Identifying Critical Success Factors for Effective Capital Structure in Infrastructure Projects under Public-Private Partnership

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Abstract

Capital structure is the key to ensuring sufficient funding and achieving Public Private Partnership (PPP) project objectives. In Indonesia, this scheme has attracted a lot of attention to meet the enormous demand for infrastructure development. However, the successful implementation of PPP projects is often impeded by significant capital investments and high uncertainty. Improper capital structure causes many projects to fail. Therefore, to overcome these challenges, this study aims to identify the success factors for an effective capital structure for PPP projects from several leading academic journals. This study shows that Financial Viability, Business Risk, Project Participants, Country Risk Factors and Government Support are the main factors that become the basis for effective decision-making in determining the capital structure of infrastructure projects with PPP schemes. From the results of the critical success factors obtained in this study, a comparison was attempted with the implementation of fulfilling the capital structure in one of the largest PPP projects in Indonesia, namely the Trans Sumatera Toll Road (TSTR) project. The parties involved in the PPP implementation are expected to know the success factors of the capital structure so that PPP development can be carried out properly.

Keywords
Capital structure, Infrastructure, Public-Private Partnerships (PPP), Trans Sumatera Toll Road (TSTR)

1. Introduction
The United Nations Development Programme (1998) defines public-private partnership (PPP) as a cooperative mechanism between the government and the private sector to finance, build, and manage infrastructure facilities such as power plants, ports, transportation systems, and telecommunication systems. The PPP model allows the government and private sector to share the rewards and risks of an infrastructure project, and it also allows the government and private sectors to fully utilize their respective advantages in order to optimize project efficiency and obtain the best value for money (World Bank, 2011).

The PPP model has been widely implemented in countries because it efficiently relieves government budgetary constraint (World Bank, 2012). When compared to traditional finance models, the PPP model offers distinct benefits to the government, such as leveraging private resources and distributing risk. However, the PPP model includes disadvantages such as greater finance costs and more interest conflicts when more parties are involved at some point. Because the capital structure reflects the interests and obligations of each project stakeholder, a PPP-mode project demands a higher level of capital structure management skill to ensure the success of the project.

An effective capital structure can reduce the cost of capital and improve the efficiency of project construction, financing, and operation, and this paper provides a comprehensive discussion of the literature review (from both theoretical and empirical studies) of capital structure optimization in PPP projects. Public-private partnerships involve collaboration between a government agency and a private-sector company that can be used to finance, build, and operate projects. Public-private partnerships often involve concessions of tax or other operating revenue, protection from liability, or partial ownership rights over nominally public services and property to private sector, for-profit entities. Public-private partnerships allow large-scale government projects, such as roads, bridges, or hospitals, to be completed with private funding. Capital structure refers to the structure of debt and equity capital in corporate finance, which is a dynamic and complicated process that represents investors' investing behavior and the value of the firm.

In project financing, sponsors seek high leverage to reduce their exposure to project risk and receive low-cost capital because the loan interest demanded by lenders is typically lower than the rate of return for shareholders. However, lenders may have reservations about offering such leverage and sharing risk with sponsors. As a result, setting a suitable capital structure—the combination of multiple funding sources (i.e., stock and debts) utilized to finance the project—that fulfills the expectations and requirements of both sponsors and lenders is a primary issue for decision makers.

Considering above, this study analyzed the success factors influencing in capital structure in PPP. However, many recent studies researched about the quantitative model rather than the systematic analysis of critical factors. Therefore, to overcome this challenge, this study aims to identify success factors for effective capital structure of several reputable academic journals.

2. Literature Review

2.1 Critical Success Factors (CSF)

CSF was introduced by John F. Rockart and MIT Sloan School of Management in 1979. A way to help senior executives define information needs with the aim of managing an organization (Rockart, 1979). Rockart's main goal with CSF is to collect information needs as a decision-making management. According to Hossain & Shakir (2001) CSF is a way that is often used to identify and state the elements used as guidelines for achieving successful business operations. CSF is an effective approach to be able to determine what factors must be carried out by an organization to support the achievement of the vision and mission (Rockart, 1979). Rockart & Marton (1984) defines that CSF is the company's operational goals and achieving these operational goals will ensure the company's success. Thus CSF is a means or core factor that supports the achievement of company goals, so that it can survive in competition.

2.2 Capital Structure

According to Neil Seitz (1999) capital structure is a combination of sources of long-term debt which include debt, common stock, and common stock. Ross also disclosed the same thing that the capital structure is a combination of long-term debt and securities used by the company to finance its operational activities. After calculating the estimated project investment costs, it is necessary to analyze the sources of financing by considering the capital structure between debt and equity. Modigliani miller (1963) suggested that capital structure does not depend on firm value. Finding a point of equilibrium between revenues and the cost of debt generates the creation of the conventional capital structure, which maximizes earnings for both the business and the shareholders. For infrastructure projects, investors and financiers analyze the investment feasibility of a project from its financial characteristics and risk sharing (Mohamed et al., 2001), as well as examine and predict the economic benefits and project expenses, profitability, solvency, and financial feasibility of the project, to serve as the basis for project decision making (Dias et al., 1995; Yeo et al., 2000; Wibowo, 2006). The commercial feasibility of project financing lies in calculating profitability and calculating risk management (Javid et al., 2000; Shen et al., 2005). Kakimoto (2000) showed in his study that the financial analysis model of project financing can be divided into three parts, namely, the cost function, the revenue function, and the decision criteria. Therefore, the essential work in project financing is establishing a set of construction cost analysis modes, revenue analysis modes, financial feasibility analysis modes, and risk analysis models. Based on the financial analysis of a hydroelectric project in Turkey, Bakatjan et al. (2003) used a linear programming model to calculate the optimal capital structure of the project by measuring the IRR, DSCR, and net cash flow of the project. Linear programming is a model that is often used to determine capital structure (Park and Sharpe-Bette, 1990). According to Marshall and Bansal (1992), this model is the best way to calculate the rate of return on investment. In the linear programming model, the optimal capital structure is a combination of debt and equity that maximizes IRR from the perspective of equity holders. Zhang (2005) said that the key factor in determining the capital structure of the project is to scientifically calculate the project financing plan because the construction of large-scale infrastructure projects is characterized by large-scale investment with a long construction period. Yun et al. (2009) proposed an optimal capital structure model to achieve a balance of profitability and solvency for a project from the perspective of the balance of interests between shareholders and creditors based on Monte Carlo simulations and Genetic Algorithms. In the BOT highway project in India, Iyer and Mohammed (2012) used a Genetic Algorithm model to study the optimal capital structure in the project bidding stage. Feng et al. (2017) developed a Genetic Algorithm model to find the optimal equity capital structure when the government provides subsidies to PPP projects.

It is necessary to carry out a comprehensive analysis of each type of risk during the project period and the effect on the optimal capital structure when making decisions about the optimal capital structure of a BOT project due to the long-term financing plan, many participants, and various factors that influence uncertainty during the cycle life of BOT projects (Iyer et al., 2011; Attarzadeh et al., 2011; Cruz and Marques, 2012; Xiong and Zhang, 2016).

Zhang (2006) considers the risks of the entire plan, including time, cost, revenue, and other risks, and the corresponding probability distributions of various risk factors.

2.3 Public-Private Partnership (PPP)

PPP is a procurement approach between the public (i.e. government) and the private sector (Liu et al. 2014). The government identifies the project requirements and then determines the concession period that is given to cooperation partners from the private sector (Algarni, Arditi, and Polat 2007). The private sector entity in this connection becomes the concessionaire, and if desired may enter into contracts with a number of other participants such as (i) a public client; (ii) main contractor; (iii) investors and lenders; (iv) insurance companies; (v) lead designer; (vi) suppliers of materials/equipment; (vii) operators/maintainers; (viii) buyers of intermediate and final products/services; and ix) non-governmental organizations (NGOs) (Zhang et al. 2016). The goal of this relationship between the public and private sectors is to provide public infrastructure services (Lee and Schaufelberger 2014). Traditionally, the government has been responsible for the provision of public infrastructure (Tsamboulas et al., 2012). However, the provision of infrastructure in developing countries is often limited by technology and government budgets (Kumaraswamy and Zhang, 2001). The PPP concept has been widely proposed to overcome the limitations of the public sector because it is believed to have many advantages such as potentially using private sector resources, encouraging innovation, increasing productivity, providing better risk allocation, promoting value for money and providing cost effectiveness. (Ng et al., 2012).

3. Methods

There are 12 publications related to the capital structure of infrastructure projects with PPP schemes published from 2003–2020. The following is a list of journals with ratings and SJR for each journal listed in Figure 1.

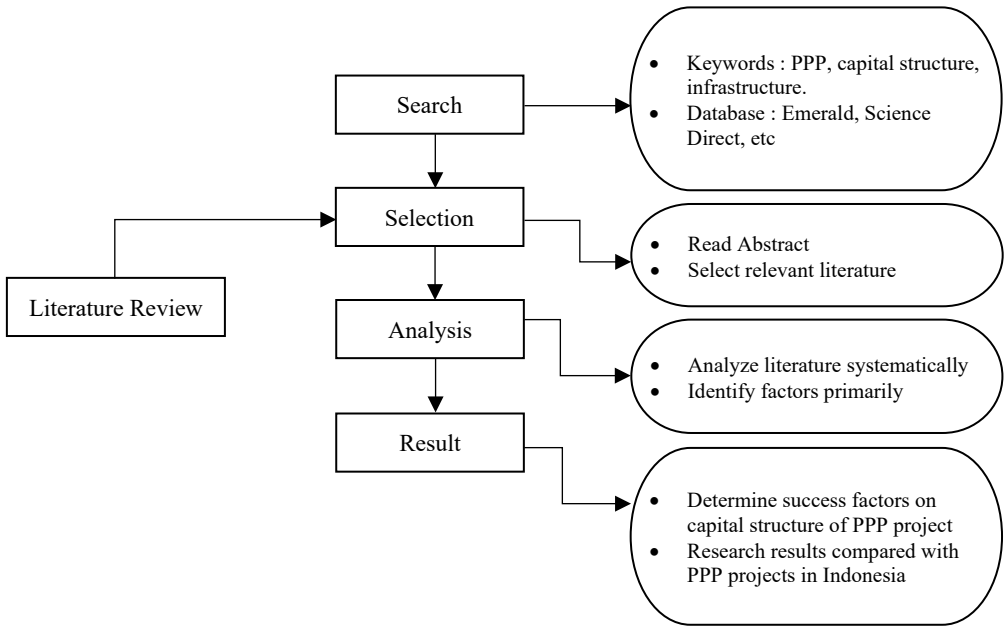

Figure 1. Identification process of critical factors on capital structure of PPP projects.

Based on Figure 1, information is obtained from around eight reputable journals to identify the determinants of capital structure. The first step is to find relevant research titles using the keywords PPP, Capital Structure, and Infrastructure. The databases used are Emerald Insight, SCOPUS and Taylor & Francis. After finding the appropriate article, the writer then reads the abstract and selects the relevant literature. Then an analysis of each article was carried out by identifying the main success factors produced by the research. The next step is to process and conclude the success factors of each article and sort the success factors that are mostly found in the selected articles (Table 1).

Table 1. Reputable Journals

Journal Publication	SJR	Quartiles Category	Number of Papers
Transportation Research Part A	2,228	Q1 Aerospace Engineering	1
Journal of Management in Engineering	1,619	Q1 Engineering (miscellaneous)	1
Journal of Construction Engineering and Management	1,07	Q1 Building and Construction	4
Engineering, Construction and Architectural Management	0,717	Q1 Architecture	2
Transportation Research Record: Journal of the Transportation Research Board	0,575	Q2 Civil and Structural Engineering	1
International Journal of Managerial Finance	0,432	Q2 Business, Management and Accounting	1
Canadian Journal of Civil Engineering	0,374	Q3 Civil and Structural Engineering	1
The Engineering Economist	0,301	Q2 Engineering (miscellaneous)	1

Research on the capital structure in the implementation of infrastructure financing with the PPP scheme has been carried out by previous researchers that are presented as follows:

Liu et al (2020) "Monte Carlo optimization model for dynamic capital structure adjustment in Chinese public-private partnerships under revenue uncertainty'. In the case of income uncertainty, the pre-determined static capital structure in the PPP project feasibility stage cannot meet the dynamic adjustment needs in China's PPP capital structure during project operation. Thereby, it is worsening the project's financial viability in the long run. Therefore, this paper proposes a Monte-Carlo optimization model that can increase the need for a dynamic PPP capital structure in the uncertain environment regarding China's bridge sector. By measuring the adjustment costs stemming from changes in equity and debt, the proposed model can make a comparative analysis of the dynamic capital structure of a particular project in different scenarios by three capital structure adjustment strategies adopted, respectively. In particular, the before and aftereffects and the effectiveness obtained from the use of government subsidies, capital market financing, and debt financing in adjusting the capital structure of PPP projects can be compared and evaluated. Based on historical data of the Hangzhou Bay Bridge case, the unbalanced role of the three strategies revealed that the government's subsidy strategy had a stronger effect than the other two strategies, thereby increasing the project's financial viability and sustainability.

K. C. Iyer and Mohammed Sagheer (2012) "Optimization of Bid-Winning Potential and Capital Structure for Build-Operate-Transfer Road Projects in India". In India's BOT highway project, the grant requested from the government is the only supply variable that determines the successful concessionaire. Higher funds, while ensuring an increased chance of winning concessions, will also lead to significant cash outflows that adversely affect project profitability. The profitability of the project is also a function of the debt-equity structure, which is determined using financial engineering techniques. Therefore, from the point of view of private investors, a systematic model is needed to optimize potential bidder winners and the capital structure, which will assist the project sponsor in bidding and financing decisions. Previous research in this area has considered this optimization problem in a fragmented manner. This paper presents a genetic algorithm (GA) based model that produces a set of optimal solutions for the main decision variables: grants, debt, and equity.

Cai et al (2019) "Empirical Analysis of Capital Structure Determinants in Infrastructure Projects under Public–Private Partnerships". Public-private partnerships (PPP) have emerged as a promising alternative to financing infrastructure projects to address the challenges of infrastructure restoration and rehabilitation. However, in current practice, there is no unanimous agreement on what factors should be considered when making capital structure decisions in PPP infrastructure projects. In closing the gap, data from 498 projects in 22 countries to identify the determinants of capital structure perform least squares regression analysis (GLS). At the 10% significance level, three project-specific factors (number of sponsors, number of lenders, and type of contract) and four country-specific factors (total tax rate, real interest rate, loan risk premium, and bond market capitalization) were identified as critical. It contributes to the body of knowledge (1) by explaining financial decisions from a lender's perspective, which complements sponsor-focused general capital structure theory; and (2) by providing knowledge to sponsors, lenders, and governments on the main factors driving decisions, which

in turn forms the basis for effective negotiations and optimization of capital structures in PPP infrastructure projects.

Feng et al (2017) "Optimizing an Equity Capital Structure Model for Public–Private Partnership Projects Involved with Public Funds". The large capital investments and high uncertainty are the challenges to implementing large PPP projects successfully. To address this challenge, the government may choose to offer public funds, including public equity and government subsidies, for Special Purpose Vehicle (SPV) financing to strengthen the financial viability of the project and increase the transparency of SPV operations. The involvement of public funds reforms the traditional equity capital structure and needs to be studied carefully. To facilitate decision-making relevant to both the private and public sectors, this study develops a genetic algorithm-based model to simultaneously optimize private equity, public equity, and government subsidies for PPP projects. The effects of risk factors are combined by utilizing a Monte Carlo simulation. Beijing Metro Line Project No. 4 is presented to demonstrate the application of the model. The optimization results show that the proposed model strikes a balance between meeting the financial feasibility of the project and saving public funds. And it will significantly facilitate the private and public sectors in determining the optimal equity capital structure involved with public funds.

Xueqing Zhang (2005) "Financial Viability Analysis and Capital Structure Optimization in Privatized Public Infrastructure Projects". This research develops a methodology for capital structure optimization and financial feasibility analysis that reflects the characteristics of project financing combines simulation and financial engineering techniques and aims for win-win outcomes for both the public and private sectors. This quantitative methodology defines the capital structure of a privatized project in four dimensions, examines the perspectives of different project participants on the capital structure, optimizes the capital structure, and evaluates the financial viability of the project when it is under construction risk, bankruptcy risk and various economic risks which are handled as variables. stochastic, and subject to other constraints imposed by different project participants. The methodology also evaluates the impact of government guarantees and support and addresses the issue of equity holder commitment to project success by initiating the concept of equity on project risk, the value of government loan guarantees, and the probability of project bankruptcy during construction.

Bakatjan et al (2003) "Optimal Capital Structure Model for BOT Power Projects in Turkey". Through the BOT project, the government reallocates the risks and benefits of developing large infrastructure projects to the private sector. One of the key aspects of the successful implementation of the BOT concept in any country is fundraising by project sponsors. Financial engineering techniques and capital management skills are required to find the right mix of debt and equity and to achieve successful financing for the proposed project. This paper aims to present a simplified model to determine the optimal level of equity for decision makers at the evaluation stage of the BOT hydroelectric project in Turkey, which takes place immediately after the completion of the feasibility study. The resulting model is a combination of a financial model and a linear programming model that incorporates the objective of maximizing project returns from the perspective of equity holders. There are different levels of equity found in the BOT hydropower projects, and there is a need for such a model to determine the optimal capital structure, which will help the project sponsor ensure that the level of equity required for the optimal capital structure is available before stage project implementation.

Wenhua Hou and Lun Wang (2020) "Research on the refinancing capital structure of highway PPP projects based on dynamic capital demand". This study aims to determine the capital requirements for the operation and maintenance of a project through a refinancing scheme, to reduce the possibility of project bankruptcy and increase the economic value of the project.

Yuning Wang and Xiaohua Jin (2019) "Determine the optimal capital structure of BOT projects using interval numbers with Tianjin Binhai New District Metro Z4 line in China as an example". A variety of factors can affect project financing when a multi-source debt financing strategy is used to finance capital investment, in general, and public infrastructure investment. Traditional indicators do not consider comprehensively the influence of many internal and external factors, such as investment structure, financing mode, and credit guarantee structure, in making decisions on financing BOT projects. An effective approach, thus, is desirable. This paper aims to discuss these issues.

Kumar et al (2017) "Research on capital structure determinants: a review and future directions". Major findings show an increase of interest in research on determinants of capital structure of the firms located in emerging markets. However, it is observed that these regions are still under-examined which provides more scope for research both empirical and survey-based studies. Majority of research studies are conducted on large-sized firms by using secondary data and regression-based models for the analysis, whereas studies on small-sized firms are

very meager. As majority of the research papers are written only at the organizational level, the impact of leverage on various industries is yet to be examined. The review highlights the major determinants of capital structure and their relationship with leverage. It also reveals the dominance of pecking order theory in explaining capital structure of firms theoretically as well as statistically.

Sharma et al. (2010) "Balancing Private and Public Interests in Public–Private Partnership Contracts Through Optimization of Equity Capital Structure". The capital structure and profit-sharing agreement lie in the essence of the balance of public and private interests in a public-private partnership (PPP) contract. In the United States, many PPP projects may not be fully self-financed through tolls or other user fees due to insufficient revenue streams. With limited debt capacity guaranteed by toll revenues, most PPP projects must be backed by private equity investments and public funds. The equity structure is very important in PPP contracts because it implies risk and profit sharing and therefore provides a mechanism for private incentives and protection of the public interest. This paper presents a structured approach to determining debt-equity investments in PPP projects. Scenarios are generated using linear programming and probability programming models to achieve an optimal equity structure under risk and uncertainty. The I-10 connector project was used as a case study to demonstrate the optimization process. This model is very useful for public bodies to (a) estimate the range of private equity investments, (b) determine the target equity structure, and (c) document the benefits and costs of private financing for a successful PPP contract.

Yun et al (2009) "Capital structure optimization for build–operate–transfer (BOT) projects using a stochastic and multi-objective approach". Private finance has long been recognized as playing an important role in providing public infrastructure facilities around the world. Private investor-operators, however, are often exposed to the financial risk of low profitability due to inaccurate estimates of facility demand, operating income, and maintenance costs. From the operator's point of view, a good and thorough financial feasibility study is required to establish the appropriate capital structure of a project. To this end, the operator tends to reduce the amount of equity to minimize the level of risk exposure, while the lender or lender continues to increase it in an effort to secure a reasonable level of financial responsibility from the operator. This paper presents an optimized capital structure model for lenders and operators to reach an agreement on a balanced structure that synchronizes profitability and payment capacity. The model was developed using Monte Carlo simulation and the generic multi-purpose (GA) algorithm to determine the optimal level of equity ratio. The results of a case study on a railway project show that the proposed model provides an appropriate range of capital structures for privately financed infrastructure projects while taking into account project-specific risks under variable conditions.

Borliang Chen (2019) "Optimal capital structure of government-subsidized private participation in infrastructure projects". A government-subsidized private participation in infrastructure (PPI) project is a solution to attract private investors to invest in financially non-viable infrastructure projects with high social benefits. A govern-ment-subsidized PPI project comprises three financing sources: gov-ernment subsidy, equity, and debt. For government-subsidized PPI projects, the government subsidy level must be determined before the optimal debt ratio can be determined. A government subsidy level that is too low may lead to the project being non-bankable for financial institutes and a level that is too high may result in high excess returns for project investors. This paper develops cooperative game models, which are multiple–variable game models, to deter-mine optimal solutions for four major decision variables – the gov-ernment subsidy, tariff, debt ratio, and interest rate for project negotiation for PPI projects.

4. Data Collection

The data in this study comes from secondary data. Secondary data is data that has been collected and analyzed by others. This research was conducted by collecting information about previous research with relevant titles from various journals. After the research results are obtained, the success factors obtained will be compared with the steps taken by Business Entities in fulfilling the Capital Structure in PPP projects in Indonesia.

5. Result and Discussion

In this study, there are 12 determinants of the capital structure of the PPP identified, which are intended for infrastructure projects in general. Table 2 shows that 12 factors affect the infrastructure capital structure under the PPP scheme, but the top factors are Financial Viability, Business Risk, Project Participants and Country Factors. Each factor was identified 7, 5, 4, 4 and 3 times in the 12 journals considered in this study. This result shows the importance of these factors for the capital structure of projects under PPP schemes (Table 2).

Table 2. Identification of Determinants based on Literature

Determinants	Publications												Total
	1	2	3	4	5	6	7	8	9	10	11	12	
Financial Viability		X			X	X		X	X	X	X		7
Business Risk							X	X	X		X	X	5
Project participants			X	X	X	X							4
Country Risk Factors			X		X			X	X				4
Government Support	X			X	X							X	3
The Sources of Financial Instrument		X								X			2
Financial Condition of the Instrument		X										X	2
Discount Rate		X										X	2
Contract Type			X							X			2
Profit Sharing							X						1
Industry Factors									X				1
Managerial Behavior									X				1

5.1. Financial Viability

The capital structure is one of the critical issues to be solved in a privatized infrastructure project because it affects: (1) the total life-cycle cost of the project, and hence its financial viability; and (2) the interests of different parties to the project and consequently, their motivations and commitments to the success of the project, for different project participants have different views on the capital structure. The public and private sectors should benefit equally from a privatized initiative. That is to say, capital structure optimization should take into account the various needs, wants, and interests of each participant, and the project should be financially viable from both the public and private sectors' points of view (Zhang, 2015).

5.2. Business Risk

According to Hanafi (2006), risk is the magnitude of the deviation between the expected return (ER) and the actual rate of return (actual return). Meanwhile, according to Arthur J. Keown (2000), the risk is the prospect of an unfavorable outcome (operational as a standard deviation). Business entities expect the return-on-investment costs for a project to be commensurate with the risk of operating the project (Hoppe et al., 2013). The capital structure is a combination of debt and equity, which is the investment value of the project and the underlying value of the project (Chen et al., 2015).

5.3. Project Participants

Referring to the Public Private Partnership (PPP) Book "Guidelines for Investors in Investment in Infrastructure" issued by the Coordinating Ministry for the Economy, the following describes the main parties generally involved in PPP infrastructure projects and the relationships that exist between them. adapted to the transportation sector. These parties are:

a. Business entities
b. Foreign and Domestic Commercial Banks provide funding in the form of credit for the Project.
c. The Project Sponsors are the shareholders of the business Entity. The Project Sponsor may consist of local or foreign investors and in general they are responsible for carrying out project development apart from capital placement.
d. Infrastructure Guarantee
e. The Infrastructure Fund, known as the Indonesian Infrastructure Fund (IIF), is funded by the Government of Indonesia (through PT. Sarana Multi Infrastruktur), multilateral development banks, the International

Finance Corporation (IFC) and the German Government to provide credit for infrastructure activities in Indonesia.

f. Third Party Service Providers, may be included by the Business Entity for various purposes of project development and implementation, including engineering engineering, procurement and construction (EPC), operational and maintenance activities or Operation and Maintenance (O&M) and others.

5.4. Country Risk Factors

Country factors reflect various aspects (e.g., macroeconomic and financial environments) of host countries, such as gross domestic product (GDP), inflation, and stock and bond market development (De Jong et al. 2008; Altuntas et al. 2015). Country-specific determinants are categorized into three subgroups representing different aspects (i.e., macroeconomic environment, ease of doing business environment, and financial environment) of a country.

5.5 Government Support

Government support means tax incentives, incentives for the reduction of mandatory contributions, government grants, government-supported loans, and guaranties, trusts, or insurance provided by a government, irrespective of whether a private entity is wholly or partially responsible for management of the government support.

6. Case Study: Trans Sumatera Toll Road Development

Based on the research results above, we made a comparison with one of the largest PPP projects in Indonesia, namely the construction of the Trans Sumatra Toll Road (TSTR) on the Terbanggi Besar – Pematang Panggang – Kayu Agung (TBPPKA) section with a length of 189 km. The Government of the Republic of Indonesia commissioned a State-Owned Enterprise, Hutama Karya (HK), to build the entire Trans Sumatra Toll Road that will connect the Provinces of Aceh to Lampung on the Island of Sumatra. After HK has finished building the toll road, the Government of the Republic of Indonesia grants a concession right to HK as a business entity to operate the toll road for an agreed period of time.

Based on the Toll Road Assignment Plan (2015), the total investment needed to build the TBPPKA segment is IDR 14,900 billion with an economic internal rate of return (EIRR) of 23.90% and an internal rate of return (IRR) of 9.36%, where there was a decrease in the IRR to 8.08% after the COVID-19 pandemic conditions due to a decrease in traffic assumptions. Comparison of the capital structure in this section is 30% financed with debt and 70% comes from own capital where concessions are obtained by business entities for 40 years. With the initial conditions, especially the condition of the capital structure, it was difficult for business entities to seek funding, so the proposals were submitted to the Government of the Republic of Indonesia and other stakeholders, which will be described below. After these changes were made, the segment became financial close so construction could proceed.One of the basic infrastructure development policies in Indonesia is through the construction of TSTR project. The existence of TSTR provides great benefits for the Indonesian economy and especially on the island of Sumatera. Social benefits in the form of toll road revenues (as a financial benefit), savings in travel time from toll road users, as well as cutting carbon dioxide (CO^2) emissions. business entity running the TSTR construction business along 2,765 Km. With a low rate of return compared to the cost of capital, initially most of the TSTR segments had a large share of equity compared to debt so that most of the Business Entities were not interested in building the TSTR project. With a large level of equity, it is very burdensome for the business entity in the construction of this project. In line with the results of this study, the determinants of the success of the TSTR capital structure are determined:

6.1 Financial Viability

In the initial feasibility study for the TBPPKA section, the IRR for this project was below 10% or still below business feasibility where the tariff for this section is Rp. 900.00 with a concession period of 40 years. Increase financial feasibility through proposed business plans such as construction support for 80 km worth IDR 8.376 billion where the government of the Republic of Indonesia will build part of the roads on this section. Furthermore, the rate increase is carried out every two years where the first rate increase is 50%. Any business entity debt used for toll road construction is guaranteed by the Government of the Republic of Indonesia and the Indonesian Infrastructure Guarantee Agency. The responsibility for land acquisition is carried out by the Lembaga Manajemen Aset Negara (Institution under the Ministry of Finance). Extension of the concession period to 50 years and all capital participation comes from state capital participation. Based on these stages, there is an increase in IRR to above 10% or in accordance with business feasibility.

6.2 Business Risk

In the initial conditions, all development and operation risks are borne by the business entity. However, with the proposed business plan, any business entity debt related to the construction of the TSTR is guaranteed by the

Government of the Republic of Indonesia and the Indonesian Infrastructure Guarantee Agency. Land acquisition is carried out by the State Asset Management Agency (Institution under the Ministry of Finance). From this condition, the risks borne by business entity are reduced so that the implementation of development can run better. To guarantee the operation of this toll road, there is a Cash Deficiency Support (CDS) facility from a financial institution which is used to cover interest payments if the toll road cannot fulfill its obligations.

6.3 Project Participant

In the initial conditions, business entity experienced difficulties in seeking funding from bank and non-bank financial institutions as well as from investors. Currently there are several parties involved in the construction of this PPP project including the Government, namely the Indonesian Ministry of Finance, the Indonesian Ministry of Public Housing and Public Housing, the Ministry of State-Owned Enterprises (SOEs), Lembaga Manajemen Aset Negara, and Lembaga Penjamin Infrastruktur Indonesia. Third parties outside the government consist of banking and non-banking financial institutions, domestic investors in Indonesia and abroad, construction consultants and subcontractors in implementing the construction of these sections. With this support, more parties are involved in the development of this PPP project.

6.4 Country Risk Factors

Rating agency Moody's has decided to maintain the Republic of Indonesia's Sovereign Credit Rating at Baa2 or one notch above investment grade. Moody's views this decision as in line with the results of an assessment that Indonesia's economic resilience and the effectiveness of monetary and macroeconomic policies are maintained. It is also believed that the structural reform policy pursued by the Government will support increased investment and support improvement in export competitiveness. Moody's projects that Indonesia's average economic growth will return to pre-pandemic levels, reaching 5%. This average is higher than other countries ranked at Baa, which is 3.7%. The forecast for increased economic growth is also supported by various structural reforms that have been undertaken by the Government, such as the Job Creation Law and HPP Law, which are aimed at improving the investment climate and increasing Government revenue. From a fiscal standpoint, Moody's estimates that the Government's debt burden will still increase to a level of 42.5% of Gross Domestic Product (GDP) in 2023, but still far lower than other countries ranked Baa, which is 64% of GDP. In addition, Moody's views the ability to pay the Government's debt, as well as the portion of loans in foreign currency, still pose a risk to fiscal conditions. An assessment conducted by Moody's shows that Indonesia supports the investment climate with a rating of one notch above investment grade.

6.5 Government support

In the initial conditions, there was almost no support from the Government of the Republic of Indonesia in developing this PPP project. The proposed business plan includes support from the Government of the Republic of Indonesia, including government guarantees, additional state equity participation, additional tariffs, additional concession periods, construction support and the Government of the Republic of Indonesia is responsible for land acquisition through Lembaga Manajemen Aset Negara.

From the explanation above, an effective capital structure is obtained where 71% of the financing comes from debt and 29% comes from equity. There was a decrease in the cost of debt because the loan was guaranteed by the Government of the Republic of Indonesia. In addition, there is a CDS facility to cover loan interest payments.

7. Conclusion

This study identifies the factors that influence the capital structure of a PPP project. The results show the following top factors: Financial Viability, Business Risk, Project Participants and Country Factors. The study is intended to address the problem of selecting the appropriate capital structure to offer adequate funding for PPP infrastructure projects by taking the top considerations. The author made a comparison with the implementation of the TSTR development on the island of Sumatra and the results are appropriate. From a theoretical perspective, this research not only enriches research on the capital structure of PPP projects. In practice, these findings can be a reference for a more comprehensive capital structure solution. This study has various limitations in addition to achieve the research aims. Due to the complexity of the PPP project's capital structure, numerous factors including the source and percentage of debt financing might be examined. In addition, this paper does not fully consider the different roles of the public and private sectors.

Future research can pay more attention to the differences to achieve more comprehensive results. In addition, considering the character of the different project areas or countries, future studies can focus on one particular region or country to make an in-depth and targeted analysis.

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