



UTILIZING UNCERTAINTY MANAGEMENT TO ANALYZE THE UNCERTAINTY OF TOLL ROAD LAND ACQUISITION

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ABSTRACT

A significant construction activity, especially for developing toll roads, is land acquisition. Due to pending issues regarding land acquisition, many construction projects have not been finished as well as financiers have been unable to pay their outstanding debts. Land acquisition is a very complex issue, although the government has overcome this problem with a regulation that land costs are under the state budget. In the case of Indonesia, land costs are operated by the State Asset Management Institution (SAMI) under the Ministry of Finance. In fact, land funds from SAMI are very late and land cost estimation is always under the actual land price. Therefore, the government asks the toll road company to bail out the land cost, and then the government will pay it the next year. However, investment costs can far exceed the original costs because land acquisition problems are still complex, and that price can be multiplied up to 10 times higher. This paper aims to analyze the unpredictability of acquiring land for toll roads by applying uncertainty management with a crystal ball simulation. A system dynamics simulation in using program uncertainty of toll road land acquisition validates it. In the case of Indonesia, it shows that the land acquisition cost increase is 30.2%, and the IRR is 0.01. Meanwhile, if a land lease is used, the revenue from the land lease can be a grace period in 2041, an IRR of 0.015, and a difference of 0.5%.

Key words: Land acquisition, Uncertainty management, Toll road.

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1. INTRODUCTION

A toll road or expressway is a kind of infrastructure. The development of toll road infrastructure as a backbone of an economy will impact its economic growth. In contrast, the planning of toll road construction is not aligned with the realization of land acquisition. Toll road land acquisition is very slow. Some factors are caused by land prices not being suitable with land owners, crowded utilities that cross roads and it is not known who the utilities' owners are, crowded traffic around the project, etc. [1]. These uncertainties cause a gap between toll road development plans and land acquisition executions.

According to Bhattacharyya [2] and Fish [3], land acquisitions are intended for public and company purposes. This study focuses more on land acquisition for public purposes, i.e. toll roads as public roads. In principle, when land acquisition is for a public purpose, then the government for either the planning or funding sponsors its development schemes as well.

In Indonesia, land acquisition funding sources come from the state budget under the operation of the State Asset Management Institution (SAMI). But, in fact, because of funding availability and limitations, SAMI needs a bailout from toll road company (TRC) to finance early land acquisitions. For the National Strategic Project, in 2016 SAMI needed a bailout from 28 TRCs that amounted to Rp16 trillion, and then it was paid Rp5.9 trillion [4] and fully paid in December 2017, for 20 million square meters [5]. This phenomenon will continue and if there is no solution, many TRCs cannot continue their bailouts. Now, they have complained about this policy.

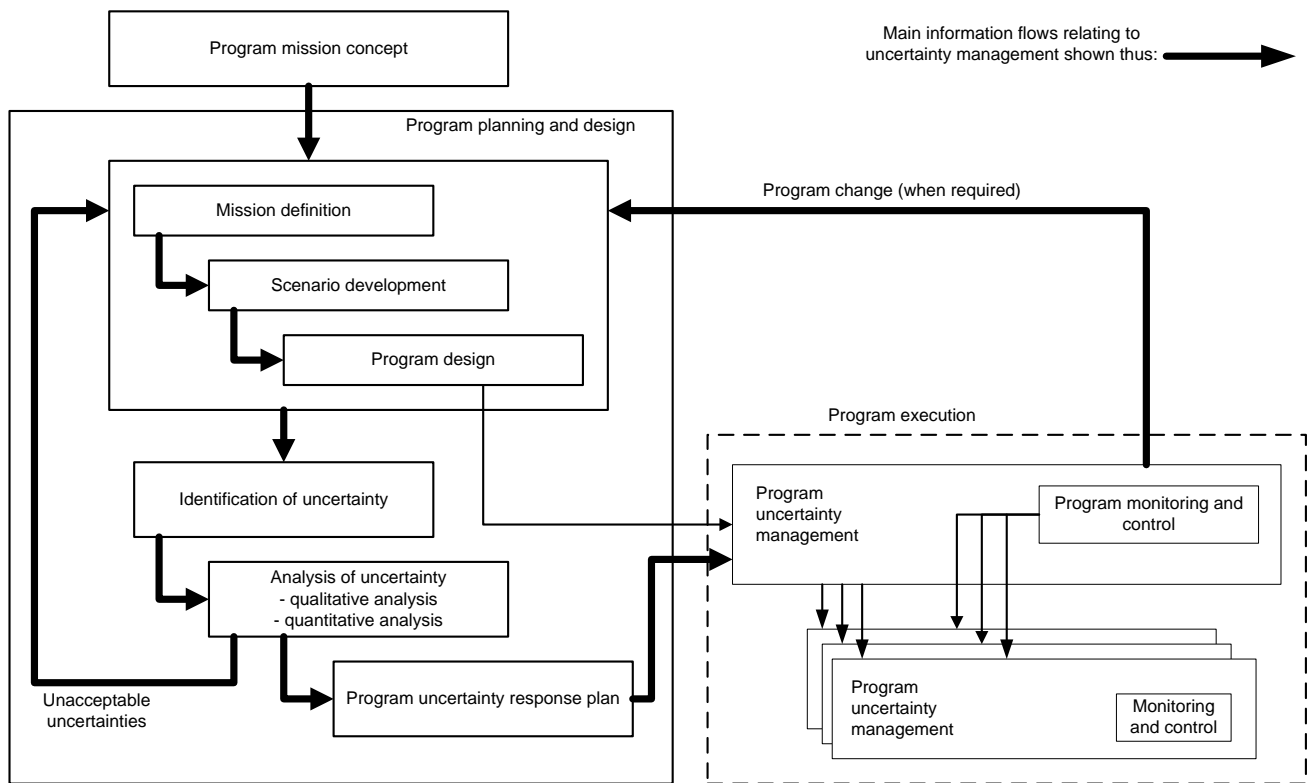
In total, the need for toll road land acquisition funds in 2019 is Rp41.74 trillion. However, the state budget only allocated land acquisition funds in 2016 of Rp1.4 trillion. Thus, the lack of funds for land acquisition was Rp14.6 trillion [6]. Meanwhile, in the process of toll road concession agreements between the government and project companies, of the 25 toll road sections which have been signed, only one section is in full operation. The other sections are still in the construction and land acquisitions stages [7].

Based on the facts, there was an uncertainty in the process of land acquisition; therefore, there was a gap between the need and realization of land acquisition, especially in toll road development. This paper aims to analyze the unpredictability of acquiring land for toll roads by applying uncertainty management with a crystal ball simulation and validated by a system dynamics simulation in utilizing a program to determine the unpredictability of acquiring land for toll roads. This paper is very useful for SAMI to manage the negative unpredictability that can dissuade a good deal of financial investments.

2. LAND ACQUISITION UNCERTAINTY UTILIZING UNCERTAINTY MANAGEMENT IN THE CASE OF INDONESIAN TOLL ROADS

The highest risk in the construction of toll roads in Indonesia is for land acquisition. This is due to the fact that the government only provides minimal guarantees to reduce risks associated with toll road construction. [8]. Thus, the impact of the delay in land acquisition will negatively affect toll road development, and it will also negatively affect the toll road investors [9].

To analyze the uncertainty of toll road land acquisition, this paper uses an uncertainty management program, which was developed by Shimuzu [10]. The basic processes of uncertainty management in a program are illustrated in Figure 1.



Source: Shimizu (2016) [10]

Figure 1 Basic processes of program uncertainty management

Based on the processes, in the mission definition stage, it defines the critical success factors (CSF) of land acquisition. The next step is to determine the execution scenario. In the case of toll road land acquisition, the first scenario is the government goes through the Ministry of Finance to provide authorization to manage national assets to fund land acquisition. In another scenario, if the land acquisition price is more than estimated, then the government uses land capping that is financed by the project company. The government will pay it if the funds for land acquisition from the state budget are available. In this process, program uncertainties are identified, while qualitative and quantitative analyses are made to confirm or improve the certainties.

In the design phase, the architecture of the program and its constituent projects are designed according to the scenario developed in the previous phase. In this stage, the certainty of the project and the total program is assessed. Unacceptable aspects of uncertainty can be removed to improve the probable success of the program. In the execution phase, the government executes land acquisition processes and then does control and monitoring. Therefore, from the basic processes of program uncertainty that are mentioned in Figure 1 above, now it can be reconstructed for the uncertainty management of acquiring toll road land as shown in Figure 2.

3. CASE: TRANS SUMATERA TOLL ROAD

An examination of this program can be seen in the Trans Sumatera Toll Road for the Bakauheni – Tebanggi Besar section. The length of the toll road is 140.7 km; the construction costs are Rp12.22 trillion; and the land acquisition is Rp1.19 trillion.

Based on Figure 2, the first phase is the program in the project strategic list. Then the program mission concept of a toll road land acquisition is made. Next, the mission of the land

acquisition is clarified during the operation. Finally, the land can be leased. The scenario development of toll road land acquisition is the land can be executed more than the toll road width to reduce the land acquisition risks. For example, 150 m can be executed, where 50 m is for the toll road, and the remaining land is allocated for railway lines, high voltage lines, and other utility lines. Meanwhile, the program design of the toll road land acquisition is the Trans Sumatera toll road.

The second phase is an identification of the toll road land acquisition uncertainty. According to Latief [11], there are five highly critical success factors (CSFs) of a land lease, such as the quality of land lease data; the transformation of land lease rights involving government control, the design plan, and integrated location; the transparent negotiation of the investment agreement; and a negotiated agreement to protect private investors and the state.

The analysis of studying the unpredictability of acquiring toll road land uses a qualitative and quantitative analysis. A qualitative analysis is ‘the process of numerically analyzing the effect of identified risks on the overall project objective’ [12]. A quantitative analysis is ‘the process of numerically analyzing the effect of identified risks on the overall project objectives’ [12].

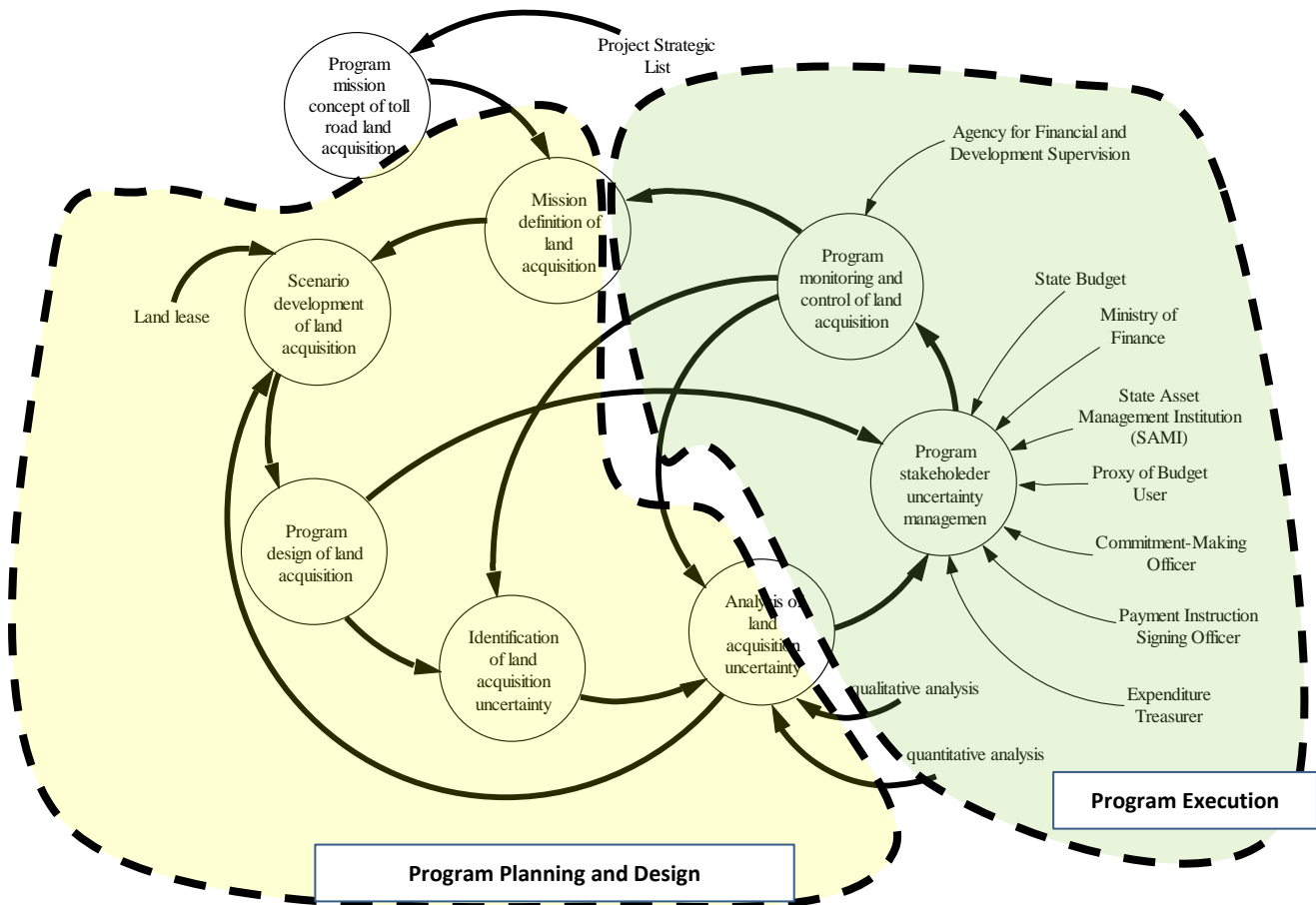


Figure 2 Processes of program toll road land acquisition uncertainty management

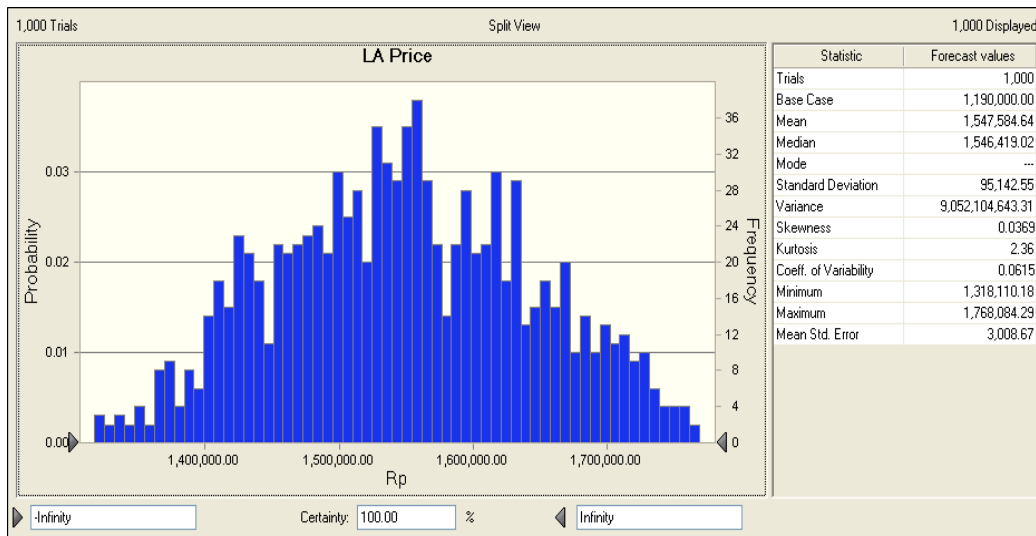


Figure 3 Results of uncertainty land acquisition

As mentioned in the identification above, the highest CSFs can be said quantitatively to have a lack of quality in land lease, as well as a lack of coordination between the central government, local government, and landowners. By using a Crystal Ball instrument, it is assumed that the lowest impact cost is 10% of the planned land acquisition cost: Rp1,309,000 million, most likely 30% from the planned land acquisition cost: Rp1,547,000 million, and the highest is 50% from the planned land acquisition cost: Rp1,785,000 million. Then after using the Crystal Ball instrument, the land acquisition can be Rp1,547,584.64 million. So, there is a probable increase of 30.2%, as shown in Figure 3.

The next phase is an execution of the toll road land acquisition using land funds in the amount of Rp1,547,584.64 million. These funds are provided by the state budget. Then the government gives authority and responsibility to the Ministry of Finance for land acquisition financing for a strategic project. Then it is done by the State Asset Management Institution (SAMI) (Lembaga Manajemen Aset Negara/LMAN) [13].

According to the Ministry of Finance [13], the involvement of stakeholders for land acquisition expenditures are a proxy of the budget user (Kuasa Pengguna Anggaran Umum Negara /KPA): officials in the work units of each budget officer user, either at the head office or the regional office or work unit in the ministry/institution, commitment-making officer (Pejabat Pembuat Komitmen/PPK): an official exercising KPA authority to make decisions and/or actions that could cause expenditures in terms of the state budget, payment instruction signing officer (Pejabat Penanda Tangan Surat Perintah Membayar/ (PPSPM): an officer who is authorized by KPA to conduct tests on payment requests and issue payment orders, and the expenditure treasurer (Bendahara Pengeluaran).

At the execution phase, it can cause uncertainty management from the start of the state budget, to the Ministry of Finance, to SAMI, until the execution of land acquisition. In that case, the land acquisition funds can be released after going through various procedures that have been approved by KPA, PPK, and PPSPM officials, and then to the expenditure treasurer to distribute financial compensation to the eligible parties. The number of bureaucrats (6 officials) that must be passed to spend the funds is one of uncertainty. This can happen if one of the officials is delayed; it will impact the delay in spending.

At the operational phase, land can be leased to the railway company, for high voltage, and for utilities. It is assumed that revenue from the railway company is 8% from the toll road

revenue, revenue from the high voltage company is 0.5% from the toll road revenue, and revenue from the utility companies is 0.3% from the toll road revenue.

Based on the calculation, the total land acquisition, leasing land as stated previously can pay which is due to unpredictability, and the grace period in 2041 is shown in Figure 4.

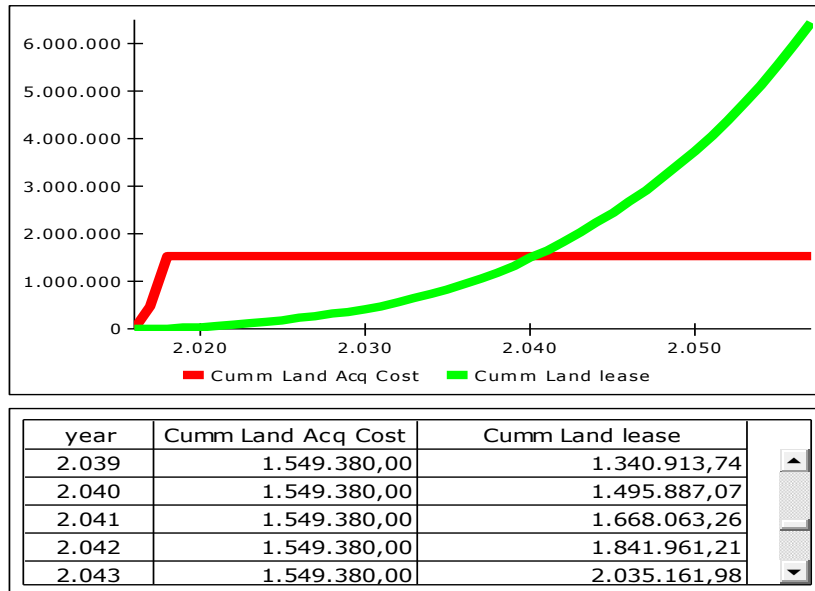


Figure 4 Grace period of land acquisition cost and land lease

As a whole analysis of the unpredictability of acquiring toll road land in using an uncertainty management (Figure 2), the non-land lease and land lease can be compared, as shown in Figure 5. So, an IRR non-land lease is 0.01, an IRR with a land lease is 0.015, and the difference is 0.5%.

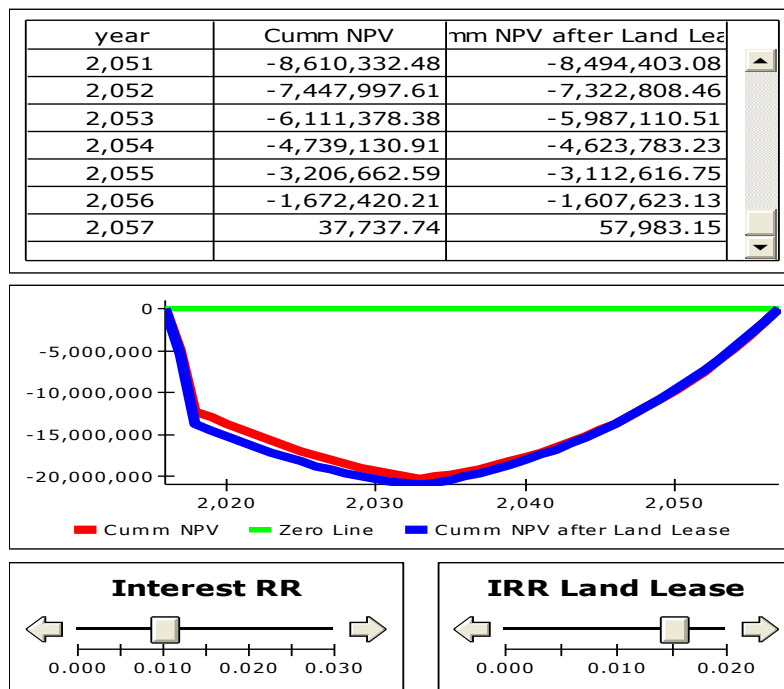


Figure 5 Interest rate of return for the Trans Sumatera Toll Road of Bakauheni – Tebanggi Besar section

At the monitoring phase, the supervision of land acquisition implementation is carried out by the Agency for Financial and Development Supervision. This agency plays a significant role starting with the implementation phase until the determination phase of replacing the land license. A letter of request is submitted for supervision by the chairperson of SAMI with copies to the Minister/Head or State Ownership Enterprise management.

The results of the supervision shall be in the form of recommendations that contain the following points:

- Suitability of land acquisition implementation to be used for the implementation of a national strategic project;
- Compliance of land acquisition implementation for infrastructure development with a technical plan of infrastructure development; and
- Compliance with the stages of land acquisition implementation for infrastructure development with the provisions of legislation concerning land procurement to be developed for public interest.

At this supervision stage, uncertainty can also occur due to the emergence of various data that is not appropriate, so it can result in a misuse of authority and cause concern to engage in land procurement implementation. This may occur if a competent authority can be easily bribed, resulting in unreliability when being supervised.

From the start, if there is unpredictability towards land acquisition for toll roads starting from the price of land that can rise up to 30%, there is also uncertainty towards stakeholder management, including the bureaucracy of doing expenditures and monitoring. This can lead to delays in the land acquisition process.

4. CONCLUSIONS

By using the process of uncertainty management in acquiring toll road land, then toll road land acquisition in Indonesia can be well executed and managed as shown in Figure 2.

As a result of the calculation of the impact of uncertainty of land acquisition, the increase in land acquisition cost is 30.2% and the IRR is 0.01. Meanwhile, if a land lease is used, the revenue from the land lease can be a grace period in 2041, an IRR of 0.015, and a difference of 0.5%.

This paper can still be further developed to obtain the CSF of land acquisition in order that the process can run smoothly, as well as this model can be developed to analyze the qualitative and quantitative methods based on these processes.

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REFERENCES

- [1] Hermawan, F., Kistiani, F., and Santoso, T.Dj. Pengaruh Pembebasan Lahan terhadap Risiko Proyek Konstruksi (Studi Kasus Social Engineering Proyek Jalan Tol Ruas Semarang Bawen). *Teknik*, **32**(2), 2011, pp. 88-92,
- [2] Bhattacharyya, D. History of Eminent Domain in Colonial Thought and Legal Practice. *Economic & Political Weekly*, **L**(50), 2015, pp. 45-53.

- [3] Fish, C. Land Acquisition for Special Economic Zones in India, Master Thesis, the Temple University Graduate Board, 2011.
- [4] Bisnis Tempo.co, Hingga Desember 2016, Dana Talangan untuk Jalan Tol Rp 16 T, 2016. Available online at <https://bisnis.tempo.co/read/821332/hingga-desember-2016-dana-talangan-untuk-jalan-tol-rp-16-t>, Accessed on May 11, 2018.
- [5] Berita Media DJKN, Dana Tol Rp 13,1 Triliun Cair, 2017. Available online at: https://www.djkn.kemenkeu.go.id/berita_media/baca/12488/Dana-Tol-Rp-131-Triliun-Cair.html , Accessed on May 11, 2018.
- [6] Ministry of Public Works and Housing, 2016, unpublished.
- [7] Toll Road Regulatory Agency (Badan Pengatur Jalan Tol/BPJT), 2016, unpublished.
- [8] Nadia, F.A. Risk and Policy in Indonesia Toll Road Development: from the Perception of Public and Private Sector Study Case of Pandaan – Malang & Manado – Bitung, Master Thesis, International Institute of Social Studies Erasmus, 2016.
- [9] Sihombing, L., Soepandji, B.S., Abidin, I. and Latief, Y. The Impact of Land Acquisition Delay in Toll Road Development, SSRN Electronic Journal, 2010.
- [10] Shimizu, M. Managing Uncertainties in Programmes, Handbook of Programme Management, Second Edition, 2016.
- [11] Latief, Y., Sihombing, L., Rarasati, A.D. and Wibowo, A. The Financial Model of Land Lease Improving Toll Road Development a Delph Survey and Critical Success Evaluation. Journal of Engineering and Applied Sciences, **12**(7), 2017, pp. 1790-1794.
- [12] Project Management Institute, A User's manual to the PMBOK® Guide – Fifth Edition, John Wiley & Sons, 2013.
- [13] Ministry of Finance. Peraturan Menteri Keuangan Republik Indonesia Nomor 21/PMK.06/2017 tentang Tata Cara Pendanaan Pengadaan Tanah bagi Proyek Strategis Nasional dan Pengelolaan Aset hasil Pengangaan Tanah oleh Lembaga Manajemen Aset Negara. 2017.
- [14] R. Anas, O. Z. Tamin, R. Z. Tamin and S. S. Wibowo , Measuring regional EconomIc Impact of Cipularang Toll road Investments: Using an Input- Output Model (Case study: Bandung District), International Journal of Civil Engineering and Technology, **8**(10), 2017, pp. 796–804
- [15] P.A. Prabakaran, Dr. K.C. Pazhani, Lisa Mary Thomas and K.M. Priyanka, Social Economic Impact Study of Risk Management in Balance d Cantilever Bridges. International Journal of Civil Engineering and Technology, **8**(9), 2017, pp. 383–390.