A PILOT-STUDY INVESTIGATING THE ASSESSMENT AND ALLOCATION OF RISKS IN PUBLIC-PRIVATE PARTNERSHIP TRANSPORTATION PROJECTS IN VIETNAM

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Many PPP projects have failed because of risks occurring during operation and earlier studies have demonstrated a need risk assessment and allocation methods for PPPs. Although researchers have been working in this area for years, the amount of empirical work is limited, especially when applied to developing countries. This paper will review previous studies and then describe a pilot study which was carried out in Vietnam. Forty one questionnaires were sent to practitioners working on PPP transportation projects and to officials from government departments. The study attempted to identify key risks in PPPs in Vietnam, and risk allocation perceptions of practitioners in these projects. Also, the pilot study also aimed to test the methods of collecting data, the quality of the questionnaires, and the ability to assess running projects. The purpose of this testing was to carry out a larger study in the fieldwork stage of a PhD program. The findings of the study suggest that ineffective decision-making processes by the public sector, difficulty in obtaining approvals, high inflation, and corruption are the most critical risks in Vietnamese PPPs. For risk allocation, the findings suggest that the government is willing to manage risks relating to political and legal issues. Whereas, private partners are willing to manage risks relating to constructing and operating issues. This may indicate that one of the prime objectives of PPP, the transferring risks to the private sector, has not been achieved. Importantly, the findings have suggested improvement for fieldwork plan. The paper will conclude by proposing a methodology for continuing the study.

Key words: public-private partnership (PPP); risk allocation perception, risk assessment, risk management, Vietnam.

INTRODUCTION

In terms of Public-Private Partnership (PPP) in construction projects, risk management has been attracting researchers because of the distinguishing characteristics of this procurement approach. In practice, the PPP form is used to combine competitive advantages and flexible negotiations, and to apportion risk appropriately with an agreement between the public and private sectors (Li *et al* 2005). However, many PPP projects have failed because of risks such as gaps between public and private sector expectations, lack of clear government objectives and commitment, inadequate legal or regulatory frameworks, poor risk management, and poor transparency (Kwak *et al* 2009). Although they are also construction

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projects, PPP projects have their own unique characteristics. For example, in comparison to conventional construction projects, PPP projects focus not only on delivering assets, but also on specified services. Additionally, a PPP contract lasts much longer than a conventional contract; therefore, managing the relationship between stakeholders during this long period can be more problematic (Chung *et al* 2010).

Vietnam, like other countries in Asia, has experienced rapid economic development in recent years, which has increased the demand for investment in infrastructure systems (Thomas *et al* 2003). Therefore, PPPs are becoming inevitable in this country. PPP transportation projects in Vietnam may have to face many risks associated with the construction industry such as poor infrastructure, underdeveloped management systems, bureaucratic government, and weak competition between public and private enterprises (Luu *et al* 2009). In the future, however, PPP investors in Vietnam would have a better time as the Vietnamese government has been attempting to improve legal and regulatory structures for this type of investment (Dry *et al* 2010).

This study attempted to identify, and evaluate risks in PPP transportation projects in Vietnam. Also, the risk allocation perception of practitioners was also investigated. Besides this, the pilot study aimed to test the methods of collecting data, the quality of the questionnaires, and the ability to assess running projects. Additionally, the way of collecting data, such as sending questionnaires and conducting interviews, was tested to make it more practical, and to ensure that in the main fieldwork sufficient data can be collected.

The paper will first review previous studies, and then research objectives and methodology will be discussed. Finally, findings will be discussed, and development of the future research will be proposed.

LITERATURE REVIEW

Before taking any action to mitigate risks, critical risks need to be identified. Risk identification is the first step of risk management in PPP projects. The purpose of this step is not only to discover events that may go wrong, but also to identify their importance and potential opportunities that arise from these events (Redmill 2002). In this stage, uncertain events are classified based on the objectives of practitioners. Techniques such as check lists, brainstorming, interview and questionnaire, cause-event-effect analyses, Delphi techniques, Brainstorming, Collective Note Book (CNB) and Nominal Group Technique (NGT) have been also used in the area of PPP construction projects (Demirag *et al* 2010). In practice, these techniques have been applied to a number of projects. For example, in order to explore critical risks in *"Build Operate Transfer"* (BOT) road projects in India, and determine the perception of stakeholders about these key risks, Thomas *et al* (2003) reviewed literature to construct a list of potential risks which are likely to occur, and then participants were required to rate these risks. Participants were also invited to take part in interview to discuss their answers. By using these methods, they discovered that traffic revenue, delay in land acquisition, demand risk, delay in financial closure, cost overrun risk, debt servicing, and political risks are the most critical events in BOT road projects in India. Amongst these risks, traffic revenue risk is the most serious issue. Similarly, a study by Ghosh *et al* (2004) also focused on PPP transportation projects, in this case aimed at identifying risks in rail projects in Thailand. Questionnaires were employed, and they were designed based on a total of 59 key risks located through a comprehensive literature review. Finally nine key risks: financial and economic risk, contractual and legal risk, subcontractors related risk, operational risk, safety and social risk, design risk, force majeure risk, physical risk, delay risk, were identified in

this research. Although Ghosh *et al*. considered that the design of research was reliable and questionnaires were well conducted, the focus of this research focused on only one project (the Chaloem to Ratchamongkhon rail line), thus the results might not be generalised. However, the advantage of this research is this was a large and complex project, of a type that may be rarely accessed by other researchers; therefore, this study can bring unique outcomes.

Li *et al* (2012) investigated the PPP context in China. For the risk identification stage, a comprehensive literature review, Delphi technique, and factor analysis were used, followed by a mean score ranking and fuzzy synthetic evaluation in the risk assessment stage. A Delphi questionnaire survey was designed based on a total of thirty four risk factors gathered from the literature review. Li and his colleagues explained state that this technique is the best for research that needs consensus results, and for areas where the historical data is insufficient. Risks then were classified to structure and evaluate the relationship between them. Unlike most of studies, where risks are classified based on their sources (UNIDO, 1996), this research classified risks based on the life cycle perspective since Li *et al* (2012) argue that risk management process is a continuous process which runs through the whole life of the project, not just at a specific moment. Moreover, Li *et al* divided projects into a greater number of phases than was commonly the case, specifically: feasibility study, financing, design, construction, operation and transfer phase.

After being identified, risks need to be allocated to the party which is best able to manage them. In fact, risk allocation can be seen as a way to respond to risks. Risk allocation is the core of PPP projects. This allocation is made between public and private sector. Although in conventional construction projects, risk allocation also needs to be implemented, risk allocation in PPP is different. Risk allocation is not an easy task as it depends on many factors, for example, the attitude of managers or their capability to manage risks (Zhang *et al* 2002).Besides which, the public sector and the private sector may have different points of view about PPP. For the public sector, PPPs are considered as a system to transfer risks to private sector participants, thus they may prefer to transfer many risks to partner parties. According to Chung (Chung 2008), the market competition now is changing the process of risk transfer or risk guarantee from the government to one of *"risk dumping"* from the government. This may mean that the government may attempt to take full advantage of the competitive environment to transfer as much risk as possible to the private partner (Chung *et al* 2010). On the other hand, for the private sector, they need to obtain a balance between risks and opportunities. This means that they need to acquire gains to balance the potential loss created by risks. The public sector may seek the lowest expenses for taxpayer while the private sector wants to maximize their profits (Innovative Program Delivery 2012). Therefore, if too few risks are allocated to the private sector the value for money, which is the heart of PPPs, can be negatively affected. In contrast, if too many risks are transferred to the private sector, including risks that private sector may not be able to manage; the value for money is also badly influenced. Moreover, this also can reduce the willingness of private sector parties of going further into projects, and if the private sector stops bidding, the final aims of the project can be seriously influenced (Innovative Program Delivery 2012). In addition, risks should be theoretically transferred to the party having the strongest ability to manage them. However, in practice, the capability of each party to manage risk is very complex to evaluate. Hence, this evaluation may be subjective (Lam *et al* 2007). Academics studying risk allocation in PPPs have usually investigated the risk perception of

stakeholders in practice, in order to form guidelines to help practitioners in the negotiation process (Zayed *et al* 2008, and Chou *et al* 2012).

Although there have been a number of empirical and non-empirical studies carried out in the field of public-private partnerships in construction projects, and through these studies, various techniques have been developed to formally manage risks, almost all of the companies manage risks based on their intuition, and experience rather than formal risk management methods. The lack of time and funds, and the complexity of techniques are the main reasons hindering companies in applying these techniques (Panthi *et al* 2001). Therefore, there is a need to have reliable, objective and practical risk assessment and allocation methods for PPPs. Moreover, the limited research in the Vietnamese construction industry also creates an urgent necessity to carry out the current study.

RESEARCH METHOD

For the purposes of this pilot study, a list of risks was created. These risks were identified from an extensive literature review, considering both the international context and the Vietnamese market, part of which was identified above. A total of 62 risks were gathered. They are categorised in two categories which are *"general risks"* and *"risks in each stage of project"*. There are 24 general risks which refer to the host country"s macro environment, and they are grouped into *"political risk"*, *"legal risk"* and *"commercial risk"*. 38 risks are *"in risk in each stage of project"*, and they are grouped into *"development risk"*, *"construction risk"* and *"operation risk"*. Questionnaire has 3 parts with the first part contains basic information about respondent. In the second part, participants were asked to rate listed risks, and in the final part, participants were asked to give their risk allocation perception for each listed risk. Following this interviews with officers from the PPP department at the Vietnam Ministry of Transport were carried out. These officers were also asked to complete the questionnaire. After that, officers were asked to send questionnaires to other practitioners in the private sector by email. In fact, the questionnaire was not sent to private practitioners directly by the researcher. This method was expected to increase the rate of response, as it can take the advantages from strong relationship between officers and private sector participants. To find the most critical risks, the data was analysed by improving the simple method used by Shen *et al* (2001). More specifically, risks were judged by their frequency of occurrence (Fr), and the degree of impact (Im). Risks were ranked by the equation:

$$R = Fr \times Im$$

In their paper, Shen and his colleagues categorized 3 levels of probability and impact which are 0.1 for *"low"* or *"small"*, 0.5 for *"normal"* or *"neutral"* impact, and 1 for *"high"* or *"large"*. However, after discussing with academic and practitioners, in this paper, 5 levels of probability and impact were used which are 0.9 for *"very high"* and *"very large"*; 0.7 for *"high"* and *"large"*, 0.5 for *"medium"*, and 0.3 for *"low"*, and 0.1 for *"very low"*. This change was expected to create more choices for practitioners in ranking and to make the analysis clearer. Risk score of risk I assessed by respondent j:

$$R_j^i = Fr_j^i \times Im_j^i$$

- Fr_j^i : Frequency of occurrence of risk I assessed by respondent j
- Im_j^i : Degree of impact if risk i assessed by respondent j

Risk score of risk i:

$$R^i = \frac{\sum_{j=1}^{n} R_j^i}{n}$$

Risks were then ranked according to their risk score (highest being most serious). In order to obtain more data and comments about the research, more interviews were carried out with some participants. These participants for interviews were chosen based on their questionnaire answers. For example, they were people who gave vague answers or significantly different to other people"s answer. The interviews were done with two officers from the government, three private practitioners who have been working in PPPs area, and two academics. Together with analysing by risk score, qualitative analysis was also applied

In terms of risk allocation, each participant was asked about their risk perception for each risk. In other words, each risk was allocated by participants to the party which they considered was best able to manage it. The percentages of respondents who allocated the risk to each party were then calculated for each risk.

FINDINGS AND DISCUSSIONS

Questionnaires were sent to forty one practitioners and thirty three of them were answered and returned. Thus, the rate of respond was about 80%. This is a high rate, and this could be because questionnaires were sent from government officers, not directly from researcher. This method is planned to be used in the fieldwork to bring a high response rate. However, not all of respondents answered all questions. For instance, few participants answered the questions on how to respond to risks and offered risks additional to those in the questionnaire. Some of them said that it would take time to answer such questions. Nevertheless, some of answers for these questions were provided during interviews. Therefore, in the fieldwork, some questions with low response rate will be used in the interviews instead of the survey.

Besides which, although the advantage of the method used in this study is that it can analyse risks both in terms of probability and impact, in reality a risk should be analysed based on additional factors too, such as the probability to lead to other risks. Hence, in the fieldwork, other risk assessment methods would be considered, and one of them may be AHP (Analytic Hierarchy Process) method which has been used in a number of researchers such as, Abdelgawad and Fayek (2010) Li and Zou (2011), Zhang and Zou (2007).

Table 1 shows the distribution of participants by sector. On consideration of these, it was decided that in the final fieldwork, lenders and academics should be invited to take part, both to extend the coverage of viewpoints sampled and increase the experience of respondents and validity of results.

Table 1. Summary of the respondents

Stakeholders	Number	Construction area working
Government	8	Transport
Investor	11	Transport
Contractor	22	Transport

Table 2: Risks ranking for General risks
Po: Political risks; Co: Commercial risks; Le: Legal risks

Type of Risks	Risks	Mean Risk Score	Rank
Po	Ineffective decision making process by public sector	0.512	1
Po	Difficulty in obtaining approvals	0.502	2
Co	Inflation risk	0.467	3
Po	Corruption risk	0.447	4
Co	Interest rate risk	0.392	5
Co	Low convertibility of currency	0.382	6
Le	Difficulty in obtaining compensation	0.382	7
Po	Uncertain policies from the government	0.380	8
Le	Inefficient legal process	0.365	9
Po	Unfair decision in selecting private investors	0.347	10
Co	Small capital market	0.320	11
Le	Change in laws and regulations	0.312	12
Le	Inadequate legal framework	0.285	13
Co	Government restriction on profit and toll decision-making process	0.275	14
Co	Negative economy of the country	0.257	15
Co	Foreign exchange risk	0.255	16
Po	Termination concession by government	0.245	17
Po	Political assistance from the government	0.225	18
Po	Risks relating to tax	0.195	19
Le	Law enforcement risk	0.180	20
Po	Forced buy-out risks	0.157	21
Po	Expropriation/nationalization risks	0.155	22
Po	Insufficient experience of the government in PPPs	0.112	23
Po	The government fails to make payment on time	0.097	24

Table 2 shows the ranking of general risks with the twenty four highest ranking risks as rated by the respondents. As can be seen from the table, amongst top ten risks, the political risks are in the majority. For example, *"ineffective decision making process by public sector"* was ranked as the most serious risk. Practitioners in interviews also stated that they have been faced with difficulty in receiving approval, and the result of the questionnaire also supports this as *"difficulty in obtaining approvals"* stands in the second position, and corruption risk stands at the fourth position. Participants in the interviews also assert that these risks do not only appear in PPPs but also in general construction projects. One of the reasons for this risk, as stated by participants, is that there are many layers in government legal systems, and these layers are sometimes not consistent with each other. Not surprisingly, *"inflation risk, interest risk and low convertibility of currency"* are commercial risks that were considered as key risks. Moreover, legal problems were also pointed out as they can lead to difficulties in running projects. These results are confirming the general conclusions of Wang *et al*. (2000) that in developing countries, political risks are more serious than other risks. However, the table also illustrates that seven other political risks stand at the bottom of the ranking table such as *"expropriation/nationalization risk"*, *"insufficient experience of the government in PPPs"*; *"the government fails to make payment on time"*. This is probably because by the time the survey was performed, there had been a number of improvements in those matters. For example, the experience of the government has been increasing because of the cooperation with other countries. There are now many specialists from other countries working as consultants and advisers for the government in terms of operating PPPs. Besides which, the questionnaires were sent only to PPPs in the transport area, and in this area operational phases are mainly funded through users paying tolls directly to the operator and this might be the reason that private partners do not consider *"the*

government fails to make payment on time" as a serious risk, as it may be in other construction sectors.

Moreover, by saying that the *"expropriation/nationalization"* is not a serious risk, respondents may be indicating that they do not worry that the projects may, at some future time, be compulsorily purchased by the government. In fact, some specialists expressed the view in the interviews that there are situations when the private sector exploits this possibility. Some projects may have 100 % private capital and the private sector may then submit a high bid price, in the belief that the government thinks that it does not really matter if the price is high (this is an internal matter for the investors as there is no government money in the scheme), as long as the toll is acceptable. Nevertheless, if after the project runs for a period, the government decides to buy back project, they will have to pay the initial bid price. In this case, obviously, the losses fall on the government.

Table 3: Risks ranking for risks in each stage of project

Type of risks	Risks	Mean	Rank
Op	Cost escalation risks	0.875	1
Op	Risks relating to employment	0.625	2
De	Impractical project feasibility report	0.565	3
Op	Inadequate demand	0.523	4
Con	Cost escalation risks	0.515	5
De	Approval risks	0.502	6
De	Bidding risks	0.445	7
Con	Loan risk	0.440	8
Con	Ineffectiveness of supervision of consultants	0.422	9
Con	Poor performance of constructors	0.370	10
De	Delay in planning process	0.337	11
De	Intervention of the government	0.336	12
De	Unavailability of finance	0.327	13
Con	Restriction on import equipment/materials	0.312	14
Con	Supply risk	0.305	15
Con	Government interference	0.250	16
Op	Government interference	0.250	17
De	The government lacks experience in PPPs	0.237	18
Con	Default by concession company	0.235	19
De	Inadequate tendering price	0.227	20
Con	Technical risk	0.195	21
Op	Restriction on repatriation of profits and funds	0.187	22
Op	Supply risk	0.175	23
De	Unclear conditions in the contract	0.165	24
De	Differences in working method and misunderstanding between partners	0.165	25
Con	Poor design	0.157	26
De	Lack of commitment from either partner	0.132	27
Op	Concession company default	0.115	28
De	Unsuitable project location selected	0.112	29
Con	Late design change	0.112	30
Op	Government department default	0.110	31
Con	Contractor default	0.103	32
Con	Protection of geological and historical object	0.080	33
Op	Inability to operate	0.080	34
Con	Environmental damage	0.070	35
Con	Land acquisition and compensation risks	0.068	36
Con	Risk relating to employment	0.065	37
Con	Work conditions differing from contract	0.052	38

Table 3 ranks risks specific to each stage of the project. Amongst the top fifteen risks, the construction risks are in the majority, for example, *"cost escalation risk, loan risk, and ineffectiveness of supervision of consultants"*. Not surprisingly, cost escalation risk was ranked as key risk in both construction stage and operational stage. This could be because the inflation rates in the Vietnamese market in recent years have been significant. For example the annual inflation rate in Vietnam dramatically increased from 6.2 per cent in 2009 to 12.1 per cent and to 21.3 per cent in 2011 and 2012, respectively (World bank, 2014). Although the rate decreased to 10.9 per cent in 2013, this still represents a threat to practitioners in PPPs. *"Impractical project feasibility report"* was also considered a serious risk as it was ranked at the third position. It is highly likely that this correlates strongly with the fourth risk which is *"inadequate demand"*. Indeed, information from interviews shows that feasibility studies at the development stage may not match the reality encountered later. For example, participants in interviews pointed out the situation of Yen Lenh Bridge as an example. The feasibility study of this project did not fully take into account the plan for other roads schemes which were built in the same region. These roads have reduced the demand for the bridge, meaning the demand is insufficient to balance expenditure.

Table 4: Risks allocation for general risks

Type of risk	Risks	Risk allocation (%)		
		Public	Private	Share
Po	The government fails to make payment on time	96.969	0	3.03
Le	Inadequate legal framework	93.939	0	6.06
Po	Political assistance from the government	100	0	0
Po	Uncertain policies from the government	100	0	0
Le	Change in laws and regulations	87.878	0	12.121
Po	Insufficient experience of the government in PPPs	90.625	0	9.375
Po	Corruption risk	84.848	12.121	3.03
Po	Ineffective decision making process by public sector	81.818		18.182
Po	Termination concession by government	78.787	3.03	18.183
Po	Difficulty in obtaining approvals	75.758	3.03	21.212
Le	Inefficient legal process	75.757	0	24.242
Po	Risks relating to tax	72.727	18.181	9.09
Le	Law enforcement risk	60.606	0	39.394
Po	Expropriation/nationalization risks	64.286	7.143	28.571
Le	Difficulty in obtaining compensation	56.667	6.667	36.667
Co	Low convertibility of currency	40.425	59.375	3.25
Co	Inflation risk	36.363	24.242	39.395
Co	Interest rate risk	33.333	51.515	15.151
Po	Unfair decision in selecting private investors	30.303	33.333	36.363
Po	Forced buy-out risks	27.272	12.121	60.606
Co	Foreign exchange risk	18.181	18.181	63.636
Co	Government restriction on profit and toll decisionmaking process	9.09	27.272	63.636
Co	Negative economy of the country	6.06	9.09	84.848
Co	Small capital market	0	0	100

Table 4 shows the respondents' risk allocation opinions for general project risks. The results indicate that the majority of risks were considered by respondents to be appropriately allocated for management by the public sector. For example, fifteen of twenty four risks on the list were chosen by more than 50% of respondents to be managed by public sector. This result is in line with the conclusion of Ke *et al* (2010) that most risks should be retained by public sector, or be shared by both parties.

Besides, through this pilot study, it is recognized that determining the concession period and toll adjustment mechanism are two of very critical issues in PPPs in

Vietnam. Therefore, in the final fieldwork, two these issues will be investigated further. A model to determine concession period and toll adjustment mechanism could be proposed using a modified *"Net Present Value"* approach to cost and income streams.

As stated above, this pilot study shows some different outcomes in comparison to previous studies in both international contexts and the Vietnamese market. These comparisons will also be re-examined on completion of the final fieldwork and explanations for any differences proposed.

CONCLUSION

This paper reports the outcomes of the pilot study in risk management in PPP transportation projects in Vietnam. This study attempted to identify and rank risks in this area in Vietnam. Moreover, the perceptions of practitioners in the area of risk allocation were also discovered. However, this pilot study also aimed to test research methods such as, the methods of collecting data, the quality of the questionnaires, and the ability to assess running projects.

The findings of the study suggest that ineffective decision-making processes by the public sector, difficulty in obtaining approvals, high inflation, and corruption are the most critical risks in Vietnamese PPPs. For risk allocation, the pilot findings suggest that the government is willing to manage risks relating to political and legal issues such as, risks of failing to make payment on time, inadequate legal framework, and uncertain policies from the government, and difficulty in obtaining approvals. Whereas, private partners are willing to manage risks relating to constructing and operating issues. Thus, according to the pilot study, the private sector is not willing to solely manage a majority of risks. This may indicate that one of the prime objectives of PPP, the transferring risks to the private sector, has not been achieved. The results are not fully consistent with results from previous studies. The possible explanations for this inconsistency will be considered as the research progresses.

The objective of the study to test the research methodology was achieved. Based on the outcomes of this pilot study, an extended field study is going to be carried out. In this fieldwork, nine selected PPP transportation projects in Vietnam will be accessed. Amongst these projects, six are currently running and three of them have finished. Furthermore, government officers who are working in PPP Department of the Ministry of Transport of Vietnam will be asked to answer questionnaires and have interviews. Also, a number of Vietnamese academics and researchers will be also invited to participate to bring different, and possibly unbiased, points of view. Additionally, other assessment methods such as Analytic Hierarchy Process (AHP) can be used to analyse and evaluate risks in combination with the analysis method used in the pilot study. Two critical issues in Vietnamese PPPs: how to determine concession period and the toll adjustment mechanism will also be researched.

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