RISK VARIABLES IN COLLABORATION OF PRIVATE GOVERNMENT (PPP) FOR TOLL ROAD CONTACTS

Putu Ika Wahyuni[1,2], Wateno Oetomo[3], Sarwono Hardjomuljadi[4], Koespiadi[5]

[1,3,4,5]Department of Civil Engineering, Tarumanagara University, Jl. Letjen S. Parman No. 1, Jakarta, Indonesia
[2]Department of Civil Engineering, Warmadewa University, Jl. Terompong No. 24, Denpasar, Indonesia
ikawahyuni1971@yahoo.co.id[1]

ABSTRACT

The first toll road in Indonesia built in 1973. The construction of the toll road connecting Jakarta-Bogor operated and funded by the government through the establishment of PT. Jasa Marga. In further developments, toll road projects also supported by foreign loans and bonds issued by PT. Jasa Marga. Along with the increasing demand for toll roads, the government is looking for new funding alternatives because, during the last ten years, the growth of toll roads only reached 26.9 km per year. Improve the growth of toll roads in Indonesia, the government took an alternative to engage the private sector in toll road operations, hoping that their role could accelerate the development of toll road infrastructure to offset economic growth. The legal basis of such a toll road is Law no. 13/1980 on Roads, involving the private sector in partnership form known as Public Private Partnership (PPP).In infrastructure development by investors, the government usually plays a role in the provision of land and concession agreements, the rest of the development stage until investors fully implement the operation. If the operation causes a loss, the loss is borne by the investor until the concession period ends. Therefore, it is necessary to review the risk-based PPP model with an attractive incentive system from the government, so that investors tend to be interested in handling the implementation until the maintenance of the toll road development project. In the dissertation writing, this research is a step to determine risk variables on private government cooperation (PPP) for toll road concession in all phases of the project. The research was conducted on five toll road segments with predetermined criteria through questionnaires distribution. From the results of data collection through questionnaires with mathematical calculations and statistical analysis program assistance using SPSS software can be concluded that the risk factor model obtained to clarify the risk factors have been recognized qualitatively so far. Based on the analytical factor model, it can be completed that the dominant risk variables are as follows: Location risk includes delays and increases in costs, unrestricted land, and difficulty of site conditions. Design risks, construction test operations include the late completion of construction and increased construction costs. Operating risks include increases in O and M costs; Income risks include changes in the projected volume of demand and initial model earnings estimation errors, Network connectivity risks include network risks. Furthermore, these variables are analyzed and processed for the implementation of subsequent stage studies on PPP risk management of toll roads.

Keywords: Variable; Risk; PPP

A. INTRODUCTION

The toll road project offering of KPS system set in rule No. 38, 2004 and the 2009 Government Cooperation Regulation on Procurement and Construction of road infrastructure, including toll roads, is the responsibility of the government. But given the limited funds, the government opens investment opportunities to the private sector by granting commercial management concessions for a specified period. It acknowledged that road infrastructure could stimulate the rapid growth of the country's economy. Government through Minister of Public Works Decree no. 280/2006 proclaimed to build more than 1,600 km of new toll roads including Trans Java Toll Road project. The project is required to require the investment of around Rp 31.8 trillion. Trans Jawa toll road alone as a whole will reach 583.8 km. Since the start of 2008, the government has eased the burden of investors for land prices that exceeded initial estimates, through landscaping patterns. Now for the funding factor should be relatively not become a problem, considering the banking sector is also now more accommodating. Likewise of determining risk factors, since the enactment of Law No. 387 The year 2004 investors have the certainty of adjusting the toll rates periodically. In 2010 through the Ministry of Finance Regulation No.260 on infrastructure guarantees in government cooperation projects with business entities (PMK No.60 / 2010) mandated PT PII to develop and issue a certain reference and infrastructure risk allocation. Quoting the result of phase 1 study of writer that is about identification of risk variable at PPP of toll road need further research to find the most dominant variable applied by risk management in five toll road project in Indonesia.

B. LITERATURE STUDY

The optimal model in the PPP analysis consisting of five perspectives and 56 tests of CIS, using a series

of GFIs, such as Chi-Square Statistics, CFI, and RMSEA, all showed reliable results (Liu et al., 2017). Warranty provisions should assist and refine creditworthiness of projects of interest but may also expose the Government of Indonesia to substantial financial risks as a result of contingent liabilities arising from warranties.

The Indonesian government is strongly advised to do so with accurate cost estimates and carefully designing a warranty instrument on land-scrapping activities. The Government of Indonesia should also be aware of the magnitude of payments when providing guarantees to cover project risks even under its control such as tariff adjustment by warrants of privatization or concessions. (Wibowo, et.al)

Case studies on PPP contracts are considered project contracting organizations and classify risks that have a significant effect on project progress, the description of the current risk allocation carried out after the assessment of two project contract studies (Heravi, 2012)

The results of the results assessment of the project case indicate that using AHP fuzzy is particularly suitable for assessing PPP project risk factors. A comparison of the proposed AHP fuzzy shows that AHP fuzzy can improve the accuracy of assessment and risk reduction of the subjectivity of respondents (Li et al., 2011)

Assessment models are applied to different combinations of risk mitigation mechanisms while keeping these total costs in favor of constant verification, while project values are constant, the effect on risk reduction increases with the proportion of MDGs. These results suggest that for a given level of risk reduction required for a project, the low-cost alternatives in the project are the government's way of increasing the MDGs and reducing the number of subsidies (Brandão et al., 2013).

Change requires restoration of financial/economic equilibrium risk. Volume changes predicted in economic and financial feasibility studies for tender purposes. A significant capacity expansion, not predicted in the investment plan. Significant regulatory or statutory changes that lead to changes in conditions reflected in the initial bid and bear costs associated with unpredictable factors such as new taxes, rates, or taxes determined by the new law Laws/regulations (Marques, 2014).

In project management, project risk is a real risk that can potentially lead to losses to achieve project objectives. Project risk faced with the golden rule. The project risk management process follows systematically that consists of identifying, assessing, designing responses to be taken against risks, and then monitoring and controlling throughout the project cycle.

Suharto, 2001, Risk identification is a process of risk assessment and uncertainty that done systematically and continuously. For the risk to be managed effectively, the first step is to identify the types of risks, which are business risks and which are the pure risk. The approach used in determining these risks is by cause and effect, by analyzing what will happen and the potential consequences that will generate. Sources of uncertainty can be interpreted as factors that can cause events that are negative or positive. Figure 1 identifies the risk chart of a project.

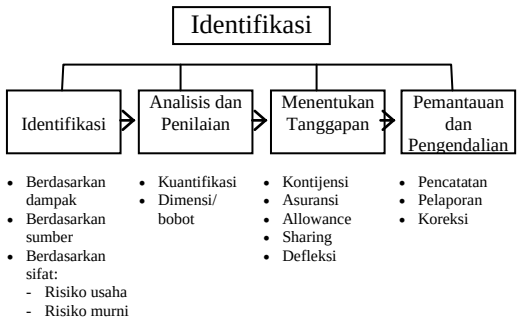


Figure 1. Risk Identification
(Sources : Author)

This Reference Guide states the definition of PPP in general as "a long-term contract between a private party and a government agency to provide a public asset or service, and under that contract, the private party bears significant risks and management responsibilities with remuneration.

Infrastructure services often have low quality or reliability, while many areas was not even serviced. Low infrastructure performance reflects the overall challenge facing governments. Moreover, the assets and services provided are often disappointing-new asset development costs more and takes longer than expected, and the facility is not qualified. Finally, infrastructure assets are usually poorly maintained, thereby increasing costs and reducing benefits.

The solutions offered by PPPs can help to overcome these overall challenges and the solutions that PPP can offer as illustrated in Figure 2: Position of Infrastructure Problems and Solutions provided by PPP. Under suitable conditions. PPP can mobilize funding resources and additional financing for infrastructure. Finally, the long-term investment perspective in PPP contracts can also help ensure

adequate maintenance so that the condition of the asset well maintained.

Figure 2. PPP Solution Structure
(Sources : Author)

In the toll road sector in Indonesia, so far KPS can be done through a scheme based on the use. PJPK in this industry is Toll Road Regulatory Agency (BPJT), Ministry of Public Works.

In the structure of the Risk Allocation Reference (IIGF) 2012 as shown in Fig. 3, this combination structure can be applied as a solution to a toll road network consisting of the built-in segment and financed from various funding sources related to different financial feasibility profiles. In this structure, the scope of work in collaboration is differentiated by segment, but the scope of the contract for the entire network. Thus the risk profiles of the parties will be very different depending on which sections of concern.

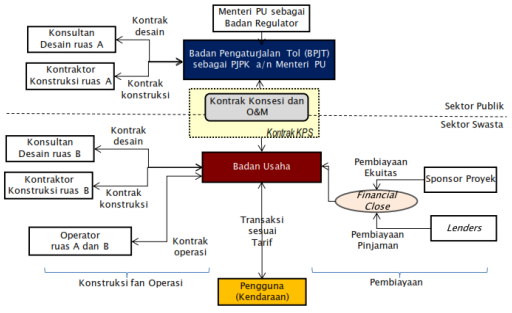
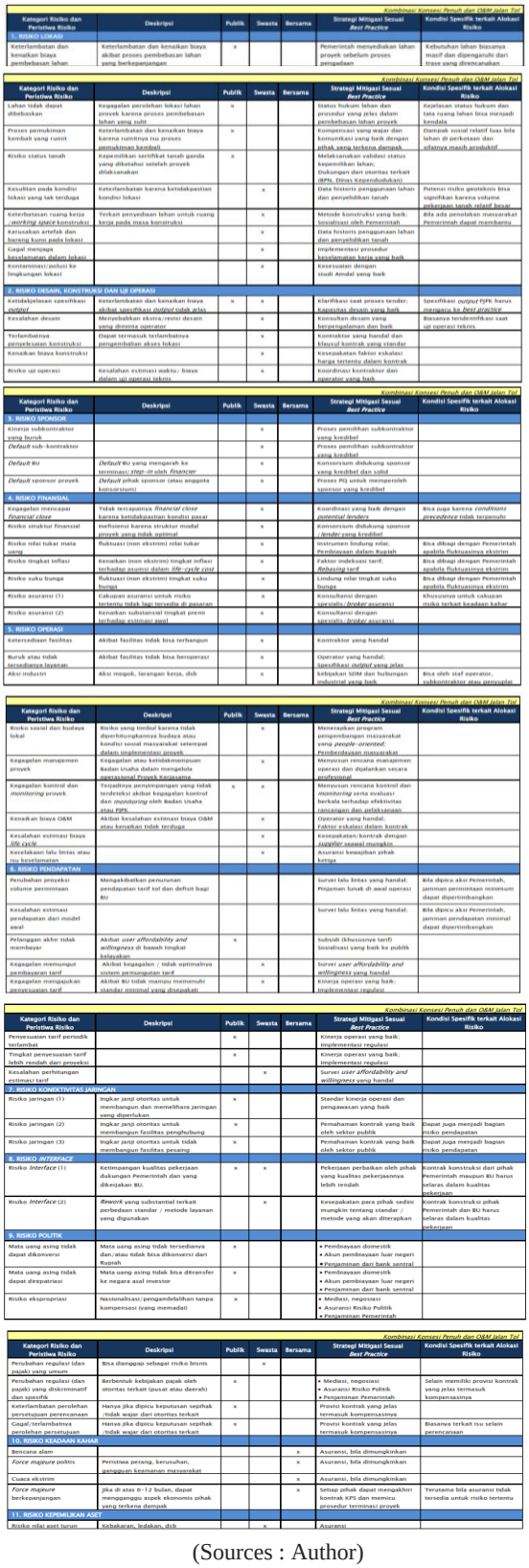


Figure 3. Risk Allocation Reference Structure
(Sources : Author)

PPP Risk Category

This risk matrix is the combination structure of Full Concession and O & M on toll road projects consisting of more than one segment. Related to the condition that the scope of work for cooperation differentiated by section, the risk allocation scheme of the parties will also be a combination of the risk matrix of both structures.

Table 1. Risk Matrix



(Sources : Author)

C. METODOLOGI

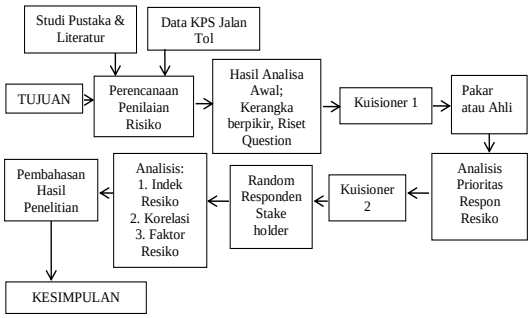


Figure 4. Flow Research
(Sources : Author)

This study was conducted based on the above framework; risk assessment planning is the result of research phase I of the dissertation is the identification of risk factors that affect the PPP toll road in Indonesia. Furthermore, to obtain the purpose of this research is the most influential risk factors then the risk assessment plan is tested by involving three experts in the field of Toll Road PPP, and 31 respondents participated in the five toll road projects with full constraint criteria O and M.

Furthermore, the analysis carried out two stages include: first done to process the results of questionnaire 1 with the analysis of risk response priority risk is done by consult and collect opinions of experts or experts about the variable response risk that has evaluated. Second, the analysis is done to process the questionnaire data 2. The analysis at this stage done by using risk index, correlation analysis and analysis factor with SPSS. To produce a variable that is very influential between one variable with another variable.

The research location conducted on five toll roads: 1) Bali Mandara Toll Road 12.7 km long and connecting three important points, ie, Ngurah Rai Tuban, Benoa and Nusa Dua. The purpose of this road is to unravel congestion in south Bali, 2) Tangerang-Merak toll road along 74.25 km, 3) Waru-Juanda toll road along 12 km, 4) Surabaya-Mojokerto toll road along 36.3 km, and 5) Semarang-Solo Toll Road in Central Java province. This toll road was constructed in 2009 by Jasa Marga with a total of 72.64 km of tracks as part of the Trans Java Toll Road connecting the Semarang toll road with Solo-Ngawi Toll Road has also started construction.

D. RESULTS AND DISCUSSION

1. Research Approach

From the results of the Phase 1 research, PT Infrastructure Guarantor (PII) issued a reasonable risk allocation and able to be managed later by the toll road PPP investor, can be implemented as a risk reference to look for the dominant risks in toll road PPP projects.

2. Risk Index

The risks in this first questionnaire, having the overall result of the average value of the risk variable on the toll road PPP performance can be seen in Table 2. The results than in the rank of the most significant amount of the smallest value as seen in Table 3, a risk that significantly affects the performance of road PPP.

Table 2 Results Overall Mean

Nomor	Butir	Total	Jml	Mean
1	X1	293	31	9,45
2	X2	280	31	9,03
3	X3	132	31	4,26
4	X4	279	31	9,00
5	X5	141	31	4,55
6	X6	130	31	4,19
7	X7	137	31	4,42
8	X8	150	31	4,84
9	X9	160	31	5,16
10	X10	338	31	10,90
11	X11	277	31	8,94
12	X12	187	31	6,03
13	X13	157	31	5,06
14	X14	161	31	5,19
15	X15	144	31	4,65
16	X16	159	31	5,13
17	X17	158	31	5,10
18	X18	169	31	5,45
19	X19	154	31	4,97
20	X20	158	31	5,10
21	X21	128	31	4,13
22	X22	126	31	4,06
23	X23	141	31	4,55
24	X24	226	31	7,29
25	X25	235	31	7,58
26	X26	134	31	4,32
27	X27	324	31	10,45
28	X28	262	31	8,45
29	X29	270	31	8,71
30	X30	336	31	10,84
31	X31	335	31	10,81
32	X32	145	31	4,68
33	X33	160	31	5,16
34	X34	153	31	4,94
35	X35	144	31	4,65
36	X36	144	31	4,65
37	X37	269	31	8,68
38	X38	323	31	10,42
39	X39	228	31	7,35
40	X40	244	31	7,87
41	X41	153	31	4,94
42	X42	148	31	4,77
43	X43	147	31	4,74
44	X44	133	31	4,29
45	X45	151	31	4,87
46	X46	145	31	4,68
47	X47	154	31	4,97
48	X48	161	31	5,19
49	X49	139	31	4,48
50	X50	145	31	4,68
51	X51	149	31	4,81
52	X52	151	31	4,87

Nomor	Butir	Total	Jml	Mean
53	X53	147	31	4,74
54	X54	155	31	5,00
	Jumlah	10169,0	1674,0	328,0
	Mean	188,3	31,0	6,07
		Risiko tinggi/medium		
		Risiko rendah		
		9 item tertinggi resiko		

(Sources : Author)

After generating the mean from the calculation of the risk index in the first questionnaire, the grouping will be done as follows:

High Risk and Medium Risk
The result whose value is more or equal to the average value (6.07).

Low Risk
is a value less than the average value (6.07). After getting the average value of each variable then done the ranking of variables as shown in table 3 below:

Table 3 High Risk and Low-Risk Variables

Nomor	Butir	Total	Jml	Mean
1	X1	293	31	9,45
2	X2	280	31	9,03
4	X4	279	31	9,00
10	X10	338	31	10,90
11	X11	277	31	8,94
27	X27	324	31	10,45
30	X30	336	31	10,84
31	X31	335	31	10,81
38	X38	323	31	10,42
29	X29	270	31	8,71
37	X37	269	31	8,68
28	X28	262	31	8,45
40	X40	244	31	7,87
25	X25	235	31	7,58
39	X39	228	31	7,35
24	X24	226	31	7,29
12	X12	187	31	6,03
18	X18	169	31	5,45
14	X14	161	31	5,19
48	X48	161	31	5,19
9	X9	160	31	5,16
33	X33	160	31	5,16
16	X16	159	31	5,13
17	X17	158	31	5,10
20	X20	158	31	5,10
13	X13	157	31	5,06
54	X54	155	31	5,00
19	X19	154	31	4,97
47	X47	154	31	4,97
34	X34	153	31	4,94
41	X41	153	31	4,94
45	X45	151	31	4,87
52	X52	151	31	4,87
8	X8	150	31	4,84
51	X51	149	31	4,81
42	X42	148	31	4,77
43	X43	147	31	4,74
53	X53	147	31	4,74
32	X32	145	31	4,68
46	X46	145	31	4,68
50	X50	145	31	4,68
15	X15	144	31	4,65
35	X35	144	31	4,65
36	X36	144	31	4,65
5	X5	141	31	4,55
23	X23	141	31	4,55
49	X49	139	31	4,48
7	X7	137	31	4,42
26	X26	134	31	4,32
44	X44	133	31	4,29
3	X3	132	31	4,26
6	X6	130	31	4,19
21	X21	128	31	4,13
22	X22	126	31	4,06
Jumlah		10169,0	1674,0	323,97
Mean		189,5	31,0	6,07

	Risiko tinggi/medium
	Risiko rendah

(Sources : Author)

The result of the above average rankings, it can be seen that high risk and medium risk variables are refracted to be factors affecting the performance of the toll road PPP Project can be seen in table 4.
Based on the result of the above average ranking. It can know that high risk and medium risk variables can be known that high risk and medium risk variables can be referenced to be factors influencing the performance of PPP toll road project can be seen in Table 4 below (calculation can be seen all in the attachment):

Table 4. Ranking of Risk-Based Ratio variables

Nomor	Variabel	Risiko / dampak	Mean
30	X30	Perubahan proyeksi volume permintaan	10,84
31	X31	Kesalahan estimasi pendapatan model awal	10,81
27	X27	Kenaikan biaya O&M	10,45
38	X38	Resiko jaringan (1)	10,42
1	X1	Keterlambatan & kenaikan Biaya	9,45
2	X2	Lahan tidak dapat dibebaskan	9,03
4	X4	Kesulitan kondisi lokasi	9,00
10	X10	Terlambatnya penyelesaian konstruksi	10,90
11	X11	Kenaikan biaya konstruksi	8,94

(Sources : Author)

1. Statistical analysis

To get the relationship of one variable with other variables then used search correlation matrix value as below.

Correlational and Inter-Correlation Analysis

The correlation in this research was conducted to measure the strength of the relationship between the independent variables of time performance with other risk factor free variables of toll road PPP project. Correlation analysis were done by person correlation method (Product Moment Correlation), can be seen in Table 5.

Table 5. Correlation Person r between Risk-free variables Against the performance of toll road PPP projects

Nomor	Variabel	Risiko / dampak	Mean
1	X1	Keterlambatan & kenaikan Biaya	9,45
2	X2	Lahan tidak dapat dibebaskan	9,03
4	X4	Kesulitan kondisi lokasi	9,00
10	X10	Terlambatnya penyelesaian konstruksi	10,90
11	X11	Kenaikan biaya konstruksi	8,94
27	X27	Kenaikan biaya O&M	10,45
30	X30	Perubahan proyeksi volume permintaan	10,84
31	X31	Kesalahan estimasi pendapatan model awal	10,81
38	X38	Resiko jaringan (1)	10,42

Intercorrelation analysis is done to find out the correlation between the independent variables of the independent variables to the other independent variables. In Table 6 below, there is an intercorrelation relationship between independent variables.

Table 6. Intercorrelation relationships Among the risk variables Free

Correlations

		X1	X2	X4	X10	X11	X27	X30	X31	X38
Pearson Correlation	X1	1	-,184	-,404*	,139	-,121	,147	,270	-,149	-,171
	X2	-,184	1	-,051	,098	,271	,089	,217	,047	-,207
	X4	-,404*	-,051	1	,074	-,142	-,098	,066	,031	,077
	X10	,139	,098	,074	1	,092	-,023	,643**	-,319	,080
	X11	-,121	,271	-,142	,092	1	-,019	,020	-,011	,117
	X27	,147	,089	-,098	-,023	-,019	1	,171	,083	-,131
	X30	,270	,217	,066	,643**	,020	,171	1	-,306	-,093
	X31	-,149	,047	,031	-,319	-,011	,083	-,306	1	,015
	X38	-,171	-,207	,077	,080	,117	-,131	-,093	,015	1
Sig. (2-tailed)	X1		,322	,024	,456	,516	,429	,142	,423	,358
	X2	,322		,786	,599	,140	,635	,240	,802	,264
	X4	,024	,786		,693	,447	,599	,723	,869	,679
	X10	,456	,599	,693		,624	,901	,000	,081	,667
	X11	,516	,140	,447	,624		,919	,915	,955	,531
	X27	,429	,635	,599	,901	,919		,356	,659	,484
	X30	,142	,240	,723	,000	,915	,356		,094	,619
	X31	,423	,802	,869	,081	,955	,659	,094		,934
	X38	,358	,264	,679	,667	,531	,484	,619	,934	

Determinant = 0,408

(Sources : Author)

2. Factor Analysis

To simplify the number of independent variables that have a value of r > 0.2 on the performance of toll road PPP project. Then factor analysis using Principal Component Analysis method and Rotated Varimax with Kaiser criteria is to take component having eigenvalue > 1. due to various limitations that meet the criteria of stars) then no factor analysis as shown in table 7.

Table 7 Rotated Component Matrix

	Component			
	1	2	3	4
X10	,859			
X30	,848			
X31	,618			
X4		,868		
X1		,740		
X11			,821	
X2			,726	
X38				,750
X27				,616

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 4 iterations.

(Sources : Author)

3. Determinant Variable Analysis

To determine the determinant variables to be selected, the process of the mean risk index that has were done by manual calculation (not using software or program), so it has a combination of the optimal determinant variables on the performance of time can be seen in table 8.

Table 8. Percentage of Dominant Risk Variables

	Persen variabel Risiko			
	Component % Pengelompokan			
	1	2	3	4
X10	85,9%			
X30	84,8%			
X31	61,8%			
X4		86,8%		
X1		74,0%		
X11			82,1%	
X2			72,6%	
X38				75,0%
X27				61,6%

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 4 iterations.

(Sources : Author)

4. Results Analysis

Of the 54 risk factor variables reduced to four dominant risk factor variables affecting the performance of toll road PPP projects as shown in Table 9:

Table 9. Results of data processing

Nomor	Variabel	Risiko / dampak	Mean
		Risiko lokasi	
1	X1	Keterlambatan & kenaikan Biaya	9,45
2	X2	Lahan tidak dapat dibebaskan	9,03
4	X4	Kesulitan kondisi lokasi	9,00
		Risiko Desain, Konstruksi Uji Operasi	
10	X10	Terlambatnya penyelesaian konstruksi	10,90
11	X11	Kenaikan biaya konstruksi	8,94
		Risiko Operasi	
26	X26	Kenaikan biaya)&M	10,45
		Risiko Pendapatan	
29	X29	Perubahan proyeksi volume permintaan	10,84
30	X30	Kesalahan estimasi pendapatan model awal	10,81
		Risiko Konektivitas jaringan	
37	X37	Resiko jaringan (1)	10,42

(Sources : Author)

E. CONCLUSION AND SUGGESTIONS

1. Conclusion

The highway freeway builders always invite great uncertainty as well as the characteristics of an infrastructure project in general. Uncertainty is still a source of risk that if not appropriately calculated can pose a damaging risk, if not managed by can reduce the performance of toll road PPP. From the results of data processing obtained the result that the variables that affect the risk are;

a. Location risks in the implementation of this study include delays and increases in costs, unrestricted land, and difficulty in site conditions.
b. Design risks, construction test operations include the late completion of construction and increased construction costs.
c. The income risks in this study include changes in the projected volume of demand and the error of initial model earnings estimates.
d. The risk of network connectivity in this research is network risk (1).

2. Suggestions

Further studies need to be impacted by the dominant risk on the performance of the toll road PPP project until the concession period ends. Therefore, it is necessary to investigate the innovation of programs to make the model to improve the PPP performance of toll road with apparent size of the project concession period such as IRR and FIRR.

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