

Risk in Government's Estimate for Toll Road: Based on Investors' Perspective

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Abstract— The government's estimate for toll road concession award, as a comparator for investors' bids, has been criticized by investors, as it does not fully include the proper cost of risks. Thus, there is a need to develop a more equitable estimate that considers the risks, both at the project and at the business/corporate level. The study was mainly supported by qualitative data on the probability of occurrences and impact assessment of risks, acquired through interviews with major investors. Probability Impact Matrices were used to identify risks categorized as "high risks." Findings have indicated that the high and dominant risks are: i) Route/traffic management (lower traffic volume due to changing routes); ii) Overloading (poorly imposing the limitations of heavy vehicles); and iii) Inadequate/inaccurate data in feasibility study documents. Recommendation on the mitigation plan for these risks has been corroborated by both parties, the government, and the investors. Parts of the risk are proposed to be incorporated into the government's estimate, while other risks should be adequately addressed in specific contract clauses for Indonesia's PPP scheme.

Keywords— toll road; government's estimate; risk; investor; mitigation

I. INTRODUCTION

Indonesia has been through many obstacles in fulfilling infrastructure needs. One of them is funding for infrastructure. National Planning Agency has calculated the funding that is needed for infrastructure from 2010 to 2014 reaching Rp 2.000 trillion; meanwhile, the ability of the government in term of the state budget is only around Rp 600 trillion [1]. Alternative funding that can be used for this problem is the Public Private Partnership (PPP) scheme.

To support the Public Private Partnership (PPP) in road infrastructure, the government has formulated various regulations. However, it is still deemed essential to prepare a guideline for investment appraisal (private deal) in toll road concession tender. Several studies related to challenges in developing toll road describes that the inhibiting factors to the operation toll road system performance were a legal framework (regulatory), institutional frameworks [2], and lack of optimal preparation from the government in preparing a PPP project [3]. The other challenges are related to the design and implementation of concession contracts that allocate risks, responsibilities, and the mechanisms for evaluating and awarding projects [4].

In Indonesia, to evaluate business proposals of the toll road (toll road investment), the government constructs an evaluation benchmark called the government's estimate for toll road concession award (HPSPJT). HPSPJT is an owner estimate that includes documents and attachments. It is used to support evaluation of business (investment) proposal for toll road concessions by the procurement committee. HPSPJT is also a tool used to assess reasonable investment prices for toll road concession which is formulated and established before the bidding process is started. Further HPSPJT becomes a benchmark for private deals.

Based on the regulation of the Ministry of Public Works No.13/ PRT/ M/ 2010, the committee shall draw up HPSPJT which is then approved by the minister or the head of Indonesia Toll Road Authority (BPJT). The component of HPSPJT at the least consists of (a) forecast of investment estimate; (b) construction cost; (c) land acquisition cost; (d) technical planning and supervision cost; (e) projected traffic volume, (f) toll rate including adjustment and toll revenue, (g) forecasts of operation and management cost; (h) projected profit/loss; (i) cash flow projections; (j) calculation of adequacy ratio for loan repayments; (k) calculation of NPV (Net Present Value), IRR (Internal Rate of Return),

Profitability Index, and Payback Period; (l) tables showing the planning of total investment cost; (m) the initial toll rate; and (n) concession period [5].

Optimal risk allocation is the main goal of all the PPP scheme, where the value of risk needs to be included in the bidding cost (estimation) document [6]. Thus, not only does owner estimation calculate the direct and indirect cost, but PPP scheme also needs to include the risk management (risk allocation sharing). To alleviate the risk, structured and specified actions are important to be planned, and cooperation with authorized parties is required [7].

II. MATERIAL AND METHODS

To achieve the objectives of this study, the method of research was carried out in four stages:

1. Identification of risk: a) referring to the paper/previous studies, and b) in HPSPJT component, tender, bid and contract documents (concession agreement).
2. Risk Analysis (to identify high/significant risks).
3. Interviews with investors about risk mitigation that could be recommended in the HPSPJT.
4. Recommendations: which one to be included in the HPSPJT and which one not to be included in the improvement of contract clauses.

A study to identify risks in PPP toll road in Indonesia has been described [8]. These risks study was based on previous studies as in [9], [10], and [11]. The identification of these risk is described in Table 1.

TABLE I
RISK IDENTIFICATION FOR PPP TOLL ROAD [9]

Risk Event	Code	Literature			Interview (2012- 2013)
		Widiantono 2003	Winarsa 2005	Naimah 2009	
I Pre – Construction					
<i>Tender</i>					
1. Lack of transparency in the tender process	R1	x			
2. Inadequate tender documents	R2	x			x
3. Inaccurate data for a feasibility study	R3	x			x
4. Changes in the scope of work by owner (design and volume)	R4	x	x		
5. Low competition	R5				x
6. Length of time for the tender process	R6				x
<i>Land Acquisition</i>					
1. Uncertain time for land acquisition	R7	x		x	x
2. Uncertain price for land acquisition	R8	x		x	x
<i>Concession Contract (PPJT)</i>					
1. Incomplete contract (related to risk arrangement)	R9				x
2. Concession period	R10				x
II Construction					
<i>Financing</i>					
1. Error in construction cost estimation	R11	x		x	
2. discontinuous funding/difficulty in obtaining bank loans	R12	x	x	x	
3. Interest rate uncertainty (significant changes in loan interest rate)	R13	x	x	x	x
4. Changes in currency exchange rates	R14	x	x		
5. Payment to subcontractors in a timely manner	R15		x		
<i>Construction</i>					
1. Unforeseen condition	R16	x			
2. Severe weather	R17	x	x		
3. Loss of material or logistic risk (theft)	R18	x			
4. Contractor's experience	R19		x		
5. Poor quality of construction (does not meet the criteria of the specification)	R20	x			
6. Labor strike	R21	x			x
7. Risk of construction delay	R22	x	x	x	x
8. Subcontractor's ability	R23		x		
9. Material price escalation due to inflation and cost escalation	R24	x			x
10. Uncertainty in the procurement of imported equipment	R25	x			
11. Poor performance of equipment	R26	x	x		
12. Inappropriate construction method	R27		x		
<i>Force majeure</i>					
1. Natural disasters in project regions	R28	x		x	
2. Political changes (lead to demands for nationalization of projects owned by foreigners).	R29	x			
3. Vandalism (destruction of property)	R30	x		x	
<i>Legal Aspect</i>					
1. Lack of legal support for investors	R31				x
2. Changes in government policy	R32		x		x
III Post – Construction					
<i>Risk of Operation and Maintenance Cost</i>					

1. Ineffective and inefficient in operation and maintenance	R33	x			
2. Construction defects	R34	x		x	
3. Escalation cost for operational and maintenance due to inaccurate estimation	R35	x			x
4. Risk of high traffic accidents	R36	x			
5. Disruption of toll road operations due to the demonstration	R37	x	x		x
6. Overloading risk	R38				x
<i>Risk of Toll Revenue</i>					
1. Inaccurate traffic volume estimation	R39	x	x	x	x
2. Determination of initial tariff and tariff adjustment mechanism	R40	x	x	x	x
3. Business risks (competitive routes)	R41	x			
4. Corruption, collusion and nepotism	R42	x			
<i>Risk of Force Majeure</i>					
1. Natural disasters in project regions	R43	x		x	
2. Political changes (lead to demands for nationalization of projects owned by foreigners).	R44	x			
3. Vandalism (destruction of property)	R45	x		x	

Table 1 shows that there are 45 risks have been identified (literature based). The dominant risk occurring in pre-construction phase is land acquisition. It is related to the uncertainty of time and price of the land acquisition, become a scourge to the investor as well [12]. According to government's regulation No. 2/2012 about Land Acquisition for Development of Public Interest, and Presidential Regulation No. 71/2012 on Implementation of Land Acquisition for Development of Public Interest, the risk of land acquisition becomes an exception in this research.

In the construction phase, the dominant risks are financing and construction risks. And in post-construction phase, the

dominant risk is income or toll revenue. It is related to inaccurate traffic volume estimation, determination of initial tariff and tariff adjustment mechanism, and market conditions as well [13].

Risks identification in Table 1 is further analyzed to screen and set risk priority based on investors/concessionaires' perspectives. The risks priority is the risk that includes in high-risk classification. This classification conducted by using a probability impact matrix. First, a rating scale must be set to determine the magnitude of probability and impact. This research has used 1 to 5 scales in Table 2 [14].

TABLE II
RISK ASSESSMENT SCALA [14]

Probability		Impact			
Scale	Description	Scale	Description		
			Cost	Schedule	Quality
1 Very low (Rare)	very unlikely/very rare. Probability less than 0.02 (< 0.02)	1 Insignificant	Budget estimates not exceed (funds are sufficient). minor impact, can be safely ignored	Slight schedule change from target	quality decreases slightly but still usable (minimal or unimportant performance impacts)
2 Low	occasionally/likely to occur. Probability 0.02-0.1	2 Minor	Project cost estimates exceed budget by 1-5% small impact on the cost, time and quality (a small reduction in performance)	Minor slip in the project schedule	Fail to fulfill promises to stakeholders
3 Medium	Possible, enough. Probability 0.1-0.5	3 Moderate	Project cost estimates increase by 5-10% moderate impact on the cost, time and quality	Small slip in schedule (delay) impacts stakeholders	Some functions cannot be used
4 High	Often occur/likely. Probability 0.5-0.8	4 Major	Project cost estimates increase by 10-20% Substantial impact on the cost, time and quality	Fail to fulfill Deadline	Fail to fulfill the needs of many stakeholders
5 Very High	almost certain/very often Probability over 0.8 (> 0.8)	5 Catastrophic	Project cost estimates increase by more than 20%. (need substantial additional funding) Threatened the success of the project	Large slip in project schedule (delay) harms the project.	The project is ineffective and useless

A qualitative method was used in this research. It means the analysis based on experts' opinions. These opinions were acquired through direct surveys and interviews. The experts who became respondents were practitioners of investments (private sector). They are Investors of a toll road that their business entities engaged in toll road concession (BUJT). Totally there are five respondents in this study, i.e., BPJT, BUJT A, B, C, and ATI.

III. RESULTS AND DISCUSSION

A. Risk Analysis in Toll Road

When the survey was conducted, there were two new risks identified from the respondent's opinion. They are (i) political, social and security risks, and (ii) risk of the uncontrolled environment along the toll road. The result of risks assessment in risk matrix can be seen in Fig. 1.

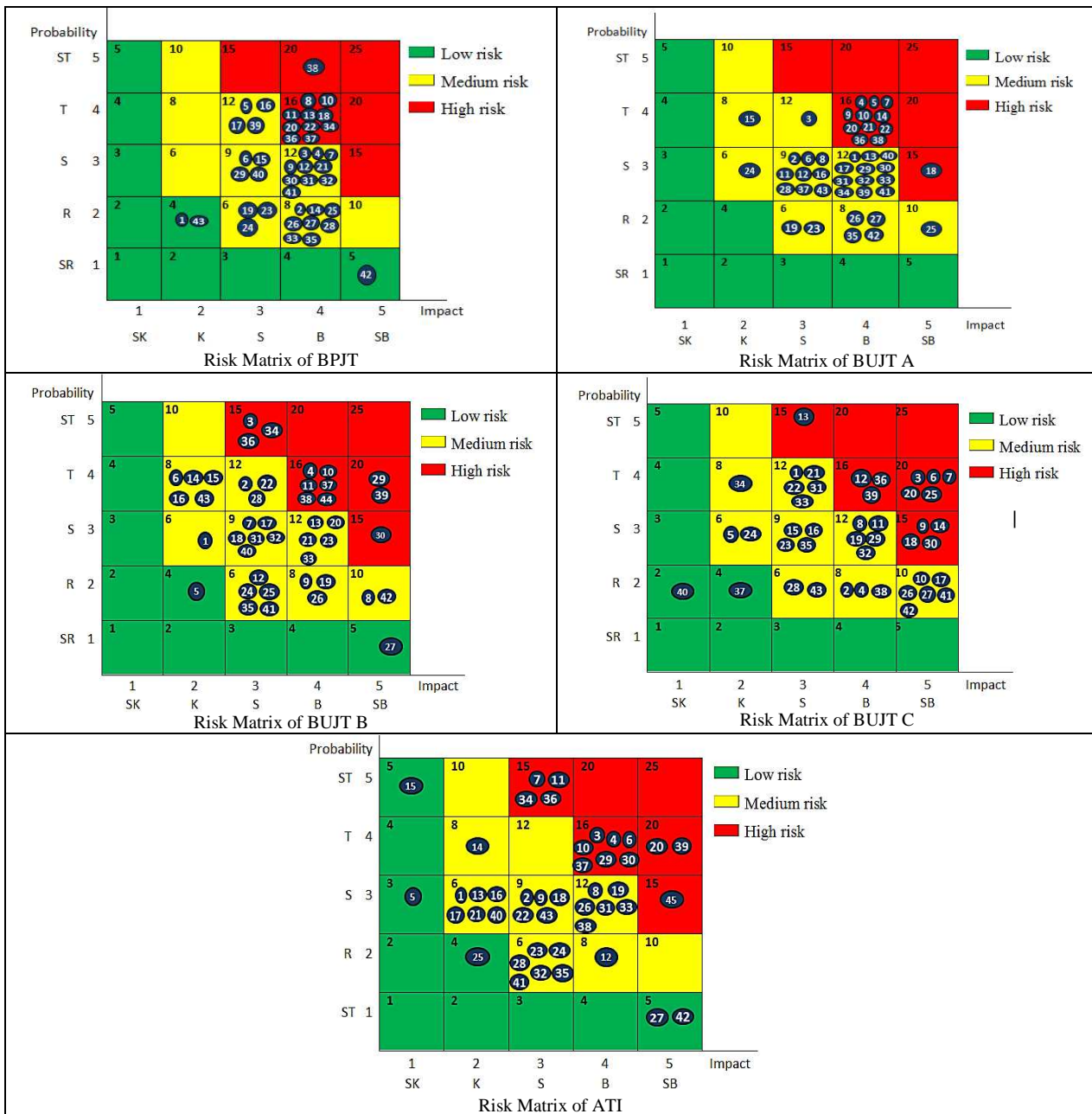


Fig. 1 Risk Matrix

Based on Fig. 1, the risks are grouped into (i) low-risk, can be accepted or ignored, (ii) moderate risk, has the high possibility but low effect, or preferably, (iii) high risk, has high probability and severe impact. The focus of this study is a high-risk category that could give great effects to PPP toll road.

1) *Risk-based on BPJT and BUJT Perceptions:* Overall, there are 26 risks that belong to the high-risk category based on BPJT and BUJT. Furthermore, these risks will be grouped into dominant risk and main risk by weighing (percentage) the number of respondents' answer (Fig. 2).

Fig. 2 shows that there are 13 dominant risks experienced by BPJT and BUJT (> 50% of respondents experienced it). They are: (i) overloading risk, (ii) risk of construction delay, (iii) discontinuous funding/difficulty in obtaining bank loans, (iv) business risks (competitive routes), (v) determination of

initial tariff and tariff adjustment mechanism, (vi) inaccurate traffic volume estimation, (vii) risk of high traffic accidents, (viii) changes in government policy, (ix) poor quality of construction (does not meet the criteria of the specification), (x) interest rate uncertainty (significant changes in loan interest rates), (xi) incomplete contract (related to risk arrangement), (xii) changes in the scope of work by owner (design and volume), and (xiii) Inaccurate data for feasibility study.

All of the 13 dominant risks are interconnected, but they cannot be merged as one because of different impacts. The major risks in the dominant risks are (a) overloading risk (100%), (b) risk of construction delay (80%), (c) discontinuous funding/difficulty in obtaining bank loans (80%).

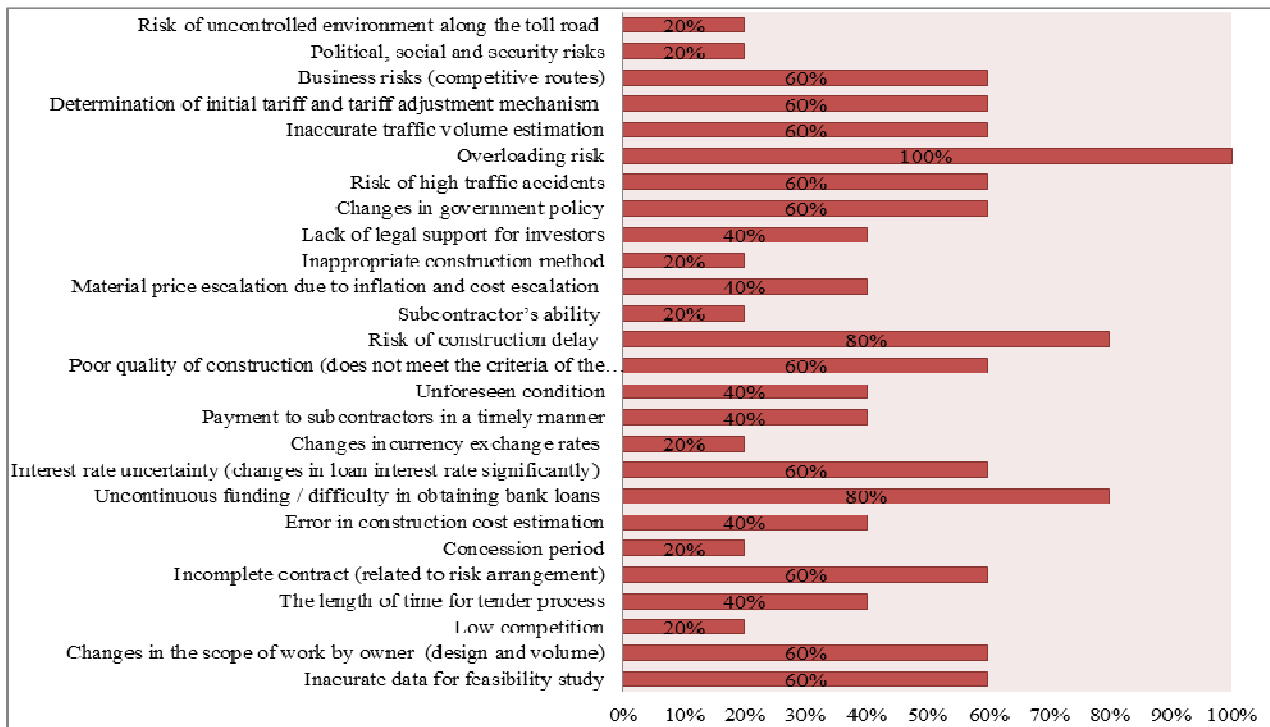


Fig. 2 Category of dominant risks based on BPJT and BUJT perception

2) *Risks Based On BUJT Perception:* There are 25 risks based on BUJT perception (Fig. 3), and only eight (8) risks as dominant risks (> 50% of respondents experienced it). They are: (a) overloading risk, (b) business risks (competitive routes, (c) changes in government policy, (d)

risk of construction delay, (e) discontinuous funding/difficulty in obtaining bank loans, (f) Incomplete contract (related to risk arrangement), (g) changes in the scope of work by owner (design and volume), and (h) Inaccurate data for feasibility study.

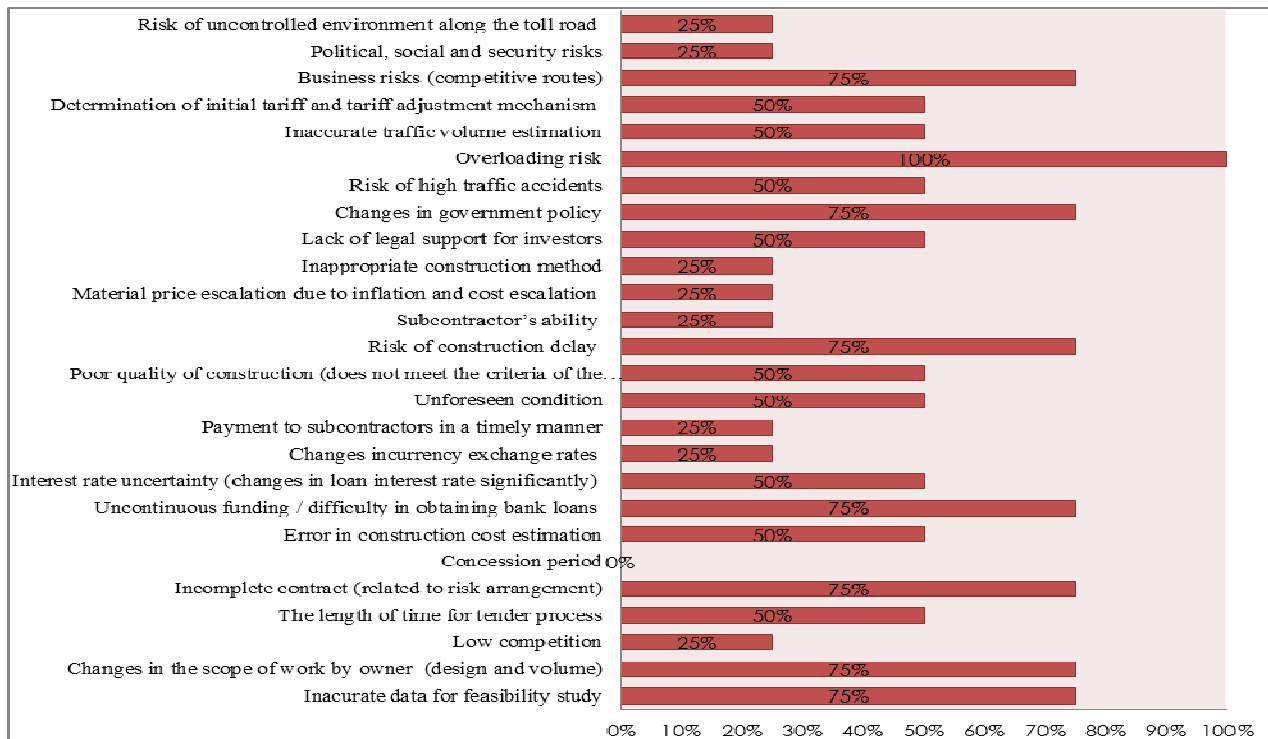


Fig. 3 Category of dominant risks based on BUJT perception

The dominant risks based on BUJT perception (Fig. 3) show that overloading risk is a major risk (100%). The other seven (7) items (75%) are also dominant risks. Business

risks (competitive routes) and inaccurate data for feasibility study have been selected as the other main risks. The reason is that these two risks could affect the occurrence of another

risk and give bad influences to the investment feasibility. Additionally, these risks are relevant in today's concession situation and often occur during the execution of toll road infrastructure projects.

These three main risks (overloading risk, business risks, and inaccurate data for a feasibility study) will be recommended to be included in HPSPJT. An examination should be first conducted to document HPSPJT, auction, bidding and PPJT documents. The purpose is to avoid overlapping risk allocations and to screen the possibility of where these three main risks could be included in the HPSPJT.

B. Risk Identification in HPSPJT Component, Tender, Bid and Contract Documents (Concession Agreement)

The second interview has been conducted to respondents from the government and investor groups to dig the fair mitigation of both two parties. The result shows that practically respondents have considered and included all HPSPJT components in the owner estimate (OE) of the investment proposal. It was conducted by adding a percentage for values of risk in OE components, but the risk details cannot be described by the respondents. The magnitude calculation of risks monetary values will also vary for each BUJT. It depends on the company's experience, type of project, and ability to manage and allocate the cost of these risks occur.

An examination of various bidding documents of BUJT shows that they generally have not included risk factors in detail yet. The reason is that including the risk costs in a bidding document can cause a higher bidding price, which can lead to a loss in the bidding process. The cost escalation and contingencies item which initially deemed cover risks do not represent one of the major risks based on the BUJT perception. An examination of the contract documents (concession agreement) also shows that the risk cost has not been accommodated in it yet. Hitherto, contract documents have only arranged risks related to law changes.

The result of the main risk examinations in the HPSPJT, tender, bidding and contract documents shows that the main risks are not calculated and included in the cost projection of toll road investment. This condition is deemed unfair when dealing with the main risks that might potentially arise in the toll road concession, consequently burdening the BUJT. The improper risk allocation between BUJT and the government becomes the main concern. It influences investors' interest to invest in Indonesia's toll road. Thus, it is highly recommended that these three main risks (based on BUJT standpoint) be included in the HPSPJT.

C. Mitigation of Main Risks

1) *Business Risks (Competitive Routes)*: This risk is greatly influenced by the government policy, and consequently it should be regulated clearly in the contract regarding responsibilities of each party. Business risk related to competitive network/routes of transportation can be proposed to be set in the contract clause which clearly details that the government would not build a competitor path before the BEP period. It should also mention the granting of subsidies or compensation (Viability Gap Funding) [15] or

other forms that could be approved by both parties as a fair risk allocation form.

2) *Overloading*: Overloading risk is assessed as the most possible risk to be recommended in the HPSPJT (can be evaluated quantitatively). The proposal has offered two possibilities:

- To include it in point (g) of the HPSPJT component, by adding in the operation cost forecast and management for toll roads.
- To include it in point (e) of the HPSPJT component, that is traffic volume projection, by adding the phrase "traffic overload". Thus, sentence (e) becomes "traffic volume projection and traffic overload".

Between two options, it would be better if the clause is included in point (g) of the HPSPJT component as the cost of overloading risk occurs during the operation and maintenance. The implementation is by inserting "overloading" in one of O and M cost items in the BUJT investment proposals.

3) *Inaccurate Data for Feasibility Study*: This risk could be recommended in the HPSPJT or be regulated in the contract. It is because this risk could be evaluated quantitatively and elaborated in the business plan calculation. The recommendation is inserting point (d) costs of technical planning and supervision in the HPSPJT. The costs calculated in point (d) are the costs incurred by the BUJT related to the feasibility study work. Another option is included in the contract (concession agreement). It can be conducted by setting out clearly in the contract clause.

TABLE III
RECOMMENDATION FOR MAIN RISKS

No.	Risks	Recommendation
1.	Business risks (competitive routes)	be regulated by contract
2.	Overloading	be included in point (g) of HPSPJT component that is costs estimation for operation and toll roads management
3.	Inaccurate data for feasibility	- be included in point (g) of HPSPJT component, that is costs of technical planning and supervision. - be regulated by contract

The risks that mentioned in Table 3 are the output of this study: the overloading risk and inaccurate data for feasibility are recommended to be calculated and included in the HPSPJT component as those risks can be quantified in the cost. The business risks (competitive routes), meanwhile, is regulated in the PPJT contract (contract agreement) as it is related to the government policy hence difficult to quantify. Although this study has not recommended business risks be added to the HPSPJT component yet, it is expected that in the near future the government could examine the possibility for these risks to be quantified and included in the HPSPJT component. This business risk (consider referred as traffic risk) will influence the toll revenue [13]. By taking action to mitigate and allocate risk should reduce the risk of project failure.

D. Recent Developments in PPP Regulations

The data were mainly collected in late 2013. The regulation effective during that period was the Presidential Regulation No.67/2005. In March 2015, a new Presidential Regulation (PR) No.38/2015 was issued. This new regulation replaced the previous Presidential Regulation No.67/2005 which was amended the last time by Presidential Regulation No.66/2013.

In conjunction with Presidential Regulation [16], there are two more regulations issued, i.e., the Ministry of National Development Planning Regulation (Permen PPN) No.4/2015 and Regulation of the Procurement Agency for Goods/Services (Perka LKPP) No.19/2015. Permen PPN No.4/2015 includes the mechanism of implementation of cooperation between government and business entities in the provision of infrastructure [17], while Perka LKPP No.19/2015 generally regulates the procedures for procurement and selection of the enterprises that will handle the cooperation between the government and the business entities of the infrastructure project [18].

In relation to risks, the old regulation only regulates the principle of risk allocation which suggests that risk is given to the party most able to control the risk [19]. Meanwhile, in the new regulation (No.38/2015), more detailed guidelines related to risks is provided. It includes the mechanism for risk control and management into the principle of cooperation between the government and enterprises. The provision of infrastructure is carried out with risk assessment, development of management strategy, and risk mitigation. Technically, risk identification, mitigation recommendations, and risk allocation are conducted on pre-feasibility study phase [16]. Furthermore, the result of the feasibility study would plausibly serve as the basis for preparing the contract/cooperation agreement.

In Permen PPN No.4/2015 also mentioned that the risk assessment should be conducted in the initial pre-feasibility study phase. That Permen describes that risk assessment/risk analysis is conducted by (1) risk identification; (2) measuring risk category/level; (3) determining risk allocation; and (4) developing risk mitigation. The risks to be examined are those of legal and market risks [17].

The states risk allocation matrix is required as one of the documents provided on the request for proposal (RFP). The procedure for procurement and selection of the business entities on PPP infrastructure projects now includes the development of risk allocation matrix, which was comprehensively described in this paper.

Thus, this study suggests the methodology and the results of estimate considering proper risk based on investors' perspective. While it was developed before the new regulations (Perpres, Permen, and Perka) were published, the methodology is highly relevant, as discussed above.

A recent interview with the head of Indonesia Toll Road Authority (BPJT) reveals that improvement efforts have been continuously conducted, i. e., the tender process have been accelerated and integrated (better planning and coordinating), and providing more varieties of PPP schemes which suited to varied project conditions. The government has also been more open to provide guarantees/support for project financing by issuing a regulation by the ministry of finance [15], [20] and taking real actions in the effective

land acquisition by providing land payback guarantee. While there are still found some lack in the implementation of PPP scheme, but generally the government has been putting more efforts in assuring better collaborations with all stakeholders. The effort such as formulated the key success factors for the infrastructure programme, for example, real coordinated improvement in bureaucracy, streamlining and improvements to the land acquisition process, etc. [21].

IV. CONCLUSION

The needs for having toll roads are essential, but many risks faced by investors become an obstacle in building toll roads. The investors also perceive that there has been less than optimal risk allocation and compensation that provide guarantees and ease to invest in Indonesia. Overall, this study has concluded that there are three main risks in the concession of Indonesian toll roads: overloading, inaccurate data for feasibility, and business risks (competitive routes). The results of mitigation for these three main risks finally become a recommendation for consideration by BPJT. They are: (i) overloading risk to be included in point (g) of HPSPJT component, "costs estimation for operation and toll roads management", (ii) inaccurate data for feasibility to be included in point (d) of HPSPJT component, "costs of technical planning and supervision, and (iii) business risks (competitive routes) to be regulated in contract clause, but not in HPSPJT due to government policies.

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