A framework to assess success criteria performance of public private partnership (PPP) toll road projects in Indonesia

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Abstract. Public Private Partnership (PPP) is widely used to bridge infrastructure projects in the world. PPP arises as a result of the ongoing budget constraints faced by various governments and part of the limited private sector opportunities in infrastructure development. In Indonesia, the implementation of PPP has not been successfully implemented. In 2017, 22 PPP projects were offered, but only 5 projects were signed. According to previous studies, there are some problems related to PPP implementation in Indonesia. Referring to this, PPP project success criteria are very important to be defined to assess the success of this type of project. Data collection procedure consists of preliminary survey involving experts in the field to verify the research attributes, followed by main survey to collect respondents’ perception regarding the attributes using Likert Scale. Importance Performance Analysis (IPA) is proposed to measure the performance of each success criterion in each respondent sector and followed by gap analysis to investigate critical gaps between them. The results of this paper are a methodological framework model that presents a gap implementation and a performance of the successful PPP criteria for toll road projects in Indonesia. These results can be used to assess the performance of PPPs in Indonesia.

1. Introduction
Economic growth in Indonesia gradually began to rise since the economic crisis that struck in 1990. Recent data show that from 2015 to 2018 Indonesia’s economic growth experienced a consistent increase and was still maintained at the 5% level [1]. To help the pace of economic growth, it needs to be balanced with an increase in adequate infrastructure. Understanding that this is not just an easy problem, the government is beginning to realize the important role of the private sector to meet the needs for this infrastructure. Public Private Partnership (PPP) is widely used to bridge infrastructure projects in the world [2]. PPP arises as a result of budget constraints that are constantly faced by various governments and part of the limited opportunities for the private sector in infrastructure development [3].

In the early 1990s, PPP was an innovation in private sector financing for infrastructure and at the same time, PPP provided an overview of the provision of public assets and services through the participation of the public, private, and consumer sectors [4]. In its development, the government began to explore any alternatives, and the PPP can facilitate various infrastructure development needs, such as transportation infrastructure, sports facilities, water treatment facilities, and waste management. In recent decades, the concept of PPP has spread rapidly, especially among developing countries. Governments in many developing countries are now considering the concept of PPP as an innovative
approach in bridging their large infrastructure gaps [5]. In Indonesia, PPP implementation has been tried since 1997-1998, but there are still many that have not been optimal. In Indonesia, one of the most dominant sectors is the toll road.

The Indonesian toll road industry has a positive outlook. The potential for strong demand is due to the limited construction of new public roads and the slow growth of public transportation infrastructure. Demand in the toll road industry is still promising, especially for inter-city toll roads. Toll road construction has been carried out in Indonesia since 1978 and currently around 1500 km of toll roads have been in operations [6]. The main purpose of developing toll roads is to reduce traffic congestion in urban areas and to support regional growth. Newly data for PPP projects offered in 2017 stated that 22 projects with PPP scheme were offered but only 8 projects in 2018 were tendered, 5 projects signed and worked on toll road projects and one of these projects was located in East Java [7].

Apart from the various success stories regarding PPP implementation in toll road construction in Indonesia, there are still a number of problems and issues that need to be addressed. Related to this, the Indonesian government has also worked hard to make PPP successful in this sector. There are many issues related to PPP problems that cause failures including: high costs in the tender process, complex negotiations, cost limitations in innovation, different or conflicting goals among project stakeholders [8]. Even though Indonesia is one of the countries that offers the biggest opportunity in Asia to invest in the national infrastructure sector [9], the lack of PPP implementation in Indonesia is because the private sector is aware that conducting PPP business in Indonesia is still very difficult [10]. If it is related to the market maturity curve [11], Indonesia can be considered having a high PPP activity but a low institutional and legal framework. This is confirmed by the statement that one of the reasons for the slow progress of the PPP is due to the inadequate policy framework, which includes the legal framework and institutional framework [12]. Moreover, the willingness of the private sector to take part in a project is based on where the project environment takes place [13]. Many issues related to the success of the PPP project give a question about the meaning given to how the PPP is considered successful and what constitutes success for the PPP itself.

Basically, the success of the PPP project has different meanings for various stakeholder groups [14]. It is important to see different understandings of 'success' that have emerged in some literature about PPP and how success can be related to various forms of PPP. The term Critical Success Factor (CSF) is often used as an additional success factor in the literature. In PPP, this factor will affect the private sector that brings superior resources and financial capital and knowledge. In line with the importance of success factors that has been widely studied, doubts often arise about what and who actually determines the success of the project. Measuring project success is difficult to understand, despite of that, to measure success in certain dimensions there is a need to identify adequate success criteria that will enable the assessment of success [15].

Success criteria are often considered similar as success factors in the literature. However, these two terms must be distinguished because these two terms are actually different [10]. A criterion is a set of principles or standards by which an assessment is made; whereas factors are a set of circumstances, facts, or influences that contributes to the outcome [16]. Success criteria can be described as a standard on which the success of the project is assessed. Success/failure of a project is determined by the outcome measure of the selected success criteria [15]. Although there are a lot of literature studies on the success factors of general construction projects and project perspectives related to PPP, many previous studies have only raised the success factors for PPP projects in Indonesia; however, there is still very little research that discusses PPP performance in Indonesia based on standards that are described from the project's success criteria. Later research is not limited to measuring performance alone, but the use of the PPP success criteria for the project should be expanded by using it to evaluate performance and by prioritizing efforts for improvement. The general management technique that fits this purpose is Importance Performance Analysis (IPA).

This paper tries to evaluate the current conditions in the PPP implementation process for toll road projects in Indonesia that will be able to assist the government and the private sector in identifying and measuring their performance based on success criteria.
2. Literature review

The theory that underlies this research includes Public Private Partnership (PPP) and concept of success criteria as an alternative assessment for measuring success in Indonesia’s toll road PPP.

2.1. Public private partnership (PPP)

Public Private Partnership (PPP) is described as a long-term arrangement between public institutions and private sector organizations where both parties carry out their additional skills and assume various levels of responsibility and risk for the purpose of developing public facilities [8], [17]. The PPP concept consists of broad relationships between the public and private sectors to develop projects or services. This contractual arrangement is built as a joint commitment, where cooperative work ideally takes place together with shared goals and authority, utilizing the strengths of each party such as creativity, efficiency, joint investment, and the allocation of risks and rewards [18]. The government can also utilize the flexibility of the private sector to innovate, obtain the latest expertise or knowledge and promote efficiency in government sector personnel by incorporating private best practices and the sophistication of the technology used [19]. As an operational definition, PPP in government is a contractual mechanism between private and public institutions which aims to provide certain assets to electronic facilities or services. They not only share responsibilities and risks, but they also invest together in organizational resources [20]. In return for this effort, both parties are valued based on agreed joint revenue and a performance-based cost collection and payment model [21]. Currently, governments in many developing countries are considering PPP as an innovative/alternative in covering the need for large infrastructure [5].

From a theoretical point of view, initially, public and local authorities assumed full responsibility for their services, provision, and territorial development. Meanwhile, in the case of PPP, the government sector delegates the provision of public services which require large investments in infrastructure and certain risks associated with the private sector in the long term, for the purpose of improving the situation [22]. Thus, the State is more likely to buy services from the private sector rather than has to involve itself in property development and public service delivery organizations related to the property. In other situations, PPP aims to accommodate situations where and when business activities are forced to reduce their level of activity as a result of reduced demand. PPP will allow to maintain and even increase the level of activity of some businesses, because the public sector does not invest in developing public services during the initial period, but this task is left to the private business sector instead and engaged in the process at a later stage. A significant advantage of this model is that the managerial experience of the private sector allows it to implement projects faster and with higher quality. The fact is that private companies have more specialization in their fields, because they are more experienced in investing and have more opportunities to obtain capital loans from banks. Partnership conditions like that make it possible to do what they know, private businesses must develop infrastructure and provide services, and the public sector will create favorable conditions.[23], [35].

2.1.1. Current situation on toll road infrastructure in Indonesia. Infrastructure development is an important and vital aspect for a country's economic development. A country's economic growth cannot be separated from the availability of infrastructure such as transportation, telecommunication, sanitation and energy. The development of transportation sector is the main dimension to encourage and contribute more to the country's economic progress [24]. Toll road development in Indonesia has started since 1978 with a State-Owned Enterprise (SOE) PT Jasa Marga as the operator and regulator of toll roads [12]. Initially, the PPP concept was not introduced to toll road development. The involvement of the private sector in the provision of toll roads began in 1983. The Government of Indonesia invited the private sector to take part in providing toll roads through the BOT (Build, Operate and Transfer) scheme and in 2004. Since 2004, the management of the implementation of Government Cooperation with Business Entities in toll road development can be done by the Government and/or Private [12]. Since then, every year, the development of toll infrastructure in Indonesia has always been included in the priority projects offered in Indonesia's PPP book [25]. For the East Java region at present, about 8 toll road projects are included in the national strategic projects. Apart from the various success stories regarding PPP
implementation in toll road construction in Indonesia, there are still a number of problems and issues that still need to be addressed.

2.2. Success criteria
The project success criteria are a set of principles or standards by which project success can be assessed. This is a condition under which judgments can be made. On the other hand, the factors for project success are a series of circumstances, facts, or influences that contributes to the project's results. This is an influential force that facilitates or impedes project success. They contribute to the success or failure of a project, but do not form the basis of assessment [16]. In general, project success is described as achieving a number of criteria that are felt externally [26]. It was explained that there were 5 types of success in the collaborative process including: (1) achieving results, (2) getting the process to work, (3) achieving the existing milestone, (4) getting recognition from others, and (5) acknowledging personal pride in fighting for partnerships [27]. In the first point, what is meant by achieving results is achieving a predetermined mission. In the second part, it is explained that if the process runs smoothly and helps create new ideas and satisfaction among participants, then the process can be a criterion for success. The third point is about an innovation content that can be produced by a good process. Meanwhile, the remaining two factors relate to personal investment and perspective of the actors to make changes. Specifically, project success is the main objective of the project manager, and to achieve this goal, a series of main objectives must be achieved [28].

Success criteria for construction projects are grouped into two broad frameworks, namely the macro and micro viewpoints. The macro criteria include time, utility, and operation, while the micro criteria include time, cost, quality, performance, and safety [16]. Meanwhile, [33] presented two groups of criteria for the success of a construction project as an objective and subjective measure. The criteria for objective success are more easily measured and objective compared to measures of subjective success. Objective criteria include time, cost, accident rate, and net present value, while subjective measures include quality, functionality, end-user satisfaction, client satisfaction, and design and construction team satisfaction. Still related to the criteria for success, [29] divides project success into three dimensions: project management success, product success, and market success. Project management success focuses on achieving management targets in terms of time, quality, and cost. The second dimension relates to final product targets in terms of customer satisfaction, technical specifications, and functionality, while the third category focuses on project potentials that contribute to the company's long-term success in terms of reputation, revenue, market share, and competitive advantage. Not much different from the general success criteria, [30] identified success criteria in developing countries and concluded that there were four groupings that underlie success measures, including costs, time, quality, customer satisfaction, and environmental impact. Meanwhile, [31] assess the success of large-scale public projects based on safety, efficient use of resources, reduced conflicts and disputes, stakeholder satisfaction, and effectiveness. This is very different from the general definition, where [31] argue that traditional measures of time, quality, and cost no longer apply in evaluating the success of large-scale public development projects. Each project has a set of objectives to achieve, and they serve as a standard for measuring performance. The criteria are needed to compare the level of objectives with the level of performance, and project success is to achieve project goals and stakeholder satisfaction. This resulted in 25 success criteria which can be seen in Table 1.

| No | Success Criteria | Definition | Source |
|----|-----------------|------------|--------|
| 1  | Local economic development | The project contributes to the economic development of the surrounding community | [32] |
| 2  | Reduced litigations and disputes | Contract litigations and disputes are minimized throughout the project lifecycle | [32], [33] |
| 3  | Effective risk management | Risks are properly identified. The risk sharing and transfer mechanism are agreed upon and implemented effectively by the government & business entities | [34], [35] |
| No | Success Criteria                                      | Definition                                                                                                                                   | Source       |
|----|-------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| 4  | Budget solution                                      | Solve the problem of restraining the public sector budget                                                                               | [36]         |
| 5  | Reduced public administration costs                  | Lower costs are incurred by the public sector in project administration because the risk of large projects is allocated to the business entity sector | [34], [37], [38] |
| 6  | Reduced public and political protest                 | Reduction in agitation (resentment due to provocation) and protests, which often arises due to increased tariffs, lack of transparency, corruption, etc. | [38]         |
| 7  | Project on time                                      | Projects in construction / before the time schedule for commissioning (implementation)                                                    | [5], [29]    |
| 8  | Accordance with the budget                           | Projects are built according to estimated costs and without excess of operational costs                                                    | [29]         |
| 9  | Additional financial resources for another priority projects | This relates to the allocation of public money for other important projects.                                                                      | [38]         |
| 10 | Environmental performance                            | The project does not affect the health and safety of residents or the environment                                                            | [28], [38]   |
| 11 | Attract towards toll road users                      | Should attract sufficient traffic so project benefit will exceed project cost                                                                   | [10], [39]   |
| 12 | Vehicle operational optimization                      | Reduce vehicle operating costs and reduce travel time                                                                                       | [10], [40]   |
| 13 | Development of alternative public transportation      | Should contribute to transportation costs and time savings that support the economy, alleviate poverty, increase community employment and increase government revenue | [10], [40]   |
| 14 | Reducing project life cycle costs                    | Lower lifecycle costs are realized, which increase the value of the project money                                                             | [37]         |
| 15 | Reliable and quality service operations              | Continuous and uninterrupted project services are provided and in accordance with user satisfaction                                           | [5], [41]    |
| 16 | Satisfy the needs of public facilities / services    | The PPP project carried out fully meets the needs for public facilities / services                                                             | [37]         |
| 17 | Effective technology transfer and innovation          | Technology and technical innovation are shared effectively among stakeholders, especially with local practitioners                            | [5], [14]    |
| 18 | Long term relationship and partnership               | Good relationships and established coordination are formed among the stakeholders                                                              | [5], [36]    |
| 19 | Long project life span                               | Longer life span means the availability of products or services in a longer period. For PPP projects with certain concession periods, a longer range means the remaining service period is longer after the project transfer to the client | [38]         |
| 20 | Increased construction and maintenance capabilities   | Constructability and maintainability are two important issues that must be considered in the design process. PPP projects encourage adequate attention at these points. | [5], [38]    |
| 21 | Low tariffs/tolls                                    | The tariff / toll level measures the cost of using project facilities. Determine the level of profit of the concession holder. Increased efficiency allows low tariff / toll level | [32]         |
| 22 | Profitability                                        | Earnings / profits are continuously received by the collaborating agents during the project operation                                          | [14]         |
| 23 | Modular and repeatable design / construction         | Facilitate public clients to develop similar projects in the future                                                                            | [5], [38]    |
| No | Success Criteria          | Definition                                                                 | Source      |
|----|---------------------------|---------------------------------------------------------------------------|-------------|
| 24 | Addition of facilities    | The public sector can obtain additional facilities / services outside the requirements of the business sector | [5], [32]   |
| 25 | Public sector guarantee   | The private sector can get government sponsorships, guarantees and tax reductions | [5], [37]   |

3. **Research methodology**

This study uses the Gap analysis (GA) method which is a representative variant of the IPA method to measure the level of importance and to prioritize criteria that require improved performance. GA is a methodological framework at which gaps are weighted according to the importance of factors [9]. Importance-performance analysis (IPA) is a method that provides a two-dimensional grid of performance interests where the values of importance and performance among the various attributes are plotted with each other and the resulting interest-performance space is generally divided into four quadrants [32]. IPA provides a measure of how well a service is to meet the needs of consumers. Before plotting with IPA, a GAP analysis is performed to show the critical gap between each variable, then a Paired T-test is conducted to show that there may be a significant gap between the level and importance of the criteria in understanding the respondents. The results of the identification of critical gaps obtained from paired T-test and gap analysis will be plotted to the IPA to provide an indication of which criteria get an assessment of their performance and to be included in the recommendations for performance improvement efforts. Based on this, this study aims to identify the criteria for success of the Indonesian PPP project, to measure the level of importance, and to prioritize criteria that require performance improvement.

3.1. **Data collection**

The initial step in obtaining data is to compile a list of experts and practitioners affiliated with the main organizations in developing PPP, from which the list is then carried out by distributing preliminary questionnaires to validate the variables obtained from literature studies in accordance with field implementation. Then, a pilot test is carried out to ensure that the questionnaires can be understood by respondents and there are no problems with the questions asked [10]. After the preliminary questionnaires and pilot test, the main survey was conducted with a questionnaire filled out by key stakeholders from public and private sector organizations, who have adequate knowledge of PPP projects in Indonesia including the Ministry of Finance, coordinating institutions and contractors, the Indonesian Infrastructure Guarantee Fund, BAPPENAS, The Indonesian Investment Agency, PT Jasa Marga, and other related organizations. To accommodate the limitations of questionnaire and respondent distribution, questionnaire surveys will be used through online questionnaire platforms. The Snowball method is also used to identify potential respondents who can be contacted for the main survey. The main questionnaire survey was conducted to obtain the value of approval and satisfaction with the practice of toll road PPP in Indonesia.

3.2. **Data analysis**

Data received from the results of questionnaires will be tested for validity and reliability. Data validity test is used to measure valid or invalid questionnaires. In testing the validity using SPSS aids, decision making is based on a significance value of less than 0.05 (5%), then the question items are declared valid. Then, the reliability test is a tool to measure the questionnaire which is an indicator of the variable or construct. The construct or variable is said to be reliable if it gives an Cronbach Alpha value $> 0.60$ [33]. Testing the validity and reliability will be assisted by the SPSS for Windows program. After going through the two tests, data analysis will be continued with GAP analysis which is a representative variant of the IPA method.

3.3. **Gap analysis**

The Gap Analysis consists of four main steps, consisting of Paired Sample T-test, Weighted Gap Analysis, Importance Performance Analysis, and Critical Gap Identification. First, the next step in data
analysis involves identifying the trust criteria which show a critical gap between the level of expected performance and the level of perceived performance. The identification of these criteria can give an indication of which criteria should be prioritized in relation to actions to be taken in an effort to improve the improvement of PPP performance in Indonesia.

3.3.1. *Paired T-test*. Paired sample T-tests aim to reveal significant differences between the level and importance of trust for each PPP success criterion. The results of Paired sample T-tests indicate that there may be a significant gap between the level and importance of trust in each success criterion.

3.3.2. *Weighted gap analysis*. Weighted gap analysis is used as a methodological framework in which the gap is weighed according to interests [9]. Weighted gaps for each confidence criterion are achieved by multiplying the average interest and the average gap together [34].

3.3.3. *Importance performance analysis (IPA)*. Importance Performance Analysis is used to map the relationship between interests and the performance attributes of each offerer and the gap between performance and attribute expectations. Importance Performance Analysis consists of two components: quadrant analysis and gap analysis. With quadrant analysis, it can be seen the response of respondents to the attributes plotted based on the order of importance (perception) and performance (expectations) attributes. Meanwhile, the gap analysis is used to see the gap between the attribute interests and the expectations of consumers / respondents for this attribute [33]. In this IPA analysis, SPSS for Windows program will be used as the software tool.

3.3.4. *Critical gaps identification*. The selection criteria for determining criteria with critical gaps are based first on the criteria that have the strongest indicative results from paired sample T-tests. The second criterion concerns existing criteria rated 1-6 results from weighted gap analysis. The third criterion is based on criteria that are included in the 'critical' or 'significant' areas resulting from the IPA analysis [34].

4. Result and discussions

Applying a methodological framework can provide an overview of the current situation related to the performance conditions of the PPP success criteria in Indonesia. Based on literature review that was conducted, there are 25 success criteria. This research proposed a framework model to identify and measure the success criteria and their performance as the basis for the PPP project implementation improvement. This model creates a network that identifies and measures PPP success criteria performance in Indonesia.

5. Conclusion and further works

Based on the background of the problem and the literature review, this study discusses about evaluating the current conditions in the PPP implementation process for toll road projects in Indonesia that will be able to assist the government and the private sector in identifying and measuring their performance based on success criteria. This study proposes the framework model to identify and measure the success criteria and their performance as the basis for the PPP project implementation improvement. This paper can be replicated with a strong theoretical basis to assist governments and the private sector in identifying and evaluating the success criteria for PPP under their control, and in measuring their performance based on these success criteria.

In further research, the framework model needs to be tried on the actual project toll road as a case study. The weight of the success criteria generated in the analysis of the model can be taken into consideration for the prioritization of proposed improvements to the criteria that have low performance.

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