade 7 companies in Pahang are mature enough, as their employees have exceed a certain number of employees.

Table 4.8: Average Annual Turnover (RM million)

Average Annual Turnover (RM million)		Frequency	Percentage (%)
I.	6 – 40	26	78.8
II.	41 – 100	7	21.2
III.	101 - 250	0	0.0

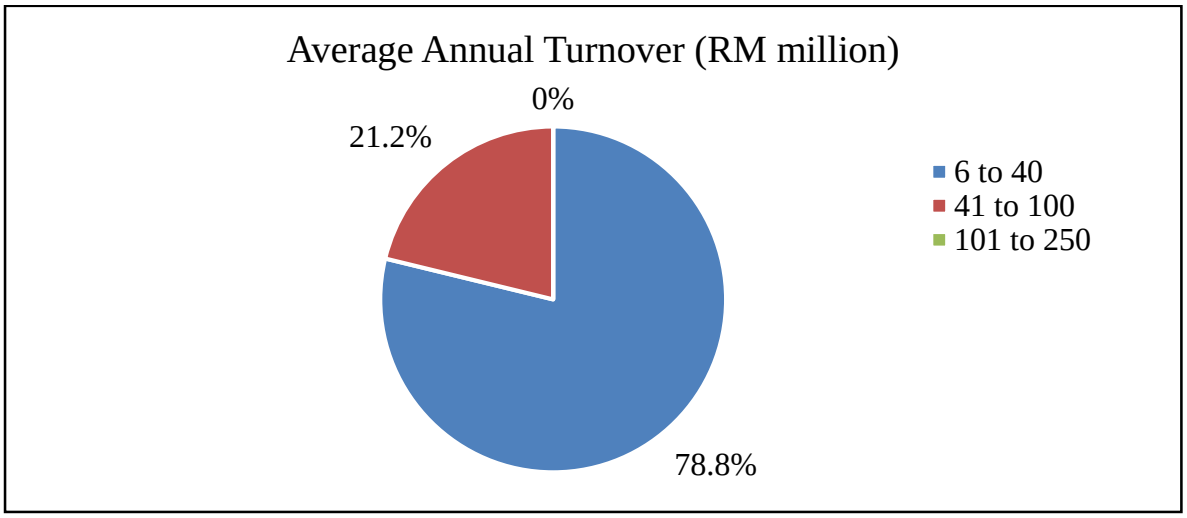

Figure 4.7: Average Annual Turnover (RM million)

By referring Figure 4.7, the analysis equally reveals that 78.8% of the companies of private sector respondents have an average turnover of between RM 6 to 40 million, 21.2% of the companies have an average turnover of between RM41 to 100 million and no one of the companies exceed above RM 100million.

4.4 RELIABILITY OF MEASUREMENT

Cronbach's alpha is a reliability coefficient that shows how well the variables in a set were consistent. The acceptable level of Cronbach's Alpha coefficient value is 0.70 or higher, while if the reading is below 0.50, the value is considered to be unreliable and unacceptable (Cavana et. al, 2001). In additional, Bahrif Yusoff (2012) stated, the reading of Cronbach's Alpha coefficient value is within 0.5 to 0.7 is represented an acceptable

level of internal consistency. The closer the reliability coefficient gets 1.0, the greater the internal consistency reliability (Glem, J and Gliem, R. 2003).

The Cronbach's Alpha values of the variables in this study are shown in Table 4.3 below. The analysis in this study declared that the Cronbach's Alpha coefficient value range from 0.668 to 0.913, thus implied that the data is statistically significant and normal as all the variables. In addition, to achieve those relevant values, no items have been deleted which explains all items were valid distributed.

Table 4.9: Reliability for variables

Variables	Cronbach's Alpha	Number of items (N)	Item deleted	Cronbach's Alpha if item deleted
Probability of occurrence of the risks of PPP project	0.867	46	-	-
Impact of risks of PPP project	0.913	46	-	-
Risk allocation preference	0.668	46	-	-

According to Glem, J. and Gliem, R. (2003), Cronbach's Alpha less than 0.6 are considered to be poor, those in the 0.7 range are considered acceptable and those over 0.8 is considered good. From the table as shown above, the variables used in this study are acceptable as the Cronbach's Alpha showed values were more than 0.7 except for the risk allocation variation with 0.668. This value is acceptable because the set of variable of risk allocation preference is ordinal not a scale.

4.5 ANALYSIS OF CRITICALITIES OF RISK FACTORS (RISK RANKING)

46 risk factors that had been identified via the literature review adopted by Li et al (2005) work performed in the UK were presented in the questionnaire. The individual risk factors are ranked in descending order of the mean scores to identify the criticalities

of risk factors as shown in Table 4.3. The rating of the Risk Criticality is calculated by the product of probability of risk occurrence and impact of risk:
Risk Criticality = Risk Probability X Risk Impact

As indicated in Table 4.4, the 46 risk factors are ranked according to the descending order of the risk criticality mean product. The top five risk factors are discussed below. The results show that the three most critical risk factors in Pahang are: "Construction time delay" with assigned with the highest criticality (mean=15.87). The second risk factor is "Land acquisition" with the value of mean rating of risk criticality equal to 14.20. The third risk factor is "Delay in project approvals and permits" was ranked with a mean rating equal to 13.89.

The first risk factor showing that Pahang construction companies face this problem on the PPP project frequently. Construction time delay can result and cause in delay of project completion, and thus suspend the start of operation. Hence, the generation of revenue from the PPP project will be also postponed. The construction time delay will cause the time overrun which will put the projects in high risks. This may cause by lack of coordination of contractors, failure to obtain standard planning approvals or insured "force majeure*"* events (Grimsey & Lewis, 2004).

Land acquisition is a construction risk which identified significant from the mapping. It normally occurs when the project land is unavailable or unable to be occupied at the required time (Ke, et al., 2010). This may cause by the land used are with native title or cultural heritage (Grimsey & Lewis, 2004). The delay risk directly related to project feasibility and commencement of construction; without land, investors cannot begin the construction and project feasibility is left hanging without certainty (Santosa, et al., 2012). Thus, the first risk factor and second quite related; when the land acquisition problem occurs, it will lead to start of a project. The construction time delay is the natural consequences of the land acquisition problem; and may be the major obstacles to the success of PPP projects in Malaysia.

"Delay in project approvals and permits" may be the cause of "Construction time delay". The interrelation between the first and third risk factor. The delay or refusal of

approval from the local government will eventually drag the construction time and thus lead to cost overrun which further exacerbate project risk (Grimsey & Lewis, 2004).

The Forth most critical risk factor was “Design deficiency” (mean=13.00). Design deficiency can lead to unanticipated changes and errors in construction or operation, insufficient income, increase maintenance cost and frequency. Design activity is at planning stage in a project life cycle, the influence on the following execution stage is very large. An error occur in design will cause a big damage on the results.

“Inflation rate volatility” was ranked as the fifth most critical risk factor with a mean rating at 12.88 in adopting PPP projects in Pahang. Unexpected local inflation rate due to immature local and global economic and banking system created volatility (Ke, et al., 2010). Inflation rate volatility, which possible happens should prior taking account. This showed in Ng and Loosemore (2007) research stated that a case such as Malaysia North-South Highway, which suffered a 75% cost over budget mainly due to an insufficient allowance made for inflation, and this can be avoided.

In conclusion, one outstanding outcome of this analysis is the fact that the three most critical risks are meso-level risks and categorized as construction risk. The construction risk are more prone to be allocate to private sector. They frequently happen and high impact of these risks should allocate properly and manage effectively in order to deliver PPP projects to meet the objectives.

Table 4.10: Criticalities of risk factors in PPP projects in Pahang

Risk factors	Rank	Risk probability mean	Risk impact mean	Risk Criticalities Mean Product
Construction time delay (28)	1	3.93	4.03	15.87
Land acquisition (18)	2	3.93	3.60	14.20
Delay in project approvals and permits (24)	3	3.69	3.75	13.89
Design deficiency (25)	4	3.54	3.66	13.00
Inflation rate volatility (6)	5	3.51	3.66	12.88
Construction cost overrun (27)	6	3.27	3.90	12.79

Poor financial market (5)	7	3.39	3.75	12.75
Interest rate volatility (7)	8	3.57	3.54	12.67
Maintenance more frequent than expected (38)	9	3.24	3.84	12.47
Operational revenues below expectation (35)	10	3.15	3.84	12.12
Operation cost overrun (34)	11	3.42	3.45	11.82
High finance costs (22)	12	3.42	3.42	11.72
Availability of finance (20)	13	3.60	3.24	11.69
Influential economic events (8)	14	3.42	3.39	11.62
Strong political opposition/hostility (4)	15	3.33	3.48	11.61
Maintenance costs higher than expected (37)	16	3.39	3.33	11.31
Unstable Government (1)	17	2.93	3.84	11.31
Unproven engineering techniques (26)	18	3.06	3.66	11.22
Material/labour availability (29)	19	2.90	3.81	11.10
Inadequate experience in PPP (40)	20	3.18	3.48	11.08
Financial attraction of project to investors (21)	21	3.09	3.57	11.05
Poor quality workmanship (31)	22	3.03	3.57	10.83
Level of demand for project (19)	23	3.36	3.21	10.80
Insolvency/default of sub-contractors or suppliers (33)	24	3.03	3.48	10.56
Inadequate distribution of responsibilities and risks (41)	25	3.03	3.42	10.37
Lack of commitment from either partner (44)	26	2.84	3.54	10.09
Inadequate distribution of authority in partnership (42)	27	2.87	3.45	9.94
Low operating productivity (36)	28	2.75	3.51	9.69
Poor public decision-making process (3)	29	2.87	3.36	9.68
Level of public opposition to project (13)	30	2.69	3.57	9.64
Lack of tradition of private provision of public services (12)	31	2.63	3.60	9.50
Organization and co-ordination risk (39)	32	2.78	3.39	9.46
Late design changes (30)	33	3.06	3.06	9.36
Excessive contract variation (32)	34	2.87	3.24	9.33
Third Party Tort Liability (45)	35	2.48	3.72	9.26
Residual risks (23)	36	3.21	2.87	9.24
Industrial regulatory change (11)	37	2.75	3.33	9.19
Geotechnical conditions (15)	38	3.00	3.06	9.18
Differences in working method and know-how between partners(43)	39	2.90	3.09	8.99
Change in tax regulation (10)	40	2.66	3.36	8.96
Legislation change (9)	41	2.45	3.27	8.03
Staff Crises (46)	42	2.45	3.27	8.03

Force majeure (14)	43	2.21	3.51	7.77
Weather (16)	44	2.48	3.09	7.68
Expropriation or nationalization of assets (2)	45	2.30	3.33	7.67
Environment (17)	46	2.36	3.00	7.09

4.6 ANALYSIS OF RISK ALLOCATION PREFERENCES

The respondents were asked to show their risk allocation preferences for the 46 risk factors. Every risks is given the identical number for reference usage. As shown in Table 4.5, the preferred risk allocation options are presented as percentages of total counts of the respondent answers. There will be 4 categories risk allocation identified: (1) Risks to be allocated to the public sector; (2) Risks to be allocated to the private sector; (3) Risks to be shared between the public and private sectors; and (4) Risks to be negotiated based on projects circumstances.

The analysis is based on the level of majority opinion (>50%). For example, if the majority of the respondent allocated the risk factor to the private sector more than 50%, then the allocation approach of that particular risk is categorized as "allocated to the private sector". Same way goes to other category "allocated to the public sector" and "shared between the public sector and private sector". In contrast, if none of the categories with frequency higher than 50%, the risk factor is put in the category of "Risks to be negotiated based on projects circumstances".

Table 4.11: Results of Risk Allocation Preferences

Allocation	Risk Factors	Level	Public	Private	Shared
Public Sector	Unstable Government (1)	Macro	54.5	21.2	24.2
	Expropriation or nationalization of assets (2)	Macro	60.6	18.2	21.2
	Poor public decision-making process (3)	Macro	75.8	12.1	12.1
	Strong political opposition/hostility (4)	Macro	63.6	15.2	21.2
	Change in tax regulation(10)	Macro	51.5	21.2	27.3

	Level of public opposition to project (13)	Macro	54.5	24.2	21.2
	Delay in project approvals and permits (24)	Meso	51.5	18.2	30.3
Private Sector	Poor financial market (5)	Macro	6.1	57.6	36.4
	Lack of tradition of private provision of public services (12)	Macro	24.2	57.6	18.2
	Geotechnical conditions (15)	Macro	15.2	51.5	33.3
	Weather (16)	Macro	18.2	54.5	27.3
	Level of demand for project (19)	Meso	15.2	54.5	30.3
	Availability of finance (20)	Meso	15.2	66.7	18.2
	Financial attraction of project to investor (21)	Meso	9.1	63.6	27.3
	High finance costs (22)	Meso	18.2	66.7	15.2
	Residual risks (23)	Meso	24.2	57.6	18.2
	Design deficiency (25)	Meso	21.2	51.5	27.3
	Construction cost overrun (27)	Meso	9.1	78.8	12.1
	Construction time delay (28)	Meso	9.1	57.6	33.3
	Material/labor availability (29)	Meso	12.1	66.7	21.2
	Late design changes (30)	Meso	6.1	63.6	30.3
	Poor quality workmanship (31)	Meso	12.1	54.5	33.3
	Insolvency/default of sub-contractors or suppliers (33)	Meso	15.2	69.7	15.2
	Operation cost overrun (34)	Meso	9.1	63.6	27.3
	Operational revenues below expectation (35)	Meso	18.2	54.5	27.3
	Low operating productivity (36)	Meso	9.1	66.7	24.2
	Maintenance costs higher than expected (37)	Meso	21.2	54.5	21.2
	Maintenance more frequent than expected (38)	Meso	3.0	69.7	27.3
	Organization and co-ordination risk (39)	Micro	15.2	54.5	30.3
	Differences in working method and know-how between partners (43)	Micro	24.2	51.5	24.2
	Third Party Tort Liability (45)	Micro	12.1	54.5	33.3
	Staff Crises (46)	Micro	15.2	54.5	30.3
Shared	Inflation rate volatility (6)	Macro	12.1	24.2	63.6
	Interest rate volatility (7)	Macro	15.2	33.3	51.5
	Influential economic events (8)	Macro	3.0	30.3	66.7

	Industrial regulatory change (11)	Macro	21.2	27.3	51.5
	Force majeure (14)	Macro	18.2	30.3	51.5
	Environment (17)	Macro	15.2	15.2	69.7
	Land acquisition (18)	Meso	15.2	18.2	66.7
	Inadequate experience in PPP (40)	Micro	6.1	24.2	69.7
	Inadequate distribution of responsibilities and risks (41)	Micro	27.3	21.2	51.5
	Inadequate distribution of authority in partnership (42)	Micro	24.2	18.2	57.6
	Lack of commitment from either partner (44)	Micro	21.2	24.2	54.5
Negotiated based on specific circumstances	Legislation change (9)	Micro	45.5	36.4	18.2
	Excessive contract variation (32)	Micro	27.3	45.5	27.3
	Unproven engineering techniques (26)	Micro	24.2	39.4	36.4

4.6.1 RISK TO BE ALLOCATED TO THE PUBLIC SECTOR

Table 4.5 shows that a total of 7 out of the 46 risk factors (Table 4.5: range 51.5% -76.8%) are preferred to be allocated to the public sector, representing 15.22% of the total risk factors. 6 of them fell within the macro level: (1), (2), (3), (4), (10), as well as (13). (24) was the only risk at the meso level. It is not surprising that most of the macro level of risks is related to the political and government policies. These results also corroborate with previous studies of Li et al. (2005) and Hwang et al. (2013). This category of risk factors showed the public sector is the best party who has the best capability to manage risk will bear the risk at low costs because the risks mostly are macro level and exogenous. This is best shown in the case of Malaysia North-South highway project, the government undertook to compensate the project association if traffic flows and resulting income fell below a certain level (Ng & Loosemore, 2007).

The public sector should also retain the risk of delay in project approvals and permit as it has higher authority to control the process of the approval. The public sector may provide the legal framework for private sectors in order to ensure that the approvals and permits are properly and effectively justified through close inspection (Hwang, et al.,

2013). Therefore, the public sector ensures that PPP projects are in a favorable environment for private sectors.

4.6.2 RISK TO BE ALLOCATED TO THE PRIVATE SECTOR

The survey results dedicated that 25 risk factors (54.35%) of 46 risk factors were preferred to be allocated to the private sector (Table 4.5: range 51.5% - 69.7%). The percentage can be represented as the objective of the PPP is achieved by transferring major risk from the public to the private sector. The analysis result in this study indicated that the extent of transferring risks to the private sector was higher than that in China done by Ke at al. (2010) with 27% of the catalogued risks and 45% in Singapore done by Hwang et al. (2013), but much lower than that in the UK, studies done by Li et al. (2005). This is because the UK launched the first PPP project since 1992, indicated that they are more mature in PPP procurement.

The results are consists of 4 macro level risks: (5), (12), (15), and (16). “Geotechnical condition” and “weather” are natural risks that are vital in construction phase and should be bear by the private sector. 17 meso level risks were allocated to the private sector: (19), (20), (21), (22), (23), (25), (27), (28), (29), (30), (31), (33), (34), (35), (36), (37), and (38). Most of the meso risks are financial risks and construction risks. Private sector was more experienced and efficient in dealing financial risks and issues, it should be considered during detailed feasibility study, and thus private sector should bear the financial risks. Lastly the remaining 4 micro level risks: (39), (43), (45), and (46). The principle of this rests in the fact that this risk relates to the daily operational demands of the project and operational responsibility is held by the private sector (Li et al., 2005).

4.6.3 RISK WHICH SHOULD BE SHARED

A total of 11 risk factors (Table 4.5: range 51.5% - 69.7%) are allocated to be equally shared between the private and public sectors. 6 of them were macro level risks such as (6), (7), (8), (11), (14), and (17). For the macro-economic risks it is best shared between the private and public sector, the government able to influence the economic condition. The results coincided with the results in Ke et al. (2010) and Hwang et al.

(2013), but contrast with Li et al (2005) as their findings indicated the financial risks should be bear by the private sector. While there is only one meso level risk which is (18). Land acquisition risk in Malaysia cannot solely transfer to private only, since the public sector has higher authority to control the process of land acquisition. The other remaining 4 micro level risks to be shared between both parties were: (40), (41), (42), and (44). All these risks occur due to either one of the parties, thus one party should depend on the other to counter these risks.

4.6.4 RISKS TO BE NEGOTIATED BASED ON PROJECTS CIRCUMSTANCES

In this survey, there are 3 risks that fell into category, including (9), (32) and (26), were found to be hard to clearly classify into the above three risk allocation preferences which the public sector, private sector, or shared allocation. Li et al. (2005) suggest that the public and private partners need to consider them carefully when making risk decision based on project circumstances.

4.7 SUMMARY OF FINDINGS

The result provides sufficient insight and understanding into the process of PPP as well as assist look deeply into the critical risks associate in the PPP projects and the contractors' preferred risk allocation for ensuring success of PPP projects.

The result indicates that the critical risk factors through risk rankings, the most critical risk factors have been identified on the PPP project in Pahang. Risk allocation preferences were indicated with most of the risk factors being allocated to the private sector, which consistent with the results of similar studies of other countries.

CHAPTER 5

CONCLUSION AND RECOMMENDATION

5.1 INTRODUCTION

The overriding purpose of this study was to determine the level of impact and probability of critical risk factors involve in PPP project. Besides that, the study also aims to examine the preferred risk allocations for PPP projects in Pahang. It is important for both public and private sectors to understand the possible risks associated with PPP projects throughout the project life cycle. The results can be used to assist contractual parties to take action to manage the risks by adding mitigation strategies on them. This can prevent their interests being affected when the risk occurrence.

The limitation of this study will be discussed in the chapter followed by the conclusion on the result of quantitative analysis of the study. Finally, a section on recommended further studies is included towards the end of this report.

5.2 LIMITATION

During the course of research, this study involves some limitation. The vital limitation of this study is the time constraint due to the time period given to collect data is inadequate, out of 95 expected respondents only 33 were collected. Low response rate from the respondents. There are respondent who not able to answer the question given because lack of time. There are also respondents' company did not exist in the current address and wrong telephone number given in the CIDB lists, thus reduce the number of respondents. Therefore, this lead to the problem because the other company (contractor)

need to be searched in order to fulfill the questionnaire thus to ensure the number of target respondent is achieved.

In addition, the 46 risk factors were identified in this study by carrying out a comprehensive literature review indicated in Table 2.2, they might have selection bias in selecting the 46 risk factors cover all the risk as the basis of evaluation. Moreover, the survey was sent to only one individual within an organization and it may be impractical to expect him/her to know the right answer to all questions asked in the survey. However, the generalization of the findings from this study may not be readily due to some detailed and specific aspects of the Malaysia construction industry that may be different from the industries of other countries.

Moreover, risk criticalities and also the risk allocation were evaluated based on the experience and subjective judgments of the respondents. Furthermore, most of them are the contractors, and did not involve third parties such as legal firms, financial institution and insurance companies who may have different views on the judgment. This may make the findings of this study unable to be generalized to other stakeholders.

5.3 SUMMARY OF RESULTS

The objective of this research was to identify the critical risk factors and to examine the preferred risk allocations for PPP projects in Pahang, which view to enhance the PPP project delivery in Malaysia. The research comprised of pure quantitative study. The whole study is focused on obtaining knowledge through a comprehensive literature review about the risk factors and the most significant risk factors.

46 risk factors, which were identified from literature review developed by Li et al. (2005), were ranked based on the risk criticalities (product of mean score of risk probability and impact) in the results. The recognized top five critical risk factors in PPP projects in Pahang were “construction time delay”, “land acquisition”, “delay in project approvals and permits”, “design deficiency” and “inflation rate volatility” that product mean score ranged within 12.88 to 15.87.

Risk allocation preferences were examined based on the opinions of the contractors. 7 out of 46 risks were preferably allocated to the public sector. 6 out of the 7 risks are macro level risks which concerned with government policies and political issues while remaining one was the delay of the approvals and permits. Furthermore, 25 risk factors were preferred to be assigned to the private sector, it represented as the objective of the PPP is achieved by transferring major risk from the public to the private sector was higher than that in China, Hong Kong, Singapore but relatively low compared with that in the UK. These risks were mainly meso level risks of financial and construction, design risks.

In addition, 11 risks cannot be handled and manage solely by private parties, the public sector should bear together, and thus these risks fell within the shared risk category. There are remaining 3 risks that cannot be found to be hard to clearly classify into the above three risk allocation preferences, which the public sector, private sector, or shared allocation. The allocation should be negotiated based on specific project circumstances. They should be handled on a case by case basis.

5.4 RECOMMENDATION

There are some of the recommendations for future research in this study. Future researchers are suggested to study the larger number of participants for a more accurate outcome and represent a more realistic population in whole Malaysia. The selected number of respondents were not large enough to be generalized the PPP situation in Malaysia.

Furthermore, the research duration might be influential in affecting the accuracy and consistency of the study. This study does not generalize the wider aspects of variables that may also cause the academic achievement due to time limitation. Hence, the future researchers are suggested to extend the current study to a larger range of the variables that will affect the academic achievement.

Future researchers can be focused on case studies of successful PPP project that were completed in Malaysia. The case studies can help both parties, public and private

sectors to have more insight in terms of lesson learn, reinforce the importance of positive factors and thus increase the attractiveness of PPP procurement. Similar studies are suggested can be conducted to determine current status of the PPP procurement in whole Malaysia not only just in Pahang state.

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APPENDIX A

PROJECT ACTIVITIES MILESTONE/ GANTT CHART

Gantt chart for Final Year Project 1

		Week													
No	Research activity	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	Briefing by FYP coordinator														
2	Meeting with supervisor, discussing project title and objective														
3	Deciding the topic and objectives														
4	Getting supervisor's approval of the topic and objectives														
5	Preparing project proposal														
6	Preparing chapter 1,2,3														
7	Submitting draft chapter 1,2,3														
8	Correcting and editing chapter 1,2,3														
9	Preparing cover page, content, preference list, questionnaire														
10	Submitting full report of FYP 1														

11	Preparing slide for oral presentation														
12	Presenting the FYP1														

Gantt chart for Final Year Project 2

		Week													
No	Research activity	2	4	6	8	10	12	14	16	18	20	22	24	26	28
1	Distribute questionnaire														
2	Analyzing the Data														
3	Preparing chapter 4														
4	Preparing chapter 5														
5	Submit draft of chapter 4 & 5														
6	Final editing of FYP 2														
7	Submitting FYP														

APPENDIX B

FACULTY OF INDUSTRY MANAGEMENT

QUESTIONNAIRE

Dear Mr / Mrs / Ms,

First of all, I would like to thank you for taking part in this survey. This questionnaire is designed to study ***Contractors' Perspective of Preferred Risk Allocation in Public-Private Partnership (PPP) projects in Pahang***. I sincerely invite you to take part in this survey and thank you for your kind contribution.

For your information, this study is conducted in fulfilment of Final Year Project for Bachelor of Project Management in Universiti Malaysia Pahang. All of your responses will be kept strictly private and confidential and will be used as academic purpose only. A summary of this result will be mailed to you after the data are analysed, if you would like to have a copy.

Thank you for your co-operation in this survey. Your involvement in this study would be very much appreciated. If you have any further question, please do not hesitate to contact with us.

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Universiti Malaysia Pahang

Introduction

This survey is part of a study about the Contractors' Perspective of Preferred Risk Allocation in Public-Private Partnership (PPP) projects in Pahang. The main objective of this study survey is to identify the relationship between the critical risk factors for PPP projects in Pahang; to examine the preferred risk allocations for PPP projects in Pahang. This study will help in shaping appropriate risk allocation framework for PPP projects, which can also help to attend to problems of construction and infrastructure deficits around the world. Study data and findings may also be presented in academic platforms including published academic papers.

Confidentiality

The information obtained will be strictly used for academic research purpose only and no attempt will be made to identify any individual or organization in any of the publications. All questionnaires will be concealed, and no one other than the Final Year Project Supervisor access to these materials.

Participation

Participation in this research study is completely voluntary. You have the right to withdraw at any time or refuse to participate entirely in this questionnaire.

Instruction

The questionnaire will take approximately 30 minutes or less. Questions are designed to determine risk allocation preferences in P3 infrastructure projects as well as the factors that shape these preferences based on your past experience. This questionnaire consists of four (2) main sections. Please read the statement carefully before answering the question.

SECTION A

This section A questions about respondents' individual and organizational background. Please tick (/) (or fill in the blank) in correct category representing the most appropriate responses for you in respect of the following items.

1. What best describe your sector?
   - ❍ Public Sector (Ministries, Department and Government Agencies)
   - ❍ Private Sector (Construction companies, Infrastructure concessionaires, Project consultants etc)

2. Describe your knowledge or experience with Public Private Partnership?
   - ❍ I am currently involved in PPP project
   - ❍ I have been involved in the past in PPP project
   - ❍ I do not have practical experience dealing with PPP projects but I have interest and knowledge of the topic
   - ❍ I do not have practical experience dealing with PPP projects and my knowledge and interest in the topic is at beginner's level

3. Years of working experiences?
   - ❍ 0 - 5
   - ❍ 6 - 10
   - ❍ 10 - 15
   - ❍ 15 - 20
   - ❍ Above 20

4. What is your level in your organization?
   - ❍ Top Level Management
   - ❍ Middle Level Management
   - ❍ Low level Management

5. When was your company established? (Private sector respondents only)
   - ❍ Before 1980
   - ❍ 1981 - 2000
   - ❍ 2001 – 2014

6. What's the number of employees in your organization?
   - ❍ <100
   - ❍ 101 - 200
   - ❍ >500

7. What's the average annual turnover in your organization in RM million? (Private sector respondents only)
   - ❍ 6 - 40

- ❍ 41 - 100
- ❍ 101 – 250

SECTION B

1. Risk factors and risk allocation preferences. Please assign estimated probability of occurrence to the risks listed below, (where probability of occurrence is nil = 0, 1= remote, 2= occasional, 3= probable, 4= frequent and 5= very frequent)

	0	1	2	3	4	5
Unstable Government (1)	□	□	□	□	□	□
Expropriation or nationalization of assets (2)	□	□	□	□	□	□
Poor public decision-making process (3)	□	□	□	□	□	□
Strong political opposition/hostility (4)	□	□	□	□	□	□
Poor financial market (5)	□	□	□	□	□	□
Inflation rate volatility (6)	□	□	□	□	□	□
Interest rate volatility (7)	□	□	□	□	□	□
Influential economic events (8)	□	□	□	□	□	□
Legislation change (9)	□	□	□	□	□	□
Change in tax regulation (10)	□	□	□	□	□	□
Industrial regulatory change (11)	□	□	□	□	□	□
Lack of tradition of private provision of public services (12)	□	□	□	□	□	□
Level of public opposition to project (13)	□	□	□	□	□	□
Force majeure (14)	□	□	□	□	□	□

Geotechnical conditions (15)	□	□	□	□	□	□
Weather (16)	□	□	□	□	□	□
Environment (17)	□	□	□	□	□	□
Land acquisition (18)	□	□	□	□	□	□
Level of demand for project (19)	□	□	□	□	□	□
Availability of finance (20)	□	□	□	□	□	□
Financial attraction of project to investors (21)	□	□	□	□	□	□
High finance costs (22)	□	□	□	□	□	□
Residual risks (23)	□	□	□	□	□	□
Delay in project approvals and permits (24)	□	□	□	□	□	□
Design deficiency (25)	□	□	□	□	□	□
Unproven engineering techniques (26)	□	□	□	□	□	□
Construction cost overrun (27)	□	□	□	□	□	□
Construction time delay (28)	□	□	□	□	□	□
Material/labour availability (29)	□	□	□	□	□	□
Late design changes (30)	□	□	□	□	□	□
Poor quality workmanship (31)	□	□	□	□	□	□
Excessive contract variation (32)	□	□	□	□	□	□

Insolvency/default of sub-contractors or suppliers (33)	□	□	□	□	□	□
Operation cost overrun (34)	□	□	□	□	□	□
Operational revenues below expectation (35)	□	□	□	□	□	□
Low operating productivity (36)	□	□	□	□	□	□
Maintenance costs higher than expected (37)	□	□	□	□	□	□
Maintenance more frequent than expected (38)	□	□	□	□	□	□
Organization and co-ordination risk (39)	□	□	□	□	□	□
Inadequate experience in PPP (40)	□	□	□	□	□	□
Inadequate distribution of responsibilities and risks (41)	□	□	□	□	□	□
Inadequate distribution of authority in partnership (42)	□	□	□	□	□	□
Differences in working method and know-how between partners(43)	□	□	□	□	□	□
Lack of commitment from either partner (44)	□	□	□	□	□	□
Third Party Tort Liability (45)	□	□	□	□	□	□
Staff Crises (46)	□	□	□	□	□	□

2. Please assign estimated impact of the risks listed below. Using 0-5 qualitative Likert scale (where 0- the impact is nil, 1= impact is neligible with no serious influence on the project, to 5= where impact is catastrophic, where the project would be aborted)

	0	**1**	**2**	**3**	**4**	**5**

Unstable Government (1)	□	□	□	□	□	□
Expropriation or nationalization of assets (2)	□	□	□	□	□	□
Poor public decision-making process (3)	□	□	□	□	□	□
Strong political opposition/hostility (4)	□	□	□	□	□	□
Poor financial market (5)	□	□	□	□	□	□
Inflation rate volatility (6)	□	□	□	□	□	□
Interest rate volatility (7)	□	□	□	□	□	□
Influential economic events (8)	□	□	□	□	□	□
Legislation change (9)	□	□	□	□	□	□
Change in tax regulation (10)	□	□	□	□	□	□
Industrial regulatory change (11)	□	□	□	□	□	□
Lack of tradition of private provision of public services (12)	□	□	□	□	□	□
Level of public opposition to project (13)	□	□	□	□	□	□
Force majeure (14)	□	□	□	□	□	□
Geotechnical conditions (15)	□	□	□	□	□	□
Weather (16)	□	□	□	□	□	□
Environment (17)	□	□	□	□	□	□
Land acquisition (18)	□	□	□	□	□	□
Level of demand for project (19)	□	□	□	□	□	□

Availability of finance (20)	□	□	□	□	□	□
Financial attraction of project to investors (21)	□	□	□	□	□	□
High finance costs (22)	□	□	□	□	□	□
Residual risks (23)	□	□	□	□	□	□
Delay in project approvals and permits (24)	□	□	□	□	□	□
Design deficiency (25)	□	□	□	□	□	□
Unproven engineering techniques (26)	□	□	□	□	□	□
Construction cost overrun (27)	□	□	□	□	□	□
Construction time delay (28)	□	□	□	□	□	□
Material/labour availability (29)	□	□	□	□	□	□
Late design changes (30)	□	□	□	□	□	□
Poor quality workmanship (31)	□	□	□	□	□	□
Excessive contract variation (32)	□	□	□	□	□	□
Insolvency/default of sub-contractors or suppliers (33)	□	□	□	□	□	□
Operation cost overrun (34)	□	□	□	□	□	□
Operational revenues below expectation (35)	□	□	□	□	□	□
Low operating productivity (36)	□	□	□	□	□	□
Maintenance costs higher than expected (37)	□	□	□	□	□	□

Maintenance more frequent than expected (38)	□	□	□	□	□	□
Organization and co-ordination risk (39)	□	□	□	□	□	□
Inadequate experience in PPP (40)	□	□	□	□	□	□
Inadequate distribution of responsibilities and risks (41)	□	□	□	□	□	□
Inadequate distribution of authority in partnership (42)	□	□	□	□	□	□
Differences in working method and know-how between partners(43)	□	□	□	□	□	□
Lack of commitment from either partner (44)	□	□	□	□	□	□
Third Party Tort Liability (45)	□	□	□	□	□	□
Staff Crises (46)	□	□	□	□	□	□

3. Please allocate the risks listed below to either the private or the public sector, or describe it as preferably ‘shared’ between the public and private sector. (Where PB = public sector, PV = private sector, SH = shared)

	PB	**PV**	**SH**
Unstable Government (1)	□	□	□
Expropriation or nationalization of assets (2)	□	□	□
Poor public decision-making process (3)	□	□	□
Strong political opposition/hostility (4)	□	□	□
Poor financial market (5)	□	□	□
Inflation rate volatility (6)	□	□	□
Interest rate volatility (7)	□	□	□

Influential economic events (8)	□	□	□
Legislation change (9)	□	□	□
Change in tax regulation (10)	□	□	□
Industrial regulatory change (11)	□	□	□
Lack of tradition of private provision of public services (12)	□	□	□
Level of public opposition to project (13)	□	□	□
Force majeure (14)	□	□	□
Geotechnical conditions (15)	□	□	□
Weather (16)	□	□	□
Environment (17)	□	□	□
Land acquisition (18)	□	□	□
Level of demand for project (19)	□	□	□
Availability of finance (20)	□	□	□
Financial attraction of project to investors (21)	□	□	□
High finance costs (22)	□	□	□
Residual risks (23)	□	□	□
Delay in project approvals and permits (24)	□	□	□
Design deficiency (25)	□	□	□
Unproven engineering techniques (26)	□	□	□
Construction cost overrun (27)	□	□	□
Construction time delay (28)	□	□	□
Material/labour availability (29)	□	□	□
Late design changes (30)	□	□	□
Poor quality workmanship (31)	□	□	□

Excessive contract variation (32)	□	□	□
Insolvency/default of sub-contractors or suppliers (33)	□	□	□
Operation cost overrun (34)	□	□	□
Operational revenues below expectation (35)	□	□	□
Low operating productivity (36)	□	□	□
Maintenance costs higher than expected (37)	□	□	□
Maintenance more frequent than expected (38)	□	□	□
Organization and co-ordination risk (39)	□	□	□
Inadequate experience in PPP (40)	□	□	□
Inadequate distribution of responsibilities and risks (41)	□	□	□
Inadequate distribution of authority in partnership (42)	□	□	□
Differences in working method and know-how between partners (43)	□	□	□
Lack of commitment from either partner (44)	□	□	□
Third Party Tort Liability (45)	□	□	□
Staff Crises (46)	□	□	□

END OF QUESTION.
THANK YOU.

Kindly reply this Questionnaire via fax to number 09-5665075.
Your kind co-operation is highly appreciated.

APPENDIC C

SPSS OUTPUT

Frequency Table

Sector

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Public Sector	1	3.0	3.0	3.0
	Private Sector	32	97.0	97.0	100.0
	Total	33	100.0	100.0	

Knowledge Experience

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Currently involved in PPP project	6	18.2	18.2	18.2
	involved in the past in PPP project	4	12.1	12.1	30.3
	Have no practical experience but have interest and knowledge in PPP	15	45.5	45.5	75.8
	Have no practical experience in PPP and their interest and knowledge is at beginner's level	8	24.2	24.2	100.0
	Total	33	100.0	100.0	

Working Experience Years

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0-5	5	15.2	15.2	15.2
	6-10	11	33.3	33.3	48.5
	11-15	13	39.4	39.4	87.9
	16-20	4	12.1	12.1	100.0
	Total	33	100.0	100.0	

Position Level

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Top Level Management	13	39.4	39.4	39.4
	Middle level Management	19	57.6	57.6	97.0
	Low Level Management	1	3.0	3.0	100.0
	Total	33	100.0	100.0	

Years of Company Establishment

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Before 1980	2	6.1	6.1	6.1
	1981-2000	20	60.6	60.6	66.7
	2001-2014	11	33.3	33.3	100.0
	Total	33	100.0	100.0	

Number of employees

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less than 100	26	78.8	78.8	78.8
	101-500	7	21.2	21.2	100.0
	Total	33	100.0	100.0	

Average Annual Turnover (RM million)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	6-40	26	78.8	78.8	78.8
	41-100	7	21.2	21.2	100.0
	Total	33	100.0	100.0	

Test of Reliability

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0.867	0.865	46

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Unstable Government (1)	137.3030	374.093	.044	.869

Expropriation or nationalization of assets (2)	137.9394	359.809	.374	.863
Poor public decision-making process (3)	137.3636	362.239	.297	.865
Strong political opposition/hostility (4)	136.9091	356.023	.450	.862
Poor financial market (5)	136.8485	370.570	.133	.868
Inflation rate volatility (6)	136.7273	373.080	.061	.869
Interest rate volatility (7)	136.6667	366.792	.212	.866
Influential economic events (8)	136.8182	364.903	.257	.865
Legislation change (9)	137.7879	361.735	.342	.864
Change in tax regulation (10)	137.5758	353.814	.489	.861
Industrial regulatory change (11)	137.4848	347.445	.603	.859
Lack of tradition of private provision of public services (12)	137.6061	357.684	.348	.864
Level of public opposition to project (13)	137.5455	359.568	.390	.863
Force majeure (14)	138.0303	351.593	.583	.859
Geotechnical conditions (15)	137.2424	371.002	.139	.867
Weather (16)	137.7576	365.814	.268	.865
Environment (17)	137.8788	356.735	.456	.862
Land acquisition (18)	136.3030	369.343	.177	.867
Level of demand for project (19)	136.8788	360.547	.343	.864
Availability of finance (20)	136.6364	362.426	.299	.865
Financial attraction of project to investors (21)	137.1515	357.758	.382	.863
High finance costs (22)	136.8182	356.341	.407	.863
Residual risks (23)	137.0303	366.530	.235	.866
Delay in project approvals and permits (24)	136.5455	378.443	-.059	.871
Design deficiency (25)	136.6970	369.593	.151	.867
Unproven engineering techniques (26)	137.1818	353.903	.523	.861

Construction cost overrun (27)	136.9697	347.780	.651	.858
Construction time delay (28)	136.3030	380.155	-.094	.873
Material/labour availability (29)	137.3333	354.854	.494	.861
Late design changes (30)	137.1818	362.966	.374	.864
Poor quality workmanship (31)	137.2121	357.797	.461	.862
Excessive contract variation (32)	137.3636	351.551	.527	.860
Insolvency/default of sub-contractors or suppliers (33)	137.2121	358.110	.383	.863
Operation cost overrun (34)	136.8182	369.028	.165	.867
Operational revenues below expectation (35)	137.0909	380.273	-.108	.871
Low operating productivity (36)	137.4848	359.383	.413	.863
Maintenance costs higher than expected (37)	136.8485	370.008	.153	.867
Maintenance more frequent than expected (38)	137.0000	359.250	.381	.863
Organization and co-ordination risk (39)	137.4545	352.443	.547	.860
Inadequate experience in PPP (40)	137.0606	355.434	.466	.862
Inadequate distribution of responsibilities and risks (41)	137.2121	360.172	.365	.864
Inadequate distribution of authority in partnership (42)	137.3636	362.426	.350	.864
Differences in working method and know-how between partners(43)	137.3333	371.042	.111	.868
Lack of commitment from either partner (44)	137.3939	363.121	.382	.863
Third Party Tort Liability (45)	137.7576	351.877	.644	.859
Staff Crises (46)	137.7879	355.485	.469	.862

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0.913	0.913	46

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Unstable Government (1)	155.9091	410.835	.275	.913
Expropriation or nationalization of assets (2)	156.4242	400.877	.438	.911
Poor public decision-making process (3)	156.3939	404.559	.323	.913
Strong political opposition/hostility (4)	156.2727	406.455	.276	.913
Poor financial market (5)	156.0000	408.500	.334	.912
Inflation rate volatility (6)	156.0909	402.398	.511	.911
Interest rate volatility (7)	156.2121	409.297	.278	.913
Influential economic events (8)	156.3636	399.989	.552	.910
Legislation change (9)	156.4848	403.320	.447	.911
Change in tax regulation (10)	156.3939	393.371	.645	.909
Industrial regulatory change (11)	156.4242	395.564	.522	.910
Lack of tradition of private provision of public services (12)	156.1515	404.258	.391	.912
Level of public opposition to project (13)	156.1818	407.716	.275	.913
Force majeure (14)	156.2424	398.252	.496	.911
Geotechnical conditions (15)	156.6970	399.593	.438	.911
Weather (16)	156.6667	409.479	.360	.912
Environment (17)	156.7576	400.377	.516	.911

Land acquisition (18)	156.1515	404.633	.330	.913
Level of demand for project (19)	156.5455	397.506	.505	.911
Availability of finance (20)	156.5152	405.195	.351	.912
Financial attraction of project to investors (21)	156.1818	399.091	.462	.911
High finance costs (22)	156.3333	402.229	.399	.912
Residual risks (23)	156.8788	400.110	.508	.911
Delay in project approvals and permits (24)	156.0000	400.688	.411	.912
Design deficiency (25)	156.0909	396.960	.489	.911
Unproven engineering techniques (26)	156.0909	405.835	.368	.912
Construction cost overrun (27)	155.8485	403.383	.464	.911
Construction time delay (28)	155.7273	411.580	.219	.913
Material/labour availability (29)	155.9394	406.934	.312	.913
Late design changes (30)	156.6970	397.030	.530	.910
Poor quality workmanship (31)	156.1818	404.216	.350	.912
Excessive contract variation (32)	156.5152	402.320	.352	.912
Insolvency/default of sub-contractors or suppliers (33)	156.2727	403.267	.415	.912
Operation cost overrun (34)	156.3030	398.218	.498	.911
Operational revenues below expectation (35)	155.9091	403.960	.504	.911
Low operating productivity (36)	156.2424	403.314	.398	.912
Maintenance costs higher than expected (37)	156.4242	392.939	.600	.909
Maintenance more frequent than expected (38)	155.9091	411.335	.230	.913
Organization and co-ordination risk (39)	156.3636	396.926	.487	.911
Inadequate experience in PPP (40)	156.2727	396.517	.456	.911
Inadequate distribution of responsibilities and risks (41)	156.3333	397.542	.458	.911

Inadequate distribution of authority in partnership (42)	156.3030	415.530	.100	.915
Differences in working method and know-how between partners(43)	156.6667	401.042	.490	.911
Lack of commitment from either partner (44)	156.2121	404.422	.345	.912
Third Party Tort Liability (45)	156.0303	400.593	.436	.911
Staff Crises (46)	156.4848	398.383	.449	.911

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.668	.702	46

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Unstable Government (1)	95.4848	66.320	.411	.646
Expropriation or nationalization of assets (2)	95.5758	63.877	.617	.631
Poor public decision-making process (3)	95.8182	70.216	.172	.663
Strong political opposition/hostility (4)	95.6061	66.434	.413	.646
Poor financial market (5)	94.8788	68.047	.448	.650
Inflation rate volatility (6)	94.6667	72.667	-.038	.676
Interest rate volatility (7)	94.8182	71.778	.031	.672
Influential economic events (8)	94.5455	71.506	.098	.667
Legislation change (9)	95.4545	68.943	.253	.658
Change in tax regulation (10)	95.4242	67.939	.282	.655
Industrial regulatory change (11)	94.8788	74.297	-.160	.685

Lack of tradition of private provision of public services (12)	95.2424	75.439	-.276	.687
Level of public opposition to project (13)	95.5152	69.195	.210	.661
Force majeure (14)	94.8485	73.070	-.072	.679
Geotechnical conditions (15)	95.0000	67.625	.412	.649
Weather (16)	95.0909	67.648	.413	.649
Environment (17)	94.6364	72.801	-.051	.677
Land acquisition (18)	94.6667	70.542	.126	.666
Level of demand for project (19)	95.0303	64.843	.691	.633
Availability of finance (20)	95.1515	70.445	.196	.662
Financial attraction of project to investors (21)	95.0000	71.375	.101	.667
High finance costs (22)	95.2121	68.422	.408	.652
Residual risks (23)	95.2424	73.314	-.092	.678
Delay in project approvals and permits (24)	95.3939	70.309	.108	.668
Design deficiency (25)	95.1212	65.485	.591	.637
Unproven engineering techniques (26)	95.0606	67.059	.395	.648
Construction cost overrun (27)	95.1515	73.508	-.126	.676
Construction time delay (28)	94.9394	73.309	-.092	.677
Material/labour availability (29)	95.0909	71.710	.068	.669
Late design changes (30)	94.9394	70.121	.243	.660
Poor quality workmanship (31)	94.9697	65.655	.630	.637
Excessive contract variation (32)	95.1818	76.841	-.356	.695
Insolvency/default of sub-contractors or suppliers (33)	95.1818	69.466	.233	.660
Operation cost overrun (34)	95.0000	68.625	.388	.653
Operational revenues below expectation (35)	95.0909	65.273	.637	.636
Low operating productivity (36)	95.0303	72.093	.032	.670
Maintenance costs higher than expected (37)	94.9091	68.898	.033	.692

Maintenance more frequent than expected (38)	94.9394	69.184	.393	.654
Organization and co-ordination risk (39)	95.0303	68.655	.327	.654
Inadequate experience in PPP (40)	94.5455	71.818	.052	.670
Inadequate distribution of responsibilities and risks (41)	94.9394	74.309	-.157	.687
Inadequate distribution of authority in partnership (42)	94.8485	76.758	-.319	.697
Differences in working method and know-how between partners(43)	95.1818	67.403	.414	.648
Lack of commitment from either partner (44)	94.8485	70.758	.094	.669
Third Party Tort Liability (45)	94.9697	71.405	.081	.668
Staff Crises (46)	95.0303	69.280	.269	.658