2. SUSTAINABLE DEVELOPMENT OF ROAD INFRASTRUCTURE: Private Sector Participation in Indonesian Toll Road Case

Dissertation Summary

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Public budget limit at the time of huge requirements for existing arterial road service capacity improvement provides the private sector chance to develop the limited access road. This paper aims at examining the framework for successful PSP in Indonesian toll road and its conditions. Lessons from international state of practice as well as Indonesian experience will be utilized to formulate a certain condition that guarantee the works of PSP in Indonesia. A certain requirement needs to be improved by the public sector to attract PSP. Among the less clear components that need to be prepared and improved before engaging with PSP are planning and some risks factors reduction. An identification of risks factor that may exist in Indonesian toll road project will be analyzed and an assessment of the effect of risk on project feasibility is conducted for a case project.

Keywords: PSP, Indonesian Toll Road, Successful Conditions, Risks.

Introduction

PSP is likely to be growing in importance to supporting every nation seeks for additional resource for road financing. Private involvement in infrastructure provision is not new story and variation on its depth and sector may be found elsewhere. Based on a decade or more of PSP in toll road implementation experience, many institutions have tried to summarize or to produce guidelines for the best practice of PSP (e.g. European Commission 2003, World Bank 2001, Asian Development Bank 2000). Nevertheless due to its nature there will not be exact and common criteria that could serve as general guidance. Every country, even every project has its own specific nature that the success or failure will not be easy to judge from those general guidelines.

From public perspective PSP is potentially assumed by many will be beneficial in terms of reducing the required public fund as PSP would substitute it, faster implementation of project, efficiency and some other benefits. And as a business entity private may need to have at least reasonable return at certain time for their capital and business efforts. However it is common that there are still mismatch between the degrees of expectations between those two parties on the benefits of a PSP. Therefore a certain conditions will need to be anticipated and created to have a successful implementation of PSP (ADB 2000).

This paper tries to examine the needs for the PSP toward the sustainable financing of road projects in Indonesia, point out the preconditions to be prepared by public sector for the PSP risk reduction in toll road development, to identify the uncertainties and risks surrounding the toll road program in Indonesia, and to explain and show the usefulness of risk analysis in guiding the public investment decision when private sector is involved mainly in toll road project. A review of international condition for success implementation will be summarized and after that a current picture of Indonesian PSP will be outlined. A synthesis of international and Indonesian state of practice will be drawn to find a formulation of possible ideal condition towards successful implementation of PSP in Indonesian Toll Road Project. To show what risk factors are considered important in Indonesian, mainly from public perspectives, an analysis of risks will be conducted and assessed their impact to a case study. Finally a conclusion and a policy recommendation will be drawn.

The PSP and Uncertainties in Toll Road Project.

PSP in infrastructure reflect a deal or co-operation between government and private in the field of infrastructure that used to be under public provision. The contents and the depth of co-operation is of course depending on the contextual, approach and negotiation that come to a

choice of co-operation legally allowed by the countries. Each co-operation will have its own features and definition based on certain characteristic according to formal agreement and law or administration (EAIU 1998).

Defining successful PSP may need an integration of many conditions and success factors. A formula of success in PSP is perhaps not so specific r no single recipe. A set of criteria and indicators may be developed from macro and micro project perspectives to measure to the success of PSP. This set of measures may be imposed to judge the project at the stage of pre, on going and post project implementation.

From macro perspective, success may be decided by the ability of both parties to meet their objectives (Lockwood et al 2000). Government interest is to minimize the costs and other resource burden associated with road development and the achievement of road development strategy. Private at least earns reasonable return for their investment. ADB (2000) stressed the success definition more on the achievement of public sector in its road development strategy objectives in terms of political, economic, social and environment objectives. A micro perspective views the success of PSP more on the operation level of project though a measurement of performance in the budget, scheduling, quality performance, although considering macro factors such as planning and politics. Tiong (1996) identified what he called Critical Success Factors of typical BOT projects comprising 6 groups namely entrepreneurship and leadership, right project identification, strength of consortium, technical solution advantage, financial package differentiation, and differentiation in guarantees. A win-win solution is then basically depends on how these factors are blended and integrated so that each actors perspectives are being accommodated.

Each party then strikes a balance where risks identification and allocation would be among the main argument to achieve that balance. Allocation of risks of the project implementation to both parties is said to be the central in the partnership, so a now well-known definition is the one given by the UK Commission on PPP: "*a PPP is a risk-sharing relationship between the public and private sectors based upon a shared aspiration to bring about a desired public policy outcome*" (EC 2003). Project success may also be viewed as a state of structure where responsibility, risks, and rewards are being agreed between public and private (Flyvbjerg 2003, ADB 2000). The success of PSP is much determined by the achievement in risk sharing between the two parties of the relevant uncertainty factors. Tam (1999) indicates there are three risks essential for PSP namely technical, financial, and political risks. Vickerman (2002) on the other hand starts from the fact that financing of infrastructure face three type of main risks namely construction, revenue and maintenance, planning and political risks. International financial analyst s as have been used by World Bank and Mackenzie identify risks in 5 to 6 groups namely: political, design & construction, operation maintenance, market, regulation, and financial. There are many grouping of risks and risk sources nevertheless all will come to the mechanism on how and to whom those risk will be allocated.

International State of practice

The PSP experience exists in international perspectives from Europe, US & Latin America and Asia. This wealth of experience show the diversity of the system, even among countries, and therefore in the implementation. Criteria commonly found to be considered in embarking concession are varied that covering: the amount of public cost/subsidy required, the credibility of financial arrangement, technical quality, operating strategy, and the price and its adjustment policy, and length of concession (EC 2003, World Bank 2002, Estache 2001).

Table 1 Conditions for Successful PSP Implementation

The United Kingdom[1]	**France[2]**	**WB/MOC Japan[3]**
Political Commitment	Contracts Life cycle	Country environment
Enabling Legislation	Legal concerns	Concession environment
Expertise	Contracting Process & The Nature of Contracts	Sponsors' ability
Project Prioritisation	Evaluation of Risks	Risks sharing
Deal Standardisation	Appropriate Financial Approach	Financial Structure & market environment

Source: 1) EC 2003 2)Perrot, Jean-Yves & Gautier Chatelus (eds). 2000 3) World Bank/MOC Japan 1999.

The above Table 1 shows on requirements factors or condition for a successful implementation

of PSP based on experience of countries and institution: This conditions are more or less are macro in nature though to some extent could be further translated into sub factors that contains micro perspective. As the private is much considering the macro conditions, therefore a program that reduce the instability or uncertainty of macro factors will be the considered a conducive and increase the confidence level of investment.

Indonesian Toll road Development

Starting in 1978, cumulatively around 580 km (or around 0.2% of national road network) of toll road has been developed wherein 161 km is developed by private sector (Prasetyo 2003). For reasons of efficiency and public finance, the government of Indonesia will continue to invite private sector in the development of toll road. Lack of regulatory framework, limited choice for concession system, and irregularities in procurement practices are among the problems in the past to attract private sector but the economic crisis has brought to some reform initiative to improve those shortcomings.

In the past, private involvement through concession has significantly expanded the toll development in Indonesia. The weakness of this approach is the distortion inherent in their procurement and considered not in line with national development objectives. All of those deficiencies were to some extent due to the absence of long range and comprehensive national toll road network planning (Prasetyo 2003). ADB confirms that at least in the early stages of recovery, unsolicited bids are likely to be viewed favorably, particularly where projects conform to government priorities to stimulate economic activity (ADB 2000). In the pre economic crisis toll road sector was a distorted industry where some problematic issues such as too much politically driven, lack of technical consideration and inadequate institutional backup, poor plan, uncoordinated concession bids. Tariff setting and its adjustment and land acquisition are the main risks for toll road developers (World Bank and MOC Japan 1999).

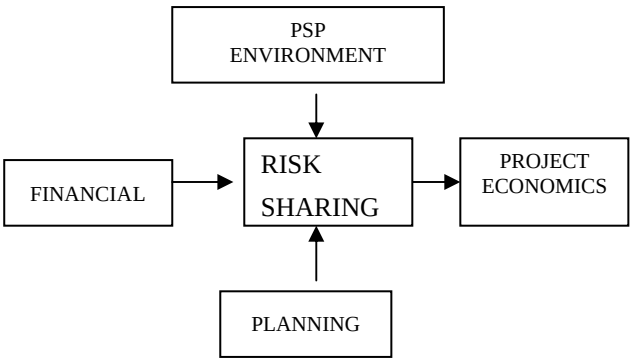
A substantial additional capacity will be needed in the major corridors in Java Island, the most densely populated island, particularly those between the major centers (DHSRI 2002). In the past road network plan was absence to guide the toll road development. Government has not defined its policy mainly in project identification for PSP, often leaving the private sector to identify projects through unsolicited bids practice, some risks are still not clearly uplifted mainly in tariff setting & its adjustment. There has also been concern that financial objectives have been the sole determinant of what happens to the detriment of development and social objectives (Jasa Marga 2002).

The study also show that public budget availability until the next 20 years is expected just enough to fulfill the existing arterial road improvement but not for new alignment. It is estimated that the funds available for major road improvements in Java between 2004-2010 will not exceed Rp. 6.4 trillion (approximately US$ 760 million) in total. Availability of funds for the period 2011-2020 will not be so constrained, and is expected to be around Rp. 15 trillion (approximately US$ 1700 million) in constant terms. This fund will be absorbed to improve capacity of around 6,820 km existing arterial road. (DHSRI 2002). Recent optimism of economic recovery has aroused the growth of toll road industry. Government itself is targeting that within 5 years (2004-2009) the toll road project already indicated should be accelerated in its implementation with around Rp 77 trillion expected investment from private sources (Kompas Daily News, 2/18/2004). Local governments have stated also their interest to develop toll road. As much as 275 km of toll road have been proposed by various local government in Java and Sumatera (Jasa Marga 2002).

Project Economics.

Among the main features of PSP is the transfer of the financing project to the private sector. Through project finance mechanism project is expected to finance itself through the revenue stream produced. Many factors determine the success of any implementation of PSP as it can function as enabler and facilitation and mechanism to work. Those conditions usually can be regrouped into 3 grouped categorized in broader context as PSP environment, Financial, and Planning. This categorization may be seen from the characteristics of each group where the degree of control and the tools to intervene may to some extent will be specific because of the different in the nature of its uncertainty and therefore the risks that may come from them.

Figure 1. Risks Sharing and Project Economics for PSP



Source: Adapted from World Bank & Ministry of Construction Japan 1999

.Figure 1 shows how the PSP environment, Financial factor and Planning are interrelated and each uncertainty component should be analyzed first before going further into the economics of the project and also later on its implication mainly the structure of PSP. PSP Environment component: comprises country political stability, basic laws, and procedures to support the implementation of PSP program. Uncertainties that may come from this component are political and regulation related risks. In developing countries where system change or reform still an on going process then usually private and international bodies will rate the country with high political risk to invest (ADB 2000).

Financial factor component is determinant with the fact that PSP contains a financial engineering so it involves mobilization of resources & various financial market, local and foreign context. Undeveloped financial market is also one of the reason to put financial sector to have some uncertainty components (Schaufelberger & Wipadapisut 2003). Planning factor including context of project that determine the size of the project mainly to deal with cost and revenue. Therefore technical component and also capacity to absorb the market (demand risk) will be the uncertain component in this factor. Among the most well known risks considered come from this factor is construction cost overrun and traffic volume risks. Risk Sharing component is responsible to analysis of all risks arise from all environment and factor being identified and trying to allocate between the parties. Risk sharing is said the central theme in PSP project (see for example Flyvberg et all 2003). This is true the case with the fact that PSP project is complicated in nature.

Risk Sharing and Allocation in Indonesian PSP.

Almost the same with its counterpart everywhere in the world, Indonesian government is dealing with private sector in PSP for toll road project. Following the international standard of risks grouping, reveals the following risks are considered high importance in term of its effect and need serious attention and handling from the perspective of private in Indonesian BOT type of toll road project (Abrar 2003).

1. Political risks: law change, toll setting authorization, concession termination, project nationalization, and government policy change
2. Design and Construction: land acquisition, cost overrun, force majeure
3. Operation and maintenance: operator bankruptcy and force majeure n operation and maintenance
4. Market: traffic volume, tariff decrease and tariff increase authorization
5. Financial: interest rate increase and foreign exchange rate
6. Regulation & Contractual: asset ownership guarantee, contract non satisfying, contract breach, investor bankruptcy, government negligence.

Those risks are considerably high and are expected have significant effect on the PSP implementation. They need special treatment compared to that of other risks factors which is less important or some other risk that negligible. Usually all of the risks will be allocated and decided who bears, those special risks may need special attention and there should be a deals that achieved on whom and how to allocate and whether it should be put in the clause. Some of those high important risks are still to some extent varies in their nature. Some are qualitative in nature and some has direct quantitative impact. Some may need priority to handle and some may take some processes. Table 1. shows the result of the survey of selected respondents on how they will re-rate the risks indicated above. This grouping is important mainly to bring back the risk to general category for measurement needed mainly from public sector where appropriate measures could be taken.

Table 1. Regrouping of Important Risks

Risks	Sub Component	Less Prioritized	Prioritized	Regrouping
Design & Construction	Cost Overrun/Land Acquisition		X	PL Risk
	Force Majeure	X		PL Risk
Operation & Maintenance	Operator Bankruptcy	X		PL Risk
	Force Majeure in OM	X		PL Risk
Market	Traffic volume		X	PL Risk
	Toll Tariff decrease	X		PL Risk
	Tariff Increase authorization		X	PL Risk
Financial	Interest rate increase		X	FIN Risk
	Foreign Exchange Rate		X	FIN Risk
Political	Law change		X	PSP Env Risk
	Toll Setting Authorization		X	PSP Env Risk
	Concession Termination	X		PSP Env Risk
	Project Nationalization	X		PSP Env Risk
	Government Policy Change		X	PSP Env Risk
Regulation & Contractual	Asset Ownership Guarantee	X		PSP Env Risk
	Contract non Satisfying	X		PSP Env Risk
	Contract Breach	X		PSP Env Risk
	Investor Bankruptcy		X	PSP Env Risk
	Government Negligence	X		PSP Env Risk

The regrouping of the sub risks to its original environment/factor is intended to take a general aspect of the factor since those risks are drawn from limited mode of PSP namely BOT (Built Operate Transfer). BOT is so far the main mode for toll road delivery mainly by the private sector in Asia (World Bank 2003). Basically PSP provide a range of modes of private involvement in toll road provision, from pure provision by private, management contract, turnkey, concession and some other derivatives. ADB suggests more utilization of mode for PSP not only BOT so that tapping private resources may be more effective and cumulative (ADB 2000).

How to allocate between Public and private then? The tenet of best risk allocation widely accepted is that risk should be given to those best able to bear. In the project the risk can be divided into distinct risks, some will be the task of private, and some will be under the public actors. Some perhaps will be shared each will bear according to certain agreement. This is the area of debate and negotiation for both parties.

Table 2. Possible Allocation of Certain Important Risks in Indonesia.

Risks Group	Sub risk category	Public	Private	Partial
Planning	Cost Overrun/Land Acquisition	V (full)		Yes
	Traffic Volume		V (full)	Yes
	Toll Tariff decrease		V (full)	No
PSP Env	Law Change	V (mostly)		Yes
	Toll Setting Authorization	V (full)		Yes
	Government Policy Change	V (full)		No
	Investor Bankruptcy	V (mostly)		No
	Foreign Exchange Rate		V (Full)	No
Financial	Interest Rate		V (full)	No

Table 2 above describes the possible allocation derived from current negotiation outcome and common international practice (Abrar 2003, World Bank 2003) . It shows that public sector will be the main bearer for the risks that come from PSP environment mainly those deal with law and administration on PSP. Political and regulation are considered risky in Indonesia. This means also the degree of confidence from private is much determined by the stability and the capability of Indonesian government to improve and stabilize those factors which now still on going process. Even though some of this risks may be shared though perhaps public sector will be the main bearer of the risk for example in law change case and concession termination the private are still could be expected to bear small part of the risk based on the negotiation (Jasa Marga 2003).In the Planning factor one important risk that fully born by public is land acquisition. Late and lengthy dispute in land acquisition are quite often reported in the media in Indonesia case

Risk Impact assessment

A typical case for the section of Sukabumi-Ciawi, a section part of southern corridor that connected Jakarta-Bandung in Indonesia is used for the case analysis (Bukaka 2003, DHSRI 2002, Harun et al 2000). Risk analysis is implemented in the spreadsheet model of the base case and simulates using Monte Carlo simulation add-in software @RISK. Monte Carlo simulation is a technique that takes the distributions specified for certain inputs of the model. This will produce a probability distribution of the output that we intent to examine.

The base case an ordinary (conventional) cost benefit analyses without explicitly integrate the risks factors in the analysis. Selected risks from the risk matrix that show what risk is likely highly to occur and likely highly impact, are being assigned with its respective distribution function based on the survey result. Traffic volume and construction cost/land acquisition are the two variables selected. Those distributions derived from the survey we labeled Risk 1. Assuming that government is successfully improving the preconditions for PSP, we assigned a narrower distribution as much as 50% and we name it Risk 2.

The simulation performed below is based on the distribution function from the survey. A comparison with the base case reveals how the risk factors of traffic volume and construction cost affect the performance of the feasibility indicator of the project. A recalculation of the appraisal through Montecarlo simulation shows slightly reduction in all of the indicators (see Table 3). The project itself is viable in the range of 30 years project length.

Table 3 Feasibility Indicators of the Project.

Viability Indicators	Original Case	Risks 1	Probability	Risk 2	Probability
BCR (Yr 20)	2.91	2.74	BCR <1 is 0	2.83	BCR <1 is 0
BCR (Yr 25)	5.09	4.81	BCR <1 is 0	4.95	BCR <1 is 0
BCR (Yr 30)	9.02	8.70	BCR <1 is 0	8.95	BCR <1 is 0
IRR (Yr 20)	18	16.52%	IRR<20% is 100%	17.29	IRR<20% is 100%
IRR (Yr 25)	20	19.09%	IRR<20% is 95%	19.76	IRR<20% is 78%
IRR (Yr 30)	22	20.47%	IRR<20% is 19.5%	21.08	IRR<20% is 0.1%
NPV (Yr 20)	7.13	6.67	NPV <0 is 0	6.90	NPV <0 is 0
NPV ‘(Yr 25)	16.72	15.93	NPV <0 is 0	16.33	NPV <0 is 0
NPV (Yr 30)	35.52	34.10	NPV <0 is 0	34.81	NPV <0 is 0

In terms of BCR and NPV this project provide a good indicators of feasibility with BCR close to 9 and NPV around Rp. 34 billion with the probability negative is close to 0% for both under Risk 1 and Risk 2. IRR around 21% is acceptable with the probability of IRR less than 20% is close to 20% under Risk 1. However the improvement of preconditions (Risk 2) has shown significantly

improved this probability of IRR being above 20%. The decision to assume that probability either risky or not will depend on the quality of the PSP actor either risk-taker or risk-avoider.

Valuing Risk & Its Meaning for PSP Decision Making

The calculation shows that the cost of uncertainty that stem from the uncertainty in cost overrun risk under Risk 1 as much as Rp 110 billion that need to be reserved or shared or transfer and possibility to be insured to third parties. This number reduced almost a half with the Risk 2 assumption into Rp 64 billion.. Cost overrun is in many cases including in Indonesia become the responsibility of private sector itself. Therefore this cost of construction will be the PSP company's own risk, and usually insurance to third party is commonly practices. Table 4 shows the consequence of either the actual traffic follow the lowest or minimum value or the highest (maximum value). In case the former happened there is an amount of – Rp 51 billion or + Rp 38 billion should be paid or received by either public or private. The similar calculation for Risk 2 shows an amount of –Rp 25 billion and Rp 19 billion as the improvement are assumed happened.

Table 4 Revenue Risk and Possible Sharing (Risk 1)

Year	At Traffic Forecast (Ro)	Traffic Estimate At Minimum Value (R1)	Traffic Estimate At Maximum Value (R2)	Ro-R1	Ro-R2
4	329.8	197.9	501.4	-131.9	98.94
10	675.8	405.5	878.5	-270.3	202.73
15	2095.2	1257.1	2723.8	-838.5	628.57
20	6657.6	3994.6	8654.9	2663.1	1997.28
25	21514.9	12908.9	27969.3	-8606	6554.46
30	41054.3	24632.6	53370.6	-16421.7	12316.28
Total	254021.8	152413.6	330228.3	-101608.7	76206.5
	Shared 50:50		Public	-50804.35	38103.25
			Private	-50804.35	38103.25

The calculation above demonstrates that risk analysis as compared to the single point estimation, provide the decision maker with much information. To some cases where the project indicator may look like positive in the single value appraisal technique, may seen risky when the appraisal is equipped with the risk analysis. The case study also reveals that it is crucial to carry out a risk analysis as part of general cost benefit analysis and therefore help a strategy to reduce uncertainty. It must be recognized that probability distribution in the analysis is subjective unless we have a complete set of data, however at least they reflect a focused and explicit judgment by the respondents, that assumed all are expert or professional in their job, and more or less consistent with best judgment from the well known analyst of professional financial /credit rating companies personnel.

Traffic Forecast: an Extended Proposal

Traffic forecast and construction cost seems two sources of risk that have well known of their occurrence and big impact (see Hall 1980). Variability in traffic forecast as compared to that of real traffic has much been discussed and become the serious concern mainly from financial stakeholders such as lenders and credit provider (SandP 2003, PWC 2000). Flivberg et al (2003) even conclude that we need to be skeptical and don't trust the traffic forecast. A financial consultant may believe only 50% or the feasibility study report (Bekka 2004). All this reveal that traffic forecast in feasibility study is in big challenge.

Uncertainty and risk conceptually is not new in business and project management. What is surprising is the fact that it has been limit in use as a decision tool. In general uncertainty could be defined as a situation where for a certain quantity, there are some different value that may exist. Risk is measurable uncertainty that may further imply how much gain or loss as the consequences of uncertainties (PWC 2000). Date back to Friend (1987), he divides the uncertainty into three

categories namely uncertainty about working Environment (UE), Uncertainty about guiding Values (UV), and Uncertainty about Related decision (UR). UE is related to situations that exist and assume beyond our capacity to directly adjust or change. In other term it may categorized as basic condition or scenario that covers variable such as population growth, economic growth. UR is uncertainties that come from the intended decision or change in agenda that may affect the decision. UV may be referred to uncertainties that rise because of the need to revisiting the aims or objectives. For example a rolling plan in which every certain period we reevaluate the goals or priorities.

Traffic forecast is usually an effort to predict the number of passer by of a road facility or network based on certain assumptions. Considering the variables involved in the forecast, it is no wonder that the possibility of wrong prediction may frequently occurs. Although sophisticated demands model may look objective it is possible it still produced bias because of wrong calibration or other subjective reasons. That's no wonder that the difference between forecast and actual traffic is not statistically random but bias.

1. Assume background scenario (UE factors (such as regional social-economic projection)) and the policy scenario (UR factor s(such as related developments and network expansions))
2. Develop the service scenario (toll structure by type of vehicle)
3. Estimating traffic volume and toll revenue by traffic forecasting models (UV factor (such as Value of Time and other coefficients))
4. Conduct a financial analysis with risk & check evaluation index (Revenue/cost ratio, IRR etc.)
5. Through step 1 to step5, compare different scenarios and select the best one

The above restructure of traffic forecast may be conducted if we know the traffic model and the further data mainly from each uncertainty. To have a better forecast, there is a need to recognize the risk factors that may affect the forecast output. An effort to push PSP implies the public and private must prepare for sharing the risks in a broader context. However it should be kept in mind that the source of uncertainties will determine the bearer and how much allocation must be shared. Uncertainties that stem from background scenario or UE (for example population and economic growth) and UV are usually beyond the direct control of both parties and therefore a balance share may be proposed. Risk due to certain action by the public (UR) will be the responsibility of public sector. One of the challenging deals in PSP is on defining how much will each party assumes the risk resulted from the scenario. In the case where traffic volume is big enough to guarantee a profit for PSP, usually private will be fully responsible for the traffic risk.

However to come to that detail risk sharing an improvement in understanding risks and on how to recognized as well as to calculate risks is needed so that the deal will be an affective one. Though traffic forecast risk in road sector is less severe than forecast in rail passenger forecast, but the difference between the forecast and actual is still high in which on average the different is around 30 percent less on average (SP 2003). This means decision making must be extra cautious when judging a traffic forecast that is not containing explicitly the risks factors. The problem is how to equip the public with the existing of these risks factors. To do so it is imperative to strengthen them with risk analysis.

Conclusions

Theoretically PSP is prospective and possible to be involved in Indonesian toll road projects because of the openness of public to accept private sector in providing the infrastructure including toll road. The demand for huge amounts of fund for arterial/trunk road, on the other hand, gives an opportunity for private to enter the project. Therefore, Promoting PSP in toll road projects is the most important issue toward the sustainable financing of road infrastructure in Indonesia.

Derive from the lessons of international and past practice, there are at least three sources that contribute to the problematic development of Indonesian PSP, and therefore increase the risk and uncertainty, in toll road project namely: PSP environment, planning, and financial factor. To reduce the uncertainty and risk that may arise from the above three factors public sector should do various measures to re-attract private sector. Government needs to confirm its commitment for PSP.

The public sector's role to reduce the PSP risks are the important key to promote the PSP in

Indonesia, and the pre-conditions to be prepared by the public sector are shown in following Table 5.

Table 5 Public Role in PSP Promotion

Components	Problems	Public Action
INSTITUTION & REGULATION	•Fixed Law and regulation •Structure of PSP	•Adjusted or revised the existing law or regulation for better framework
PROJECT & PLANNING	•No fixed network plan •Land acquisition problem	•Set the definitive plan •Direct Support for land •Regional development
UNCERTAINTY FACTOR	•Tariff setting and its adjustment •Traffic Volume	•Adjustment of contract •Direct sharing
FINANCING	•Limit of public sources •Market failure/private is less attracted.	•Infrastructure Fund for toll road •Other type of PSP scheme introduction

To recognize the risk inherent in Indonesian toll road project, the survey result showed that there are various risks factors that considered significant and need to be prioritized. They are construction cost/land acquisition overrun, traffic volume, toll increase authorization, law change, public policy change, investor bankruptcy, foreign exchange rate, and interest rate. For these highly important risks, a public and a private sector's desirable role assignment was proposed.

An assessment for risk inclusion in the appraisal has been performed by quantifying the selected risks. The selected risk are traffic volume and construction/land acquisition risks in which there is expectation of distribution range from 60-130% and 90-135% for both risks respectively. The result of the appraisal showed that integration of the risks factor in the financial model for the case study is able to show a clearer view of the uncertainty in the key elements of uncertainties in the project.

The research has confirmed the inadequacy of conventional appraisal techniques in investment decision making related to PSP. It shows the usefulness of risks analysis to decision making and has contributed on development of the risk analysis in Indonesia by recognizing the important risks and their size (distribution) through survey, and incorporate them in the base case. Recognizing the usefulness of risk analysis for decision making in PSP for toll road, a more complete risk analysis proposal is raised by considering various uncertainty sources namely uncertainty about working environment (UE), uncertainty about guiding value (UV) and uncertainty about related decision (UR). Considering those sources uncertainties, a background scenario, policy scenario and service scenario could be identified for a better traffic forecasting.

Recommendation & Policy Implication

The following policy implications are considerable for the PSP development in Indonesia. To anticipate the gap and uncertainty for future years, a periodical redefinition and revision of the contract would be needed. In other word a flexible contract is expected to overcome the risk that may occur. A certain preconditions should be prioritized first to improve as the analysis show how they will reduce the variation and improve the feasibility index of the projects as well as improve the probability of that index to occur. Some strategic additional measures are recommended as they will reduce risk and uncertainty for PSP as well as in risk sharing identification of all possible error source in forecast, introduction of more detail scenarios, and a better toll setting regulation and adjustment.

This study is still limited in recognizing the risks usually inherent in toll road project for Indonesia case. A more complete risk factor can be analyzed and included in the analysis. The distribution attributes of the selected risks would be better if combining of survey and historical data. A

more constructive traffic forecasting that accommodating all factors of uncertainties is expected will reduce prediction errors of the actual volume.

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