SUPPORTED BUILD OPERATE TRANSFER EFFECTIVENESS ANALYSIS TO IMPROVE FINANCIAL FEASIBILITY OF TOLL ROADS IN INDONESIA

Rizal Z. Tamin
Construction Engineering &
Management Research Group
FCEE, ITB
Jln. Ganesha No. 10
Bandung 40132
rztamin@gmail.com

Iris Mahani
Civil Engineering Graduate Program
FCEE, ITB
Jln. Ganesha No. 10
Bandung 40132
irismahani1970@gmail.com

Puti F. Marzuki
Construction Engineering &
Management Research Group
FCEE, ITB
Jln. Ganesha No. 10
Bandung 40132
puti@si.itb.ac.id

Abstract

This paper is aimed to analyze Supported Build Operate Transfer as an alternative toll road development financing scheme in the Public Private Partnership framework. Support alternatives analyzed include construction grant, operation grant, tax holiday, and soft loan. The adopted approach consists of classifying groups of non-financially feasible toll roads based on the main causes, analyzing effective support alternative for each group, and performing sensitivity analysis to measure the relationship between the condition of financial infeasibility and the extent of the needed support. Analysis results show that the most effective support is construction grant (investment cost) and operation grant (revenue improvement) while supports in form of tax reduction or decrease of discount rate are very marginal. The analysis also indicate that Supported Build Operate Transfer is effective to be granted to toll roads that need relatively high investment cost but have low revenue. Meanwhile, for toll roads that need high investment cost and have high revenue, it is not suggested to apply Supported Build Operate Transfer. For toll roads with low investment cost and low revenue, the government has to get involved by applying Availability Based Payment scheme as in this case, besides support at initial phase, support during operation phase would also be needed.

Keywords: toll road, Public Private Partnership, Supported Build Operate Transfer, Availability Based Payment

Abstrak

Makalah ini bertujuan untuk menganalisis *Supported Build Operate Transfer* sebagai alternatif skema pembiayaan pembangunan jalan tol dalam kerangka Kerjasama Pemerintah dan Badan Usaha. Dukungan alternatif yang dianalisis meliputi hibah konstruksi, hibah operasi, *tax holiday*, dan *soft loan*. Pendekatan yang diadopsi terdiri atas penggolongan kelompok jalan tol yang tidak layak secara finansial berdasarkan penyebab utamanya, menganalisis alternatif dukungan yang efektif untuk masing-masing kelompok, dan melakukan analisis sensitivitas untuk mengukur hubungan antara kondisi ketidakseimbangan keuangan dan tingkat dukungan yang dibutuhkan. Hasil analisis menunjukkan bahwa dukungan yang paling efektif adalah hibah konstruksi (*investment cost*) dan hibah operasi (*revenue improvement*) sementara dukungan dalam bentuk pengurangan pajak atau penurunan tingkat diskonto sangat marjinal. Analisis juga menunjukkan bahwa *Supported Build Operate Transfer* efektif untuk diberikan pada jalan tol yang membutuhkan biaya investasi yang relatif tinggi namun memiliki pendapatan rendah. Sedangkan untuk jalan tol yang membutuhkan biaya investasi tinggi dan memiliki pendapatan tinggi, tidak disarankan untuk menerapkan *Supported Build Operate Transfer*. Untuk jalan tol dengan biaya investasi rendah dan pendapatan rendah, pemerintah harus terlibat dengan menerapkan skema *Available Based Payment*, seperti pada kasus ini, selain dukungan pada tahap awal, dukungan selama tahap operasi juga akan dibutuhkan.

Kata-kata kunci: jalan tol, Kerjasama Pemerintah dan Badan Usaha, *Supported Build Operate Transfer*, *Availability Based Payment*

INTRODUCTION

The new Jokowi-Jusuf Kalla government (2014-2019) is promoting infrastructure development as national economic push. This development covers various public infrastructure, among which 1,000 km toll roads. Overall, a budget of IDR 5,519.4 trillion is needed. Only half of the amount will be financed through government budget. A Public Private Partnership (PPP) scheme is an alternative financing form being considered (Dardak, 2016).

From 1978 to 2015 Indonesia has built 949 km of toll roads. The growth is not as good as planned. Some of the many reasons that make the growth of toll roads in Indonesia slow are the high risk of toll road investment in Indonesia, the low rate of return of some toll roads, and the difficulties of long term financing sources (Kirmanto, 2014).

Basically, there are 3 (three) categories of PPP, i.e. pure Build Operate Transfer (BOT) for those which are financially feasible, Supported Build Operate Transfer (SBOT) for those which financial feasibility is marginal, and Availability Based Payment (ABP) for those which are not financially feasible. Financial feasibility is normally based on Internal Rate of Return (IRR) value, which for Indonesia’s condition, considering experiences of toll road development during the last ten years, is around 3.58% above the prevailing investment discount rate (Mahani, 2016).

Among the 60 (sixty) PPP toll road projects that are in preparation during the last ten years, only 59% are financially feasible. The private sector would not be interested to invest if a project is not financially feasible. In this case, the government needs to provide a Viability Gap Funding (VGF). A VGF can have different forms, including capital grant, subordinated loans, operation and maintenance (O&M) support grants or interest subsidy. A mix of capital and revenue support may also be considered (Deulkar and Shaikh, 2013).

This research is focused on financially less feasible toll roads that still need support. Support alternatives analyzed include construction grant, operation grant, tax holiday, and soft loan. The adopted approach consists of classifying groups of non-financially feasible toll roads based on the main causes, analyzing effective support alternative for each group, and performing sensitivity analysis to measure the relationship between the condition of financial infeasibility and the extent of needed support.

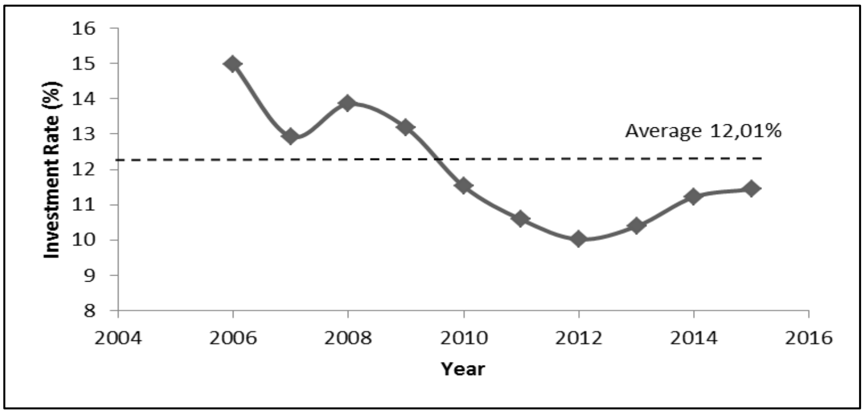
MATERIAL AND METHODS

The research is conducted with a quantitative approach through case studies of financially non-viable toll roads. These cases’ plan are studied based on the needs of investment, and their revenue is analyzed based on the tariff plan and prediction of traffic volume in the first year. The cases vary from those with high investment and high revenue, high revenue and low investment, to those with low investment and low revenue. For each condition, two cases are studied, except for high investment costs and high revenue condition where only one case is studied. There are then a total of five cases reviewed in this research. For each case, the effect of provided support, that includes construction costs, revenue, maintenance costs, tax reduction and reduction of interest rates, on the increase of Internal Rate of Return (IRR) and Net Present Value (NPV) is studied. Support effectiveness is determined by evaluating the increase of the average IRR and NPV: a higher increase in IRR and NPV indicates better effectiveness of the support to improve financial feasibility. Then, to determine the potential area of SBOT, the most effective support to fulfil the needs of each case is identified. SBOT is deemed practicable for cases where the required support is less than 50% (Ministry of Finance Regulation 223/2012). The case studies' data are presented in Table 1.

Table 1 Data of Case Studies

Information	High Cost High Revenue	High Cost Low Revenue		Low Cost Low Revenue	
	Case 1	Case 2	Case 3	Case 4	Case 5
Location	Java	Non Java	Java	Java	Non Java
Zona	Urban	Rural	Rural	Rural	Rural
Length (km)	27,2	22	60,7	12	69,92
Investment Cost (M Rp/km)	235	98,05	149,37	58,5	88
Year of Study	2009	2004	2015	2004	2007
Construction Planning	2011-2017	2005-2006	2016-2019	2007-2008	2008-2011
Operation Planning	2015	2007	2020	2009	2011
Traffic Volume (vehicle/day)	45000	13180	23780	5068	6286
Tarif Group I (IDR/km)	750	600	1000	250	500
Concession (year)	30	30	35	30	40

For discount rate, the Minimum Attractive Rate of Return (MARR) is used, based on empirical research of toll road concession agreements from 2006 to 2015. The discount rate is equal to investment interest rate plus 3.58%. Interest rate of investment is based on the average value of 2006-2015 or 12.01% (Figure 1). The MARR adopted is then 15.59%.



Source: BPS (2016)

Figure 1 Indonesia Investment Rate (2006-2015)

MARR represents an appropriate minimum rate of return of an investment. It is also called hurdle rate, cut-off rate, benchmark rate, and minimum acceptable rate (Blank et al., 2009). Degarmo in 2006 defines MARR as a minimum investment rate of return to be attractive, i.e. the lower limit of financial feasibility of a project. Wibowo, in 2011 denotes that MARR signifies opportunity cost (minimum capital return) offered by an investment project having equivalent risk profile. MARR is specific for every type of project, it also shows the attractiveness of investment in a country. It reflects the competitiveness of related infrastructure business in the country which for BOT Toll Roads depend on the following parameters: effectiveness of financial condition (interest rate -r), Benefit (traffic & tariff), Cost (Investment, Land acquisition), O & M, and Risk.

The MARR of toll roads PPP in Indonesia is relatively high i.e. 15.9%. It is not only due to economic inefficiency reflected by a high risk free/central bank interest rate, but also due to the high risk of toll roads investment and high expected benefit of investors. Figure 2 shows comparison of toll roads project discount rates of several countries. As developed countries, United State of America and South Korea have relatively low risk free rate. Although the risks of toll roads PPP are normally well managed, business environment in both countries would like to gain adequate benefits. The condition is quite different in China, where it is known that almost all of business risks are borne by the government and almost all of its investors are state-owned companies that do not expect to obtain high profit. This would probably explain why China has a very rapid development of toll roads.

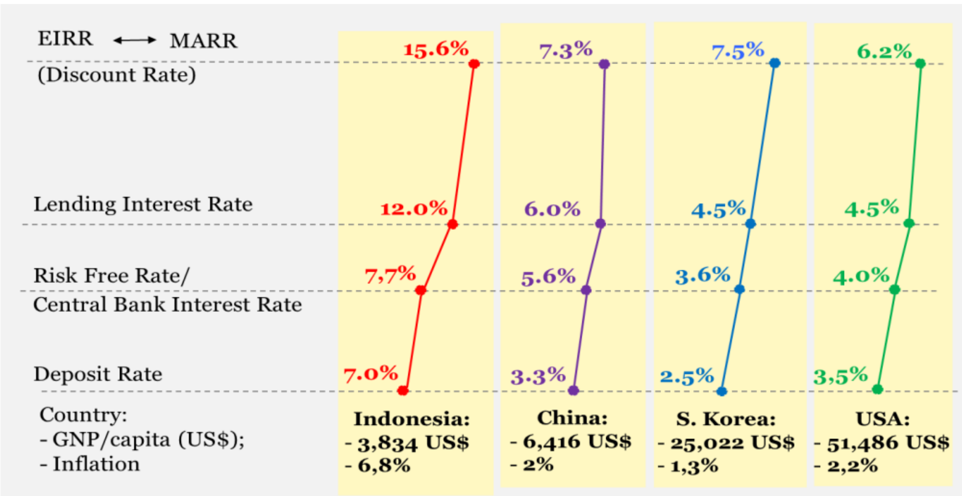


Figure 2 Toll Roads Project Discount Rates of Several Countries-2014

The challenges of toll road project feasibility in Indonesia include the following aspects:

1) Definition of toll road: Toll roads are not firmly defined as alternative roads. Therefor toll roads in Indonesia can't be totally considered as private goods. Toll roads' tariff adjustment (i.e. every 2 years) should consider social impact and needs to involve consultation with legislative body.

2) Land acquisition & investment cost: The regulation stipulates that land should be determined by governor decision before investment tender. Actually, it could not be fully adopted. Land acquisition is still very complicated, costly, and risky. Moreover, toll roads need high investment cost (see Fig. 3). The projects involve very limited players with low Design Build capacity.
3) Uncertainty of operation and maintenance cost: 52% of trucks in toll roads' are 45% overloaded. Operation and maintenance cost can't be well predicted and involve very high risk.
4) Uncertainty of traffic volume: This is caused by weak Pre-Feasibility Study and Feasibility Study. Moreover toll roads are mostly developed without appropriate planning system that includes spatial planning, transportation system planning, and road network master planning.
5) Tariff is determined based on users' willingness to pay, VoC saving, and investment return. In Indonesia, the tariff is relatively low (see Fig. 3), as it used to be limited to 70% of VoC saving (Gov. Reg. No. 8, 1990 on Toll Road).

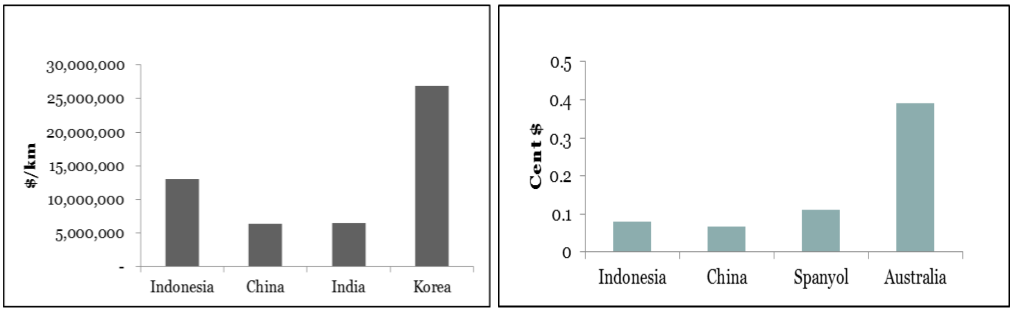


Figure 3 Toll Roads Investment Cost ($/km) & Toll Tariff (Cent $/km)-2014

The determination of each support's effectiveness is based on the average increase in the IRR or NPV due to the provision of support of 0%, 10%, 20%, 30%, 40% and 50%. IRR is the rate of return or interest rate at NPV = 0. The IRR of the project should be bigger than MARR.

$$\mathrm{IRR} = i_1 + (i_2 - i_1)\frac{\mathrm{NPV}_1}{\mathrm{NPV}_1 - \mathrm{NPV}_2} \tag{1}$$

with:

i_1 = interest rate 1
i_2 = interest rate 2
NPV_1 = Net present value related to interest rate 1
NPV_2 = Net present value related to interest rate 2

NPV is the difference between the present value of benefit and the present value of cost (Husnan and Pudjiastuti 2006). A project is deemed financially feasible if its NPV value is positive. NPV can be determined by the following equation.

$$\text{NPV} = \sum_{i=0}^{n-1}\left((\text{bi} - \text{ci})\left(1 + \frac{r}{100}\right)^{i}\right)^{-1} \qquad (2)$$

with:

NPV = Net present value

Bi = Benefit

Ci = Cost

r = Discount rate

n = Life time

RESULTS

The following figures depict the results of each case study’s analysis, i.e. Figure 4 for high cost and high revenue case, Figure 5 and Figure 6 for high cost and low revenue case, Figure 7 and Figure 8 for low cost and low revenue case.

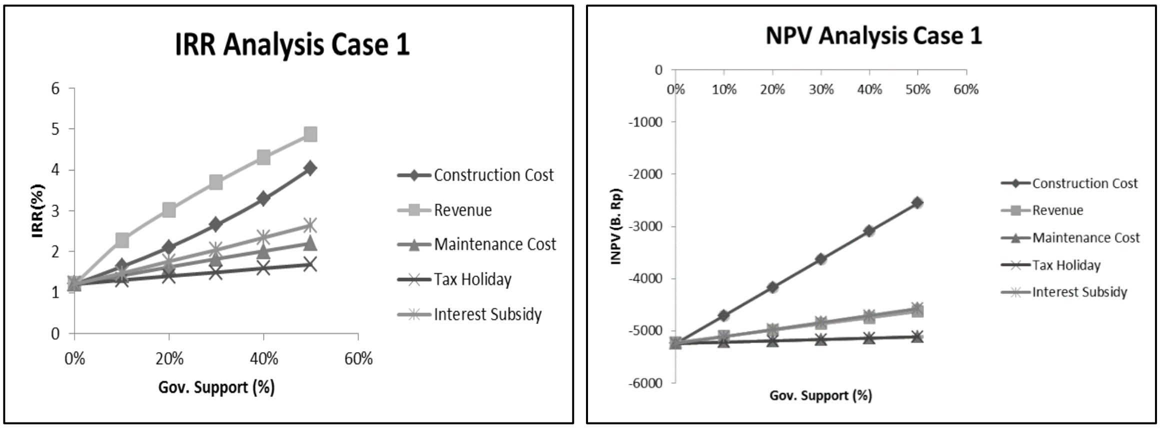


Figure 4 Analysis Result of Case 1 (High Cost High Revenue)

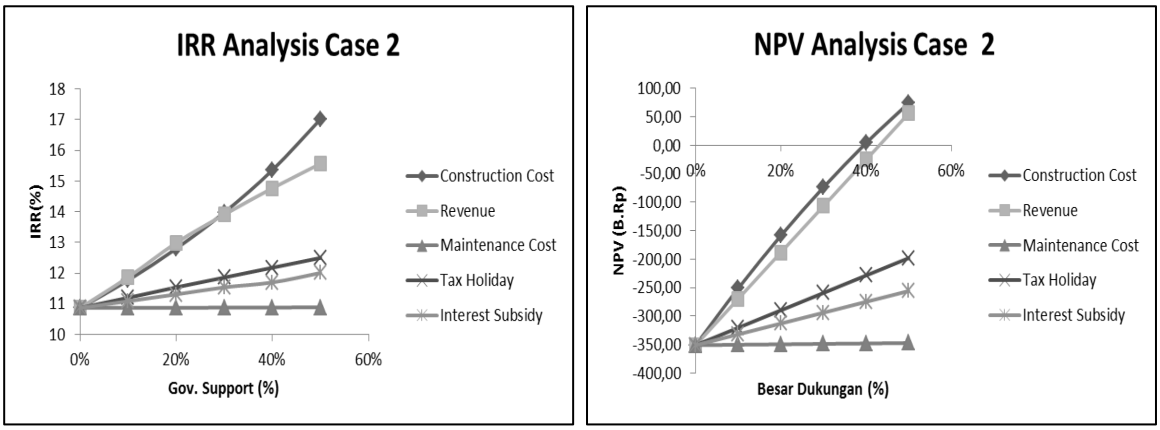


Figure 5 Analysis Result of Case 2 (High Cost Low Revenue)

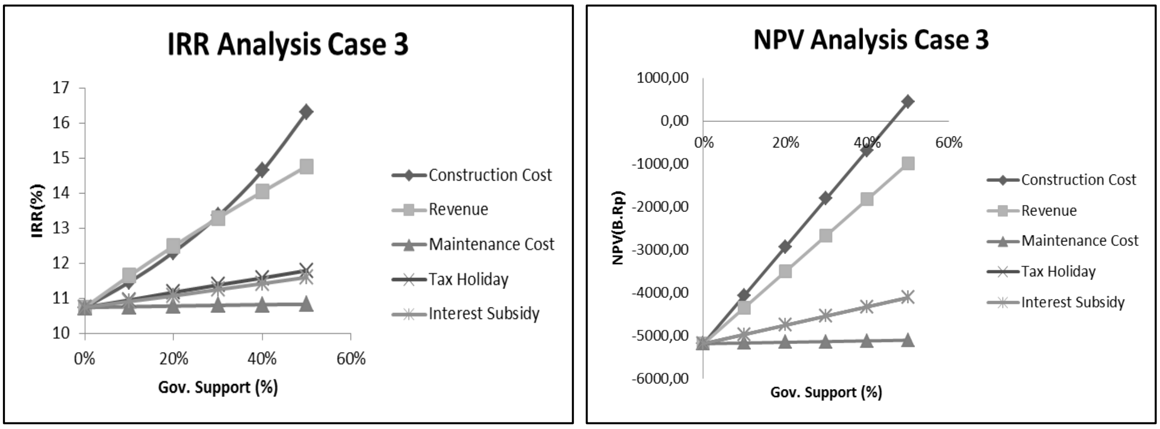


Figure 6 Analysis Result of Case 3 (High Cost Low Revenue)

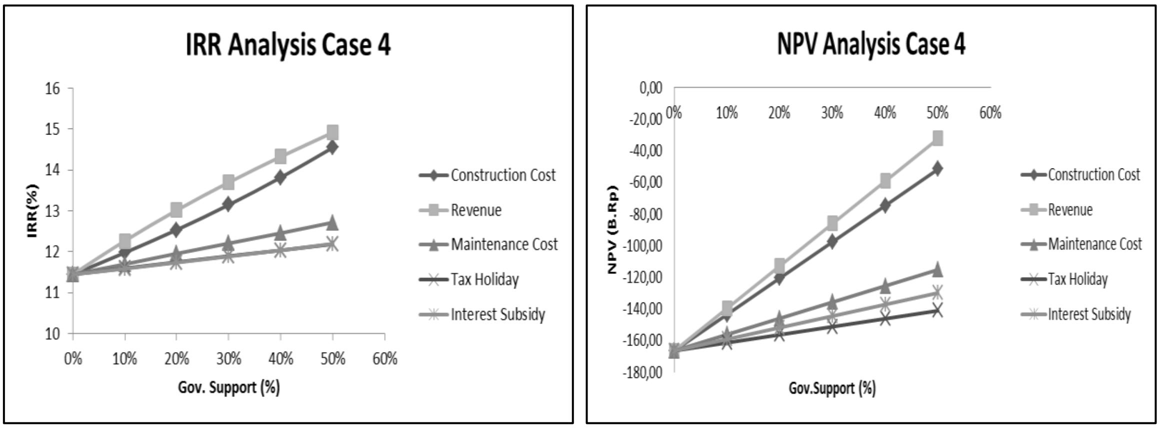


Figure 7 Analysis Result of Case 4 (Low Cost Low Revenue)

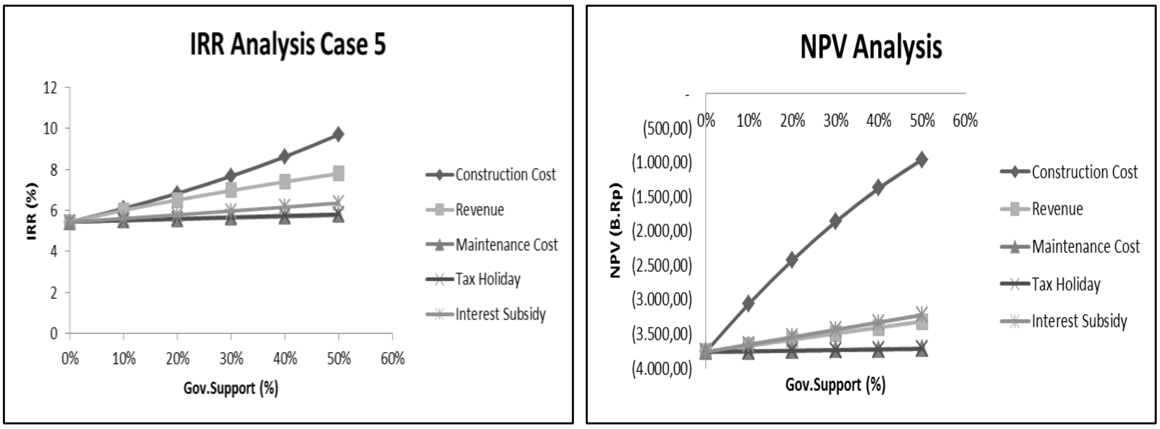


Figure 8 Analysis Result of Case 5 (Low Cost Low Revenue)

Based on the results of the analysis, the effectiveness of each support can be shown. Effectiveness evaluation is based on the average IRR increase for each incremental support of 10%. Lastly, two of the most effective support in increasing financial feasibility is determined. The results are presented in Table 2.

Table 2 Effectiveness of Supports (Average of $\Delta_{IRR}/10\%_{Support}$)

Information	Case 1	Case 2	Case 3	Case 4	Case 5
IRR without government support (%)	1,21	10,84	10,75	11,45	5,44
Effectiveness of construction grant/construction cost support (%)	0,566	1,23	1,14	0,62	0,854
Effectiveness of operation grant/construction support (%)	0,732	0,94	0,806	0,694	0,472
Effectiveness of maintenance cost support (%)	0,2	0,004	0,018	0,254	0,066
Effectiveness of tax reduction (%)	0,096	0,326	0,21	0,148	0,076
Effectiveness of interest rate reduction (%)	0,288	0,288	0,172	0,15	0,186
Construction grant needed (%)	97,48	39,5	46	72,5	89,5
Operation grant needed (%)	537	43	61,5	62	520

Table 2 shows that the most effective support is construction grant (investment cost) and operation grant (revenue improvement) while supports in form of tax reduction, maintenance cost and interest subsidy has only a slight effect on IRR.

The results also show that support needs of cases 1, 4, and 5 are more than 50% of investment cost and only cases 2 and 3 that need an investment support of less than 50%. This indicates that SBOT is effective to be granted to toll roads that need relatively high investment cost but have low revenue. Meanwhile, for toll roads that need high investment cost and have high revenue, which for Indonesia's case mostly are urban toll roads, it is not suggested to apply SBOT and it is better to shift into other mass transportation modes as in this case, toll roads' function would only be as traffic jam problem solver. For toll roads with low investment cost and low revenue, a support of more than 50% is also needed. In this case, the government has to get involved by applying Availability Based Payment (ABP) scheme as, besides support at initial phase, support during operation phase (revenue support) would also be needed because traffic growth is still low. The detailed quadrant of investment schemes are presented in Figure 9.

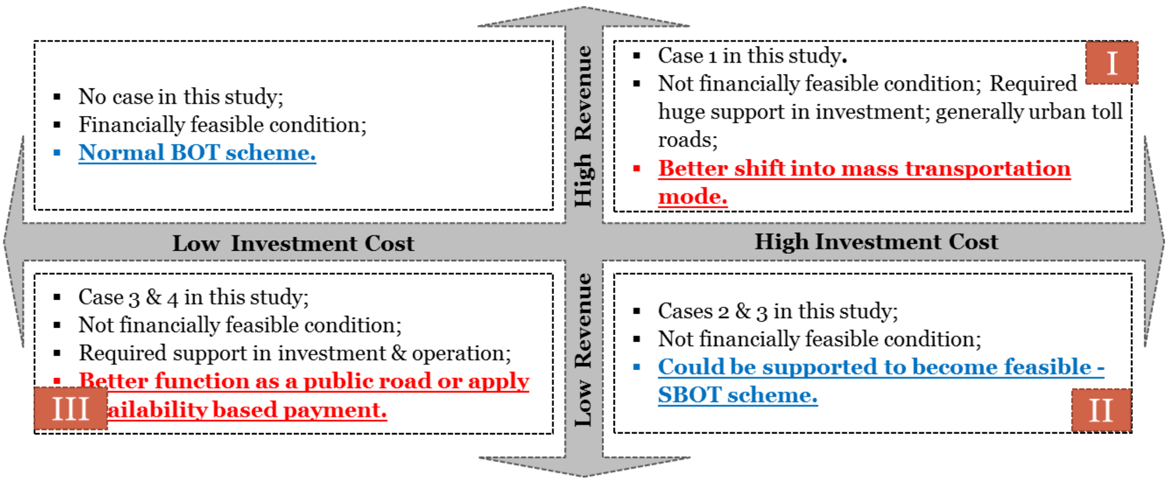


Figure 9 Quadrant of Toll Road Investment Schemes

A 50% construction grant limit is deemed rather high. Table 3 shows best practices of construction grant amounts in several countries with a limit of 25-30%. This is understandable as it is not sufficiently reasonable to use public money to support private business. In Indonesia, if the construction grant is too high (50%), the government would probably face difficulties to obtain approval from the legislative body.

Table 3 Best Practices-Maximum Amount of Construction Grant in Several Countries

Indonesia	Other Countries
1. Construction grant would not dominate the investment cost (should be less than 50%). 2. Cases of portion of toll road constructed by government: a. Solo-Ngawi: 30.1%. b. Ngawi Kertosono: 43.1%. c. Cileunyi-Sumedang-Dawuan: 47.2%. 3. Potential difficulty to have legislative body approval.	1. Government of India 20% (40% only if local governments participate). 2. Republic of South Korea 25-30%. 3. Government of Bangladesh 30%.

CONCLUSION

The conclusion of this study is as follows:

1) The most effective supports for toll road investment in Indonesia are construction and operation costs grant.
2) SBOT is effective to be granted to toll roads that need relatively high investment cost but have low revenue.

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