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# DEVELOPING A TOLL ROAD FINANCING MODEL WITH A HYBRID OF DEEP DISCOUNT PROJECT BONDS AND LAND LEASES IN INDONESIA

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## ABSTRACT

*There are three main problems with the existing toll road financing model in Indonesia. First, there are limitations, and the fund disbursements take a rather long time in the state budget fund allocations for land acquisition. Second, there is inability to have long-term financing. Third, there are banking limitations in the borrowing tenor period. Therefore, it is significant to develop a new financial model that can be implemented in developing toll roads in Indonesia. There are seven financing models that have been identified as being successfully implemented and effective in the world. To determine which model is most effective to be implemented in Indonesia, a literature study and in-depth interviews need to be conducted. These paper results revealed two appropriate financing models that can be implemented, which are the deep discount bonds, and the land lease financing model. Next, to obtain the critical success factor (CSF) of this hybrid of models, this paper uses a Delphi method. The three top ratings above for the hybrid CSF model are land status that is leased “clear and clean”, fair risk allocations and risk divisions, government involvement in guaranteeing risks that become the responsibility of the government. The next step is to build a deep discount project bond and land lease hybrid financing model, as well as develop an institution and hybrid model policy. For the hybrid financing model institution, it creates optimization of land lease, and a sustainable financial system for a toll road investing, secures physical state land, administration and legally, and improves the management, added value, financial system, and investments that are conducive for public-private partnership (PPP). The policy needed in order that this hybrid financing model can be applied is suggested in a government regulation or law about the DDPB and land lease hybrid financing model.*

**Key words:** Financing model, Deep discount project bonds, Land lease, Toll road infrastructure investments.

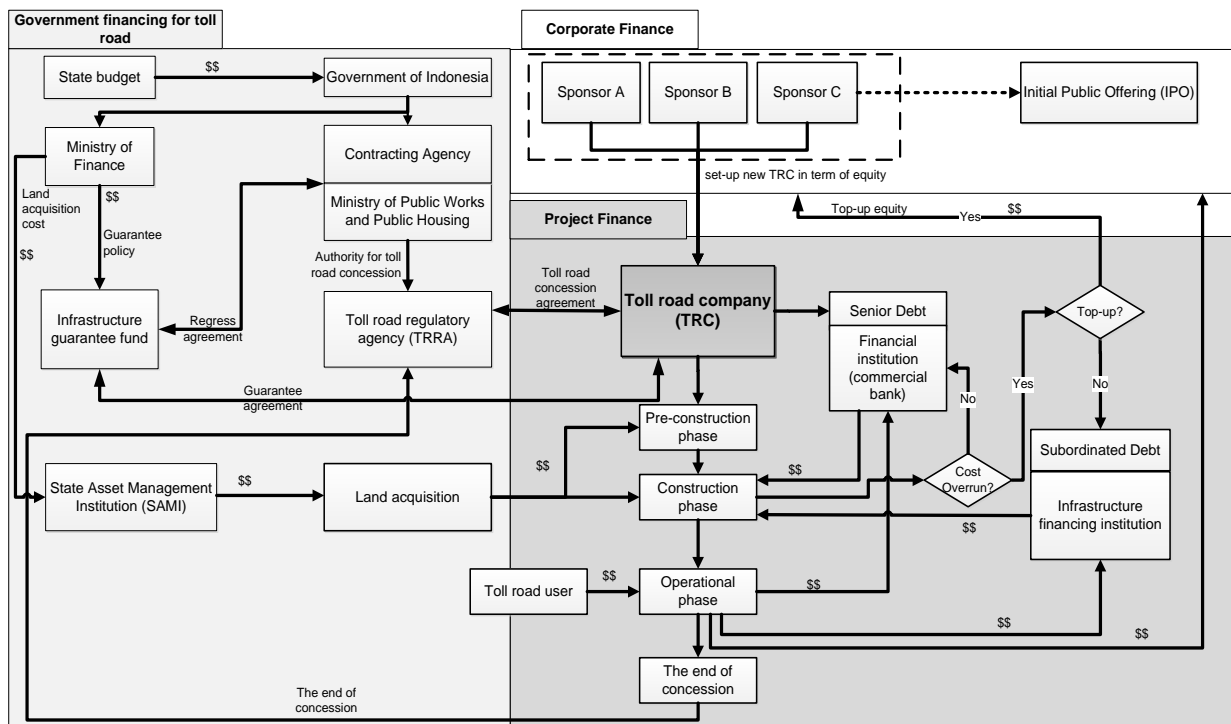
**Cite this Article:** Lukas Sihombing, Yusuf Latief, Ayomi D. Rarasati and Andreas Wibowo, Developing a Toll Road Financing Model with a Hybrid of Deep Discount Project Bonds and Land Leases in Indonesia, International Journal of Civil Engineering and Technology, 9(6), 2018, pp. 1310–1323.

<http://www.iaeme.com/IJCIET/issues.asp?JType=IJCIET&VType=9&IType=6>

## 1. INTRODUCTION

The financing model that has been used for a toll road financing in Indonesia is the financing model that matches with Government Regulation No. 15 of 2005 regarding Toll Roads, which is “financing that originates from the government is used for toll road routes that are feasible economically but not yet feasible financially. Financing which originates from a company body is used for toll road routes that are feasible economically and financially. Financing that comes from the government and a company body is purposed for toll roads that are feasible economically but not yet feasible financially”.

Another financing model is assignment to State Owned Enterprise (SOE), as stated in Presidential Decree No. 100 of 2014 regarding Assignment of Toll Road Building in Sumatera and Presidential Decree No. 81 of 2017 regarding assignment to PT Hutama Karya to operate the Tanjung Priok Access Route Toll Road. Meanwhile, for land financing, according to Amendment No. 2 of 2012, it is financing for land acquisition for the public private partnership (PPP) originating from State Budget. So, the existing toll road financing model scheme is depicted in Figure 1, regarding PPP principle, financing is divided based on each role, such as financing from the government, financing from the toll road company (TRC) e.g., corporate finance, and project finance.



**Figure 1** Existing Toll Road Financing Model in Indonesia

However, according to Soepandji et al. [1] there are three problems which become issues from the toll road financing model used in Indonesia. Therefore, to solve these problems, other previous research that is relevant with the toll road project financing model includes: (1) an earmarked tax revenue system [2-8]; (2) deep discount bonds (DDBs) [9-12]; (3) take out financing (TOF) [9, 13-14]; (4) tax increment financing [15-18]; (5) land lease [15, 19-21]; (6) deferred debt [15, 22]; and (7) private donations [15, 23].

Next, the seven financing models above were examined based on strengths, weaknesses, and lessons learned. For example, earmarked tax revenue (ETR), a significant problem is that the ETR financing model is crucial to be separated from the influence of its fiscal decentralization from other policies (such as private transportation sector privatization decentralization) [6]. Besides that, earmarked funds cannot be diverted directly to general budgets [2]. Earmarked funds cannot be diverted directly, as they have to go through the government [24]. The overlapping between a general tax paying group with infrastructure users will also occur [5].

This paper aims (i) to identify critical success factors (CSFs) of a deep discount project bond and land lease hybrid financing model, which can be applied in Indonesia; (ii) to develop a deep discount project bond and land lease hybrid financing model in the toll road sector in Indonesia, in order that it can be well implemented; and (iii) to develop a policy and institution model that is needed to support the deep discount project bond and land lease hybrid financing model.

## 2. LITERATURE REVIEW

Based on the results of the analysis, the most promising model to be applied is a deep discount project bond and land lease hybrid financing model, which simultaneously is state-of-the-art. In mapping the development of the toll road financing model, various related research is summarized briefly. The literature review mapping in the toll road financing model is described in Table 1.

## 3. METHODOLOGY

The methods are based on three objectives. To identify CSFs of a deep discount project bond and land lease hybrid financing model, which can be applied in Indonesia, a qualitative method was conducted. In this method, CSFs were obtained to be observed, so that the deep discount project bond and land lease hybrid financing model could be applied in Indonesia. The CSFs were a number of critical and limited regions to taught success, whether in an organizational context or in a project implementation context [25]. The steps that were done were: the success factors were identified from the literature study, a comprehensive questionnaire was developed and tested, data was collected through interviews, a data analysis was conducted, and then the hybrid financing model CSFs were determined.

After the CSFs were chosen from the hybrid financing model for a toll road development in Indonesia, the objective number 2 was answered. To make a response to objective number 2, an in-depth interview method was used to respond to the deep discount project bond and land lease hybrid financing model that was made previously. Finally, a qualitative method was used to answer the objective number 3. In the end, a validation was done to conclude that development innovations of the toll road financing model in Indonesia to respond to the paper objectives.

**Table 1** Mapping of Toll Road Financing Model Research

Researcher(s)	Toll Road Financing Model							Results
	ETR	DDB	TOF	TIF	LL	DD	PF	
<i>Small Business Report</i> [26]		√						With 17 years of zero-coupon bonds at an initial value (face value) of \$30,000, it can be sold nearing \$4,500.
Kistner [27]		√						In period of 30 years, US Treasury Bonds are obtained at 8.5%, and the returns are 12 times a normal investment at the maturity date (before taxes).
Dailami & Hauswald [28]		√						There is a significant increase in additional maturity dates up to 2 bpts.
Tourrucôo [29]		√						The Black Karasinski Model (gBK) makes the bond prices become feasible with a formula and calibration that is based on a lower order formula.
Favero [6]	√							It reduces sustainable negotiation uncertainty in middle term planning.
Nambu [2]	√							Revenue from motor vehicle taxes reached 77.5% from the national revenue, and there was an increase in building toll roads at an average of 83 km/year for 29 years.
Blackwell et al. [24]	√							Fiscal substitution from earmarked revenue does not need to be limited with regulations.
Doll & van Essen [5]	√							About 50% was obtained from fuel that was used for financing infrastructure.
Jackson [30]	√							The earmarked revenue model will occur when the legislative body is controlled by the majority of votes or when the government is combined under the control of a party.
Investment Weekly News [31]		√						It could add 1.25 x cash flow equity.
Farris & Horbas [18]				√				The suggestion failed because TIF could not influence all tax obligations.
Zhao & Cao [32]	√							The total proportion of local earmarked tax financing was reduced.
Srivastava [13]			√					A bottleneck was made of infrastructure project financing.
Kunz & O'Leary [8]	√							The earmarked funds for main road projects were increased by 382 percent.

Continuation ...

Researcher	Toll Road Financing Model							Results
	ETR	DDB	TOF	TIF	LL	DD	PF	
Lakhmani & Sikroria [9]		√						The new toll road infrastructure project was first used in companies that were already IPO.
Xueming [15]				√	√	√	√	There was expediency in project delivery.
Weidong & Xiaolong [20]					√			The land lease transaction price with a bidding method was 39.7% higher than the non-bidding method.
Nguyen [33]	√							The earmarked revenue fluctuated more negatively during an economic recession.
Tecklin & Sepulveda [23]							√	There were contradictions between individual land right freedom with a commitment to promote

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Ovsiannykova [34]	√		natural resources. There was significant potential in investor developments and interest in financing PPP projects through project bonds. The risks of project bonds are tied to asset allocations.
IIFCL [14]	√		Take-outs were conducted of up to 100% from the bank.
Lukas B. Sihombing (2018)	√	√	Toll road building was increased more quickly in Indonesia with a new financing model scheme.

Where ETR = *earmarked tax revenue*, DDB = *deep discount bond*, TOF = *take out financing*, TIF = *tax increment financing*, LL = *land lease*, DD = *deferred debt*, and PF = *private finance*.

### 4. CRITICAL SUCCESS FACTORS (CSFS) OF THE DDPB AND LAND LEASE HYBRID FINANCING MODEL

This section explains the CSF results of the DDPB and land lease hybrid financing model. This was based on the survey results of 26 CSFs that were given to the respondents, by using a Delphi method. This survey was answered by 16 respondents, starting from academicians, project management experts, government officials, toll road investment experts, and infrastructure financing experts. The respondents had 17 until 50 years of experience in the field, as shown at Table 2.

From the survey and interview results, the CSFs of the DDPB and land lease hybrid financing model are depicted in Table 3. The collected data was analyzed with a relative importance indices (RII), mean score (MS) and standard deviation (SD), which adopted from Sihombing et al. [35]. However, this paper discusses the three highest ranked CSFs.

**Table 2** Respondent Descriptions

No	Respondent code	Experiiece (year)	Education	Expert area
1	NR3	50	Doctoral	Academician
2	NR2	42	Doctoral	Project management expert
3	NR6	30	Doctoral	Government official
4	NR11	30	Doctoral	Toll road investment expert
5	NR13	30	Doctoral	Government official
6	NR12	30	Master	Toll road investment expert
7	NR7	30	Bachelor	Toll road investment expert
8	NR10	27	Doctoral	Government official
9	NR15	27	Master	Government official
10	NR5	25	Doctoral	Academician
11	NR8	21	Master	Toll road investment expert
12	NR9	21	Master	Infrastructure financing expert
13	NR4	21	Bachelor	Toll road investment expert
14	NR1	20	Doctoral	Project management expert
15	NR16	20	Master	Toll road investment expert
16	NR14	17	Master	Government official

#### 4.1. Rank No. 1: Land Status that is Leased “Clear and Clean”

Land status that is leased “clean and clear” means there is data accuracy from the land history that will be leased, such as legal land ownership according to the law and effective, in order that there are no disputes.

It was also stated by Navarro and Turnbull [36] that land status which is leased legally must have clear ownership, because the land price reflects the land ownership right risks

(possessory) and land quality. Related with this, a land ownership right risk can be in the form of an eviction threat. This can occur because there is unclear ownership and there is a significant legal influence towards transfer of ownership rights in the future.

#### 4.2. Rank No. 2: Fair Risk Allocation and Risk Sharing

Fair risk allocation and risk sharing is dividing risks using a DDPB financing model based on the toll road building phase. For instance, there is an interest risk in zero-coupon bonds, because most treasury bonds pay interest before the due date. Therefore, to overcome that risk, a polynomial spine is used to match treasury bond trading prices and receive zero-coupon bond yields with due dates of one until five years [37].

Related with this, a business entity must communicate this strategy, in order that its construction succeeds, which is debt originating from DDPB. For example, a business entity must be responsible for payment failure risks as well as obligation interest risks when payment due dates are at the end of the borrowing (maturity) period.

**Table 3** Critical Success Factors (CSFs) of the DDPB and Land Lease Hybrid Financing Model

CSF	CSFs of the DDPB and Land Lease Hybrid Financing Model	RII	MS	SD	Rank
16	Land status leased is "clear and clean"	0.94	4.69	0.60	1
3	Fair risk allocation and risk division	0.93	4.63	0.62	2
2	Government involvement in guaranteeing risks that become the government's responsibility	0.91	4.56	0.63	3
12	Supported by a stable political system	0.90	4.50	0.52	4
17	The planning design and location leased are planned and integrated	0.90	4.50	0.63	5
21	Asset returns	0.90	4.50	0.63	6
6	Toll road project land preparation	0.90	4.50	0.89	7
11	Revenue from the hybrid model toll road, both from DDPB and land leases	0.89	4.44	0.63	8
15	Good governance	0.89	4.44	0.63	9
7	On-time project completion	0.89	4.44	0.73	10
20	Transparent regulations towards land rental	0.88	4.38	0.50	11
18	Transparent negotiations between the renter and government (BLU) for investment agreements	0.88	4.38	0.62	12
8	Project management capability	0.88	4.38	0.72	13
13	DDPB debt returns to investor bonds that are issued by TRC	0.86	4.31	0.48	14
19	Land rental rights transformation involving a government control process	0.85	4.25	0.68	15
9	Availability of an appropriate DDPB investor market	0.84	4.19	0.75	16
4	Availability of a financial market that oversees DDPB	0.84	4.19	0.83	17
10	An appropriate DDPB financing structure and mechanism	0.83	4.13	0.50	18
14	Availability of long-term DDPB debt financing that is provided by the stock exchange between investor bonds and business entities	0.81	4.06	0.44	19
1	Certainty of a land lease legal framework, in order that it will succeed:				
1.b	a. When it is enacted at the amendment level	0.79	3.94	1.12	20
1.a	b. When it is enacted at the government regulation level	0.69	3.44	1.21	21
1.c	c. When it is enacted at the ministry regulation level	0.69	3.44	1.41	22
5	DDPB investor credit ranking (according to the Standard & Poor version):				
5.a	a. When it has an investment ranking of AAA+	0.78	3.88	1.15	23
5.b	b. When it has an investment ranking of BAA	0.69	3.44	1.09	24
5.c	c. When it has an investment ranking of BBB	0.60	3.00	1.15	25
5.d	d. Input when there are other investment rankings, mention and fill in the level of importance:				
	- When the investment level: .....	0.23	3.60	1.67	26

This is also the case with monetary stability. This is related with the financial crisis that occurred in Indonesia from 1997-1999, until the government issued Presidential Decree No. 47 of 1997 regarding status changes in conducting various SOE government projects, and private ones that are related with the government/SOE, which are deferred or reexamined; as well as Presidential Decree No. 5 of 1998 regarding revocation of Presidential Decree No. 47 of 1997 regarding change of status in conducting several SOE government projects, and private ones that are related with the government/SOE, which are deferred or reexamined.

According to Doh, Cao, and Molling [38], they mentioned that to protect financial stability, such as fluctuations in obligation market risk premiums (bonds), monitoring is done of estimated risk premiums. Another addition is conducting the quantitative easing (QE) program policy, which is a monetary policy that counters disinflation pressure that is renewed (renewed disinflationary) under the control of the central bank; manages interest levels that are low for a long-term period; improves the market in a global direction; deals with unpredictable geopolitical risks; and handles market liquidity illusions [39].

Thus, to reduce the risks, according to NR8, the society needs to be educated through the stock market community, as well as involve education institutions, among others, as well as strong coordination between institutions [NR12].

### **4.3. Rank No. 3: Government Involvement in Guaranteeing Risks that Become the Government's Responsibility**

The government's involvement in guaranteeing risks that are the government's responsibility as being accountable for Contracting Agency in building toll roads are land acquisition responsibility, tariff adjustments, concession periods, political changes, and termination. These are also supported by several resource persons through interviews that stated that the hybrid financing model needs to involve the government, in that 'there is a guarantee' [NR11] from the government and 'investors should be able to show equity or state capital participation (*Penyertan Modal Negara/PMN*) of at least 30%' [NR15].

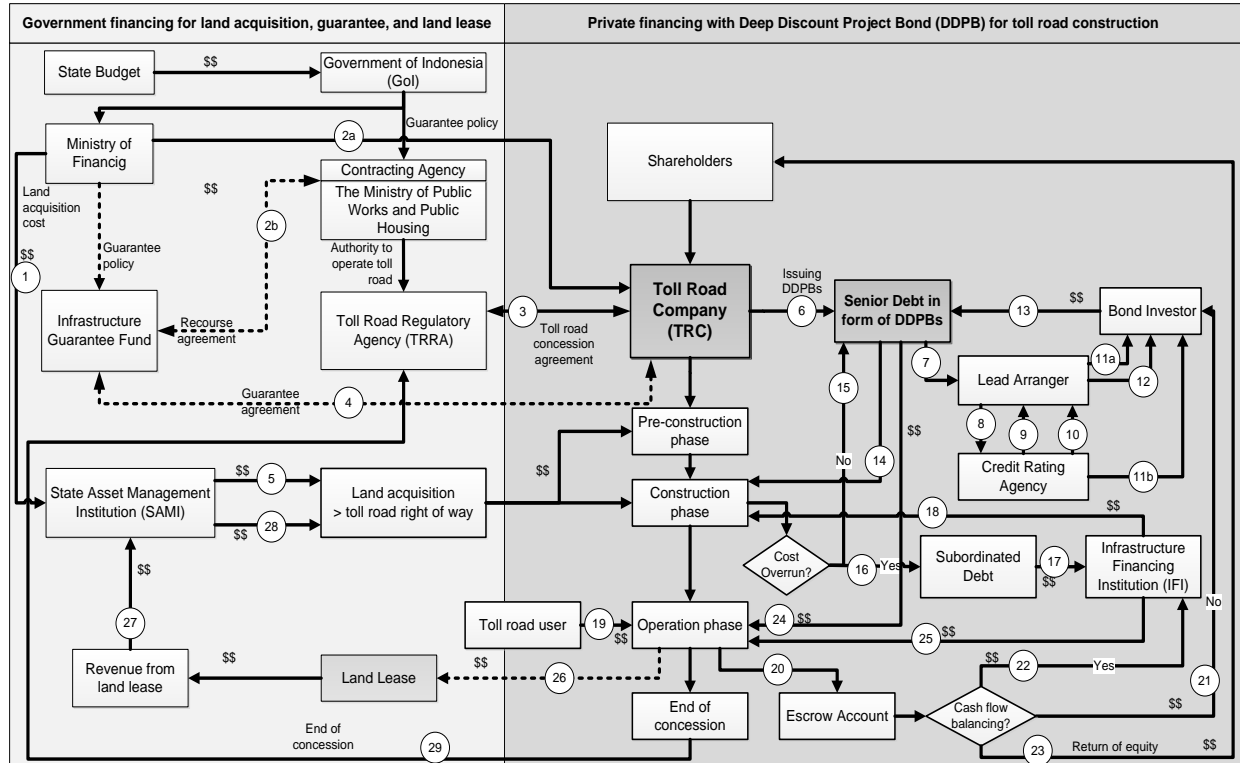
As of now, the government body which guarantees the infrastructure is the infrastructure guarantee fund (IGF), which is under the Ministry of Finance. The guarantees that are ensured by IGF are guarantees of Contracting Agency financial obligations that surface due to risks that have been allocated to Contracting Agency in the PPP agreement.

These financial responsibilities must be quantified, referring to a formula or size of compensation that is established in a joint agreement. For instance, a financial responsibility that is guaranteed by IGF is payment obligations to business entities that surface resulting from delays in handling permits/licenses, changes in government regulations, a lack of tariff adjustments, and failure to integrate networks/facilities that are the government's responsibility [40].

Besides that, IGF also guarantees land acquisition risks, land bailouts, tariff adjustments, revenue during ramp up period, political changes, and termination while the risks are contained within toll road concession agreement (TRCA) [41]. These analysis findings show that government guarantees of risks are greatly needed, as mentioned by a resource person: "... to improve the investment grade rating, SOE which will issue DDPB greatly needs guarantees from the government ...".

## 5. DEEP DISCOUNT PROJECT BOND (DDPB) AND LAND LEASE FINANCING MODEL

The deep discount project bond (DDPB) and land lease hybrid financing model can be viewed in Figure 2 [1]. This hybrid model is divided into four stages: pre-construction, construction, post-construction, and end of concession.



Source: Soepandji et al. [1] and final modified

Figure 2 Hybrid of Deep Discount Project Bond (DDPB) and Land Lease Toll Road Financing Model

## 6. INSTITUTIONS AND THE HYBRID FINANCING MODEL POLICY

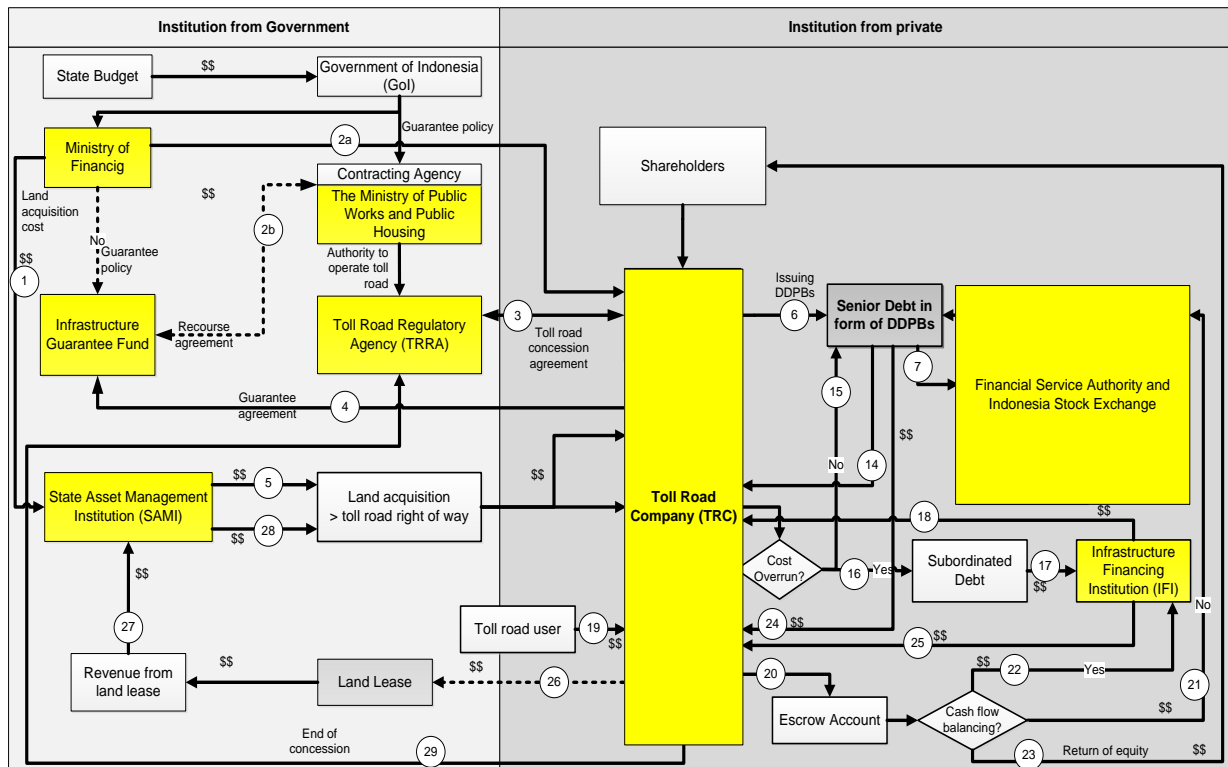
### 6.1. Institutional Hybrid Financing Model

Based on the discussion above, the DDPB and land lease institution hybrid financing model can be used to respond to objective number 3 as depicted in Figure 3.

Figure 3 explains the relationship between institutions, starting from government institutions and private institutions. The institutions that are connected with the DDPB and land lease hybrid financing model are: (i) the Ministry of Finance; (ii) the Ministry of Public Works and Public Housing; (iii) the State Asset Management Institution (SAMI); (iv) the Infrastructure Guarantee fund (IGF); (v) the Toll Road company (TRC); (vi) the Financial Service Authority (FSA); (vii) the Indonesia Stock Exchange (ISE); and (viii) the Indonesia Financing Institution (IFI).



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**Figure 3** DDPB and Land Lease Institution Hybrid Financing Model

Thus, to implement the DDPB and land lease hybrid financing model, and so that the institution mission can be applied, such as: to create optimization of land lease and a sustainable financial system for toll road investments; to secure state land physically, administratively, and legally; to improve the management, added value, financial system, and investments that are conducive for public-private partnership (PPP).

### 6.2. Hybrid Financing Model Policy

According to Lilja [42], the framework in making a policy is as follows: (i) define the system limitations; (ii) focus on every phase of the life cycle one by one with different framework elements and indicators in every phase; (iii) analyze and make feasible policy goals; and (iv) target the policies of a regulation that are recognized based on the problems and opportunity identification that are mutually profitable and efficient.

The system limitations of this paper are especially for the DDPB and land lease hybrid financing model, which is focused on the pre-construction phase, construction phase, and toll road operational phase. Therefore, the target is to make acceptable government regulations or policies about the DDPB and land lease hybrid financing model.

Before making the government regulations, the identification that is obtained from the survey is to request that this hybrid financing model is quickly implemented. However, the main obstacle or problem is that there are no regulations that manage the DDPB and land lease hybrid financing model. This is supported by resource persons, who mentioned that there needs to be legal certainties and government ordinances made [NR4; NR5].

Therefore, the regulations must be covered by strong rules [NR9]. An example needs to be made quickly (pilot) by completing all the requirements, and adjusting them to be in line with the effective regulations [NR10 & NR16]. In spite of this, NR16 further clarified that in

principle, the hybrid financing model can be implemented with the support of government regulations/policies.

According to Sucipto [43], drafting government regulations can be done through academic scripts, which are “scripts from research results or tests of a particular problem that can be accounted for academically regarding handling the problem through a government regulation design as a solution towards a social problem and legal need”.

The suggestion to make a Presidential Decree is based on survey results that recommend this hybrid financing model be ‘quickly’ implemented and make a regulation that configures the DDPB and land lease hybrid financing model. Likewise, a Presidential Decree can supervise two different ministries, which are the Ministry of Finance for the land lease mechanism of SAMI, the DDPB mechanism in the Indonesia Stock Exchange under Financial Service Authority (FSA); as well as the Ministry of Public Works and Public Housing for the toll road and concession mechanism. Related to this, the Ministry of Finance recommends this Presidential Decree, because SAMI and FSA are under the Ministry of Finance.

According to Koynja [44], every government regulation, whether it is already official or still in the form of a government regulation design, has sections that are arranged or a certain orderly framework system, which is a government ordinance framework.

## 7. CONCLUSIONS

The development of a toll road financing model with a hybrid of deep discount project bonds (DDPB) and land leases in Indonesia has been surveyed, analyzed, synthesized, and characterized according to the critical success factors, hybrid model, institution, and policies. Therefore, these paper results can be concluded as follows:

- The advantages and disadvantages of using the DDPB and land lease hybrid financing model are as outlined in Table 4.
- The critical success factors (CSFs) of this hybrid financing model are: the leased land has “clear and clean” status; the risk allocations and divisions are fair; and the government is involved in guaranteeing risks that are the government’s responsibility.
- The DDPB and land lease hybrid financing model in the toll road sector in Indonesia can be well implemented where firstly TRC issues DDB or zero coupon bonds in the financial market that are based on the project cash flow that will be guaranteed for toll road construction financing. The payment of DDB debt is based on toll road revenue that is inserted in an escrow account. If the cash flow is positive after operational costs, then the DDB debt can be paid. Next, if the cash flow is enough, it can be paid to IFI. Then if the cash flow is really positive after it has been decreased by operational costs, DDB debt payments, and debt payments to IFI, then it can be paid to shareholders. Second, in the operation phase, land that has been executed by SAMI beside a toll road can be leased to a railway company, an electricity company, or a telecommunications and utilities company, where that revenue can be used by SAMI as added funding from the state budget to execute land acquisition in other toll road sections.
- The institution that is needed in order that this hybrid financing model can be applied is one which has functions and responsibilities that match with the hybrid model. The DDPB functions are under the Ministry of PWP, TRRA, TRC, IGF, FSA, and ISE. Meanwhile, the land lease functions are under the Ministry of Finance, SAMI, and MoU between three parties (TRRA-SAMI-TRC).

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**Table 4** Advantage and Disadvantage of the DDPB and Land Lease Hybrid Financing Model

No	Advantages	Disadvantages
1	General	This DDPB hybrid model can reduce debt payments in the early operational stage.
2	Interest level	<p>An investment is profitable if the obligation profit level (yield) is higher than the time deposit interest level or SBI.</p> <p>It is crucial to convince bond investors to buy deep discount bonds. Investors will divert their funds to savings if the obligation yield offers are low.</p> <p>When the interest level increases, DDPB holding investors experience double loss because they are locked into lower yields and do not receive interest payment coupons for reinvestments.</p>
3	Investment	<p>It requests that the capital outflow is smaller than other fixed-income securities.</p> <p>There are no coupons for reinvestments at unpredictable market interest levels.</p> <p>Investments in DDPBs need a smaller capital outflow than other fixed-income securities.</p> <p>It is the best investment (excellent) for IRA, 401(k)s, and pension plans, because there is tax growth that is deferred and an amount in which the due date is predicted.</p> <p>If the DDPB issuer fails to pay, the investor experiences many losses compared with conventional bonds, because in the end, they will still receive interest payments that have been reinvested.</p> <p>Markups tend to be higher with DDPBs, which makes it a little more liquid than other fixed-income securities.</p>
4	Land acquisition	<p>There is no need for land acquisition along a toll road if it is leased to another party.</p> <p>It requires additional costs.</p>

- The policies that are needed so that this hybrid financing model can be applied are those which are based on a Presidential Decree that originates from government amendments and regulations. This Presidential Decree is a supplement of the present regulations, and it adds a clause or article that has not yet explained about DDPB and land lease hybrid financing. Then, a Presidential Decree about the Form and Mechanism of a DDPB and Land Lease Hybrid Financing Model should be issued by the Ministry of Finance.

This paper is still a work in progress, but in order to perfect this paper in the future, several suggestions are proposed:

- In implementing a policy, it must be clear what the authority limitations are for the Ministry of Finance or the Ministry of Public Works and Public Housing (PWPH) in conducting a Presidential Decree policy regarding the form and mechanism of the DDPB and land lease hybrid financing model. For instance, the Ministry of PWPH must be clear to provide guidelines regarding the kinds of feasible projects that can use this hybrid financing model.
- The Ministry of Finance, which manages land leases under SAMI, can be handed over to the regions, so that the regions can obtain advantages from building toll roads in their areas through land leases. For future paper, the various kinds of regulations can be examined in detail.
- For future paper, more in-depth studies can be conducted on the size of financial capital from State Budget for SAMI in releasing land by using a DDPB and land lease hybrid model; as well as the risks of using a DDPB and land lease hybrid financing model.

## ACKNOWLEDGMENT

The authors would like to express gratitude to Universitas Indonesia for granting support through the PITTA scheme to assist the researchers in completing this research.

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