Master Thesis

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Exploring the Social Potential of Public-Private Partnerships in Transport Infrastructure

A conceptual model and empirical study of a Toll Road Project in Indonesia

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EXPLORING THE SOCIAL POTENTIAL OF PUBLIC-PRIVATE PARTNERSHIPS IN TRANSPORT INFRASTRUCTURE

A conceptual model and empirical study of a Toll Road Project in Indonesia

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Research Summary

Public-private partnerships (PPP) is one of the project procurement strategies that has been implemented in transport sector. Koppenjan (2005) defined PPP as a form of structured collaboration framework where risks, costs, benefits and resources are shared between public and private sector from the start of a project to the operation or maintenance. Most of the research that has been done revealed the use of PPP is still being in question, whether the benefits outweigh the costs of PPP. For instance, in some cases, there are cost overruns that have exceeded the planned budget in the initial contract even in a fairly large margin (Hodge & Greve, 2007). It is found in a paper by Decorla-Souza et al. (2013), nonfinancial aspects can be captured by using cost-benefit analysis (CBA) to explore potential welfare impacts of a PPP project. Although there has been found some significant benefits in CBA, the utilisation of CBA in transport PPP project appraisal remains a niche. Consequently, this study's objective is to research what PPP brings societally, as well as to contribute to the existing literature of transport infrastructure by exploring the social potential of PPP project compared to traditional public procurement through the use of societal CBA. The objectives are encapsulated into the main research question underlying this study, namely:

"What are the potential social impacts of PPP project compared to traditional public procurement in transport infrastructure by incorporating considerations from Cost-Benefit Analysis?"

Research methodology

Answering the research question entails two types of analysis: conceptual model development and empirical analysis. Theoretical conceptualisation is performed to identify the potential social impacts of a PPP project into two models, compared to traditional public procurement. On the basis of the identified theoretical considerations, some factors influencing a PPP project to generate potential impacts are thoroughly scrutinised. This development process was also conducted utilising analytical skills to further examine the literature findings. After the conceptualisation is done, the potential social impacts are subsequently investigated in an empirical setting. The idea behind a case study is that in order to obtain a clear picture of a problem, the real-world scenario must be examined from a variety of angles and perspectives. It involves an empirical analysis of a specific current topic in its actual environment utilising several data collection methodology (Yin, 2009). It should be emphasised that this case study collects both quantitative and qualitative data for analysis and interpretation. Quantitative research focuses on gathering numerical data and conducting numerical analysis in order to understand that particular situation (Sekaran & Bougie, 2016; USC, n.d.). Meanwhile, some interviews were done to investigate qualitative information about which stakeholders the PPP would be beneficial, or would be a bad influence. In the end, the key findings in the empirical study are utilised to provide feedbacks on the conceptual models.

Results of the study

Some potential social impacts of a PPP project compared to traditional public procurement have been conceptualised into two models: PPP project with actual tolls and shadow tolls. In actual tolls, the road user has to pay for the road use themselves, whereas the government needs to return the

private investment as it is counted how much users use the road in shadow tolls. An inventory of the potential costs and benefits of a PPP project with both tolls are presented in the following table.

Initial impacts	*Potential social costs*	*Potential social benefits*
Higher construction costs	Higher construction costs (P)	Less maintenance costs (P)
		Higher traffic safety (R)
		Less travel time loss (R)
Higher risk premium		Less time overruns (P)
		Less cost overruns (P)
		Political credit gains (G)
		Lower political risks (G)
		Less risks burden (R)
Higher (**actual**) tolls	Mobility loss (P)	Reduced budget deficit (G) Higher revenue (P) Higher traffic safety (R) Less pollution (R)
Higher (**shadow**) tolls	No mobility loss (P)	Higher revenue (P)
Higher up-front transaction costs	Higher up-front transaction costs (G)	Less back-end transaction costs (G)
	Higher up-front transaction costs (P)	Less back-end transaction costs (P)

Legend: G = impact on public party, P = impact on private party, R = impact on road user

The similarities between the two models include the potential social impacts resulting from a number of theoretical considerations, such as cost-saving investment, quality-enhancing effect, better risks management, and higher up-front transaction costs in a PPP project. On the contrary, implications of toll road PPP with both actual tolls and shadow tolls also have different potential impacts due to the difference in payment arrangement for the road use. It is clear from the yellow-highlighted cells in the table that whether mobility loss does exist or not is what distinguish between the two conceptual models. Actual tolls under PPP project provide users with incentives to decide whether or not using the road, since they have to pay the tolls independently. It is thus understandable if there will be a reduction in traffic volume on the road (mobility loss). Road users who decide to avoid such costs will experience a loss of consumer surplus. However, those who keep using the road will experience travel time gains due to less congestion on the road. It is also important to note that mobility loss in PPP project with actual tolls will result in more societal gains, such as environmental gains in which less CO_2 emissions would be generated on the road (less pollution). Conversely, the demand for the road use will not be influenced in PPP project with shadow tolls, thus neither environmental nor travel time gains can be obtained.

It has to be acknowledged that this study is conducted on a positive case, where all potential impacts in the theoretical conceptualisation were confirmed in the empirical analysis of the Indonesian context. Based on the two scenarios, the outcomes of CBA demonstrate that both PPP project with actual tolls and shadow tolls have a positive Net Present Value (NPV) compared to the reference case. A positive NPV implies a net positive impact on social welfare in the PPP project. It is also important to realise PPP project with actual tolls has a larger NPV since the travel time gains are much higher than the potential costs of mobility loss. This may happen as there are more people who keep using the road of PPP project found in the empirical study. Further, if the environmental gains are feasible to monetise then the NPV of the PPP project with actual tolls could become much

higher. In contrast, the absence of mobility loss in the PPP project with shadow tolls will result in increased revenue for the private party. However, as there will no longer travel time gains it indicates that a positive net impact on social welfare in shadow tolls can only be achieved if the efficiency gained from the cost-saving investment is substantial.

Key takeaway

The key takeaway of the research is that in doing the CBA, outcomes of a PPP project compared to traditional public procurement is dependent on the way the tolls are implemented. The research shows the importance of distinguishing between PPP with actual tolls and shadow tolls. Reflecting on the theoretical conceptualisation and empirical analysis, there have been huge implications for the CBA outcomes since there are different potential social costs and benefits to be expected in the two models. For instance, it is important to realise there would be more societal gains, such as travel time savings and environmental gains in a PPP project with actual tolls. On the other side, the use of shadow tolls in a PPP project has the potential to provide a greater societal benefit to the private party since the demand for the road use would not be influenced. The insights presented in this study, more specifically, has demonstrated significant implications of the CBA outcomes to the public party, the private party and the road user.

Implications

The research scientifically contributes to the existing body of knowledge on exploring the social potential of a PPP project. Further, this research also advances the body of literature on the novelty of theoretical conceptualisation of the potential impacts of PPP project compared to traditional public procurement by incorporating considerations from CBA. Compared to findings in current scientific literature (see Chapter 2), this research advances the literature by presenting the importance of distinguishing between PPP with actual tolls and shadow tolls. Significant theoretical implications for the CBA outcomes have been outlined considering there are different potential costs and benefits in both conceptual models.

From a public perspective, the outcomes of the CBA imply that using actual tolls in a PPP project would be more desirable due to more fiscal freedom that can be obtained by the government. From a private perspective, it is perceived PPP project with shadow tolls would be more beneficial for the private parties through receiving higher revenue for return on their investments. Meanwhile, this study finds either actual tolls or shadow tolls is more desirable for a road user is still case dependent. It means road users will only greatly benefit more societal gains as long as they want to spend more effort in the sense of spending higher tolls in the user charges model.

Key words: public-private partnerships, cost-benefit analysis, transport infrastructure, social impacts, actual tolls, shadow tolls

List of Abbreviations

APBN	*Anggaran Pendapatan dan Belanja Negara* (Government Budget)
BCR	Benefit-Cost Ratio
BOT	Build-Operate-Transfer
BPJT	*Badan Pengatur Jalan Tol* (Indonesia Toll Road Authority)
BTO	Build-Transfer-Operate
CBA	Cost-Benefit Analysis
DBFO	Design-Build-Finance-Operate
DJPI	*Direktorat Jenderal Pembiayaan Infrastruktur* (Directorate General of Infrastructure Funding)
GOI	Government of Indonesia
GR	Government Regulation
JJC	Jasamarga Jalanlayang Cikampek
JMBD	Jasa Marga Business Development
MBZ	Mohammed Bin Zayed
MR	Ministerial Regulation
NPV	Net Present Value
PFI	Private Finance Initiative
PII	*Penjaminan Infrastruktur Indonesia* (Indonesia Infrastructure Guarantee Fund)
PJPK	*Penanggung Jawab Proyek Kerjasama*
PPP	Public-Private Partnerships
PSC	Public Sector Comparator
PUPR	*Kementerian Pekerjaan Umum dan Perumahan Rakyat* (Ministry of Public Works and Housing)
RFP	Request for Proposals
SPM	*Standar Pelayanan Minimal* (Minimum Service Standard)
VFM	Value for Money
VSL	Value of Statistical Life
VTTS	Value of Travel Time Savings

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Chapter 1. Introduction

1.1. Research background

The importance of transport infrastructure

Over the last two decades, the impact of public infrastructure spending on economic development has received much interest in the economic literature. By lowering travelling costs and enhancing accessibility, public infrastructure, particularly transport infrastructure can help boost overall economic performance. The transport infrastructure comprises all the systems and facilities that are required to ensure the process of an economy's day-to-day activities and to raise the living standards of citizens. Roads, railroads, airports and seaports are some examples of transport infrastructure that has often been advocated as a critical factor in promoting well-being, productivity and economic growth (Deng, 2013; Elburz et al., 2017; OECD, 2013). To be able to construct transport infrastructure, infrastructure procurement is essential. The procurement method serves as a baseline for recognising the obligation of relevant stakeholders, as well as for outlining the financial and legal parameters within which the project will be executed (Lam, 2004). Accordingly, project procurement strategy is considered to be a critical component in the practice of almost any commercial endeavour or construction development, and it has a significant impact on the final project results (Doloi, 2012).

Public-private partnerships procurement strategy

One of the project procurement strategies in transport infrastructure is public-private partnerships (PPP). Ever since the Private Finance Initiative (PFI) was presented in 1990s, PPP has attracted a great deal of attention in the development of infrastructure projects all over the globe, including in developing countries (Hodge et al., 2018). In general, PPP is described as a long-term collaborative effort between public and private sectors to provide infrastructure and services while the risks, costs and benefits are shared between the two groups (Hodge & Greve, 2007; Klijn & Teisman, 2003; Koppenjan, 2005). PPP can be classified into two models: the concession and the alliance. Concession is a model in which the government delegates some of their tasks or responsibilities to the contracting private sector. On the other side, both public and private sectors may participate in the development, maintenance and/or operation of the infrastructure facility under a joint-venture agreement in the alliance model (Endo et al., 2021).

This collaboration is hence considered an innovative approach of improving transport infrastructure while also contributing to satisfy the growing needs of such infrastructure (Yescombe & Farquharson, 2018). More importantly, PPP in developing countries have favoured to address the issue of budget constraints of the public sector (Endo et al., 2021). Other possible driving forces are lowering public sector borrowing costs, opportunity cost of public funds and foreign exchange, but also potential efficiency and experience brought by the private sector to the project. Regardless of the intention for implementing PPP in transport infrastructure, the partnerships are aimed at delivering infrastructure projects or services at reasonable cost and with attention to social aspects. It is also becoming more common for the government to compare public-funded and alternative

solutions (Estache, 2011). There are various benefits to a PPP for both public and private parties, but also some pitfalls (Alexandersson & Hulten, 2009), which will be elaborated in literature review section.

Challenges in public-private partnerships

The use of public-private partnership contracts has been considered effective in accessing innovative finance and avoiding cost overruns than conventional contracts. However, the claim is still weak as it lacks concrete evidence that PPP can outperform regularly procured project. There is less indication of effectiveness in terms of shifting revenue risk or realising efficiency advantages (Wang & Zhao, 2018). The existent evidence as far counts on reports or observations of usually unscientific observers and subjective data. Additionally, Verweij & van Meerkerk (2021) found that although PPP projects performed better regarding cost and time overruns than the conventional projects, the difference was not statistically significant. Further research is also recommended to explore the impacts on sustainability, risk, maintenance/operation, innovation, or other perhaps social benefits, since valuing the PPP only on the basis of cost and time performance may seem to be too narrow.

The need for incorporating Cost-Benefit Analysis to evaluate a PPP project

In fact, "The main rationale behind PPP projects is efficiency" (Cruz & Marques, 2013, p. 5). Value for Money (VfM) has been frequently used to examine whether a public-private partnership is likely to be more efficient and financially superior to traditional ways. This is an evaluation method that focuses primarily on the financial implications of procurement models from the perspective of the agency sponsoring a project (Wang & Zhao, 2018). However, Decorla-Souza et al. (2013) has stimulated discussion in the transportation community to improve the state of the practice of PPP evaluation by incorporating cost-benefit analysis (CBA). CBA is able to quantify and monetise non-financial impacts, thus it can also be used to measure welfare impacts of PPP projects compared to non-PPP projects. Another study also suggested that social CBA needs to be done by the government as part of their evaluation procedures, particularly before the Request for Proposals (RfP) for a PPP project is launched. This is carried out initially in order to assess whether the PPP project is beneficial to society. If the project evaluation produces a positive CBA, then the PPP option might be better than the conventional one (Tsamboulas et al., 2013). On the other side, conducting and publishing more *ex-post* CBA reviews of PPP projects are also recommended to give more weight to the economic and social impact of PPP to procure social infrastructure (O'Shea et al., 2020). Lastly, Oyeyoade (2012) demonstrated that CBA is also required in PPP projects as a base to present that a private partner involvement into public project should bring more benefits from social point of view than other procurement arrangements. To summarise, there has been found some scientific studies that link CBA as an analytical tool to evaluate the welfare impacts of PPP projects.

1.2. Problem statement and knowledge gap

Section 1.1 implies the use of public-private partnerships (PPP) in transport infrastructure is still being in question, whether the benefits outweigh the costs of PPP. For instance, in some cases, there are cost overruns that have exceeded the planned budget in the initial contract even in a fairly large margin (Hodge & Greve, 2007). Therefore, there are some analytical tools which can be used to evaluate it, one of which is Value for Money (VfM). Although VfM has been used frequently to figure

out about how the PPP procurement strategy has affected transportation projects, there are some drawbacks in which the approach only focusses on financial aspects. It is, therefore, important to realise that the nonfinancial aspects of PPP can be captured through using Cost-Benefit Analysis (CBA). A paper by Decorla-Souza et al. (2013) has revealed that CBA is considered more applicable to explore potential welfare impacts of a PPP project.

Built on these findings, this study identifies a knowledge gap within the literature about the application of using CBA in evaluating the effectiveness of PPP project compared to non-PPP project, and offers future studies where an interesting main research question is proposed as stated in Section 1.4. To conclude, the literature review has assessed the current state of the literature on the use of CBA with respect to PPP. Although there has been found some significant benefits that can be captured by utilising CBA, there are still a niche application of CBA in analysing the impact of PPP in transport infrastructure. Accordingly, the potential emphasis of further research in this area will provide a more advance and comprehensive way of applying CBA in comparing PPP project to non-PPP project considering its ability to monetise all the nonfinancial aspects of project.

1.3. Research objectives

Based on the above, the overarching objective of this study is ***to research what PPP brings societally, as well as to contribute to the existing literature of transport infrastructure by exploring the potential impacts of PPP project compared to traditional public procurement through the use of societal Cost-Benefit Analysis***.

The objective is operationalised into five sub-objectives:

(i) Identify theoretical considerations regarding PPP project that can serve as the basis for the conceptualisation,
(ii) Conceptualise theoretically potential social costs and benefits of PPP project,
(iii) Investigate the theoretical conceptualisation in empirical setting,
(iv) Further improve the theoretical conceptualisation through findings in empirical setting,
(v) Evaluate the implications of the outcomes of doing CBA in PPP project compared to traditional public procurement.

Looking from the position of the whole society, the thesis will apply the societal CBA to the policy of PPP, which resulted in potential benefits and costs to different actors. Among the actors in question are the government, private parties and users of the road infrastructure. Therefore, this study is expected to deliver valuable insights into the distributional impacts of the CBA results for all actors participating in the PPP project.

1.4. Research questions

The objectives are encapsulated into the main research question underlying this study, namely:

What are the potential social impacts of PPP project compared to traditional public procurement in transport infrastructure by incorporating considerations from Cost-Benefit Analysis?

In turn, five sub-questions are formulated to answer the main research question (see Table 1).

Table 1. A list of sub-questions underlying this study

Code	*Sub-question*
SQ1	What factors influence the PPP project to generate potential social impacts?
SQ2	What are the potential social costs and benefits of PPP project theoretically compared to traditional public procurement?
SQ3	How is the theoretical conceptualisation represented in empirical setting?
SQ4	How can the theoretical conceptualisation be strengthened through findings in the empirical setting?
SQ5	What are the implications of the potential social costs and benefits of PPP project to the stakeholders involved?

1.5. Thesis outline

This report is divided into three parts. The first part will conceptualise theoretically the potential social costs and benefits of PPP project compared to traditional public procurement. This can be accomplished by performing study on existing scientific literature and critically analysing further potential impacts that can be realised in a PPP project. In light of the results, Part II entails a comparison analysis between PPP project and traditional public procurement in empirical setting. Therefore, the potential impacts will be investigated in a toll road project based on the conceptual models that have been constructed. The results of this empirical study will provide feedbacks on the potential outcomes of PPP outlined in the conceptual models in Part I. Lastly, Part III comprises conclusions, discussions and recommendations of this study. Sections within this part also include reflections on the results, implications for scientific literature and stakeholders, and limitations of the study. Finally, the research conclusions are provided with regards to the research questions, along with recommendations for future studies. A research flow diagram summarising the thesis' outline can be seen in Figure 1.

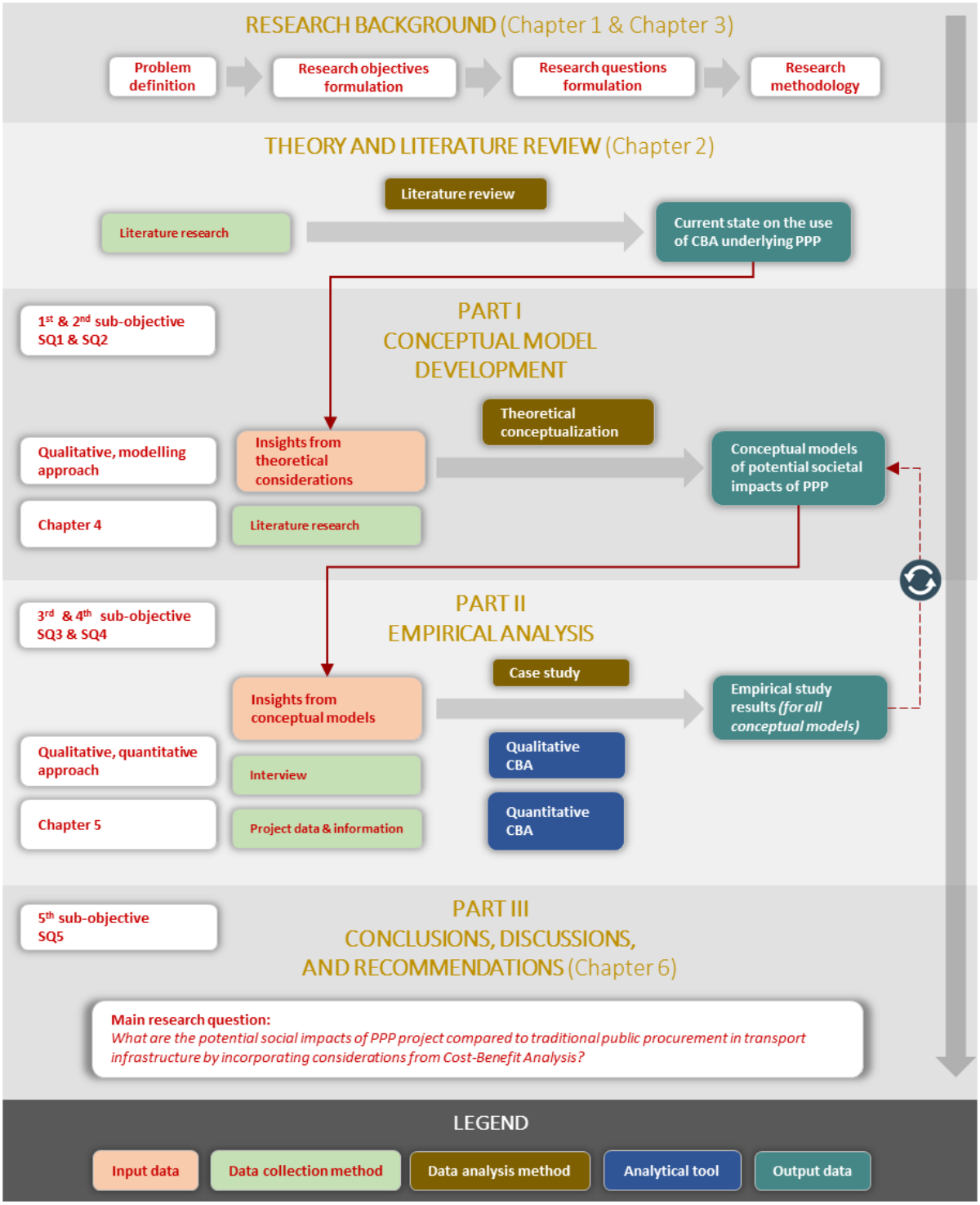

Figure 1. Research flow diagram

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Chapter 2. Literature Review

This chapter will discuss the current state of the literature on basic principles of public-private partnerships (PPP) and the use of cost-benefit analysis (CBA) in exploring the potential impacts of PPP project in transport infrastructure. The main findings are summarised in the following section which is organised into three parts. At first an overview of the main concepts of PPP including its definition, objectives, classification will be described. Then, the second part explores the use of CBA in appraising the potential impacts of PPP. Accordingly, three channels through which PPP procurement can boost efficiency above the levels that are obtained through traditional public procurement, particularly in transport infrastructure will be presented.

The articles used in this literature review were acquired by doing a computerised search of scientific literature via Scopus, Google Scholar, ScienceDirect and TU Delft Repository. The following keywords were used: *"public-private partnerships"*, *"transport PPP"*, *"impacts of PPP"*, *"benefits of PPP"*, *"costs of PPP"*, *"cost-benefit analysis"*, *"uses of CBA"*, *"PPP evaluation using CBA"*, *"efficiency in PPP"*.

The references of the obtained articles were checked but also look at which articles referred to the obtained articles, and subsequently included in the literature findings if they contain relevant information (forward and backward snowballing approach).

2.1. Overview of the literature review

The existing literature studying public-private partnerships (PPP) is examined based on the previous explanation about its main concepts, potential impacts and the evaluation tools, particularly cost-benefit analysis (CBA). Table 2 presents the overview of some important papers used in this literature review.

Table 2. Overview of the literature used

Author	*Title*	*Main concepts*	*Potential impacts*	*Evaluation tools*
(Cruz & Marques, 2013)	Infrastructure Public-Private Partnerships: Decision, Management and Development	✓	✓	
(Koppenjan, 2005)	The Formation of Public-Private Partnerships: Lessons from Nine Transport Infrastructure Projects in the Netherlands	✓		
(G. A. Hodge & Greve, 2005)	The Challenge of Public-Private Partnerships: Learning from International Experience			✓
(G. A. Hodge & Greve, 2007)	Public-Private Partnerships: An International Performance Review	✓		✓
(Alexandersson & Hulten, 2009)	Prospects and Pitfalls of Public-Private Partnerships in Railway Transportation: Theoretical Issues and Empirical Experience	✓	✓	
(World Bank, 2017)	Public-Private Partnerships Reference Guide (Version 3)	✓		
(Yescombe & Farquharson, 2018)	Public-Private Partnerships for Infrastructure: Principles of Policy and Finance	✓		
(Endo et al., 2021)	Coming to Financial Close in PPPs: Identifying Critical Factors in the Case of Toll Road Projects in Indonesia	✓		
(Wang & Zhao,	Evaluating the Effectiveness of Public-Private	✓		✓

Author	*Title*	*Main concepts*	*Potential impacts*	*Evaluation tools*
2018)	Partnerships in Highway Development: The case of Virginia			
(Estache, 2011)	Public-Private Partnerships in Transport		✓	
(Doloi, 2012)	Understanding Impacts of Time and Cost Related Construction Risks on Operational Performance of PPP Projects		✓	
(Decorla-Souza et al., 2013)	Comparing Public-Private Partnerships with Conventional Procurement			✓
(Boardman et al., 2013)	Cost-benefit Analysis: Concepts and Practice			✓
(Oyeyoade, 2012)	The Appropriateness of Cost Benefit Analysis (CBA) to Public Project Evaluation			✓
(O'Shea et al., 2020)	Using PPP to Procure Social Infrastructure: Lessons from 20 Years' Experience in Ireland			✓
(Tsamboulas et al., 2013)	Transport Infrastructure Provision and Operations: Why should Governments Chose Public-Private Partnerships?			✓
(Verweij & van Meerkerk, 2021)	Do Public-Private Partnerships Achieve Better Time and Cost Performance than Regular Contracts?		✓	
((EPEC), 2011)	The Non-Financial Benefits of PPPs		✓	

2.2. Main concepts of PPP

2.2.1. Definition

For the last decade, public-private partnerships (PPP) has emerged as a viable option for governments seeking to overcome budgetary constraints while also enabling them to benefit from private sector experience and ability in delivery and management of public services and infrastructure (Cruz & Marques, 2013). There are some definitions of PPP found in the literatures which actually make sense together.

The concept of PPP is defined as an arrangement of structured collaboration amongst public and private entities involved starting from the design, building, until the operation of infrastructure projects, where the risks, costs, benefits and resources are shared or redistributed between themselves (Koppenjan, 2005). Some see it as a novel form of governance that may eventually replace the conventional approach of procuring public services via competitive open public tender (Hodge & Greve, 2007). Another simpler definition was proposed by Cruz & Marques (2013) who stated that PPP is often referred to as a privatisation process, despite the fact that in PPP projects, the ownership is either left in the public domain or reversed at the completion of the contract. Furthermore, the ultimate purpose of PPP initiatives is to discover solutions to issues by combining the benefits of the private and public sector. Financial assets, advanced management, innovation and entrepreneurship are just a few of the benefits that the private sector may provide. Meanwhile, the expertise of the public sector is linked to social and environmental aspects (Alexandersson & Hulten, 2009).

Following the understandings mentioned previously, these are some key elements to sum up the framework of PPP as follows (Yescombe & Farquharson, 2018):

- PPP contracts are long-term agreements between public and private parties.
- The collaboration includes in the design, construction and operation of public facilities.

- All funding or significant portion are provided by the private parties.
- There are PPP contract payments to the private parties conducted either by public parties or general public as users of the facility or both.
- The facility remains in public domain or returning to public domain after the completion of PPP contract.
- Multiple risks are shared between public and private parties.

The aim is to provide a public service, which may include the provision of public infrastructure such as transport systems and facilities.

2.2.2. Objectives

Governments pursue PPP programs for different reasons. Most government define broad PPP program objectives when formulating and documenting their PPP policies. The choice and relative priority of these objectives cascade from the government's other policies and priorities (World Bank, 2017). The following table are examples of PPP program objectives in different countries:

Table 3. PPP program objectives

Country	*Reference*	*PPP Objectives*
Australia	National PPP Policy Framework	The aim of PPP is "to deliver improved services and better value for money, primarily through appropriate risk transfer, encouraging innovation, greater asset utilization and an integrated whole-of-life management, underpinned by private financing" (AU, 2016, Article 3).
Indonesia	Regulation of Government Cooperation with Business Entity in the Supply of Infrastructure	The purpose of PPP is set out as follows: • To fulfil sustainable funding requirements in the supply of infrastructure through mobilization of private sector funds. • To improve the quantity, quality and efficiency of services through healthy competition. • To improve the quantity of management and maintenance in the supply of infrastructure. • To encourage the use of the principle where users pay for services received; or in certain cases the paying ability of the users shall be taken into consideration. (ID, 2005, Chapter II Article 3)
Sao Paulo (Brazil)	Law 11688	The objective of PPP program is "to promote, coordinate, regulate, and audit the activities of the private sector agents who, as collaborators, participate in the implementation of public policies aimed at the development of the state and the collective wellbeing" (SP, 2004, Article 1).
Mexico	PPP Law	The objective of the PPP program is "to increase social wellbeing, and investment levels in the country" Law (MX, 2012, Article 1).

Source: (AU, 2016; ID, 2005; MX, 2012; SP, 2004)

It can be inferred from Table 3 that the aims of PPP program are not only about improving the procurement strategy of the project, such as by enabling greater investment and increasing access additional management capacity. Instead, since they are partnerships in PPP wherein public services will be delivered to citizens, PPP is created to primarily benefit communities by increasing their social wellbeing. This implies that government should formulate the program by going a step further

and making it a people-first approach. Therefore, how PPP must evolve to create social impact becomes more important in defining the PPP program objectives.

2.2.3. Classification

Public-private partnerships (PPP) can be classified into two types: the concession model and the alliance model. Concession is a model in which the public or government contracts out part of the activities and obligations of the projects to the private sector, whereas alliance is likewise an organisational cooperation partnership, allowing two organisations to work toward common or correlating goals (Endo et al., 2021).

	Public project ←——————————————————→ Private project					
			←— Public-Private Partnership ——→			
Contract Type	**Public-sector procurement**	**Franchise (*Affermage*)**	**Design-Build Finance-Operate (DBFO) ***	**Build-Transfer-Operate (BTO) ****	**Build-Operate-Transfer (BOT) *****	**Build-Own-Operate (BOO)**
Construction	Public sector [2]	Public sector [2]	Private sector	Private sector	Private sector	Private sector
Operation	Public sector [3]	Private sector	Private sector	Private sector	Private sector	Private sector
Ownership [1]	Public sector [4]	Public sector	Public sector	Private sector during construction, then public sector	Private sector during contract period, then public sector	Private sector
Who pays?	Public sector	Users	Public sector or users	Public sector or users	Public sector or users	Private-sector off-taker, public sector, or users [5]
Who is paid?	n/a	Private sector	Private sector	Private sector	Private sector	Private sector

* Also known as Design-Build-Finance-Maintain (DBFM)

** Also known as Build-Transfer-Lease (BTL)

*** Also known as Build-Own-Operate-Transfer (BOOT)

Figure 2. Private and public sector breakdown by type of PPP. Source: (Yescombe & Farquharson, 2018, p. 21)

According to some literatures, various forms of private sector roles and duties are included within the contract. Therefore, there are some types of contracts, of which Build-Operate-Transfer (BOT), Build-Transfer-Operate (BTO) and Design-Build-Finance-Operate (DBFO) are the three main contracts of PPP. All of them have similarities in fundamental but also differ in several aspects. The diversification of public/private roles for each contract can be seen in Figure 2. In BOT, the private sector (builder) is given the authority to design, finance, maintain and operate a facility. Tolls collected during the concession term are used to reimburse the project's costs. Meanwhile, the sponsoring government agency acquires legal possession of a facility built by the private sector in BTO. After that, the agency should return the facility to the government (developer) on a long-term rental agreement. During the term of the lease, the government runs the facility and makes a fair profit from the fees it collects from users. On the other hand, a DBFO contract lets the private sector to be in charge of all aspects of the project, from conception to completion, maintenance and funding included. During the course of the project the public sector pays the private sector for specified services (Cruz & Marques, 2013; Koppenjan, 2005; Wang & Zhao, 2018; Yescombe & Farquharson, 2018).

2.2.4. Life-cycle

According to Cruz & Marques (2013), it must first conduct preliminary studies before a PPP can be implemented. These preliminary studies may take many years and include forecasting and technical studies, as well as the first assessment of investment, expenditures, and revenues. Afterwards, procurement procedure, whose only objective is to pick the most competitive bid available, needs to be done. Following the signing of the contract, the winner will begin the necessary processes to create the infrastructure, which will include the design of the infrastructure as well as the actual construction of the infrastructure. After the completion of the construction, there is typically a brief period of commissioning during which technical verifications and quality assurance mechanisms are established. Once this procedure is completed, the actual operation may commence, along with any required maintenance tasks. After that, the contract is terminated, and the procedure is complete (Cruz & Marques, 2013). Figure 3 below demonstrates the life-cycle of a PPP project, provided with the respective roles of public and private parties throughout the course of the process.

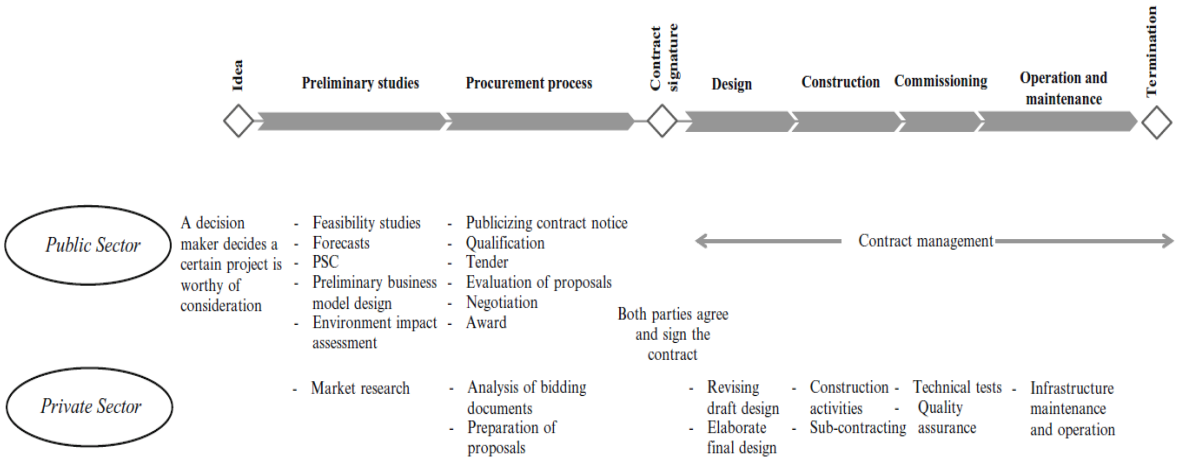

Figure 3. A PPP project's life-cycle with respective roles of public and private parties. Source: (Cruz & Marques, 2013, p. 16)

2.2.5. Potential impacts

A private-public partnership (PPP) offers several potential benefits to both the public sector and the private sector. Indeed, both parties are preoccupied with two distinct interests. Private's interest is defined as profit-driven, implying that they concern about the rate of return from taking risks and meeting their corporate goals. On the other side, policy and control are all driving factors in the public's interest, which is also influenced by public opinion and collective decision-making, with the goal of limiting risk while increasing societal value (Cruz & Marques, 2013). Among the benefits of private sector are the likelihood that they will get access to new venture activities and so generate more commercial activities, while also achieving greater margins and generating more long-term income (Alexandersson & Hulten, 2009).

Alexandersson & Hulten (2009) also identified some potential benefits for the public sector as in the following general points. First, improve service quality. PPP enables the public sector to decide and manage the quality of their service that will be provided to the public. As a consequence, the quality of services may be enhanced as they are equipped with better particular proficiency and technology.

Second, reduce project costs. The life cycle expenses of the whole project may be kept to a minimum. Such impact can be achieved as a result of the specialised expertise maintained by private firms on doing sort of project, opposed to the public sector. Furthermore, the reduced costs that the public sector benefit might not always come from the private sector, instead extra revenues may be generated due to its partnership's similarities. Third, improved budgetary compliance. Private sector involvement may produce a higher level of guarantee which perhaps the targets are met as well as price and subsidies are maintained. It thus decreases the likelihood of unforeseen cost overruns, implying better condition for the public sector to prepare for the long run. Lastly, risk sharing is one of the greatest benefits of PPP project that allows for more flexibility. When it comes to managing construction, schedule and market risk, private sector is superior instead of the public sector (Alexandersson & Hulten, 2009). In most cases, the private sector is more adept at handling business risks and duties involved with construction, operation, and financing. In comparison, transportation infrastructure almost always needs public involvement in domains such as land acquisition, political risk, but also traffic and revenue risk for certain circumstances. Further instance of distribution of the risks are that public sector will deal with risks such as weather and policy changes, whereas private sector will take aggressive measures to ensure that the project's revenue is not jeopardised (Estache, 2011).

Despite of its benefits, PPP projects are somehow often complex in nature, therefore there are inherent risks associated with them. This is mainly because some projects are coped with long-term investments comprising two stages: construction and operational / maintenance stages. Moreover, in both stages attributes and requirements vary greatly. Public-private partnerships may have the drawback of higher capital expenses. It is indeed possible that private partners would require to be compensated to be able to hold up several financial risks connected with a large-scale project. In other words, although the government is involved in assuring the completion of the project, the government may somehow be feasible to attain comparable costs of capital as well, associated with its costs of borrowing. Another potential downside of PPP is a loss of flexibility due to long-term agreements and lock-ins. In most PPP projects, all participants are expected to commit for an extended period of time so that decrease flexibility to a certain level. Whenever a party has spent a sunk investment in another party, such investment is done with the expectation that the partnership would persist. Alternatively, if such project incurs loss, the controlling party may either request that the project's term be renegotiated or withdraw by incurring any sunk costs. Because of this, the government may find itself in a difficult situation in the long run (Alexandersson & Hulten, 2009; Doloi, 2012; Estache, 2011).

2.3. The use of CBA in analysing the impacts of PPP

2.3.1. Evaluation tools of PPP

As previously mentioned, "the main rationale behind PPP projects is efficiency" (Cruz & Marques, 2013, p. 5). To further analyse the impacts related to the implementation of PPP procurement strategy in transportation projects, it requires some evaluation tools. Value for Money (VfM) has been performed frequently to assess transportation projects especially when it comes to highway projects (Decorla-Souza et al., 2013).

According to Decorla-Souza et al. (2013), VfM has been developed to establish whether or not it will be more financially advantageous by implementing PPP than instead of traditional procurement methods in assessing the same project. Since government entities have fewer resources, VfM implies that the issue to be addressed is that which procurement strategy will provide the most significance. Performing a quantitative VfM analytical tool employs a variety of methods. This can be done by first establishing an appraisal of the total financial implications of the project if it were procured using a standard procurement method, namely public-sector comparator (PSC). Second, it is important to estimate the whole cost of the proposed PPP alternative to the sponsoring parties. In addition, the last step is to compare net present value (NPV) of cash flows between the PSC and the PPP alternatives.

Nevertheless, this assessment tool is limited in that it only considers the financial implications of procurement methods from the standpoint of the party that is funding the project. The basic reliability and legality of the VfM approach, on the other hand, are being called into doubt (Hodge & Greve, 2007). The computation appears to be skewed in favour of the adoption of public-private partnerships. This would generate issues regarding a number of governance problems, particularly in the PPP planning phase that is often considered less transparent. There is also the problem of results changing over time, which is a concern with VfM after the *ex-ante* VfM study has been completed throughout the duration of PPP execution. Moreover, many situations, cost overruns have exceeded the initial agreement's budget by a large margin (Hodge & Greve, 2007). Therefore, the next question that may arise regarding PPP is: *Do they bring what they actually want to bring?*

2.3.2. The current state of incorporating CBA

As part of this literature review process, two publications by Decorla-Souza et al. (2013) and Wang & Zhao (2018) have described how cost-benefit analysis (CBA) principles might be included towards a more thorough method in comparing PPP project with non-PPP project. According to the research, nonfinancial implications, such as advantages to both users and non-users, are either not addressed or are consigned to a qualitative assessment when utilising a VfM evaluation. On the other hand, those nonfinancial implications as well as those due to a project's faster completion including in transport infrastructure, may be quantified and monetised using CBA, thus it is considered more inclusive than VfM. In that sense, the main concept of CBA is to quantify in monetary terms all the benefits and costs of a policy or project. Increasing social value or improving efficiency gains is the overarching goal of CBA. It is possible to apply CBA at various stage of a project's lifecycle which are *ex ante* and *ex post* CBA. *Ex ante* CBA is undertaken prior to initiating or executing the project, whereas *ex post* CBA is undertaken after the completion of the project (Boardman et al., 2013).

In accordance with a book by Boardman et al. (2013), "a key concept for valuing policy impacts is change in social surplus" (p. 87). It signifies that analysts conducting a CBA should assess the changes in social surplus that arise as a result of new policies, initiatives, or projects. The difference in social surplus reflects the change in allocative efficiency (or net social benefits). The total of consumer surplus, producer surplus, and government surplus represents the social surplus. Further, changes in social surplus are commonly depicted as triangular areas bordered by supply and demand curves. When the shapes and positions of the supply and demand curves prior to and following the policy change are known, calculating changes in social surplus is rather uncomplicated. However, these

curves are typically unknown in practice. CBA analysts should thus estimate them based on existing data or devise new methods for measuring costs and benefits (Boardman et al., 2013).

When it comes to determining whether an investment is worthwhile from a long-term viewpoint, CBA has been frequently used by governmental bodies especially in the planning and project development stages (Decorla-Souza et al., 2013). In a new road project, the costs are all things associated with the construction and maintenance costs. Conversely, the benefits can be the time travel savings, higher traffic safety, liveability, health of the inhabitants and landscape quality. All these features are possible to monetise when cost-benefit analysis is used. For example, the liveability or quality of life effects can be valued through a Willingness to Pay (WTP) survey or increase in real estate prices as a result of the road project. Thus, CBA is mainly used to answer the question whether the project's long-term benefits outweigh its short-term costs in societal context (Boardman et al., 2013).

Decorla-Souza et al. (2013) have explored the implications of incorporating CBA in the assessment of different procurement strategies. They discovered that there may be large nonfinancial benefits of PPP, such as accelerated delivery, enhanced delivery and wider social impacts. Accelerated delivery means benefits to users or nonusers that may accrue from earlier delivery of a project. Meanwhile, enhanced delivery refers to the additional quality of infrastructure assets and related services delivered in PPP projects ((EPEC), 2011). Further, Adighibe (2015) emphasized the consumer's perception of a benefit is the satisfaction, or the willingness (affordability) to pay for those goods and services at the price indicated in exchange for the benefit (value obtained). However, the application of using CBA in appraising PPP project is still limited. Therefore, the potential emphasis of further research in this area might be related to more advanced development and exploring how CBA may be utilised in addition to VfM in assessing PPP project in comparison to non-PPP project in the future.

2.4. Three channels of efficiency in PPP

The main justification for choosing PPP instead of traditional public procurement is the greater productive efficiency that can be reached by involving a private sector partner throughout the project's lifecycle. However, the cost-of-service quality may suffer as production efficiency increases i.e., allocative efficiency. The research on incomplete contracts has been used to study the trade-off between productive and allocative efficiency in PPP-type contracting (Grossman & Hart, 1986; Hart, 1995; Williamson, 1979). Blanc-Brude et al. (2009), furthermore, show that it feasible to make some solid conclusions about the circumstances in which PPP dominates over traditional public procurement, and vice versa.

Regarding productive efficiency in the delivery of infrastructure assets and services, the above-mentioned literature identifies three ways in which PPP procurement can increase productivity above the levels achieved by traditional public procurement: residual control (ownership) rights, bundling contracts, and risks sharing (Blanc-Brude et al., 2009).

2.4.1. Ownership rights

The concept of incomplete contracts admits from the beginning that the world is so complicated and uncertain that creating contracts is an expensive business. It is difficult to prepare for all potential occurrences throughout the length of the contract. Therefore, contracts, particularly those with lengthy terms, are subject to renegotiation. Because of the incompleteness of contracts, renegotiation will require ineffective bargaining and potentially even inability to come to an agreement. The result of any renegotiation will largely rely on the relative strength of the parties involved. Ultimately, the party to the contract that owns the asset or at least has control over the financial flows connected with it may make all choices about the asset. Residual control (ownership) rights relate to the control of an asset in the event of unanticipated circumstances that are not controlled by a contract (Välilä, 2020).

Välilä (2020) also highlights another important aspect of the incomplete contracts' theory, namely that contractual agreements requiring relation-specific investment are challenging in a complex environment, thereby rendering the contract incomplete. Specifically, a relationship-specific investment is an investment in an asset that cannot be utilized for reasons other than those specified in the contract. This is obviously relevant given that a PPP project is a relationship-based investment with an average contract duration of 20 to 35 years (long-term). The payments to the private sector might be paid by the government, as in Private Finance Initiative (PFI) projects, or directly by service users, as in default concession contracts (Fernandez et al., 2016). In other ways, relation-specific investments, such as PPP projects, tend to be sub optimally low in a complex environment where contracts can never completely account for all potential future outcomes.

Since contractual incompleteness makes it hard to distinguish between good-faith and bad-faith renegotiation, contractual incompleteness offers incentives for ex post bargaining on the profits created by the investment in the particular asset. Given the risk of bad-faith renegotiation, the optimum investment in a particular asset will be less than it otherwise would be (Blanc-Brude et al., 2009). Based on this analysis, Grossman & Hart (1986) hypothesized that the assignment of ownership rights to the relation-specific asset may be created to ease the under-investment issue. In this application, ownership rights refer to residual control rights that bestow negotiating power, providing the asset's owner complete control over the asset and the ultimate word in the event of a dispute.

In principle, an adequate assignment of ownership (or control) rights of a (infrastructure) asset may enhance productive efficiency by driving relation-specific investment, even when contracts are incomplete. Additionally, Blanc-Brude et al. (2009) concludes that where relation-specific cost-saving investments may be made, asset building costs should be higher under a PPP than under traditional public procurement.

2.4.2. Bundling contracts

Private firms create a consortium to provide design, building, finance, and project management as contractual services under the PPP. In general way, this consortium includes a company responsible for the management and another for constructing and reforming (Fernandez et al., 2016).

As previously referred to, the bundling of the asset's construction and operation into a single contractual framework, which allows the internalisation of any positive externalities that may exist between the construction and operational phases, is another potential reason for the higher productive efficiency of PPP. In the instance of a road project, bundling would enable the private contractor to make decisions during the construction process (i.e., greater up-front investment) that might reduce the route's life-cycle maintenance costs. Without bundling, such externalities would not be considered during the construction process and productive efficiency would be decreased (Blanc-Brude et al., 2009).

Oliver Hart (2003) formalised this idea. In Hart's model, the public sector is considered to be virtuous and to want to maximize net social good, while private sector companies seek to maximize profits. The public sector procures a project involving the construction of a specific asset and its operation, and it has the option to choose the procurement method: either the project is procured as a traditional public procurement, with the construction and operation procured separately with two different private sector firms, or they are procured as a bundle with just one firm. The former refers to traditional public procurement, whereas the latter corresponds to a public-private partnership.

In addition, Oliver Hart (2003) and Blanc-Brude et al. (2009) argue that the private sector business that is granted the construction contract – regardless of whether operation is included or not – may make investments during the construction phase. Despite the fact that this investment would alter the business's earnings and net social benefit as explained below, the firm may make either investment without breaching its contract with the public sector, i.e., incomplete contracts.

This investment would lower operational maintenance expenses and enhance the quality of the final product delivered to customers (Blanc-Brude et al., 2009). Investing in a new road surface material with improved durability and safety attributes compared to previous options would minimize maintenance costs and enhance the condition of the road, for instance. If this investment is made during the construction phase, it will increase both productive and allocative efficiency.

According to Oliver Hart (2003), this option between unbundling construction and operation and combining them is the core of deciding between traditional public procurement of infrastructure and PPP arrangement. As previously indicated, the presence of a time dimension to the analysis enables the evaluation of any externalities between the first and second stages of a project's life cycle. Internalization of such externalities is clearly a potentially significant pathway for efficiency benefits in long-term contracts (Välilä, 2020).

The unbundling case, however, results in too little investment of the kind that lowers costs and improves quality, but the ideal amount of investment of the type that reduces costs while improving quality (Välilä, 2020). Naturally, construction contractors do not care about the positive (cost-reduction) or quality-improving effects of investments during operation. This investment does not provide any benefit to the building contractor, since the advantages flow to the operator via cheaper costs and to customers through improved service quality. Alternatively, it is indicated that transport infrastructure and roads (highways) are well-suited for PPP procurement from a bundling standpoint. The internalization of positive externalities between construction and operation presents a promising opportunity for life-cycle cost reductions. Strong ties exist between asset quality and service quality (Engel et al., 2014; Iossa & Martimort, 2011; Riess, 2005).

2.4.3. Risk sharing

In addition to residual control rights over an infrastructure asset and the bundling of asset construction and operation, another potential source of productive efficiency in a PPP is the public sector and its private partner sharing project risks. The reasoning behind this argument is straightforward: if each project risk is assigned to the party best able to manage it, spread or diversify it away, or at least live with the consequences should the risk materialize, then optimal risk sharing will result in better risk management and, most likely, lower life-cycle costs and thus greater efficiency (Välilä, 2020). In comparison to conventional procurement, the PPP contract entails a greater risk transfer. In this new structure, the government determines the service and intended fundamental patterns, but entrusts the consortium with delivery and achievement of the established precondition requirements. Consequently, a significant amount of the design, construction, and operating risks are passed to the private sector (Fernandez et al., 2016).

According to Grout (2005), the transfer of risk from the public to the private sector might result in a more clear acknowledgment, measurement, and price of the transferred risk. Grout, furthermore, also agrees that in a PPP, risks should be transferred to the party that is most equipped to handle them. Consequently, this party will price the cost of minimizing the risk that a certain result with negative financial repercussions will occur. Therefore, risk transfer itself has no effect on productive efficiency; rather, it is the chance that risk transfer will enhance risk management that might make a PPP more cost-effective than traditional public procurement (Blanc-Brude et al., 2009).

In PPP, the risks transferred to the private sector partner include construction costs and schedule. At the risk of oversimplification, typical public procurement of infrastructure assets, at least in the road sector, may be characterized as cost-plus contracting, with the public sector assuming the bulk of construction cost and delay risks. Consequently, cost and schedule overruns are common in traditional public procurement (Flyvbjerg et al., 2002). Conversely, a PPP may be characterized as a date-certain, fixed-price contract in which the private partner, rather than the public sector, bears the construction cost and schedule risks.

The *ex ante* price that the public sector should pay for the asset would reflect the fact that the private partner covers all construction risks under PPP contracting but not under traditional public contracting. The transfer of construction risk signifies that the private sector partner has assessed and priced such risk, hence increasing the value of his or her bid for the contract. As a result of the explicit acknowledgment and price of construction risks transferred to the private partner, construction costs are anticipated to be higher under PPP than in traditional public procurement (Blanc-Brude et al., 2009).

2.5. Conclusion

In the first place, the theories presented in this chapter serve as the underlying rationale for the framework of this study. The current state of the literature on the main principles of PPP and the use of CBA in evaluating the potential impacts of PPP have been discussed. Despite the finding of its substantial benefits, utilising CBA remains a niche in appraising PPP in transport project. For further research, this literature review provides justification about why incorporating CBA is deemed

plausible in comparing PPP project to traditional public procurement, considering its ability to monetise all the nonfinancial aspects of project.

Another key point is the greater productive efficiency in PPP which comes from involving the private sector throughout the project's lifecycle. This has been the main justification of choosing PPP procurement strategy instead of traditional public procurement. There are three channels through which PPP can boost efficiency, including residual control (ownership) rights, bundling contracts between construction and operation, and sharing of project's risks. Ownership rights may enhance productive efficiency by driving relation-specific investment, whereas bundling contracts allows the internalisation of positive externalities between construction and operational phases. In addition, risks transfer in PPP project enables the risks to be managed by the parties who are best able to do so. Finally, these theoretical findings will help conceptualising the potential social costs and benefits of PPP project compared to traditional public procurement in Chapter 4.

Chapter 3. Research Methodology

This chapter will outline the research methodology used to meet the research objectives of this study. In summary, the research methodology commences with research strategies that correspond to each sub-question. It is then followed by the selection of case study, data collection and data analysis. In order to provide answers to the research questions, this research utilises literature study, semi-structured interviews, as well as secondary data pertaining to the case study.

3.1. Research strategies

To answer the sub-questions, and thereby the main research question which were mentioned in Section 1.4 several research strategies are required. This research incorporates an analysis of qualitative and quantitative information (Sekaran & Bougie, 2016). The approach allows for the use of a wider range of data collection tools from qualitative and quantitative research. Therefore, new findings, which exceed those of each research type, can be derived.

The first sub-question pertains to identify theoretical considerations regarding public-private partnerships (PPP) project that can serve as the basis for the conceptualisation. The theories in question include an investigation on how cost-benefit analysis (CBA) can be applied to appraise PPP project in transport infrastructure. This question requires literature research to get a deeper understanding of the factors influencing the PPP project to create potential social impacts, as well as a societal CBA that specifies the methods to monetise all the costs and benefits of the PPP project.

The second sub-question encompasses a theoretical conceptualisation of the potential social costs and benefits of PPP project compared to traditional public procurement. On the basis of the identified theoretical considerations, further potential impacts will be thoroughly examined. Therefore, more study into the relevant literature will be carried out, so that comprehensive conceptual models of the potential social impacts may be developed.

The third and fourth sub-question involves an in-depth case study of a transport PPP project. The idea behind a case study is that in order to obtain a clear picture of a problem, the real-world scenario must be examined from a variety of angles and perspectives. It involves an empirical analysis of a specific current topic in its actual environment utilising several data collection methodology (Yin, 2009). Furthermore, Sekaran & Bougie (2016) found that this single study are concerned with gathering and combining both qualitative and quantitative data for analysis and interpretation. Quantitative research focuses on gathering numerical data and conducting numerical analysis in order to understand that particular situation (Sekaran & Bougie, 2016; USC, n.d.). Meanwhile, there will be some interviews to investigate qualitative information about which stakeholders the PPP would be beneficial, or would be a bad influence. In the end, the key findings in the empirical study will be utilised to further develop the conceptual models.

The fifth sub-question will evaluate the implications of potential social impacts assessment of PPP project compared to traditional public procurement. This question will be answered by further examining qualitative and quantitative analysis that have been done. Results from both analyses

thus serve as an input for building discussions and creating some recommendations. These recommendations are aimed at improving the collaboration setting within public-private partnerships in transport project.

3.2. Case study selection

Derived from several sources, some basic information of the project is presented (see Table 4).

Table 4. Basic project information

Project name:	Jakarta – Cikampek II (Elevated) or Mohammed Bin Zayed (MBZ) Toll Road
Project signing:	December 5, 2016
First operating date:	December 12, 2019
Capex/Opex:	IDR 16.2 billion
Contract period:	45 years (since 2017)
Contract type:	Build, Operate, Transfer (BOT)
Responsible party:	Ministry of Public Works and Housing Indonesia (PUPR)
Private entity:	PT Jasamarga Jalan Layang Cikampek (80% of ownership) PT Ranggi Sugiron Perkasa (20% of ownership)
Joint Mandated Lead Arrangers and Bookrunners (JMLAB):	PT Bank Mandiri (Persero), PT Bank Central Asia Tbk, PT Bank Negara Indonesia (Persero) Tbk, PT Bank Rakyat Indonesia (Persero), PT Bank CIMB Niaga, dan PT Sarana Multi Infrastruktur (Persero)
Syndicated loan:	Conventional and sharia financing
Loan duration:	15 years
Characteristic:	The total length of the toll road is 36.4 kilometres, extending from Cikunir to West Karawang
Location:	Jakarta – Cikampek

Source: (KEMENKEU, n.d.; KPPIP, n.d.; PII, 2017; The World Bank Group, 2018)

As a case study, this thesis will investigate the Jakarta – Cikampek II (Elevated) Toll Road project in Indonesia. The toll road project is one of national strategic projects in the country procured under public-private partnerships (PPP) scheme. The Ministry of Finance and PT Penjaminan Infrastruktur Indonesia (PII) have jointly guaranteed the project for the security and convenience of private investments. Moreover, the completion of this toll road is considered to mark the success of synergy between actors participating in the project, so as to delivering road infrastructure services for the society (PII, 2017).

The selection of this project is based on a preliminary assessment against some key criteria for determining whether a project qualifies as a public-private partnership, as discussed in the literature review (see Section 2.2). According to Yescombe & Farquharson (2018), PPP contracts are long-term agreements between public and private parties. These criteria can be met since this project is being carried out under a 45-year concession agreement between the Government of Indonesia (GoI) and the private sector. Additionally, the collaboration includes in the design, construction and operation of public facilities since the project was developed under a BOT contract. It is also known that the construction of Jakarta – Cikampek II (Elevated) Toll Road was constructed by a state-owned contractor, PT Waskita Karya (Persero) Tbk, and a private construction company, PT Acset Indonusa Tbk (BPJT, 2019). The third criterion is that a substantial share of funding should come from the

private parties, as indicated in Table 4. Lastly, given the large number of parties involved in this project, it is reasonable to infer that there are distributional risks shared among the actors.

Another critical criterion is that PPP projects should incorporate social priorities by delivering improved access to infrastructure (Felsinger et al., 2008). On this account, the majority of possible PPP projects may include public infrastructure, one of which is highway project. According to BPJT (2019), the presence of this toll road has been eagerly awaited by the community. The toll road is perceived to serve as the backbone for better access from the Greater Jakarta area to toll roads in West Java and other Trans Java, which are directly connected.

3.3. Data collection

3.3.1. Literature study

Scientific journal papers, government publications and openly accessible laws and regulations are all used in the literature research. It is therefore necessary to utilise some academic search engines, such as Scopus, Google Scholar, ScienceDirect and TU Delft Repository. For the case study, this thesis also relies on official publications mainly from the Ministry of Public Works and Housing Indonesia (PUPR), in order to gain essential data and information regarding the chosen PPP project that was developed by the ministry as the responsible party. In addition, secondary data may be found on websites and reports, for instance those were published by the World Bank and the Asian Development Bank.

In the present study the literature research is conducted from the first stage to outline the problems, identify knowledge gap and construct conceptual frameworks. In the later stages, the literature research is utilised to develop the analytical framework for this thesis, as well as to provide guidelines when developing interview questions.

3.3.2. Semi-structured interview

During exploratory research, a semi-structured interview is one of the interview approaches that enables the interviewer to incorporate follow up questions aside from the list of interview questions that has been pre-determined in advance (Edwards & Holland, 2013). In this regard, semi-structured interviews are best fitted for this thesis to gather information in the case study and collect insights on the potential impacts of PPP project that cannot be gathered through the literature research.

Ideally, face-to-face interviews are the preferred technique of conducting interviews. According to Sekaran & Bougie (2016), face-to-face communication offers several advantages. The interviewer can capture non-verbal clues from the respondents, explain any unclear message and confirm comprehension by rephrasing the questions. However, due to this pandemic situation, it is probable that the interviews will be held through online zoom meetings. In addition, interview questions are developed from the theoretical conceptualisation models and related to potential costs and benefits societally in the transport PPP project of the case study.

3.3.2.1. Data collection steps

As discussed previously, a PPP project in Indonesia has been chosen for the case study of this research, hence it can be identified which government party and private entity are mainly involved in the project. To develop a quantitative cost-benefit analysis (CBA), primary data were collected from the Ministry of Public Works and Housing (PUPR) as the responsible party of the PPP project. Not only that, project data and information were also gathered from another private entity who operates the toll road, namely PT Jasamarga Jalanlayang Cikampek (JJC). Also required is the fulfilment of an official correspondence process in order to get access to their data and information.

Aside from quantitative data, qualitative data collection through interviews has been carried out through the following steps:

1. Identified the information that would be required to completely answer the sub-questions.
2. Interview questions were drafted in English and then translated into Bahasa. This is done to reduce ambiguity and ensure that inquiries are clearly understood by the interviewees.
3. Consent forms were prepared and given to the interviewees.
4. Prepared a formal letter requesting an interview, which is likely to be produced by professional organisations.
5. Prospective interviewees were listed and informed to the thesis supervisors. In this study, several interviewees that have been approached for the interviews are stakeholders in the chosen transport PPP project.
6. The interviews were scheduled depending on the interviewees' availability.
7. Conducted interview. During the interview the audio has been recorded, provided with approval from the interviewees.
8. Structured insights gathered from the interviews.
9. Interview coding and analysis.

3.3.2.2. Interview selection criteria and respondents

Respondent interviews which are data collected for qualitative analysis in this research will be explained in this sub-section. The data collection involves selection criteria of the respondents. The research applied two specific criteria in the selection of respondents of the interviews. Both criteria were meant to select individuals who are regarded capable of providing the most relevant information about the subject of this research. The first criterion is to select individuals from institutions or organisations that are primarily accountable for developing PPP toll road projects in Indonesia, and are also participating in the case study project. Subsequently, as a second criterion, the respondents from each organisation should be experts in the transport infrastructure industry, and possess a high capability for managing and operating PPP projects in the country. Thus, the selection of position or role of the respondents is also included in the criteria.

The prospective respondents that have been identified comprises of public parties and private parties. In fact, several respondents from the Directorate General of Infrastructure Funding at PUPR and the Indonesia Toll Road Authority (BPJT) have been interviewed to represent the public party in this study. On the private side, it has been determined that two business entities, PT Jasamarga Jalanlayang Cikampek (JJC) and PT Jasa Marga Business Development (JMBD), were engaged. A list of the respondents can be seen in Table 5.

Table 5. List of respondents

Code	Type	Institution	Role
G1	Public	Directorate General of Infrastructure Funding (DJPI)	Director General
G2	Public	Directorate General of Infrastructure Funding (DJPI)	Head of Investment Planning Legislation
G3	Public	Directorate General of Infrastructure Funding (DJPI)	Deputy Director General
G4	Public	Indonesia Toll Road Authority (BPJT)	Head of Investment
G5	Public	Indonesia Toll Road Authority (BPJT)	Toll Road Specialist
P1	Private	PT. Jasamarga Jalanlayang Cikampek (JJC)	Maintenance Manager
P2	Private	PT. Jasamarga Jalanlayang Cikampek (JJC)	Sr. Technical Manager
P3	Private	PT. Jasa Marga Business Development (JMBD)	Toll Road Investment Planning Dept. Head

Legend: G = public party, P = private party

3.3.2.3. Interview protocol

An interview protocol is prepared as a framework for the interview process, and ensures that ethical considerations are met. The list of interview questions is presented in Appendix A. Furthermore, in general, the interview procedure is described as follows:

1. Prior to the interview, the interviewer explained the informed consent forms and requested permission to record the discussion and anonymously quote the interviewees' remarks in the thesis.
2. The interviewer introduced the study's background and objectives.
3. The interviewer presented interviewees with a set of questions in advance to guide the discussion.
4. A typical interview is 45 – 60 minutes in length, depending on the availability of the interviewees.
5. Two days after the interview, the recording was transcribed to prevent information loss or misinterpretation.

3.4. Data analysis

This Section describes how theoretical frameworks are used and integrated to investigate the empirical analysis of this study. Cost-benefit analysis (CBA) plays a central role as the main conceptual framework to analyse potential costs and benefits of PPP project compared to traditional public procurement.

3.4.1. Interview coding

ATLAS.ti is used for qualitative data analysis once all interviews have been transcribed. ATLAS.ti is considered as an easy-to-use tool that allows researchers to organise, restructure and process information effectively. In that sense, the interview data collected are coded and analysed using the software. The code list has been derived from the conceptual models as the interview questions are

already constructed in line with the potential social impacts in the conceptual models. A more detailed explanation of the interview process and coding will be explained in Section 5.2.

3.4.2. Cost-Benefit Analysis

In terms of transport appraisal, CBA has grown into a commonly utilised and well-established approach for analysing proposed transportation projects in improving social welfare (Mackie et al., 2014). The analysis of this study follows the conceptual foundations of cost-benefit analysis (CBA) and impacts valuations by Boardman et al. (2013). To analyse problems through CBA calculation, at first, everything, both gain and loss should be monetised into some classifications. Afterwards, the rationale of CBA calculation is described in more depth both in the thesis report and in the separate spreadsheet. There are also some critical elements are of importance to highlight. The results of CBA calculation will be presented in tables to indicate the transport PPP project yields either a positive or negative Net Present Value (NPV), as well as the Benefit-Cost Ratio (BCR). Therefore, it would be presumed whether or not the PPP project is more socially beneficial compared to non-PPP project. The primary numerical data is analysed using Microsoft Excel that will be developed in separate spreadsheet.

Chapter 4. Conceptual Model Development

This chapter focuses on the theoretical conceptualisation of the potential social costs and benefits of PPP project compared to traditional public procurement. Built on the theoretical considerations found in Chapter 2, Section 4.1 will consist of identifying factors and initial (theoretical-based) potential impacts of PPP project. Subsequently, two conceptual models of the potential social impacts of PPP project against traditional public procurement will be presented and compared in Section 4.2. The conceptual models illustrate, theoretically, how these potential impacts relate to one another, and how they differ from traditional public procurement. Later, the conceptual models would be used to guide the process of designing interview questions and the coding process of interview results, to illustrate the empirical linkage between impacts in the case study, and to structure the analysis and key findings.

4.1. Identifying initial (theoretical-based) potential impacts of PPP

In this section, several initial potential impacts of PPP, theoretically, will be derived from the principles discussed in the theoretical considerations (see Section 2.4). The process of identifying the initial potential impacts in question involves two phases. The first phase aims at identifying the influence of three channels through which PPP procurement can boost efficiency above the levels that are obtained through traditional public procurement. The result of this phase would be a number of factors that might be relevant to infer the initial potential impacts of PPP project. These factors will subsequently be conceptualised into variables in phase 2. The variables are believed to represent initial potential impacts of PPP in comparison to traditional public procurement.

Table 6. First phase: Identified factors

Source	*Influence*	*Identified factor*
Ownership rights	*Incomplete contracts, such as PPP, recognise up-front that the world is so complex and unpredictable that writing contracts is costly business.*	High complexity contract
	PPP include relation-specific investment that is an asset that cannot be readily used for purposes other than that stipulated in the contract.	High asset specificity
Bundling contracts	*A single contractual framework allows the internalisation of any positive externalities that may exist between the construction and operational phase.*	Cost-saving investments
	Bundling incentivises the private sector to spend higher up-front investment at the construction phase if such investments lower the project's life cycle operating costs.	
	Such investment would reduce maintenance costs in the operational phase, and it would also improve the quality of the end-product offered to consumers.	Quality-enhancing effect
Risks sharing	*The transfer of the construction risk implies that the private sector partner would evaluate and prices such risk, which increases the value of his/her bid for the contract.*	Explicit recognition and pricing of construction risks

As shown in Table 6, the theoretical considerations section attempts to deduce, from three channels, a number of factors possibly useful to identifying the initial potential impacts of a PPP project. Using the notion of ownership rights, PPP involves additional parties in the construction and operational phases, as well as incorporates relation-specific investments. Thus, it is determined that a PPP project would be with a contract of high complexity and asset specificity. Furthermore, bundling contracts in PPP has influenced to make internalisation of any positive externalities that may exist between the construction and operational phases. In other words, the private party now has incentives to make cost-saving investments throughout the two phases of the project. if the private party takes advantage of bundling contracts in PPP by making cost-saving investments, this will affect the maintenance process, resulting in a quality-enhancing effect on the roads. The last factor derived from risks sharing concept is the explicit recognition and pricing of construction risks which requires private partners to evaluate and price these risks in their contract of PPP.

In the next phase, these factors would be conceptualised into variables that reflect potential initial costs and benefits of PPP project compared to traditional public procurement. Table 7 below illustrates from which factor each initial potential impact of PPP is derived.

Table 7. Second phase: Identified initial (theoretical-based) potential impacts

Factor	*Identified Initial impact*
Cost-saving investment	Higher construction costs (c)
Cost-saving investment	Less maintenance costs (b)
Cost-saving investment Quality-enhancing effect	Higher road's quality (b)
Explicit recognition and pricing of construction risks	Higher risk (uncertainty) premium (c)
High complexity contract High asset specificity	Higher up-front transaction costs (c)

Legend: c = potential cost, b = potential benefit

As described in theoretical section, cost-saving investment allows the private partner to spend higher in the construction phase in order to lower the life-cycle operating costs. Thus, it can be inferred that PPP project would have the potential to require higher construction costs, but less maintenance costs on the other side. As such investment would reduce maintenance costs in the operational phase, it also signifies that the road could be built with a better quality. In addition, transferred risk to the private is not free, the government should expect to pay an uncertainty (risk) premium to the private partner. Finally, higher asset specificity and complexity in PPP allows higher up-front transaction costs between public and private party.

4.2. Conceptual Model

This section presents and compares two conceptual models of the potential social impacts of PPP project against traditional public procurement. Each concept is modelled using a two-phase process. In the first phase, additional potential impacts are derived from the initial (theoretical-based) impacts described in the preceding section, allowing for the identification of the overall potential impacts of PPP. All these potential impacts are subsequently further analysed to find out how they might affect society, such as public party, private party and road user. Therefore, a list of social costs and benefits of PPP project compared to traditional public procurement will be inventoried at the conclusion of this section.

This development process was conducted utilising analytical skills – to analyse the subject or situation objectively, and critically evaluate alternative features or possibilities. This entails the ability to argue correctly, identify and assess the initial potential impacts while taking into consideration all the factors. By all means, theories or abstract notions are utilised in these conceptual models, but also the thinking process were methodically explained, so that expectedly the conceptual models can be well understood.

Actual Tolls vs. Shadow Tolls

The key difference between the two conceptual models is the potential social impacts due to different payment mechanisms in order to return the private investments. It was observed in the existing literature that since then there are at least two toll payment mechanisms associated with public-private partnerships, namely user charges (actual tolls) and shadow tolls.

In the 1980s, the United Kingdom, a worldwide leader in the PPP area, first relied on private investment and user fees to construct new bridges and roads. Direct costs incurred for the use of roadways, especially toll highways, represent user charges. Long-term debt issued to fund the toll road might be repaid in part using the revenues earned by these charges. Road users, thus, would be required to pay for accessing the infrastructure asset (Acerete et al., 2010). User fees have a number of benefits, one of which is that there is no cost to the government; as a result, the government is free to allocate its resources toward funding other kinds of programs. In turn, it also comes with other costs, particularly high capital construction costs, which means that the traffic volumes of projects are frequently regarded as an inadequate source of revenue to meet debt payments and returns on equity for sponsors, who are the private partner in the PPP sector. Last but not least, there is the possibility that investors will be reluctant to participate since the costs will be greater to represent the increased level of risk, and there is also the possibility that prospective users may be unwilling to pay for road usage (Queiroz et al., 2008).

Shadow tolls, on the other hand, are merely amounts that are charged per vehicle to the toll operator for anything other than the use of the facility. When the financial advantages of a project are widespread, and the parties who will profit from the project may pay to a shadow toll fund, this is an innovative strategy that can either enhance or substitute actual tolls, also known as user chargers. Shadow tolls will thus result in recurring periodic or yearly payments being made to a toll operator over the duration of the concession term. Since this concessionaire gets paid by the government based on the amount of road usage, the government would not really collect any tolls

from the road users. As a result, there would be no real tolls collected from the road users (Tillman, 1997). Additionally, the process of traffic risk transfer may be a benefit of this kind of toll since it should lessen the amount of effort required. The government may rely on a variety of other sources of financing. On the other hand, there is no mechanism for generating revenue since the whole cost of the project is covered by the taxpayers. If traffic volumes end up being much higher than anticipated, the government may end up paying a higher "toll" than what was originally planned for the toll operator, which is the private partner in this scenario (Santos & Santos, 2012). Under these circumstances, the concept of shadow tolls is particularly applicable to public-private partnerships as well.

Reflecting on the rationale provided above, the following section will provide a more in-depth explanation of the distinctions between the potential social impacts of PPP associated with actual tolls and shadow tolls.

4.2.1. Conceptual Model 1 (with Actual Tolls)

The potential impacts are conceptualised from the perspective of the entire society, as depicted in Figure 4 below. As previously mentioned, the society referred to this study comprises public party, private party and road user. The following is a guideline that can help to understand the conceptual scheme:

1. *Label*. Used to indicate the potential impacts which are color-coded to differentiate the impacts on the public party (*orange*), private party (*blue*) and road user (*green*).
2. *Plus/minus*. Used to illustrate the difference (Δ) between public-private partnerships and traditional public procurement. When compared to traditional public procurement, an increased value in PPP is defined by (+), while (–) implies a decreased value in PPP.
3. *Arrow*. There are two arrows adopted in the scheme: one with rightwards (→) / leftwards (←) arrow, and the other with left-right arrow (↔). When a rightwards/leftwards arrow is used, it means there is a casual relation between impacts, whereas left-right arrow represents reverse causality.
4. Some text is added to each arrow to describe the logical reasoning behind the causality between impacts.
5. A list of all the potential costs is shown on the left side of the scheme, the potential benefits of PPP are all presented on the right side.

The scheme starts with the basic principle of PPP to boost productive efficiency including residual control (ownership) rights, bundling of the asset's construction and operation into a single contractual framework, and sharing of project risks between the public party and its private partner. From this principle, some initial potential costs are generated as described previously, such as higher construction costs, higher risk (uncertainty) premium, higher tolls and higher up-front transaction costs. All these costs come to PPP, in turn, would provide some potential benefits mostly in the operational phase of the toll road.

Higher traffic safety and less travel time loss

Cost-saving investment does provide incentives to the private party to invest more in the construction phase in order to save life-cycle operating cost, hence less maintenance costs would be required in PPP project. Less maintenance costs can be achieved because a PPP toll road is able to be constructed with better quality (*higher road's quality*), which in turn minimise the likelihood of accident risks (*higher traffic safety*). Furthermore, less maintenance would also make the number of days needed to close the lane due of repairment during the toll road's operational phase lower (*reduced downtime*). As PPP has shorter time to close the lane, there would be less congestion that occurs. As a result, a PPP project would have (*less travel time loss*) compared to traditional public procurement.

With costs-benefit analysis (CBA), this less travel time loss can be valued as a social benefit in transport infrastructure, provided by reductions in the amount of time spent on travel. The social value of travel time gain in CBA is normally referred to as the value of travel time savings (VTTS). The VTTS takes into account not only the advantages of shorter travel times but also the decreased likelihood of being involved in an accident and the dependability of time savings (Boardman et al., 2013). Moreover, as the PPP toll road reduces risk of accident due to higher road's quality, it will also lead to traffic safety effects as mentioned previously. According to Boardman et al. (2013), A cost-benefit analysis of traffic safety enables the combined assessment of their efficacy in decreasing collisions of varying severity and provides information on their socio-economic return. In that sense, higher traffic safety can be considered a social benefit in PPP project compared to traditional public procurement. To conclude, higher costs in the construction phase of PPP project can ultimately generate potential social benefits in the form of higher traffic safety and less travel time loss to the road user.

Political credit gains, lower political risks and less risks burden

Transferred risks to the private party, such as risk associated with cost overruns, is not free since the government should expect to pay a higher risk (uncertainty) premium. In turn, this transfer risk also implies that the private partner has to price such risks and reflect them in the contract that underpins the PPP, which increases the construction costs. However, that being said sharing of project risks between the public party and its private partner allows the risks to be allocated to the party best able to manage it. This optimal risk sharing will lead to better risk management, indicating that they would have fewer problems both during the construction and operational phases. In this way, there is a potential that the PPP project could be built quicker than traditional public procurement (*less time overruns*). If there is less time overruns, over budgets of the road construction can also be prevented better in PPP project (*less cost overruns*).

This reduction in time and cost overruns may result in more travel time gains (*less travel time loss*), which may occur earlier in time than the travel time gains coming from less downtime. Furthermore, the potential higher construction costs, as were formerly discussed, would be reduced due the chance of the costs overruns is now lower in PPP project. In the meanwhile, the public party would gain some (*political credit*) for delivering a project more on time but has to pay only a relatively small part of the cost up-front and often little or nothing throughout the construction phase. Transferred construction risks to the private party, however, would include lowering political risks associated

with cost overruns that the public party has to bear on traditional public procurement (*lower political risks*).

As in conventional model of public procurement, the government takes on the construction risks in order to transfer them on to the common public, who are both the ultimate financiers and the end users of the road service. Cost and time overruns during construction are thus harmful to taxpayers as well as end users, who bear the risk that these overruns may manifest without getting any compensation from the government (Blanc-Brude et al., 2009). This would not be the case in PPP project as the project can be delivered more on-time and on-budget compared to traditional public procurement. Consequently, the road user would stand to benefit from the fact that their tax expenditures can be more compensated properly (*less risks burden*).

From this conceptualisation, it can be inferred that PPP project would be able to bring more potential benefits, such as political credit gains and lower political risks to the public party, as well as less risks burden to the road user, whose tax expenditures may be more properly repaid.

Reduced budget deficit, higher revenue, mobility loss and less pollution

According to the aforementioned definition of actual tolls, the public party is no longer accountable for the return on private investments. Thus, it will increase government's cash flow to fund other projects (*higher cash flow*). This more fiscal freedom, to be specific, would also reduce government deficit in providing facilities and services including public infrastructure (*reduced budget deficit*).

In compliance with tolls pricing, a PPP project might have higher tolls compared to traditional public procurement. This is found in the literature by (King, 2013), who expresses that the private partner's tolls will rise in proportion to the degree of risks. So, road users will bear the risk of the project through high toll charges, but otherwise, the private party who is responsible for the toll operation will get extra revenue from higher tolls in a PPP project (*higher revenue*).

Actual tolls under PPP, however, provide road users with incentives to decide whether or not using the road, since they are required to pay more directly from their pockets for the road use. They may take a detour (to choose different route) or go carpooling as long as they can avoid those costs. It is then conceivable this incentive to road users might result in lower use of the road in PPP with actual tolls compared to traditional public procurement (*mobility loss*). This potential loss of mobility would likely reduce the private party's revenue; hence an empirical investigation is necessary to evaluate whether the potential higher revenue owing to higher tolls in PPP may be compromised. On the other hand, there is also a potential reduction in safety issues as a result of fewer traffic congestions that occurs (*higher traffic safety*). Moreover, a decrease in CO_2 emissions can be produced (*less pollution*) resulting from the mobility loss in PPP with actual tolls.

In the end, higher tolls in PPP project with user charges is subject to produce some potential social impacts, such as reducing budget deficit of the public party, providing higher revenue to the private party but which also compromising the social cost of mobility loss, and positively affecting the quality of life of the inhabitants.

Less interagency conflicts

Although PPP has become a key procurement strategy in delivering public infrastructure, its governance is complicated and sometimes underestimated. In fact, PPP governance entails particular interactions between public and private stakeholders, as well as funding concerns (Ho & Tsui, 2009). In research by Sollño & de Santos (2010), three types of transaction costs are identified, namely, search and information costs, bargaining costs, and policing and enforcement costs. Search and information costs are costs needed to find out whether a certain product is accessible on the market, whereas costs necessary for parties to establish an agreement are defined by bargaining costs. The first two costs are regarded *ex ante* transaction costs while the latest is examined as *ex post* transaction costs (Sollño & de Santos, 2010).

As the asset specificity and complexity are usually high in PPP, therefore *ex ante* (up-front) transaction cost of PPP is often high and usually exceed the up-front transaction costs of the traditional public procurement (*higher up-front transaction costs*) (Vining & Boardman, 2008). Although up-front both private and public sector may have to negotiate more, this could save transaction costs later when both parties try to fulfil the terms of the contract (*lower back-end transaction costs*), but also of taking appropriate action (often through legal system) if not (Sollño & de Santos, 2010).

The above findings imply that the interaction dynamics between public and private parties in PPP may result in any interagency conflicts. When the dealing parties attempt to reach an agreement more conflicts may emerge between them. Nonetheless, compared to traditional public procurement, a PPP project societally would have the potential to minimise interagency conflicts later in the contract fulfilment process.

4.2.2. Conceptual Model 2 (with Shadow Tolls)

In this second conceptual model, shadow tolls are implemented under the public-private partnerships (see Figure 5). To recapitulate the aforementioned, shadow tolls are a method of toll payment in which the charges are merely collected depending on how much the road users make use of the road (Tillman, 1997). They are exempt from having to pay the tolls out of their own pockets (user-charges free), since it is the responsibility of the public party to ensure that the private party receives a return on their investment. As a consequence, the only difference between this conceptual model and its antecedent resides in the potential social impacts of the application of shadow tolls in the PPP project, which will be elaborated in the following paragraphs.

Higher revenue (to the private party)

The basic principle that differentiates PPP with shadow tolls is that, turns out, the road users now have no incentive to change their behaviour. That means the demand of road use would not be affected compared to the old way of building road (*no mobility loss*), since the road is free of user charges.

The absence of mobility loss, however, would not have a harmful impact societally on the revenue of the private party. It thus can be inferred that the private party has the potential to collect more

revenue under PPP with shadow tolls compared to PPP using actual tolls. Furthermore, as already mentioned in the literature, the private party may be able to earn more revenue through shadow tolls because sometimes traffic volumes are much in excess of forecasts, which requires the government to pay more tolls than are budgeted in the toll road planning for the toll operator (Santos & Santos, 2012).

In the meanwhile, shadow tolls would inevitably come at other social costs of higher level of congestions on the road, and thus resulting in a reduction in traffic safety (*less traffic safety*), compared to PPP using actual tolls. The potential social benefits of environmental gains for the road user also will no longer be the case since no reduction in CO_2 emissions can be obtained (*no less pollution*).

In conclusion, compared with traditional public procurement, the use of shadow tolls in PPP project has the potential to provide a social benefit to the private party through receiving higher revenue for their return on their investment. This amount of revenue can even be greater than the revenue obtained by the private party in PPP arrangement with actual tolls.

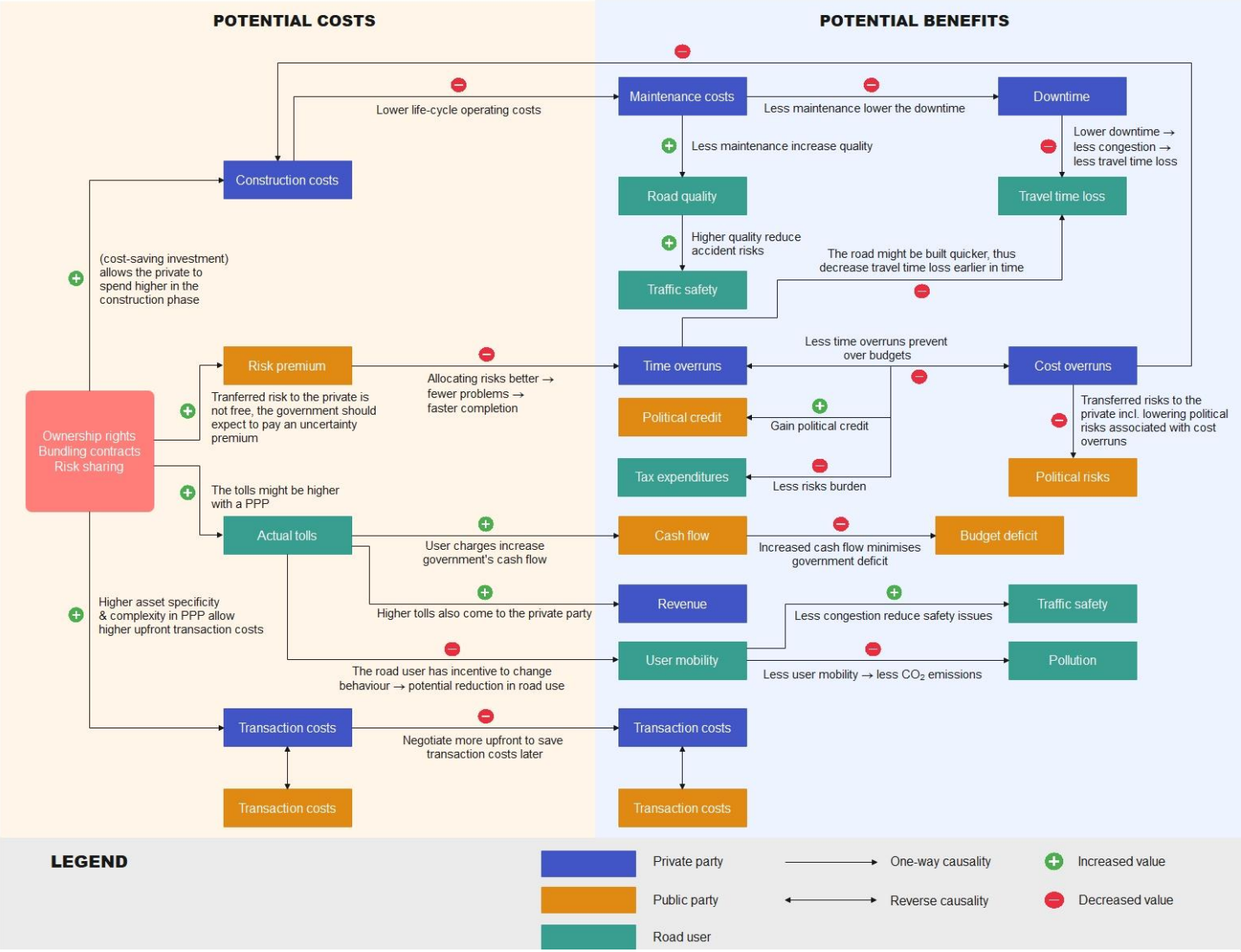

Figure 4. Conceptual model 1: Potential social impacts of PPP project compared to traditional public procurement (with actual tolls)

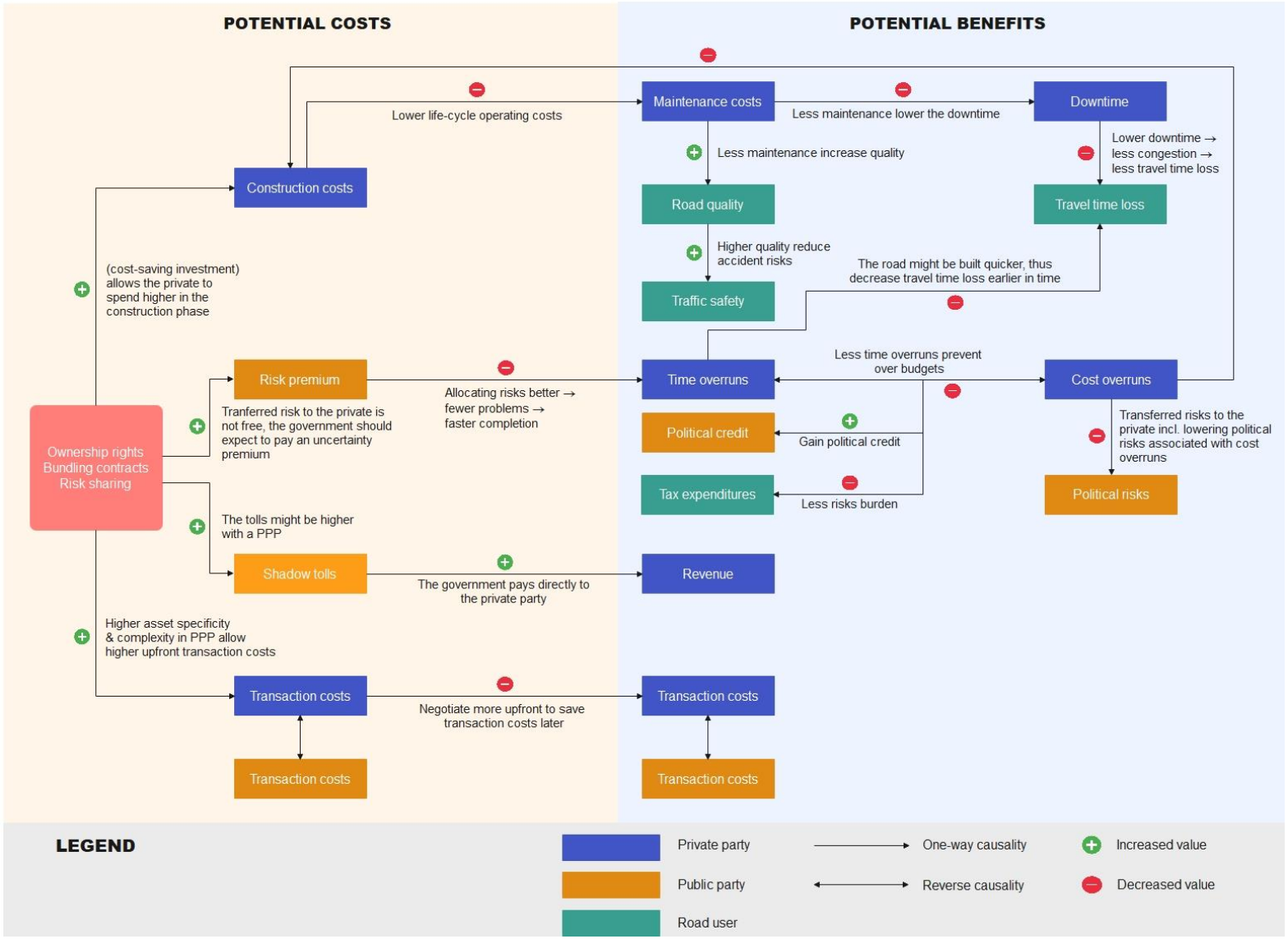

Figure 5. Conceptual model 2: Potential social impacts of PPP project compared to traditional public procurement (with shadow tolls)

4.3. Conclusion

In this chapter's conclusion, some potential social costs and benefits of PPP project compared to traditional public procurement have been conceptualised, providing the answer to SQ2: *"What are the potential social costs and benefits of PPP project theoretically compared to traditional public procurement?"*. The two conceptual models have been discussed throughout the chapter, but also visualised in Figure 4 and Figure 5. In the end, an inventory of potential social costs and benefits of PPP project associated with actual tolls and shadow tolls are provided in Table 8 and Table 9, respectively. It is clear from the yellow-highlighted cells in the tables that the potential social impacts of having mobility loss or not are what distinguish between the two conceptual models. In subsequent chapter, the conceptual models will be investigated in an empirical study of a toll road project in Indonesia.

Table 8. Potential social costs and benefits of PPP project (with Actual Tolls), compared to traditional public procurement

Initial impacts	*Potential social costs*	*Potential social benefits*
Higher construction costs	Higher construction costs (P)	Less maintenance costs (P)
		Higher traffic safety (R)
		Less travel time loss (R)
Higher risk premium		Less time overruns (P)
		Less cost overruns (P)
		Political credit gains (G)
		Lower political risks (G)
		Less risks burden (R)
Higher tolls	Mobility loss (P)	Reduced budget deficit (G) Higher revenue (P) Higher traffic safety (R) Less pollution (R)
Higher up-front transaction costs	Higher up-front transaction costs (G)	Less back-end transaction costs (G)
	Higher up-front transaction costs (P)	Less back-end transaction costs (P)

Legend: G = public party, P = private party, R = road user

Table 9. Potential social costs and benefits of PPP project (with Shadow Tolls), compared to traditional public procurement

Initial impacts	*Potential social costs*	*Potential social benefits*
Higher construction costs	Higher construction costs (P)	Less maintenance costs (P)
		Higher traffic safety (R)
		Less travel time loss (R)
Higher risk premium		Less time overruns (P)
		Less cost overruns (P)
		Political credit gains (G)
		Lower political risks (G)
		Less risks burden (R)
Higher tolls	No mobility loss (P)	Higher revenue (P)
Higher up-front transaction costs	Higher up-front transaction costs (G)	Less back-end transaction costs (G)
	Higher up-front transaction costs (P)	Less back-end transaction costs (P)

Legend: G = public party, P = private party, R = road user

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Chapter 5. Empirical Analysis

This chapter aims to answer SQ3: *"How is the theoretical conceptualisation represented in empirical setting?"*, by conducting case study research on Jakarta-Cikampek II (Elevated) / Mohammed Bin Zayed (MBZ) Toll Road Project in Indonesia. Findings from semi-structured interviews, observations, and secondary data will be organised to examine the potential social impacts of PPP project in an empirical setting. In that sense, both qualitative and quantitative analysis are utilised to examine the case study, and empirical findings that were not covered in the conceptual models. The chapter begins with case study introduction, followed by interview coding and results, as well as the results of CBA in comparing the two conceptual models.

5.1. Case introduction

Data and Information from interview results, government publications and openly accessible laws and regulations are used to build this section of case introduction. The research investigates the Jakarta-Cikampek II Elevated project in Indonesia, or commonly called by the Mohammed Bin Zayed (MBZ) Toll Road as a case study. The toll road project is one of national strategic projects in the country. A form of public-private collaboration (PPP) with a build-operate-transfer (BOT) scheme is applied in the construction of the project. With this scheme, ownership of the infrastructure will be transferred to the government after the private party operates the infrastructure for a certain period of time (45 years since 2017), and has received a return on their investment. In the following, stakeholders involved and how public-private partnerships is structured and implemented in the project will be described.

5.1.1. Stakeholders and their relationships

The stakeholders who collaborate to execute the public-private partnerships scheme in the MBZ toll road project are illustrated in the following Figure 6.

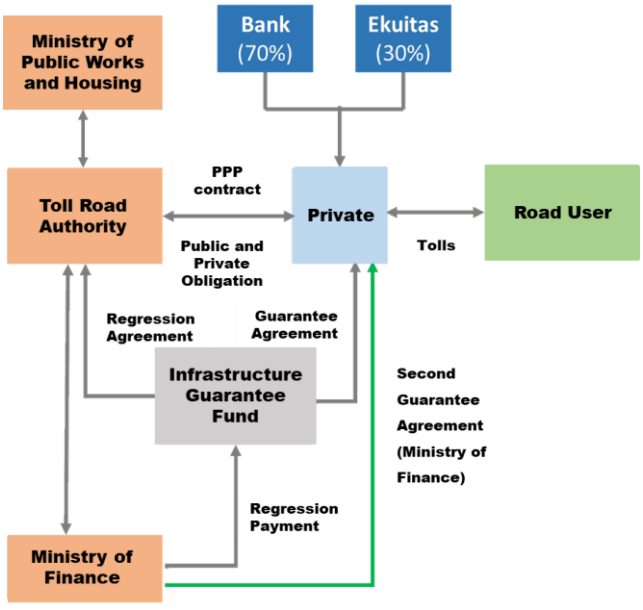

Figure 6. Stakeholders in the PPP arrangement of the MBZ Toll Road project

As seen in Figure 6, the project has received a joint guarantee by the Ministry of Finance and Indonesia Infrastructure Guarantee Fund (PT PII) for the security and convenience of private party investment. More specifically, there are two agreements that have been made, namely Guarantee Agreement and Regress Agreement. With Guarantee Agreement, PT Penjaminan Infrastruktur Indonesia (PII), as the guarantor, agrees to provide assurance of payment in the event the private party involved in the transaction fails to live up to their end of the bargain (Abubakar & Handayani, 2022). The private party in the project is PT Jasamarga Jalan Layang Cikampek (PT JJC), which was selected through an open tender. At the same time, the Regress Agreement was signed between the Ministry of Public Works and Housing (PUPR) and PT PII.

To execute the project, PT JJC formed a consortium which consists of two private business entities, including PT Jasa Marga (Persero) Tbk and PT Ranggi Sugiron Perkasa. They are responsible for both the construction and operation of the toll road. The majority of their source of funds come from bank loans, which account for 70%. Meanwhile, the remaining 30% is from their equity.

The public party is represented by the Indonesia Toll Road Authority (BPJT), which operates under the Ministry of Public Works and Housing (PUPR). PUPR has been designated as the responsible party of the collaboration project (PJPK). In this PPP project, the government has the authority to bear the risk of tolls adjustment, political risk and the risk of project termination. In addition, actual tolls are applied, thus road users need to pay directly the tolls to the consortium.

5.1.2. PPP arrangement in Indonesia

The collaboration between stakeholders in the MBZ Toll Road is essentially arranged based on the PUPR Ministerial Regulation No. 20 of 2020, regarding Roles and Authorities of the Directorate General of Bina Marga, Directorate General of Infrastructure Funding, Indonesia Toll Road Authority, and Toll Road Business Entity. According to the regulation, the Government of Indonesia (GoI) and business entities should collaborate in the provision of infrastructure for the public interest by referring to the pre- determined specifications from the Minister, which partly or fully uses the resources of the business entities by taking into account the risk sharing between the parties involved (MR, 2020). Further, the GoI has appointed three main stakeholders which should be involved in the PPP project in Indonesia, namely:

1. *Directorate General of Infrastructure Funding (DJPI)*, is a directorate general under Ministry of Public Works and Housing, which is responsible for carrying out the formulation and implementation of policies related to infrastructure financing in Indonesia.
2. *Indonesia Toll Road Authority (BPJT)*, is an agency established by the Minister, which is authorized to carry out the administration of toll roads in Indonesia. More specifically, its tasks include regulating, managing and supervising Toll Road Business Entity in providing the infrastructure.
3. *Toll Road Business Entity*, is a private entity engaged in the toll road concessions in Indonesia. Toll road concessions are tasks that include funding, technical planning, construction, operation and/or maintenance of toll roads, both on projects initiated by the government and the business entities themselves.

In terms of infrastructure funding, the GoI has also established the Indonesia Infrastructure Guarantee Fund (PT PII) that operates under the Ministry of Finance. According to Government Regulation no. 38 of 2009 on *PPP in Infrastructure Development*, PT PII is obligated to provide guarantees for infrastructure projects in Indonesia. Therefore, PT PII needs to perform its function as fiscal tools to assist the Ministry of Finance in securing the government's contingent obligations, as well as minimising direct impact on the state budget (APBN), especially for the provision of government infrastructure projects (GR, 2009).

5.2. Qualitative CBA

5.2.1. Interview process

To demonstrate the sequence of information gathered during the research, the respondents are displayed in the order of their scheduled interviews. Eight respondents from public and private organizations were interviewed all together. At the ending of the interview, the respondent is asked to propose an individual who may be suitable for the research. The length of the interview ranges from 38 minutes to over one and a half hours and is completed within three weeks. The typical length of an interview is 58 minutes. The shortest (38-minute) interview was with the Deputy Director General of DJPI. The Maintenance Manager of PT JJC was the subject of the longest (1.3 hours) interview. Table 10 presents the interview sequence with details regarding the type of respondent (public/private), name of organisation, role, date, duration and mode of interview that was utilised. Each respondent has been given a code that will facilitate easier reference in the future.

Table 10. Sequence of interviews

Code	*Type*	*Institution*	*Role*	*Date*	*Duration*	*Mode*
G1	Public	Infrastructure Funding (DJPI)	Director General	13/06/22	1:11	Face-to-face
P1	Private	PT. Jasamarga Jalanlayang Cikampek (JJC)	Maintenance Manager	15/06/22	1:20	Face-to-face
P2	Private	PT. Jasamarga Jalanlayang Cikampek (JJC)	Sr. Technical Manager	15/06/22	00:42	Face-to-face
G2	Public	Infrastructure Funding (DJPI)	Head of Investment Planning Legislation	22/06/22	00:55	Face-to-face
G3	Public	Infrastructure Funding (DJPI)	Deputy Director General	27/06/22	00:38	Face-to-face
P3	Private	PT. Jasa Marga Business Development (JMBD)	Toll Road Investment Planning Dept. Head	28/06/22	1:03	Face-to-face
G4	Public	Indonesia Toll Road Authority (BPJT)	Head of Investment	04/07/22	00:49	Online
G5	Public	Indonesia Toll Road Authority (BPJT)	Toll Road Specialist	04/07/22	00:45	Online

Legend: G = public party, P = private party

The sequence of interviews was essential for obtaining meaningful findings, since information from the previous respondent would bring additional insight and concerns to be explained in the upcoming interview. Another important point of the data collection part was the interview with the key respondents: DJPI Director General, JMBD Toll Road Investment Planning Dept. Head, and BPJT Head of Investment.

The interview begins with the DJPI Director General as he possesses the greatest authority in this instance and has a wide network, so that he can help guide the selection of next respondents. In addition, the interview with the JMBD Toll Road Investment Planning Dept. Head is also of importance to gain insights from the main player in the private sector. Thus, the interview was performed after almost all information was gathered from both the government and other private parties. Lastly, the BPJT Head of Investment is a highly experienced government official, who is responsible for the PPP arrangement in the case study project and is frequently in touch with the private partners. Therefore, the interview was done after obtaining perspectives from all respondents. On this basis, a lot of aspects could be verified, validated, and further enquired.

5.2.2. Coding and data analysis

Every interview is transcribed and preserved as a separate file. The documents are then transferred into ATLAS.ti for analysis and coding. To facilitate the analysis process, the files are separated into two categories: public and private. The coding process uses a predefined code list derived from Chapter 4 regarding the potential social impacts in theoretical conceptualisation models. A list of 22 codes used in the coding process can be seen in Table 11.

Table 11. Code list

Conceptual model component	*Code*	*Related codes*
Cost-saving investment	(1) Higher construction costs	
	(2) Less maintenance costs	(9) Higher road's quality (10) Higher traffic safety (11) Less downtime (12) Less travel time loss
Risk sharing	(3) Higher risk premium	
	(4) Less time overruns	(13) Less cost overruns (14) Political credit gains (15) Lower political risks (16) Less risks burden
Actual tolls	(5) Higher tolls	(17) Higher revenue
	(6) Mobility loss	(18) Reduced budget deficit (19) Higher traffic safety (20) Less pollution
Shadow tolls	(7) Higher tolls	(21) Higher revenue
Transaction costs	(8) Higher up-front transaction costs	(22) Less back-end transaction costs

Thematic codes such as Public Party, Private Party and Road User are also created to facilitate data analysis, where code co-occurrence can be identified more easily. For instance, to identify which potential social impacts are present in Public Party benefits, then one of the codes and *Public Party-*

benefits in the code co-occurrence Table menu of ATLAS.ti can be chosen. The thematic codes are presented in Table 12. After then, the codes are connected with each other to generate network visuals and make it easier to see the relationships between them.

Table 12. Thematic codes

Public Party:	*Private Party:*	*Road User:*	*Partnership:*
Costs	Costs	Costs	Arrangement
Benefits	Benefits	Benefits	Challenges
Responsibilities	Responsibilities	Responsibilities	Improvement
New impacts	New impacts	New impacts	

5.2.3. Interview results

The interview results are classified based on the theoretical principles in the conceptual models. Therefore, the result starts with a descriptive delineation of potential social impacts of cost-saving investment that can be internalised in the PPP project. It is followed by the result of potential social impacts of the risk sharing principle. Afterwards, the analysis will continue with the potential social impacts due to the difference in transaction costs between PPP project and traditional public procurement. As the last principle in the conceptual models, the corresponding impacts on societal context from different tolls mechanism (actual and shadow tolls) are discussed. In addition, the implementation of PPP arrangement in the case study project would also provide values added to the interview results. It means challenges, expectations and improvements can be captured in an empirical setting, especially in Indonesia. The complete quotations of each respondent can be seen in Appendix B.

5.2.3.1. Cost-saving investment

<u>Higher construction costs and less maintenance costs</u>

Public-private partnerships project has a better potential for cost-saving investment compared to traditional public procurement (G1 22:54; G3 08:08; G5 12:33; P1 10:07). The potential is indeed huge as PPP is able to realise business and economic circular in the infrastructure industry (G1 22:54). Most importantly, the contract is bundled between the construction and operation and/or maintenance (OM) phases. Thus, the private party should be responsible for the whole process, starting from preparation until the concession period is over (P1 10:07). Conversely, the government would bear the greater risk if the construction and operation of the project are separated. The government's budget is, however, very limited, thus the operational would also be carried out with a limited budget. Private party, on the other hand, has a greater financial capability to do better in the maintenance of the road in order to meet the Minimum Service Standards (SPM) set by the government, as stated in the PUPR Ministerial Regulation No. 16 of 2014 (G2 11:20).

From the perspective of private party, efficiency and profit maximisation are the main goals. The private parties are very aware of this, hence if they do not finish the construction as scheduled, they would not immediately get revenues. In addition, if they cannot control the quality of the construction properly, the initial construction costs incurred would not be commensurate with costs they need to expense during the operational phase (G5 12:33). Therefore, PT JMBD as the major shareholder of the project, has been trying very hard to create efficiency during the operational

phase by spending higher in the construction. If efficiency can be made, it would affect positively for their return on investment. In summary, PPP through its potential regarding cost-saving investment does help them to pursue this goal (P3 15:44).

Higher road's quality and higher traffic safety

The PPP procurement strategy is truly sustainable, in which PPP allows the private party to internalise any positive externalities between the construction and operational phases of the road. That is, it would reduce maintenance costs in the operational phase (higher productive efficiency), and it would also improve the quality of the road delivered to road users (higher allocative efficiency) (G1 35:23).

A few more factors contribute as well to the improvement of road's quality in PPP project. In the first place, it is believed that the private sector in Indonesia has much greater skills and experiences than the public sector. More specifically, PT JMBD thus empower its two subsidiaries to handle the MBZ toll road project, from which each subsidiary may work on its area of expertise: one handles operation, while the other is responsible for road maintenance (G2 14:21). The second factor is that, in order to collect tolls adjustment from the government, the private party must meet the specified quality as indicated in the Minimum Maintenance Standards (SPM) (G2 13:05; P3 20:08). This suggests that the government also participates in enhancing the quality of the road by supervising and monitoring the private party during operation. Therefore, when looking for contractors and consultants for the project, the private party should be more selective (G3 13:18), allowing them to be more carefully maintain the road's quality throughout its operating period.

It can be inferred the private party will spend higher in the construction so as to reduce maintenance costs. With the cost-saving investment, it is then highly expected the road can be built with higher quality, thereby increasing the traffic safety as there is less risk of accidents on the road (G2 18:17; G4 13:46). Despite this, there is sometimes overloaded and over dimensional traffic that occur which allows private party to incur additional maintenance costs, since the road might deteriorate more quickly (G3 09:42). Therefore, the potential for higher allocative efficiency can only be attained if there is also a good supervision and monitoring from the toll operators and the government during the operation (G2 11:20).

Less downtime and less travel time loss

Following the rationale outlined above, both the government and the private party accept that PPP projects can be constructed with higher quality than traditional public procurement. This indicates that the amount of maintenance operations would decrease under PPP. Additionally, they will no longer need a longer time to complete the repairment. Based on experiences on the MBZ toll road, they only take a maximum of one day to repair, and it is often performed at night to minimize traffic congestion (P2 12:20). This potential reduction in the amount of time needed for maintenance is also strengthened by the Minimum Maintenance Standards (SPM), which stipulates that any repairments to the PPP project must be completed within two days (G2 17:59). Less maintenance, thus, reduces the amount of time required to close the toll road during operation hours for any maintenance activities. In other words, there is less congestion on the road, thereby a PPP project would result in less travel time loss than traditional public procurement (G1 38:43; G4 36:41).

5.2.3.2. Risk sharing

Less time and cost overruns

Compared to traditional public procurement, PPP has the potential social benefits of less time and cost overruns, which could eventually lower the construction costs of the road (P1 15:32). There are three essential factors that influence the construction to be done quicker: better risk management, the integration of work in the private sector, and the financial capability of the private sector.

Under a PPP scheme, the project risks are allocated better, hence such risks can be managed by those who are best able to mitigate them. In other words, transferred risks associated with cost overruns to the private party is the main factor of higher productive efficiency in PPP. It means better integration of work can be realised by the private party (P1 16:05; G2 16:17). The project may also be finished more quickly due to the private party's greater financial resources and flexibility in financing the project (P3 31:52). Moreover, both the government and the private party believe it would take longer than three years to finish the MBZ toll road if it was built by the government as they have more fiscal constraints (G2 15:50; P1 16:05). The private party, however, are willing to incur higher costs during the construction as long as they can mitigate the risk of cost overruns in the operational phase, but also cost overruns due to delays in project completion, thus allowing them to yield greater efficiency (P3 17:08).

Other factors, on the other hand, may also cause potential time overruns on toll road projects in Indonesia. They are delays in financial close with the bank, poor contractor cash flow in the Contractor Pre Financing scheme, weather, and the land acquisition process (G5 32:09).

Lower political risk and political credit gains

There would be more risks to the government if the project is done with the conventional way of building roads, since they are fully responsible for the whole process of road construction and operation (P1 19:07). Political risk associated with cost overruns is one of the greatest risks. In a PPP project, however, this risk of cost overruns is transferred to the private party, resulting in improved risk management (G2 19:34; P2 05:55). In this manner, the government will incur potentially less political risk, since they will be able to deliver the project faster, but has to pay only a relatively small part of the cost up-front and often little or nothing throughout the construction phase (G1 43:44).

In accordance with the Law of Republic of Indonesia No. 2 of 2012, the government is still accountable for the risks of land acquisition, tolls adjustment and project termination, as well as political risks under the PPP procurement strategy (G2 20:58). For instance, if the government requests any additional scope of work, the private party may include these extra costs into its investment costs. Due to this additional investment costs while keeping the higher quality of the road, the government can compensate the private party through tolls adjustment. Under these circumstances, the government would have lower political risk compared to traditional public procurement (G4 31:17).

In addition to the aforementioned, the PPP procurement strategy allows the government to potentially improve its political standing (political credit gains). The government's success in

delivering infrastructure to the society may be attributed to less time and cost overruns in the construction of the road (G4 26:22). Infrastructure projects, subsequently, are often used as promotions for some politicians when they participate in general elections in the country (G2 24:14).

Less risks burden

Infrastructure funding under traditional public procurement is sourced from government fiscal, the majority of which consists of tax revenues. In PPP projects with actual tolls in Indonesia, which are entirely funded by private partners, no direct tax expenditures are utilised. The risk carried by road users is reflected in the amount of tolls paid to the private party, and whether or not it is compensated properly with the quality of the road (G4 37:02). Nevertheless, as described in the theoretical conceptualisation, in traditional public procurement the public sector assumes construction risks will be passed on to the population, thus construction costs overruns would hurt taxpayers and road users. It can also be inferred that PPP project with shadow tolls, in which no tolls are collected from the road users, tax expenditures may be more compensated properly as the delivery of infrastructure can be done more on time, but also with higher quality.

5.2.3.3. Transaction costs

Higher up-front transaction costs / less back-end transaction costs

Higher up-front transaction costs needed in PPP project is indeed true according to some respondents. Compared to traditional public procurement, a PPP project normally necessitates a more complex structure considering more stakeholders are involved in the project (G2 28:41). Document preparation, a more complicated tendering process and market consultation are identified as the primary contributors to these higher up-front transaction costs (G4 38:44). A more prolonged of the tendering process, furthermore, indicates that additional stages should be done in the project preparations. In Indonesia, it usually takes around one year to prepare a PPP project. In that regard, the longer the preparation period, the higher up-front transaction costs would be required.

However, while more negotiations must be done at the beginning of the project, the government and the private parties are often able to make negotiations more efficient during the operation and maintenance of the road (G2 26:28). It implies higher up-front transaction costs can be compensated properly by the efficiency gained in PPP (G4 38: 12). This efficiency may be substantial; hence, transaction costs of PPP project is considered to have a larger positive net impact than the conventional way of building roads (G4 39:10). To conclude, negotiate more up-front would potentially save transaction costs during the operational phase of PPP projects.

5.2.3.4. Tolls

Actual Tolls

It is probable that tolls in PPP project are higher than in traditional public procurement, given that the funding of private parties originates from bank loans which include interest charges, as well as they need to build a higher quality of the road (G4 45:06). This means that greater risks should be managed by the private party. To return their investment, PPP thus allows the private party to set

higher tolls (P2 22:03). In other words, if the private party could always meet the Minimum Service Standards (SPM) during the operation, it is possible for them to get higher revenue (G3 10:15; P3 20:08).

Nevertheless, higher revenue may be compromised by potential mobility loss. Since road users have to pay for the road use themselves, they are now incentivised to decide whether or not using the road. In contrast to traditional public procurement, hence a PPP project with actual tolls may result in lower use of the road (mobility loss) (P2 24:04). It is, however, necessary to emphasise that the government has performed a feasibility study on tolls pricing via a traffic demand survey to estimate the Ability to Pay (ATP) and Willingness to Pay (WTP) of road users (G2 37:58). This is done to minimise the likelihood of higher mobility loss on the road. It is just sometimes these estimates may not correspond well with reality; they might be undervalued or overestimated because there is usually a significant time gap between the feasibility study and the operation of the road (G3 28:06).

In essence, this PPP strategy really helps the government in accelerating infrastructure procurement in the country as it reduces the government's budget deficit (P2 31:58). Although all revenues received by private parties are collected from road users, this does not necessarily indicate an increase in government's cash flow. A respondent argues, in this situation, the government will have more fiscal freedom to better maintain their cash flow (P3 58:06). Moreover, reduced government's budget deficit can be obtained as long as the implementation of higher tolls in PPP provide socio-economic benefits for road users while taking into account an appropriate ATP/WTP (P3 45:06).

Compared to PPP with shadow tolls, respondents also agree that with actual tolls the traffic volume can be lower, resulting in a potential social benefit of higher traffic safety (P2 26:06). Lastly, other economic advantages, such as reduced vehicle operating costs, may be added to the environmental benefits of pollution reduction due to mobility loss in PPP with actual tolls (G5 36:11).

Shadow tolls

Shadow tolls are potential to increase private investment in toll road developments. Since the government will pay them directly, the private party would have a greater assurance of the return on their investment (P3 46:09). In other words, the private sector will obtain a kind of revenue guarantee, therefore less risk of revenue in the business entity (P1 36:05). In terms of potential social impacts on road user, respondents believe that road users will greatly benefit through shadow tolls as they no longer need to pay the tolls from their own, but perhaps this should be compensated by tax adjustments (P2 27:23). Hence, there will be no potential mobility loss on the road in shadow tolls (G2 37:58). This would also have a positive impact on the private sector as their revenue won't be compromised, thereby higher revenue can be obtained compared to PPP with actual tolls. In the meanwhile, the absence of mobility loss will not have a positive effect either on the environment or the traffic safety.

Although shadow tolls are not yet applicable in Indonesia given the government's current fiscal capability, in the future, it should be implemented according to some respondents. This notion may make sense when considering the process of returning private investment and the affordability of the road user. As stated earlier, this contract arrangement can expedite the return on investment and provide revenue guarantee to the private sector, since there is no adverse impact on the

demand for road use. In fact, a kind of shadow tolls through Availability Payment (AP) mechanism has been applied in national roads (non-toll) in Indonesia. Through the AP, the government directly repays the private investment thus providing a revenue guarantee, that is likely similar with shadow tolls, to the private partner (P1 36:05). In this regard, when implementing shadow tolls in Indonesia in the near future the contractual arrangement may also be supplemented with more innovative financing in infrastructure to help the government in returning the investment. This arrangement also signifies if traffic falls below a specified level, the government contract to top up revenue by means of shadow toll in order to guarantee the financial viability of the toll road operator. On the other hand, if traffic exceeds the forecasts, the additional profits can be shared between the government and the toll road operator (G1 17:50; G2 41:44). By this way, the government will have a more sustainable source of funds, from which to return private investments (G3 20:00).

The summary of the interview results per stakeholder is presented in the following Table 13.

Table 13. Summary of the interview results

Parameters	*Interview results*	
	Public Party	*Private Party*
Cost-saving investment	- PPP has huge potential for cost-saving investment - Private party has greater financial capability to better construct and maintain the project - The government will bear greater risks with unbundled contracts	- Highly encouraged to make cost-saving investment as private parties are profit driven
Higher road's quality	- PPP would also improve the quality of the road (higher allocative efficiency) - Private party has much better skills and experiences - Quality-enhancing effect from supervision and monitoring by the government	- Private party must meet the specified quality as indicated in the SPM
Higher traffic safety	- Higher quality of the road indicates less risk of accidents - Monitoring towards overloaded and over dimensional traffic are the challenges	
Less downtime	- Less maintenance under PPP shorter time needed for repairments - Stipulated in the SPM, repairments of PPP project should be done within two days	- PT JJC only take a maximum of one day to repair
Less travel time loss	- Less maintenance reduces time to close the lane for repairs	- Less congestion on the road results in less travel time loss

Parameters	*Interview results*	
	Public Party	*Private Party*
Less time and cost overruns	- Better risk management, integration of work amongst private partner, and better financial capability of the private partner - Longer time needed to complete the MBZ project if it was built by the government, given its more fiscal constraints	- Project risks are allocated better under PPP - Transferred risks of cost overruns to the private is the main factor of higher productive efficiency - Willing to incur higher costs during construction to mitigate cost overruns due to delays of construction and during operation
Lower political risk	- The government will incur potentially less political risk due to transferred risk of cost overruns - Risk of land acquisition, tolls adjustment and project termination are risks of the government in PPP project in Indonesia	- More risks to the government in traditional public procurement - Cost overruns is one of the greater risks
Political credit gains	- PPP improve the government's political standing by delivering the project more on time and on budget - Infrastructure delivery is often used as promotion for politicians in the country	
Less risks burden	- No direct tax expenditures are incurred in PPP with actual tolls in Indonesia - PPP with shadow tolls may incur tax expenditures paid by the road user - Construction risks will be passed on to the taxpayers and road users in traditional public procurement - Less cost and time overruns in PPP thus compensate tolls or tax paid by the road user more properly	
Transaction costs	- Higher up-front transaction costs due to more document preparation, more complex tendering process, and market consultation - More negotiations up-front reduce negotiations during	- PPP needs a more complex structure in the arrangement

Parameters	*Interview results*	
	Public Party	*Private Party*
	operation and maintenance - The efficiency is substantial, hence a larger positive net impact of transaction costs in PPP	
Higher (Actual) Tolls	- Traffic demand survey for tolls pricing is indeed important to minimise the likelihood of higher mobility loss - PPP reduces government's budget deficit, hence more fiscal freedom to maintain cash flow - Environmental gains of pollution reduction, but also reduced vehicle operating costs due to mobility loss	- Incentive to the road user may result in lower use of the road - Higher revenue may be compromised by potential mobility loss - Mobility loss will result in a higher traffic safety
Higher (Shadow) tolls	- As road users are no longer to pay the tolls, there will be no potential mobility loss - The private sector revenue will not be compromised - No mobility, however, will not have impacts on environmental gains and traffic safety	- The private party would have a greater assurance of their return on investments

5.3. Quantitative CBA

This section will perform a Cost-Benefit Analysis to evaluate the potential social impacts of PPP project compared to traditional public procurement as the reference case (status quo). As previously mentioned, this research selected the MBZ Toll Road project as the case study of PPP project. However, to conduct the CBA for the MBZ Toll Road project, the reference case to be compared must be the same project as the case study, in order to minimise any deviations in the analysis. Therefore, a number of approaches were utilised to estimate the costs of the MBZ Toll Road project, as if it were constructed under traditional public procurement. These estimates will subsequently be used as the data for the reference case.

5.3.1. Data collection

The data collected include construction costs and duration, maintenance costs, traffic volume, travel time and a record of accident statistics. It will be first described the data collection of the reference case, followed by a discussion of data collected for the selected PPP project.

5.3.1.1. Data and information of the reference case

To estimate the reference case, data from another project are initially used as a basis for future estimations. The project in question is the Jakarta-Cikampek I (Japek I) Toll Road, which was built non-elevated (underneath the MBZ Toll Road) in 1985 through traditional public procurement scheme (The World Bank Group, n.d.). In the following Table 14, data regarding the final estimates of construction costs, maintenance costs, traffic volume, travel time and a record of accident statistics are presented based on the information obtained from the toll road operator, PT Jasamarga Jalanlayang Cikampek (JJC), as well as further estimations:

Table 14. Data of the reference case

Data	*Unit*	*Value*
Estimated Construction costs	IDR*	8,613,789,747,206
Maintenance costs	IDR per year	258,526,324,000
Number of trips	trip per year	71,876,359
Travel time	minutes	35.47
Number of accidents	death per year	27

** IDR = Indonesian rupiah*

Based on information obtained from PT JJC, the Japek I Toll Road was built at a cost of IDR 433.172 billion in 1985. The construction process lasted three years, hence the toll road started operating since 1988. The future value of the construction costs is estimated as if the project were constructed in 2017 (the same year as the PPP project), using the average inflation rate of 6.69% between 1985 and 2017 (BPS, n.d.). Based on this assumption, it is obtained that the estimated construction costs of the Japek I Toll Road will be IDR 3.446 trillion in 2017. However, since the toll road was designed non-elevated, further approach is necessary to estimate the construction costs of the Japek I Toll Road if it is built elevated. Thus, it may be comparable to represent the reference case of the PPP project. According to Agus Setiawan, Corporate Secretary at PT Jasa Marga (Persero), currently there are two types of toll road construction in Indonesia, namely elevated and at grade (non-elevated) toll roads. The construction cost of an elevated toll road is more expensive, reaching around IDR 400 billion per kilometre. Meanwhile, the cost of building an at grade toll road is around IDR 160 billion per kilometre (Abdila, 2020). In this regard, it can be inferred that an elevated toll road in Indonesia costs 2.5 times as much as a non-elevated toll road. Multiplying the future costs obtained previously by this ratio yields the final estimated construction costs of the reference case of IDR 8.614 trillion (as seen in Table 14).

Table 14 also includes other information on maintenance costs, number of trips, travel time and number of accidents. These data were collected directly from PT JJC during the operation and maintenance of the reference case in 2021.

5.3.1.2. Data and information of the PPP project

Public-private partnerships are implemented throughout the building process and operation of the MBZ Toll Road project. Using this scheme resulted in a cost of IDR 13.445 trillion for the construction of the project. Furthermore, the project was built in 2017 and has been operating since 2020.

Table 15 below provides information on construction costs, maintenance costs, estimated number of trips, estimated travel time, and a record of accident statistics of the PPP project. In addition to information obtained from the toll road operator, PT JJC, other estimates were utilised to construct the data.

Table 15. Data of the PPP project

Data	*Unit*	*Value*
Construction costs	IDR*	13,444,691,083,672
Maintenance costs	IDR per year	121,237,000,000
Estimated number of trips	trip per year	50,313,451
Estimated travel time	minutes	29.47 – 32.47
Number of accidents	death per year	19

** IDR = Indonesian rupiah*

According to PT JJC, the MBZ Toll Road's toll price is IDR 398 per kilometre (IDR 15,000 in total), whereas the toll price in the reference case is IDR 203 per kilometre (IDR 7,703 in total). It can be argued that the PPP project has a higher toll with an increase of 95% than the reference case. By multiplying the increase in toll of the PPP project with a toll elasticity of -0.3 (Raymond & Raymond, 2003), it is estimated that there would be a 30% reduction in road use of the PPP project. Therefore, compared to the reference case the PPP project would have 21,562,908 fewer trips per year. This implies that there would be a total of 50,313,451 trips per year in the PPP project (as seen in Table 15). Furthermore, the average travel time gain of the PPP project is also uncertain. In the low scenario the time gain is 3 minutes, and 5 minutes in the high scenario based on information from PT JJC. Information on maintenance costs and number of accidents were also gathered directly from PT JJC during the operation and maintenance of the PPP project in 2021, as shown in Table 15.

5.3.2. Data analysis

There will be two scenarios of this CBA calculations: the PPP project with actual tolls or with shadow tolls, in comparison to the reference case. Initially, several general parameters applicable to the entire project are combined with the data collected, such as the Value of Travel Time Savings (VTTS), the impact on traffic safety, the Value of Statistical Life (VSL), the time horizon, and the prescribed discount rate. These general parameters can be seen in Table 16.

Table 16. General parameters

Parameter	*Unit*	*Value*
Value of Travel Time Savings (VTTS)	IDR per hour	129,685
Impact on traffic safety	Death per year	0.3
Value of Statistical Life (VSL)*	IDR per traffic death saved	14,274,557,500
Time horizon	Year	45
Discount rate	%	6.5

** Source: (Wulandari, 2020)*

The following approach is utilised to estimate the value of travel time savings (VTTS) in Indonesia. To begin, it was initially found that the VTTS in Australia in 2019 was AUD 14.20 per hour (VTPI, 2022). A one-hour travel time gain in Australia, thus, will be worth AUD 14.78 in 2022, given an annual interest rate at 1.35% (CNBC, 2022). Afterwards, the Income Elasticity of Demand (Ed) on Road Transport Fuel in both countries is compared to reflect the degree of difference between the VTTS in Indonesia and Australia. The (Ed) on road transport fuel in Indonesia and Australia are 0.97 and 1.13, respectively (DITRDC, 2022; Sa'ad, 2009). This signifies that the VTTS in Indonesia will be approximately 14% lower than the VTTS in Australia in 2022. Therefore, the value of one-hour travel time gain In Indonesia in 2022 is AUD 12.69, or equivalent to IDR 129,685 (as seen in Table 16).

The PPP project will lead to traffic safety effects. Based on the data, on average, 0.3 death every year is prevented by the construction of the PPP project. The value of statistical life (VSL) is estimated to be around USD 950,000, or equivalent to IDR 14.275 billion (Wulandari, 2020). Under the PPP scheme, ownership of the project will be transferred to the government after the private party operates the infrastructure for 45 years, thus this period serves as the time horizon for the CBA. The prescribed discount rate is 6.5%, as reported by The World Bank Group (2022). Note that a debate is always raging in the country regarding the accuracy of this discount rate. Therefore, the lowest discount rate at 3.5% for the past 5 years may also be considered (BI, 2022).

5.3.2.1. PPP project with actual tolls

To conduct CBA for the PPP project with actual tolls compared to the reference case, all gain and loss will be monetised into the following potential impacts: *construction costs*, *maintenance costs*, *travel time savings*, *revenue to the private party*, *mobility loss* and *traffic safety*.

The construction costs included in the CBA are the difference between the construction costs of the PPP project and the reference case. Similar to this, the maintenance costs are obtained when the difference in maintenance costs between the two projects is multiplied by the discount factor. It was found that the PPP project has more expensive construction costs, but can be operated with less maintenance costs than the reference case (as seen in Table 17). Since road users need to pay the tolls directly to the private party, there would be some revenue gained by the private party as the return on their investment. The revenue can be valued by multiplying the difference in toll price between the PPP project and the reference case by the number of trips in the PPP project and the discount rate.

In actual tolls, the road users have incentives to change their behaviour as they have to pay the tolls from their own. This suggests that there would be a lower road use (*mobility loss*) in the PPP project compared to the reference case. Mobility loss is calculated by multiplying a decreased number of trips in the PPP project with the difference in toll price between the PPP project and the reference case and the discount rate, in which 'Rule of Half' is applied. The Rule of Half represents the change in Consumer Surplus to consider welfare impact on the road users as the consumer in this project. Utilising the Rule of Half, mobility loss can be acquired from the given traffic volume and prices, and how they shift as a consequence of the measure (Romijn & Renes, 2013). However, those people who keep using the PPP toll road will benefit travel time savings. Travel time savings are realised as there would be reduced travel times in the PPP project based on data described previously. When multiplying the value of travel time savings by the number of trips in the PPP project and the

discount rate, the benefit of travel time savings can be estimated, as shown in Table 17. Lastly, the decrease of the traffic volume will likely lower the number of traffic accidents. Therefore, the benefit of the traffic safety in the PPP project can be monetised by multiplying the value of statistical life with the decrease of death in traffic accidents per year and the discount rate.

According to the aforementioned, Table 17 below presents the CBA results of the PPP project with actual tolls compared to the reference case. All gain and loss are calculated with two different discount rates. It shows that the Net Present Value (NPV) and the Benefit-Cost Ratio (BCR) of the project are IDR 6.784 trillion and 2.1 respectively, after discounted at a rate of 6.5%. In addition, with a discount rate of 3.5% the project will result in the NPV of IDR 12.610 trillion and the BCR of 2.9.

Table 17. CBA results of PPP project with Actual Tolls

	Present Value (discount rate at 6.5%)	*Present Value (discount rate at 3.5%)*
Δ Construction costs	-4,830,901,336,466	-4,830,901,336,466
Δ Maintenance costs	2,108,604,360,263	3,166,260,941,870
Travel time savings	5,010,739,047,129	7,524,079,734,355
Revenue to the private party (tolls paid)	5,639,030,972,007	8,467,517,118,494
Mobility loss	-1,208,363,779,716	-1,814,467,953,963
Traffic safety	64,960,178,680	97,543,607,709
Environmental	+	+
Net Present Value (NPV)	**6,784,069,441,897**	**12,610,032,112,000**
Benefit-Cost Ratio (BCR)	**2.1**	**2.9**

5.3.2.2. PPP project with shadow tolls

The second scenario is to calculate the CBA results of PPP project with shadow tolls compared to the reference case. As previously discussed in Chapter 4, in shadow tolls, no actual tolls would be collected from road users because the toll operator is paid by the authority on road use (the government) (Tillman, 1997). The road users will no longer have any incentives not to use the road anymore, as they don't experience the difference. Therefore, there will be no travel time gains and mobility loss in the PPP project with shadow tolls compared to the reference case.

Applying the same formula from the CBA calculations of the PPP project with actual tolls, the potential impacts in this PPP project, such as the difference in construction costs and maintenance costs, as well as the revenue to the private party can be shown in Table 18. Nonetheless, this PPP project will also lead to traffic safety effects due to *higher productive efficiency* gained in a PPP project, resulting in a higher quality of the road (*higher allocative efficiency*). The potential benefit of the traffic safety is then calculated by multiplying the value of statistical of life with the decrease of death in traffic accidents per year and the discount rate. In the following Table 18, it can be seen that the PPP project with shadow tolls yields positive Net Present Value (NPV) of IDR 2.982 trillion and Benefit-Cost Ratio (BCR) of 1.6 after discounted at a rate of 6.5%. It also shows that with a discount rate of 3.5% the project will result in the NPV of IDR 6.9 trillion and the BCR of 2.4.

However, the NPV and the BCR obtained are lower than the NPV and the BCR in the PPP project with actual tolls.

Table 18. CBA results of PPP project with Shadow Tolls

	Present Value (discount rate at 6.5%)	*Present Value (discount rate at 3.5%)*
Δ Construction costs	-4,830,901,336,466	-4,830,901,336,466
Δ Maintenance costs	2,108,604,360,263	3,166,260,941,870
Revenue to the private party (tolls paid)	5,639,030,972,007	8,467,517,118,494
Traffic safety	64,960,178,680	97,543,607,709
Net Present Value (NPV)	**2,981,694,174,484**	**6,900,420,331,608**
Benefit-Cost Ratio (BCR)	**1.6**	**2.4**

Based on the two scenarios, it has been discovered that the PPP project either with actual tolls or shadow tolls have a positive Net Present Value compared to the reference case. Additionally, the Benefit-Cost Ratio is greater than 1. These two findings indicate that both PPP projects would gain a net positive impact on social welfare.

It is, however, important to emphasise that differences in the result of quantitative CBA do exist between the two scenarios. In the PPP project with actual tolls, the potential benefit of travel time savings is demonstrated in Table 17 to be significantly greater than the potential cost of mobility loss that occurred. Therefore, in comparison to a PPP project with shadow tolls, the PPP project with actual tolls has a larger NPV. A positive value (plus) in Table 17 also suggests that mobility loss will result in more societal benefits, such as environmental gains in which less CO_2 emissions will be generated on the road. These environmental gains cannot be monetised in this empirical study since the data related is hard to acquire. If feasible, then the NPV of the PPP project with actual tolls could become much higher than in shadow tolls. In contrast, the absence of mobility loss in the PPP project with shadow tolls would result in increased revenue for the private party. Despite this potential social benefit to the private party, the potential benefit to the road user may be jeopardised as there will be no longer any travel time savings that can be obtained. This signifies that with shadow tolls, a positive net impact on social welfare can only be achieved if the efficiency gained from the cost-saving investment between the construction and operation of the project is substantial.

5.3.3. Tornado sensitivity analysis

Tornado diagrams are used in this study to assess the impact of uncertainty in the cost-benefit analysis (CBA). Sensitivity of CBA result of the PPP project with actual tolls to changes of its input parameters by +20% and -20% is depicted in Figure 7. The figure demonstrates the Net Present Value (NPV) being highly sensitive to changes in number of trips PPP project: a 20% increase of this parameter increases the NPV to be IDR 9.48 trillion (40% higher than the first result). This is likely due to higher potential benefits of travel time savings and revenue to the private party, but also less mobility loss (see monetisation formula in Sub-Section 5.3.2.1). On the contrary, a 20% decrease of

this parameter reduces the NPV by nearly 40%. The reduction is caused by less potential benefits that can be obtained regarding travel time savings and revenue to the private party, and greater reduction in the road use. Figure 7 also implies the importance of changes of other parameters, such as discount rate, travel time gain, Δ construction costs, number of trips reference case, Δ maintenance costs and impact on traffic safety. The parameters are orderly mentioned from the most to the least sensitive towards the CBA result of the PPP project with actual tolls.

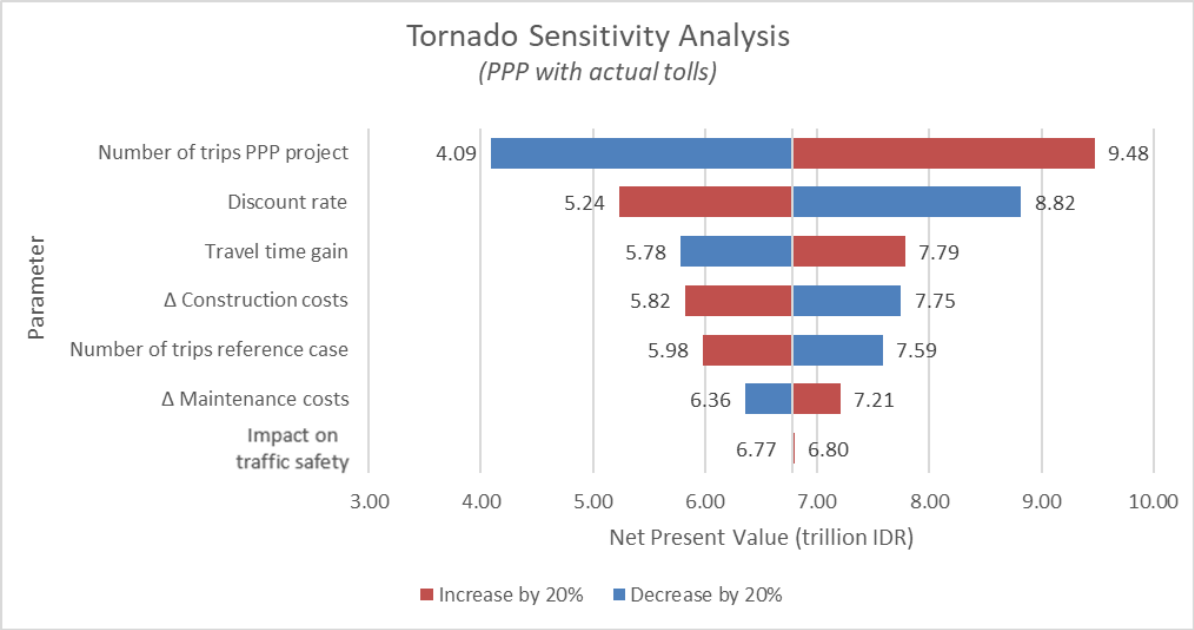

Figure 7. Sensitivity of CBA result of PPP project (with actual tolls) with respect to its input parameters

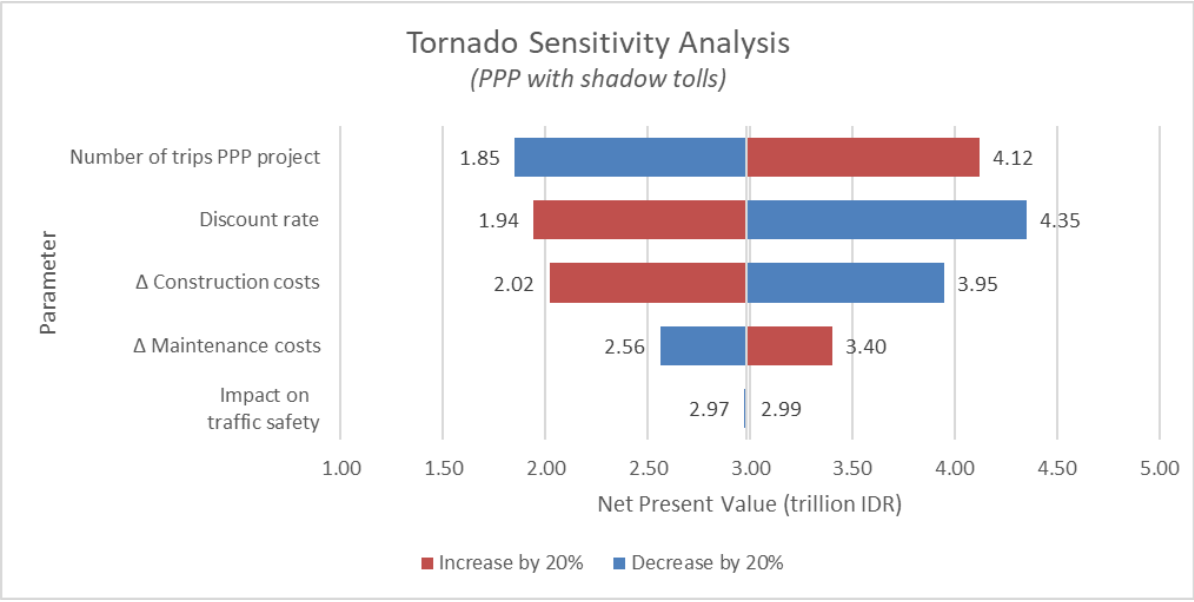

Figure 8. Sensitivity of CBA result of PPP project (with shadow tolls) with respect to its input parameters

Furthermore, Figure 8 above indicates sensitivity of CBA result of the PPP project with shadow tolls to changes of its input parameter by +20% and -20%. The input parameters are slightly different where the number of trips reference case and travel time gain are no longer relevant in this case. Depicted in Figure 7, the NPV also being highly sensitive to changes in number of trips PPP project: a 20% increase of this parameter increases the NPV to be IDR 4.12 trillion (nearly 40% higher than then first result). Vice versa, a 20% decrease of this parameter reduces the NPV by nearly 40%. It is important to note that the CBA result can be more sensitive to a 20% decrease of the discount rate at 6.5%. The changes of this input parameter will increase the NPV to be IDR 4.35 trillion (more than 40% higher than the first result). This is likely due to all potential benefits becomes substantially higher, and there is no impact on the construction costs after discounted at a lower rate (see monetisation formula in Sub-Section 5.3.2.2). Figure 8 also implies the importance of changes of other parameters, such as Δ construction costs, Δ maintenance costs and impact on traffic safety, which orderly mentioned from the most to the least sensitive towards the CBA results of the PPP project with shadow tolls.

5.4. Conclusion: Case study results

In this chapter's conclusion, the theoretical conceptualisation of potential social impacts of PPP project has been investigated in empirical setting, providing the answer to SQ3: *"How is the theoretical conceptualisation represented in empirical setting?"*. This chapter reveals that this case study has been conducted on a positive case. It thus implies all potential costs and benefits in the theoretical conceptualisation (see Section 4.2) were confirmed in the empirical setting of the Indonesian context.

Two conceptualisations of the potential impacts of PPP project against traditional public procurement has been discussed previously in Chapter 4. The first conceptual model incorporates actual tolls, commonly known as user charges, under the PPP project. In the second conceptual model, shadow tolls are adopted in the PPP project in order to return the private investment. Notably, both the theoretical findings in Chapter 4 and the empirical results in Chapter 5 indicate that the two conceptual models have similarities and differences with respect to their potential social impacts. The similarities between the two models include the potential social impacts resulting from a number of theoretical considerations, such as cost-saving investment, quality-enhancing effect, better risks management, and higher up-front transaction costs in a PPP project.

Implications of toll road PPP with both actual tolls and shadow tolls, however, do have different impacts due to the difference in payment arrangement for the road use. In the following, the difference impacts are summarised based on theoretical and empirical findings.

Travel time savings and environmental gains

In PPP with actual tolls, as the road user has to pay more for the road use themselves compared to the reference case, it gives the road user incentives not to use the road any more or less. This does influence behaviour of the road user. The road user would try to do whatever to avoid those extra costs, for instance, by making a detour or go carpooling. In other words, it implies that PPP with actual tolls, theoretically and empirically, would have lower the road use than the old way of not paying the toll (mobility loss). Some road users will experience a loss of consumer surplus, resulting

from the mobility loss. However, those road users who keep using the road will experience travel time gains due to less congestion on the road. Last but not least, mobility loss will result in more societal gains, such as environmental gains in which less CO_2 emissions would be generated on the road (less pollution).

Conversely, in PPP with shadow tolls, it is counted how much users use the road, they don't have to pay for the road use, but the government pays a kind of shadow tolls to the private party. This implies the road user does not experience the increased toll price since they do not have to pay it from their own pocket. That means the demand would not be influenced compared to the old way of building roads (no mobility loss), thus, there will be no environmental and travel time gains in PPP with shadow tolls.

Revenue of the private partner

Higher tolls in PPP do not only flow into the government but also would greatly benefit the private party. This, of course, becomes the reason why they want to participate in the PPP project compared to traditional public procurement. Mobility loss in PPP with actual tolls implies the revenue gained by the private party may be harmful. Meanwhile, the demand for the road use would not be influenced in PPP with shadow tolls. To conclude, in comparison with traditional public procurement, the use of shadow tolls in PPP project has the potential to provide a social benefit to the private party through receiving higher revenue for return on their investment. This amount of revenue can even be greater than the revenue obtained by the private party in PPP arrangement with actual tolls.

Chapter 6. Conclusions and Discussions

In this chapter, concluding answers to the research questions will be firstly presented in Section 6.1. Several topics of discussion regarding the results are then outlined in Section 6.2. The discussions include answering the fourth sub-question: *"How can the theoretical conceptualisation be strengthened through findings in the empirical setting?"* and fifth sub-question, *"What are the implications of the potential social costs and benefits of PPP project to the stakeholders involved?"*. The discussion is followed by limitations of this study including recommendations for future research in Section 6.3. In the end, the relevance of the study to the Management of Technology (MoT) programme is discussed in Section 6.4.

6.1. Conclusions

In this section, concluding answers are presented in which key takeaway of the research is firstly outlined in answering the main research question. It is then followed by a brief summary of answers to each research sub-question.

6.1.1. Key takeaway of the study

This study examines what a PPP project brings societally by exploring the potential costs and benefits of PPP project compared to traditional public procurement through societal costs-benefit analysis (CBA). Therefore, this section will provide key takeaway of the study in answering the main research question:

MRQ – *What are the potential social impacts of PPP project compared to traditional public procurement in transport infrastructure by incorporating considerations from Cost-Benefit Analysis?*

The key takeaway of the research is that in doing the CBA, outcomes of a PPP project compared to traditional public procurement is dependent on the way the tolls are implemented. The research shows the importance of distinguishing between PPP with actual tolls and shadow tolls. Reflecting on the theoretical conceptualisation and empirical analysis, there have been huge implications for the CBA outcomes since there are different potential social costs and benefits to be expected in the two models. For instance, although mobility loss does exist, it is important to realise there would be more societal gains, such as travel time savings and environmental gains in a PPP project with actual tolls. On the other side, the use of shadow tolls in a PPP project has the potential to provide a greater societal benefit to the private party since the demand for the road use would not be influenced. The insights presented in this study, more specifically, has demonstrated significant implications of the CBA outcomes to the public party, the private party and the road user.

In the following section, answers to each research sub-question are briefly summarised.

6.1.2. Answering sub-research question 1

SQ1 – *What factors influence the PPP project to generate potential social impacts?*

The question is answered by conducting literature study. It can be inferred that there are five factors influencing a PPP project to generate potential social impacts, such as high complexity contracts, high asset specificity, cost-saving investments, quality-enhancing effects, and explicit recognition and pricing of construction risks. These influencing factors are determined, notably based on the three channels through which PPP can boost efficiency. The first channel, ownership rights, suggests that incomplete contracts in PPP means there would be a complex and costly matter to reaching an agreement. In addition, the ownership rights theory reveals that PPP contains relation-specific investment. The second channel, contractual arrangement, allows the internalisation of any potentially beneficial externalities that may present between the two phases of construction and operation of the road (cost-saving investment). Efficiencies obtained in the operation means that there would be a quality-enhancing effect. Accordingly, the last channel of risk sharing implies that the private party is expected to acknowledge and price the construction risks that have been transferred from the public party in their offer for the contract.

6.1.3. Answering sub-research question 2

SQ2 – *What are the potential social costs and benefits of PPP project theoretically compared to traditional public procurement?*

Table 19. An inventory of potential social costs and benefits of PPP project compared to traditional public procurement

Initial impacts	*Potential social costs*	*Potential social benefits*
Higher construction costs	Higher construction costs (P)	Less maintenance costs (P)
		Higher traffic safety (R)
		Less travel time loss (R)
Higher risk premium		Less time overruns (P)
		Less cost overruns (P)
		Political credit gains (G)
		Lower political risks (G)
		Less risks burden (R)
Higher (**actual**) tolls	Mobility loss (P)	Reduced budget deficit (G) Higher revenue (P) Higher traffic safety (R) Less pollution (R)
Higher (**shadow**) tolls	No mobility loss (P)	Higher revenue (P)
Higher up-front transaction costs	Higher up-front transaction costs (G)	Less back-end transaction costs (G)
	Higher up-front transaction costs (P)	Less back-end transaction costs (P)

Legend: G = impact on public party, P = impact on private party, R = impact on road user

The potential societal costs and benefits of a PPP project compared to traditional public procurement have been theoretically conceptualised into two models: PPP with actual tolls and PPP with shadow tolls. The conceptual models illustrate, from a theoretical perspective, how these potential impacts correlate to one another and how they differ from traditional public procurement. The final outcome of the theoretical conceptualization is an inventory of potential societal costs and

benefits of the PPP project, as provided in Table 19. From the table, both actual tolls and shadow tolls would have some similarities of societal gains and losses. On the contrary, it is also clear from the yellow-highlighted cells in the tables that either mobility loss does exist or not distinguishes the potential social impacts of PPP project in the two conceptual models.

6.1.4. Answering sub-research question 3

SQ3 - *How is the theoretical conceptualisation represented in empirical setting?*

It has to be acknowledged that this study is conducted on a positive case, where all potential impacts in the theoretical conceptualisation were confirmed in the empirical analysis of the Indonesian context. The outcomes of CBA demonstrate both PPP project with actual tolls and shadow tolls would have a net positive impact on social welfare. Nevertheless, there are similarities and differences between the two models in relation to their social potential. The similarities in question include the potential social impacts resulting from a number of theoretical considerations, such as cost-saving investment, quality-enhancing effect, better risks management, and higher up-front transaction costs in a PPP project. On the contrary, implications of toll road PPP with both actual tolls and shadow tolls also have different potential impacts due to the difference in payment arrangement for the road use. It is then important to realise whether there would be a loss of mobility in the PPP project, resulting from this distinct payment arrangement between actual and shadow tolls. Thus, both PPP projects would have different societal gains and losses with respect to environment, travel time savings and revenue of the private partner.

6.1.5. Answering sub-research question 4

SQ4 - *How can the theoretical conceptualisation be strengthened through findings in the empirical setting?*

The outcome of empirical study allows some adjustments to the theoretical conceptualisation of the potential social impacts of PPP project. The adjustments are made to the higher risk premium that must be paid by the government, as well as the impacts of higher tolls on the government. To help clarify better risk allocation, this higher risk premium should be accompanied with the allocation of a greater risk of construction cost overruns to private parties. In addition, it should be noted that in PPP with actual tolls, what is compensated is the road user's own money specifically for paying the tolls facility. Meanwhile, in PPP with shadow tolls, as the government is responsible for returning the private investment, it is then still appropriate to state that the tax paid by the road users will be more compensated properly. The next adjustment is concerning more fiscal freedom to the private party and reduced vehicle operating costs of road user

6.1.6. Answering sub-research question 5

SQ5 - *What are the implications of the potential social costs and benefits of PPP project to the stakeholders involved?*

The implications of the study are derived mainly from the key takeaway that has been captured. The differences in societal gains and losses to be expected for both conceptual models have also been examined through theoretical and empirical analysis. From a public perspective, the outcomes of the

CBA imply using actual tolls in a PPP project would be more desirable due to more fiscal freedom that can be obtained by the government. From a private perspective, it is perceived PPP project with shadow tolls would be more beneficial for the private parties through receiving higher revenue for return on their investments. Meanwhile, this study implies either actual tolls or shadow tolls is more desirable for a road user is still case dependent. It means road users will only greatly benefit more societal gains as long as they want to spend more effort to spend higher in the user charges model.

6.2. Discussions

6.2.1. Adjusted conceptual models

In this section, adjustments are made to the conceptual model based on qualitative and quantitative results obtained from the case study. This will answer the fourth research sub-question of this study: *"How can the theoretical conceptualisation be strengthened through findings in the empirical setting?"*. Adjusted conceptual models are presented in Figure 9 and Figure 10.

In both figures, it can be seen that there is an adjustment for the higher premium risk that the government has to pay under the preceding conceptual model. The case study reveals that the government is still accountable for the risks of land acquisition, tolls adjustment and project termination, as well as political risks. Political risk associated with cost overruns is one of the greatest risks. In a PPP project, however, this risk of cost overruns is transferred to the private party, resulting in improved risk management. In this manner, the private party will bear higher risk of project cost overruns. This adjustment demonstrates a clearer distribution of risks between the government and the private party.

The second adjustment concerns the road users' tax expenditures in PPP project with actual tolls. According to the findings of the case study, PPP projects utilising actual tolls in Indonesia get their full funding from private partners. The amount of tolls paid to the private party is a reflection of the risk that road users are willing to take on, and whether or not this risk is adequately compensated by the quality of the road (see Figure 9). Thus, no tax expenditures are incurred in the PPP project with actual tolls.

Although all revenues received by private parties are collected from road users, this does not necessarily indicate an increase in government's cash flow in PPP with actual tolls. It would be better to consider that the government will have more fiscal freedom to better maintain their cash flow. The third adjustment to the conceptual model can be seen in Figure 9. In the end, from the figure additional potential benefits, such as reduction in vehicle operating costs for road users, may also be incorporated to the potential less pollution due to mobility loss in PPP with actual tolls.

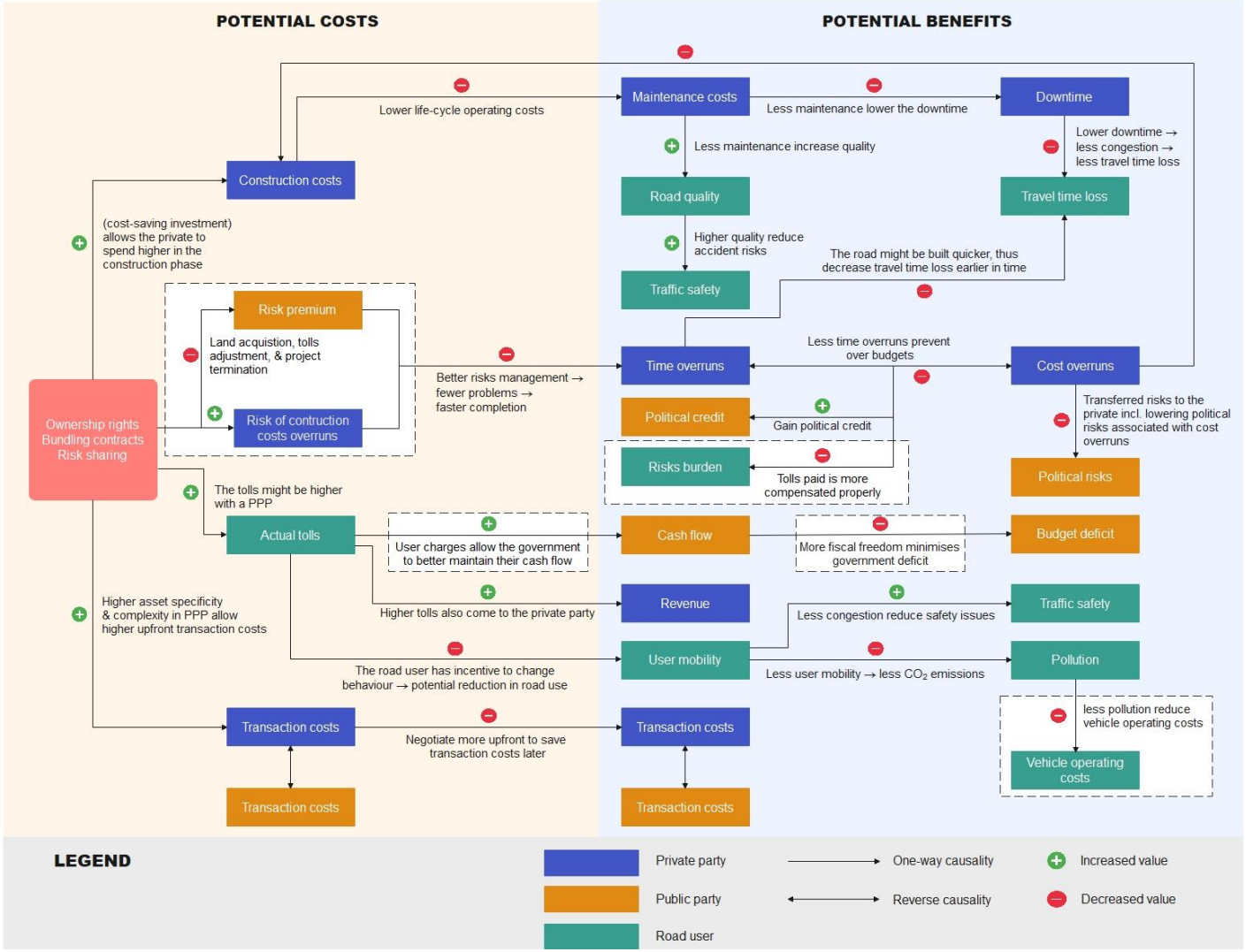

Figure 9. Adjusted conceptual model 1: Potential social impacts of PPP project compared to traditional public procurement (with Actual Tolls)

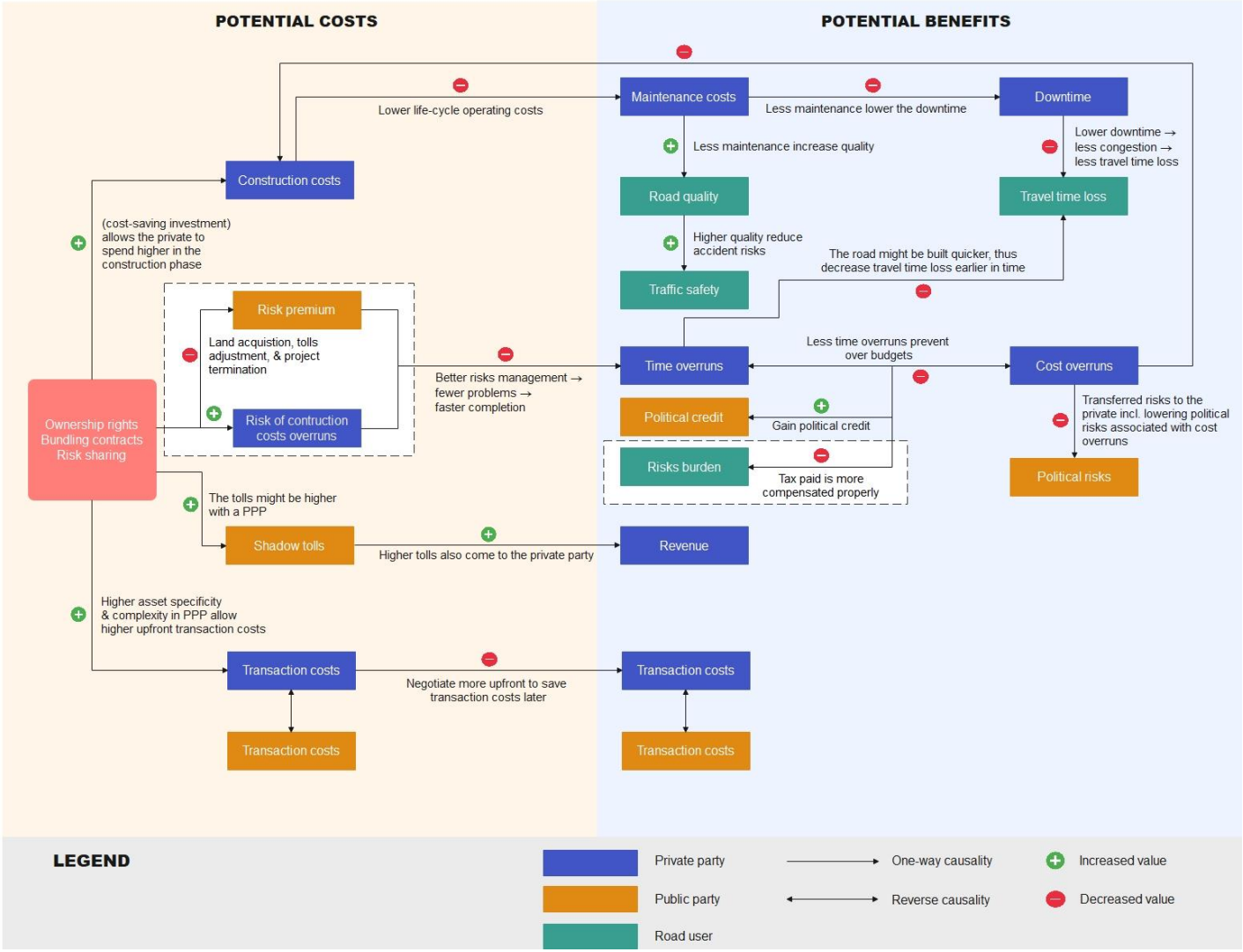

Figure 10. Adjusted conceptual model 2: Potential social impacts of PPP project compared to traditional public procurement (with Shadow Tolls)

6.2.2. Scientific implications

The research contributes to the existing body of knowledge on exploring the social potential impacts of PPP project compared to traditional public procurement. As discussed in Chapter 2, cost-benefit analysis (CBA) is a common tool in transport infrastructure industry to appraise non-financial aspects of the project, and there has been found significant benefits that can be captured by utilising CBA to explore potential welfare impacts. However, the application of CBA particularly in analysing the potential impacts of PPP project remains a niche. Therefore, this study notably contributes to incorporate the potentials of CBA in conceptualising the social potential impacts of a PPP project.

This research also advances the body of literature on the novelty of two theoretical conceptualisations of the potential social impacts of a PPP project. Compared to findings in current scientific literature (see Chapter 2), this research advances the literature by presenting the importance of distinguishing between PPP with actual tolls and shadow tolls. Significant theoretical implications for the CBA outcomes have been outlined considering there are different potential costs and benefits in both conceptual models. Furthermore, the conceptual models are built on in-depth theoretical considerations, particularly through which PPP project can enhance higher productive efficiency and higher allocative efficiency.

Another academic scientific contribution stems from the correlation drawn between the theoretical conceptualisation and empirical study. Not only conceptualized, but the potential social impacts of a PPP project are also investigated in an empirical setting. It turns out that the research is conducted on a positive case, where all potential impacts in the theoretical conceptualization were confirmed in the case study.

6.2.3. Societal implications

Implications for Public Party

The research key takeaway is to propose the importance of distinguishing a PPP project with actual tolls and shadow tolls. The differences in societal gains and losses for both models have also been examined in an empirical setting of a toll road project in Indonesia through some interviews and quantitative cost-benefit analysis (CBA). From a public perspective, the outcomes of both qualitative and quantitative CBA imply PPP project with actual tolls would be more desirable. The reason is because user charges allow the government to better maintain their cash flow. Thus, the government would have more fiscal freedom to minimise its budget deficit. In other words, the government can take advantage of this fiscal freedom to fund other social facilities in its national and regional programmes. Other considerations for choosing PPP project instead of traditional public procurement are also of importance. They are societal gains in PPP that can be obtained by the government, such as less risk of cost overruns and a positive net impact of transaction costs. Not only that, potential less time and cost overruns in the delivery of the project enables the government to enhance its political standing.

This study provides recommendation for the public party to always implement PPP in road projects with actual tolls, after considering its potential societal implications. However, the result of the study also suggests tax adjustments and the combination of PPP with other schemes, such as project financing may be necessary if the government wishes to employ PPP with shadow tolls in the

country. By this way, the government will have a more reliable and sustainable source of funds to return private investments. As the likelihood of undervaluing or overestimating the demand for the road use remains a problem in Indonesia, the government should improve the feasibility study. Furthermore, in terms of public policy, the government may incorporate societal CBA into the feasibility study of future PPP projects in the country. In this regard, significant impacts of PPP project can be captured, so that the stakeholders become more aware of the need for a PPP project whose impacts are not only economically favourable but also societally beneficial.

Implications for Private Party

With respect to the main findings of the study, it is perceived the PPP project with shadow tolls would be more worthwhile for the private party. The demand for the road use would not be influenced in PPP with shadow tolls. It means the use of shadow tolls has the potential to provide more societal gains to the private party through receiving higher revenue for return on their investments. This amount of revenue can even be greater than the revenue obtained in PPP arrangement with actual tolls. Therefore, this study suggests private party to employ shadow tolls especially in a transport PPP project.

Another key point is reflecting on the social potential that have been captured in a PPP project compared to traditional public procurement. It can be inferred that private parties play a key role in realising efficiency in a PPP project while capitalising the investments that have been made. The incentive obtained by the private sector to carry out the internalization of any positive externalities between the construction and operational phase of the road becomes crucial. If the private sector can take advantage of this cost-saving investment, later they would gain some potential benefits. Although, the efficiency gain will substantially benefit road users in this case, in turn, their revenue generation depends on the road users and the government as well. It was determined in the case study that the government would grant periodic toll adjustments if the private parties were able to build and operate the toll roads in accordance with the specified minimum standards. Meanwhile, in terms of transaction costs, the private sector should also recognise that PPP projects are complicated, thus it needs more effort to reach an agreement at the beginning. It means more meetings and discussions must be conducted upfront to gain efficiency in the subsequent negotiation process.

Implications for Road User

The results of the study imply that road users will get a positive net impact from the potential benefits but also efforts that should be made. From the perspective of road users, the impacts on travel time loss and traffic safety are the two main indicators to consider. Societally the road users can be more convenient in using the public facilities as there would be potential for less congestion and higher quality of the road. In this way, tolls paid through user charges or taxes in shadow tolls can be more properly compensated.

It is also of importance to realise the difference impacts on road users due to distinct models in a PPP project. It is indeed, with the user charges mechanism, road users should spend more effort because of the possible higher tolls on the road that should be paid from their own. In turn, road users will greatly benefit the societal gains due to reduction in road use, such as environmental gains

and higher traffic safety than a PPP project with shadow tolls. Those who try to avoid such extra costs will experience a loss of consumer surplus, but those who keep using the road of actual tolls will experience the aforementioned societal gains. Thus, this study implies whether a one model is more desirable for road users is still case dependent.

6.3. Limitations and recommendations for future research

The analysis of this study entails several limitations to be aware of. The first limitation pertains to the nature of a single case study in the empirical analysis, where the generalisability of findings is limited. This study evaluates the potential costs against the potential benefits of a project CBA to determine how much the benefit outweighs the cost. Therefore, the case study might not represent the whole society. It is then recommended for future studies to conduct CBA in a wider societal context beyond the public party, the private party and the road users. For instance, it might be also of importance to consider the beneficiary of the toll road project. In addition, having more respondents to gain better case study representation is recommended.

The second limitation relates to the monetisation of the impacts. Not all the potential impacts in the conceptual models can be monetised in the CBA. In this study, there are non-monetary impacts, such as environmental, transaction costs, political credit and risk, and government's budget deficit that cannot be valued cost-effectively. These non-monetary costs and benefits must be taken into account and should not be regarded as any less important than the monetary values. The reason is because these non-monetary impacts may significantly change the results of quantitative CBA, either in a good or bad way. For example, as already discussed, a PPP project contains high asset specificity and complexity so transaction costs may be substantial. Although in the case study, it is found qualitatively a net positive impact can be obtained by negotiating more up-front in order to minimize the later process of negotiation, the results may be different when it is monetised. Therefore, it is recommended in future research, where possible, to include relevant data to support the qualitative analysis. For instance, statistics on the number of individuals impacted by the policy or the added value of the affected project may be important for determining the end outcomes.

6.4. Management of technology relevance

This study is indeed in line with some of the concepts that Management of Technology (MoT) graduates learn to explore and understand. First, the study works on a scientific study in innovation processes. Public-private partnerships (PPP) can be considered an innovation in procurement strategy in transport infrastructure, whereas the interactions amongst stakeholders are also discussed. Secondly, the study shows an understanding of innovation that is done not only from a corporate perspective, the private party in this case, but also from governmental and societal perspectives. The innovation in the procurement strategy thus allows both the public and the private parties to internalise any potential benefits from the framework, such as cost-saving investments. Therefore, thirdly, from the perspective of managing a project, this study provides empirical data of different potential revenue generation that can be obtained by the private party through distinguishing a transport PPP project. Lastly, the study shows incorporating scientific methods and techniques relevant to MoT courses, such as Cost-Benefit Analysis.

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Appendix

Appendix A: Interview questions

Interview Questions – Research on Transport Infrastructure

Research Title : Exploring the Social Potential of PPP in Transport Infrastructure

Researcher : Maruli Claudio Sibuea

Affiliation : Delft University of Technology (TU Delft)

Supervisor : Dr. J. A. Annema

A list of concept-related questions to ask during the interview has been prepared. The questions are defined based on a theoretical conceptualization of the potential costs and benefits of a Public-Private Partnerships (PPP) project in the transport industry.

(Daftar pertanyaan terkait konsep untuk ditanyakan selama wawancara telah disiapkan. Pertanyaan-pertanyaan tersebut disusun berdasarkan konseptualisasi teoretis tentang potensi biaya dan manfaat proyek Kerja Sama Pemerintah dengan Badan Usaha (KPBU) pada industri transportasi.)

Introductory questions

- Could you please describe the role and expertise of your company/organisation in the PPP project (MBZ Toll Road)?
  (Dapatkah Anda jelaskan peran dan keahlian perusahaan/organisasi Anda dalam proyek KPBU Jalan Tol MBZ?)
- How do you see the role being played in this PPP project?
  (Bagaimana Anda melihat peran yang dijalankan perusahaan/organisasi Anda dalam proyek KPBU ini?)
- What are your thoughts on the current development of PPP projects in Indonesia's transport infrastructure?
  (Bagaimana pendapat Anda tentang perkembangan proyek KPBU pada infrastruktur transportasi Indonesia saat ini?)

Theme 1: Validation of potential impacts with regards to Construction Costs

- To what extent do you agree that PPP projects have a greater potential for cost-saving investments?
  (Sejauh mana Anda setuju bahwa proyek KPBU memiliki potensi yang lebih besar dalam hal investasi penghematan biaya?)

- Potential impacts to *private party*
    - In your opinion, how much higher are the construction costs in this PPP project compared to the reference case? What factors are impacting this?
      (Menurut Anda, seberapa lebih besar biaya konstruksi dalam proyek KPBU ini dibandingkan dengan proyek konvensional? Faktor apa saja yang mempengaruhi hal tersebut?)
    - In your opinion, how much lower are the maintenance costs in PPP project compared to the reference case? What factors are impacting this?
      (Menurut Anda, seberapa lebih rendah biaya pemeliharaan dalam proyek KPBU ini dibandingkan dengan proyek konvensional? Faktor apa saja yang mempengaruhi hal tersebut?)
    - Do you believe cost-saving investment (higher construction costs to save maintenance costs during the operational phase) in this PPP project would generate a higher positive net impact compared to the reference case?
      (Apakah menurut Anda investasi penghematan biaya (biaya konstruksi yang lebih tinggi untuk menghemat biaya pemeliharaan selama fase operasional) dalam proyek KPBU ini akan menghasilkan "net impact" positif yang lebih tinggi dibandingkan dengan proyek konvensional?)
    - Less repairment would reduce the road's **downtime** (the number of days needed to repair the road), implying more time savings in the repairment. According to your experience, do you find this to be true? If yes, how much possible time savings are there?
      *(Perbaikan yang lebih sedikit akan mengurangi **downtime** (jumlah hari yang diperlukan untuk memperbaiki jalan), yang menyiratkan lebih banyak penghematan waktu dalam melakukan perbaikan. Apakah hal ini benar adanya menurut pengalaman Anda? Jika ya, seberapa besar kemungkinan penghematan waktu yang dihasilkan?)*
- Potential impacts to *road user*
    - As less maintenance / less repairment is required, do you believe this will lead to an improvement in the road's quality?
      (Karena lebih sedikit pemeliharaan / lebih sedikit perbaikan yang diperlukan, apakah menurut Anda hal ini akan berdampak pada peningkatan kualitas jalan?)
    - In relation to the preceding question, do you think that improved road quality will also increase higher traffic safety (less accident risks)?
      (Berkaitan dengan pertanyaan sebelumnya, apakah menurut Anda peningkatan kualitas jalan juga akan meningkatkan keselamatan lalu lintas dengan mengurangi risiko terhadap kecelakaan?)
    - As smaller number of days required to repair, you will have shorter time to close the lane, thus there will be less congestion. Do you find there is less **travel time** loss during the operating phase in this PPP project compared to the reference case?
      *(Semakin sedikit hari yang dibutuhkan untuk melakukan perbaikan, Anda akan memiliki waktu yang lebih singkat untuk menutup jalur, sehingga kemacetan akan berkurang. Apakah menurut Anda kerugian **waktu tempuh** selama fase operasi dalam proyek KPBU ini lebih sedikit dibandingkan dengan proyek konvensional?)*

Theme 2: Validation of potential impacts with regards to Risk Sharing

- To what extent do you agree that risks are allocated better among stakeholders in this PPP project compared to the reference case?
  (Sejauh mana Anda setuju bahwa risiko dapat dialokasikan lebih baik di antara para pemangku kepentingan dalam proyek KPBU ini dibandingkan dengan proyek konvensional?)
- Potential impacts to *public party*
  - Transferred risk to the private sector is not free, the government should expect to pay an uncertainty premium. Is the risk premium in this PPP project significant?
    (Risiko yang didistribusikan ke sektor swasta memiliki konsekuensi bahwa pemerintah diharapkan untuk membayar premi. Apakah besarnya premi risiko dalam proyek KPBU ini signifikan?)
  - In your view, will the government gain political credit for delivering the project now, despite having to pay only a relatively small part of the cost upfront and often little or nothing throughout the construction phase?
    (Menurut Anda, apakah pemerintah akan mendapatkan kredit politik melalui mekanisme KPBU dalam membangun infrastruktur transportasi?)
  - In your view, does the government transfer construction risks to the private sector along with political risks associated with construction cost overruns in a PPP project?
    (Menurut Anda, apakah pemerintah mendistribusikan risiko konstruksi ke sektor swasta bersama dengan risiko politik yang terkait dengan pembengkakan biaya konstruksi dalam proyek KPBU?)
- Potential impacts to *private party*
  - Due to higher construction costs and better risks allocation, do you find there is potential less time overruns in this PPP project compared to the reference case?
    (Karena biaya konstruksi yang lebih tinggi dan alokasi risiko yang lebih baik, apakah menurut Anda ada potensi keterlambatan penyelesaian proyek yang lebih kecil pada proyek KPBU ini dibandingkan dengan proyek konvensional?)
  - In relation to the preceding question, would a more timely completion of the road construction reduce budgetary overruns? If so, how much less cost overruns did you anticipate this PPP project to incur in comparison to the reference case?
    (Berkaitan dengan pertanyaan sebelumnya, apakah penyelesaian konstruksi jalan yang lebih tepat waktu akan mengurangi pembengkakan anggaran? Jika ya, seberapa besar pembengkakan biaya yang Anda antisipasi dari proyek KPBU ini dibandingkan dengan proyek konvensional?)
  - Could you please give your opinion on the potential reduced construction costs due to less cost overruns in this PPP project?
    (Dapatkah Anda memberikan pendapat Anda tentang adanya potensi pengurangan biaya konstruksi akibat kemungkinan pembengkakan biaya yang lebih kecil dalam proyek KPBU ini?)
- Potential impacts to *road user*
  - Do you agree if this project may be constructed faster under PPP procurement? If so, will there be an early reduction in **travel time** loss (different with those associated with reduced downtime)?

*(Apakah Anda setuju jika proyek ini dibangun lebih cepat dengan diterapkannya skema KPBU? Jika demikian, apakah hal ini juga berdampak pada kehilangan **waktu perjalanan** yang lebih sedikit?)*

- In traditional public procurement, construction costs and time overruns hurt taxpayers and road users, who carry the risks. Do you believe that tax expenditures are more properly compensated in this PPP project, hence reducing road users' exposure to risk?
  (Dalam pengadaan publik tradisional, biaya konstruksi dan kelebihan waktu merugikan pembayar pajak dan pengguna jalan, yang menanggung risikonya. Apakah menurut Anda pengeluaran pajak dapat dikompensasikan dengan lebih baik dalam proyek KPBU ini, sehingga mengurangi risiko pengguna jalan?)

Theme 3: Validation of potential impacts with regards to Transaction Costs

- To what extent do you agree that this PPP project will incur higher upfront transaction costs compared to the reference case?
  (Sejauh mana Anda setuju bahwa proyek KPBU ini akan menimbulkan biaya transaksi dimuka yang lebih tinggi dibandingkan dengan proyek konvensional?)
- What are the main factors that make transaction costs more expensive?
  (Apa saja faktor utama yang membuat biaya transaksi menjadi lebih mahal?)
- In your opinion, would more negotiation upfront save transaction costs during the process (e.g., maintenance/operating phase)?
  (Menurut Anda, apakah dengan negosiasi awal yang lebih besar akan menghemat biaya transaksi selama proses selanjutnya (misalnya, pada fase pemeliharaan/operasi)?)
- Do the entire transaction costs in this PPP project have a greater positive net impact than the reference case?
  (Apakah seluruh biaya transaksi dalam proyek KPBU ini memiliki "net impact" positif yang lebih besar daripada proyek konvensional?)

Theme 4: Validation of potential impacts with regards to Tolls

- What type of **tolls** are applied in this PPP project (**actual / shadow tolls**)?
  *(**Tolls** jenis apa yang diterapkan dalam proyek KPBU ini (**actual / shadow tolls**)?)*
- Could you perhaps explain on how the toll tariffs have been included into the PPP structure of this project? Where would the money go? What are the rules?
  (Dapatkah Anda menjelaskan bagaimana tarif tol direncanakan ke dalam struktur KPBU proyek ini? Bagaimana aturannya?)
- To what extent do you agree that tolls might be higher with a PPP project?
  (Sejauh mana Anda setuju bahwa biaya tol mungkin lebih tinggi pada proyek KPBU?)
- Potential impacts to *public party*
  - Do you think that higher tolls will increase government's cash flow, hence minimising the government's budget deficit?
    (Apakah menurut Anda tarif tol yang lebih tinggi akan meningkatkan arus kas pemerintah, sehingga meminimalkan defisit anggaran pemerintah?)

- Potential impacts to *private party*
    - In your opinion, would this PPP structure/design result in higher revenue to the private party?
      (Menurut Anda, apakah struktur/desain KPBU pada proyek ini akan menghasilkan pendapatan yang lebih tinggi bagi pihak swasta?)
- Potential impacts to *road user*
    - Do you agree if the road users now have incentive to change their behaviour? (*As they have to pay more for the road directly compared to the reference case, maybe they will use the road less often or will decide not to use the road anymore*).
      (Apakah Anda setuju jika pengguna jalan sekarang memiliki insentif untuk mengubah perilaku mereka? (Karena mereka harus membayar lebih untuk menggunakan jalan secara langsung dibandingkan dengan proyek konvensional, mereka mungkin saja akan lebih jarang menggunakan jalan tersebut atau memutuskan untuk tidak menggunakannya).)
    - In relation to the preceding question, would this PPP project result in potential mobility loss (less road users)?
      (Berkaitan dengan pertanyaan sebelumnya, apakah proyek KPBU ini akan mengakibatkan potensi kehilangan mobilitas (pengguna jalan yang lebih sedikit)?)
    - On the other hand, does it also imply that they would have gains in less pollution (e.g., CO_2 emissions) and less safety issues?
      (Di sisi lain, apakah hal tersebut juga menyiratkan bahwa masyarakat akan memperoleh keuntungan dari potensi adanya pengurangan polusi (mis., Emisi CO_2) dan masalah keselamatan yang lebih sedikit?)
- Could you please give your opinion on why **shadow tolls** are not implemented yet in Indonesia? In the future, would you consider this type of tolls?
  *(Menurut Anda, mengapa **shadow tolls** belum diterapkan di Indonesia? Di masa depan, apakah Anda akan mempertimbangkan jenis tol ini?)*

Theme 5: Validation of Conceptual Scheme (in general)

- What is your opinion of this conceptual scheme?
  (Bagaimana pendapat Anda tentang skema konseptual ini?)
- Do you agree with how the potential impacts are laid out in the scheme?
  (Apakah Anda setuju dengan bagaimana dampak potensial dijabarkan dalam skema ini?)
- How to make this scheme more complete? Could you please tell me of other potential social costs or benefits of PPP in transport infrastructure?
  (Bagaimana cara membuat skema ini lebih lengkap? Apakah menurut Anda ada potensi biaya atau manfaat sosial lain dari proyek KPBU dalam infrastruktur transportasi?)

Closing questions (additional)

- Do you see that PPP procurement has greater potential benefits compared to the reference case?
  (Apakah Anda melihat bahwa skema KPBU memiliki potensi manfaat yang lebih besar dibandingkan dengan proyek konvensional?)
- How do you see the development of PPP procurement in Indonesia's transport infrastructure in the future?
  (Bagaimana Anda melihat perkembangan pengadaan KPBU terhadap infrastruktur transportasi Indonesia ke depan?)
- Is Indonesia moving in the right direction in terms of enabling PPP procurement development?
  (Apakah Anda memiliki masukkan untuk mengoptimalkan pengaplikasian skema KPBU dalam proyek infrastruktur Indonesia di masa mendatang?)

Acknowledgement,

Dr. J. A. Annema

Associate Professor in Faculty Technology, Policy and Management

Appendix B: Interview results

The quotations are grouped according to the respondent.

A.1. Public Party

G1: Director General, DJPI

ATLAS.ti reference	*Quotation*	*Codes*
10:28	User mobility, I mean, I want to convey that in practice we are less likely to experience mobility loss, because the implementation of PPP here is not supported by setting the appropriate toll rates. I think our toll rates are under-priced, we haven't found yet a more proportional limit for the Willingness to Pay value. The way we calculate WTP is too theoretical compared to actual spending.	Partnership-challenge; Actual tolls: higher tolls
10:44	If we look at the study, the WTP should be at 50 percent, right? In fact, with current WTP, today we are still experiencing traffic jams, meaning that this value has already been exceeded, maybe it should be set at 100 percent. I think this must be corrected later.	Partnership-challenge; Actual tolls: higher tolls
14.45	There are regulators, operators, and users. The relationship of these three parties is ideally separated. The regulator and the operator should have their own contractual. Likewise with regulator and user. The regulator will ask the private party to build roads in good condition at all times, then pay them. Between the regulator and the user, it has to do with affordability. Yes, we, the government, will provide a good service where you (road user) will use it at an affordable rate. Regulators must ensure that these rates do not become unaffordable. So, if the traffic is overload today, it means that the tariff is too low. The focus should be on economic efficiency, you have to find a toll tariff that can make it more efficient, so that the mobility can change.	Partnership-arrangement; Partnership-improvement
14:45	Conversely, today we merge them. It's as if the inability of the project was imposed on the tariff so that we eliminate the rights of the private party. Often, later in the contract, private party must bear many risks. For example, they are not able to bear the risk of too low traffic, as happened in Kalimantan and Sumatra. They become bankrupt. The ecosystem is wrong in my opinion.	Partnership-challenges
17:50	I think Indonesia should implement shadow toll in the future. It can be supported with the Availability Payment (AP) mechanism. Good service must be binding. If there is an incapacity, it is the government's job to fill it. On the other hand, if there is an excess, it is also the duty of the government to capture.	Partnership-improvement; Shadow tolls
22:19	MPWH is the regulator, the contracting agency. In the toll road sector, the Directorate of Binamarga has the task of providing infrastructure connectivity in Indonesia. Then the Indonesian Toll Road Authority (BPJT) was formed under Binamarga as the project supervisor. This is mainly because PPP projects require long-term handling.	Public Party-responsibilities
22:54	Yes, I really agree that PPP has huge potential for cost-saving investment. I see that PPP is indeed circular, it means PPP is able to realize business and economic circular. However, its implementation in Indonesia has not been optimal. Some stakeholders here have not seen this strategy as a solid unit from upstream to downstream. The implementation is still partial.	Cost-saving investment: higher construction costs less maintenance costs
30:44	Although the construction costs are higher, the overall net impact of cost-saving investment is still better than conventional ones. When compared to conventional, the efficiency is very much better. It's just that our implementation has not been optimized. The question is, can we still make it better? That is, has the Pareto optimal been reached? No, I don't think so.	Cost-saving investment: higher construction costs less maintenance costs
33:56	I strongly agree that there is a time saving during the maintenance phase in PPP. In fact, it will be much better than conventional, because the process is very separated in conventional strategy. If the implementation could become more optimized, it will be even much better.	Cost-saving investment: less maintenance costs

ATLAS.ti reference	*Quotation*	*Codes*
35:23	This is also related to improving road quality and traffic safety. I see that all of them are truly sustainable in PPP. Lower maintenance costs mean that the quality of the roads would be much better, as well as the traffic safety. However, the ecosystem still needs to be improved in Indonesia, because everything tends to be bestowed to the contractor as the main driver until today.	Cost-saving investment: less maintenance costs, higher road's quality, higher traffic safety
38:43	I also strongly agree that PPP has a higher potential for less travel time loss, then there is no need to argue about it. Just now, can we increase the less travel time loss? Well, that's the question. How to make an appropriate asset management to face the challenges ahead?	Cost-saving investment: less maintenance costs, less travel time loss; Partnership-challenge
42:02	I also agree that the risk allocation in the PPP scheme is also more appropriate than in conventional because it is precisely charged according to the capacity of each stakeholder. However, in Indonesia, some of the risk sharing implementation still follow conventional way, especially at the Finance and Development Supervision Body (BPKP), which ultimately makes the contractors unable to realize the expected innovation, in terms of efficiency.	Risk sharing
43:44	Of course, with the possibility of a smaller project completion delay in PPP, the political risks borne by the government will also be reduced. Political risks in question, such as changes to regulations and tariff adjustments. The guarantee of land availability is also a government risk.	Risk sharing: less cost overruns, lower political risks
50:27	PPP toll road projects in Indonesia are charged to road users (user charge), which will be paid to private parties. This toll is calculated based on the toll tariff times the traffic volume, the aim is to return the investment that comes from its Capex and Opex. The formula is that simple. The problem is how to develop a good cash flow so that it can return the investment of the private party.	Actual tolls
50:31	However, those Capex and Opex are financed by loans, which have interest. Often there is a shortfall in the beginning because the revenue has not been able to cover the obligation to pay basic costs and its interest. That's where there might be a cash deficiency.	Actual tolls
59:26	I am very interested if we can also consider the beneficiary. For example, who will benefit from the construction of the MBZ Toll Road? Is it only users who go to Bandung? Is it only the business entity or the government? What about the surrounding industrial area? They will of course also gain some benefits. Another example, along the corridor, because if we look outside, the benefits may be too broad to investigate. You can look at the increase of quality of life and the level of transportation service there. Not only road users, but also non-users will benefit.	Road User-new impacts

G2: Head of Investment Planning Legislation, DJPI

ATLAS.ti reference	*Quotation*	*Codes*
04:05	The task of DJPI is to evaluate whether the private parties are financially capable in building the road of PPP project. The result will be a recommendation to the Minister, while at the same time, Bina Marga Directorate also needs to give their recommendation regarding the technical capability of the private parties. Finally, after the permit has been issued, BPJT will execute the tendering process.	Public Party-responsibilities
10:07	Cost-saving investment has the potential to be realized in PPP because the construction and OM contracts are bundled. If separated, as in conventional projects, the government will bear the greatest risk. Compared to the private parties who are more financially capable, there is always a limit on government's budget, as well as limited budget to conduct the OM of the road.	Cost-saving investment: higher construction costs, less maintenance costs

ATLAS.ti reference	*Quotation*	*Codes*
11:20	In Indonesia, the private party is expected to meet the Minimum Maintenance Standards (SPM) in carrying out road maintenance, as stated in PUPR Ministerial Regulation No. 16 of 2014. So, the quality of roads will also improve because the government really supervise and monitor them.	Cost-saving investment: higher road's quality
13:05	Based on the Constitution of 1945 no. 2 of 2002, the government needs to make tolls adjustment for the private party every 2 years. Tolls adjustment can be made through an evaluation whether the road's quality complies with the SPM. If the private party fails to comply, they will be subject to certain sanctions. This regulation encourage the private party to leverage cost-saving investment in PPP as much as possible, so the road can be built with a higher quality.	Cost-saving investment: higher road's quality
14:21	I also believe that a potential higher quality in PPP can be done as the private sector has more experts with greater experiences. For instance, at Jasa Marga, they have even more subsidiaries so that they can perform both the construction and maintenance more efficiently.	Cost-saving investment: higher road's quality
15:50	With the better financial capability of the private sector, the construction would be completed faster, say in 2 years. On the other hand, if it is built using the government budget, the budget is limited, so it must be used for other projects as well. I think if the government builds the MBZ toll road, it may be completed in more than 2 years.	Risk sharing: less time overruns, less cost overruns
16:17	Construction can also be completed faster because there is an integration of work in the private sector, thus it becomes more efficient.	Risk sharing: less time overruns, less cost overruns
17:59	The potential less downtime in PPP projects is indeed true. It is also enhanced by the stipulations of the SPM that require repairments of the PPP projects to be completed in less than two days.	Risk sharing: less downtime
18:17	With the cost-saving investment, it is expected the road may be constructed with much better quality, therefore increasing traffic safety.	Cost-saving investment: higher traffic safety
19:34	The risks in PPP are indeed more well allocated. In conventional projects, in my opinion, the government bears the bulk of risks. Meanwhile, one of the greater risks associated with cost overruns is now transferred to the private partner under PPP.	Risk sharing: lower political risks
20:58	In accordance with the constitution of 1945 no. 2 of 2012, the government is responsible for the risks of land acquisition, tolls adjustment, and project termination, but also political risks.	Risk sharing; Partnership-arrangement
22:31	In Indonesia, there is also risk that can be shared between the government and the private party, such as risk related to geotechnical issues. For instance, when the private sector undertook soil investigations, it was discovered that the soil conditions did not match the initial assessment conducted by the government, hence such risk can be shared.	Risk sharing; Partnership-arrangement
23:49	With PPP, a greater risk premium is required. In Indonesia, however, the risk premium must be included into the calculation of its Capex. We may then estimate the appropriate IRR for the project based on this information. In essence, it has been accommodated by the Capex.	Risk sharing: higher risk premium
24:14	It is possible for the government to get political credit, especially in Indonesia, infrastructure projects are often used as promotions for some politicians during their general elections.	Risk sharing: political credit gains
26:28	As we have done more negotiations at the beginning, during operation and maintenance we are usually able to make negotiations more efficient.	Transaction costs: less back-end transaction costs
28:41	Project preparation in PPP, based on my experience, takes longer than traditional procurement. It can be about 1 year to prepare. I think there must be more complex structure in this project, considering more stakeholders are involved. The longer the time is needed, the higher construction costs will be.	Transaction costs: higher up-front transaction costs
32:32	One of the parameters in tolls pricing is Capex/Opex of the project. So, with a higher Capex in PPP, the tolls charged will also be more expensive.	Actual tolls: higher tolls
34:11	In the case of actual tolls, the private party bears the risk of investment return itself; neither the government nor PII can provide a guarantee. This is because of the government's limited budget in Indonesia.	Risk sharing; Partnership-arrangement
37:58	Compared to shadow tolls, there should be some mobility loss in PPP projects with actual tolls. However, we did a feasibility study on pricing the	Actual tolls: mobility loss

ATLAS.ti reference	*Quotation*	*Codes*
	tolls through a traffic demand survey to find how much ATP and WTP of the road users.	
41:44	It seems that shadow tolls are not applicable in Indonesia considering our government's fiscal capability currently. However, BPJT has now a Public Service Agency (BLU) program, where additional funds will be obtained from toll roads with a high level of feasibility. This is only for toll roads that are strategic in nature but may not be financially feasible.	Shadow tolls; Partnership-Improvement
45:21	In actual tolls, especially in Indonesia, the tolls will be directly collected by the private party. So, it might be more appropriate to say that the government would be better in maintaining their cash flow instead of higher cash flow.	Actual tolls: reduced budget deficit
51:02	The PPP method is quite promising for infrastructure delivery, but its implementation in the country is still relatively modest. Perhaps we might combine PPP with other schemes, such as project financing so that projects can generate their own revenues, or by subsidizing between bundled projects.	Partnership-improvement

G3: Deputy Director General, DJPI

ATLAS.ti reference	*Quotation*	*Codes*
01:50	The four phases of PPP in Indonesia are planning, preparation, transaction, and operation/maintenance. In planning, we consider the implementation of the toll road program. In preparation, we then conduct an economic and financial feasibility study. Thirdly, we need, at the transaction phase, to have everything complete, such as the readiness criteria, so that we can start the tendering process. After selecting the successful bidder, we execute construction and manage operation and maintenance of the road.	Partnership-arrangement
02:08	On the government side, there are three primary stakeholders participating in the PPP project. During planning and preparation stages, DJPI is responsible for funding and all other financial aspects. BPJT must manage the tendering procedure, but also supervise the private party during the construction. In the meanwhile, the Bina Marga Directorate is accountable for the technical parts of the road's construction and operation.	Public Party-responsibilities
04:15	A solicited project is a government-initiated project. In this manner, the government will be responsible for both the FS and land acquisition. If the project is unsolicited (initiated by a private party), the private party will prepare the FS, basic design, environmental impact study, as well as the land acquisition documents.	Partnership-arrangement
08:08	I don't think that PPP will always have the potential for cost-saving investment, that enable us to gain more efficiency in the maintenance. In all projects, the private sector must not only construct the infrastructure, but also carry out operation and maintenance according to government-established standards, specifications and criteria.	Cost-saving investment: higher construction costs, less maintenance costs
09:42	Problems that often occur during the maintenance process include additional maintenance costs due to traffic volume, which are sometimes overloaded and over dimensions. This causes the quality of the road to reduce faster than expectation.	Cost-saving investment: less maintenance costs, higher road's quality
10:15	Higher revenue can be obtained by the private party as long as they could always meet the Minimum Service Standards (SPM) during the operation. Thus, we would not delay the tolls adjustment that we usually do periodically.	Actual tolls: higher revenue
12:03	Yes, I see that projects can be finished more rapidly using this PPP scheme. Aside from that, what needs to be considered is also the quality of the roads that should comply with the required standards. In this way, the roads delivered would have a positive social impact on the society.	Risk sharing: less time overruns
13:18	On the one hand, I realise that this cost-saving investment may be more obtainable under PPP due to the bundling of the contracts. It implies the private party must be diligent in their search for the highest-quality	Cost-saving investment: higher road's quality

ATLAS.ti reference	*Quotation*	*Codes*
	contractors and consultants of the project. Thus, they can meet the standards required, and finally the quality of the road will also improve.	
14:19	The DJPI needs to analyse the financial capability of the private party in the expectation that they will be able to hire highly qualified contractors and consultants.	Public Party-responsibilities
15:37	The objective of risk sharing in PPP is actually to determine which party is more capable of mitigating certain risks.	Risk sharing
17:29	Whether the revenue received by the private sector is commensurate with the planned ROI remains the private party's risk. Every loss and excess profit is returned to them.	Risk sharing: higher revenue
17:45	To be able to minimise the likelihood of underinvestment by private party, the government should be able to mitigate earlier in the feasibility study. We should analyse the traffic volume more carefully, including its ATP and WTP.	Partnership-improvement
20:00	If we want to apply shadow tolls under PPP, the main challenge is to assess the government's fiscal capability to return private sector investment. It must also be considered for the payment to the private sector, which can be 10 until 15 years of long-term payment. How, therefore, can we guarantee that the country has a reliable and sustainable source of funding for investment returns every year?	Partnership-challenges; Shadow tolls
28:06	In terms of mobility loss or overcapacity on the road, the difficulty is that there is a significant time gap between the feasibility study and the operation of the road. Sometimes, the outcomes of the study may not correspond well to reality; they might be undervalued or overstated. In addition, the road network is principally intended to connect regions to create economic growth, but often the growth is not as expected since the road starts to operate.	Partnership-challenge; Actual tolls: mobility loss
30:05	To better guarantee the return on investment of business entities, I believe it is necessary to enhance the feasibility study, so that we can reduce the likelihood of undervaluing or overestimating every aspect both in the construction and operation.	Partnership-improvement
32:16	In addition to greater planning, the government agencies must cooperate with one another. In PUPR itself, there are DJPI, Bina Marga, BPJT and the Regional Infrastructure Development Agency (BPIW). The PUPR must then work with the National Land Agency (BPN) and the Ministry of Environment and Forestry regarding spatial planning of the project. It implies that various sectors would be engaged in any infrastructure project, thus government agencies should enhance their synergy.	Partnership-improvement
34:10	The PPP strategy should keep developed in the country, but in practice we also need to think further about the legislation so that the PPP road becomes more investor-friendly and can ultimately provide high quality road for the users.	Partnership-challenges

G4: Head of Investment, BPJT

ATLAS.ti reference	*Quotation*	*Codes*
05:02	The BPJT has some roles and functions as follows: - Recommend initial tolls and tolls adjustments to the Minister. - Take over the concession rights of toll roads whose concession period has ended and recommend further operations to the Minister. - Carry out temporary takeover of toll road concession rights that fail in the implementation of the concession, to then re-tender the concession. - Assist in the process of implementing land acquisition, more specifically to ensure the availability of funds originating from private parties and to establish a mechanism for their use. - Monitor the implementation of planning and construction as well as	Public Party-responsibilities

ATLAS.ti reference	*Quotation*	*Codes*
	operation and maintenance of toll roads carried out by private parties. - Supervise private parties on the implementation of all toll road concession agreements and report them periodically to the Minister.	
07:12	Considering the favourable aspects of the infrastructure development in the country, in the future the construction of transport infrastructure projects that require high costs will of course still rely on the PPP scheme. However, to ensure the implementation of PPP, the government should continue to perform an in-depth analysis of the project's financial feasibility so that it can obtain funding from banks and other financial institutions.	Partnership-improvement
13:46	True, increasing road's quality will also improve traffic safety by reducing the risk of accidents.	Cost-saving investment: higher road's quality, higher traffic safety
23:49	The transfer of risk to the private party is paid by the government through compensation in the form of tolls and concessions. So far, these costs are calculated as efficiently as possible so that the costs paid by the government are proportional to the benefits and services obtained.	Risk sharing: higher risk premium
26:22	Obviously, infrastructure development boosts the economy, which may be seen as an infrastructure success and become potential political gains for the government.	Risk sharing: political credit gains
31:17	Cost overruns are risk for business entities in PPP. However, if there is additional request from the government to expand the scope of work, the private party may include these extra costs into its investment costs. With these additional investment costs, so that the quality does not reduce, the government can provide compensation, one of which is through tolls adjustments. In this condition, the government will have lower political risk.	Risk sharing: lower political risks
36:41	Given the government's budget limit, the option to use PPP certainly accelerate infrastructure development in the country. The construction of a new network of toll roads speeds up travel time, thereby reducing travel time loss.	Cost-saving investment: less travel time loss
37:02	Infrastructure funding under traditional procurement is sourced from government fiscal, the majority of which consists of tax revenues. In PPP projects, which are entirely funded by private partners, no tax expenditures are utilised. The risk carried by road users is reflected in the amount of tolls paid, and whether or not it is proportional to the road's toll rate.	Risk sharing: less risks burden
38:12	PPP projects require more complex preparation and transaction documents than conventional projects. The transaction process also requires a longer process and stages so that higher costs will be needed, but these higher transaction costs are compensated by the efficiency gained from PPP.	Transaction costs: higher up-front transaction costs, less back-end transaction costs
38:44	The main factors causing higher up-front transaction costs include document preparation, a more complex tendering process and market consultation.	Transaction costs: higher up-front transaction costs
39:10	That's right, through the efficiency gained during construction and operation, transaction costs of PPP project would have a larger positive net impact than conventional project.	Transaction costs: higher up-front transaction costs, less back-end transaction costs
42:18	In accordance with the Law No. 38 in 2004 concerning roads (Road Law), tolls are calculated based on the ability to pay of the road users (ATP/WTP), the revenue from Vehicle Operating Costs (BKBOK) and investment feasibility.	Partnership-arrangement
44:43	It is probable that the tolls in PPP are greater than in traditional project, given that the funding of private parties under PPP comes from loans with interest charges, but also to build higher quality roads.	Actual tolls: higher tolls; Shadow tolls: higher tolls;
45:06	To date, the revenues are entirely received by toll road operator. However, the needs of higher tolls in PPP can be an alternative financing in the construction of toll roads with marginal feasibility and reduce government's budget deficit. This is achievable as long as the implementation of higher tolls provides benefits for road users in terms of economic feasibility of the project, as well as the BKBOK, and has taken into account the ATP/WTP.	Actual tolls: reduced budget deficit
47:59	Shadow tolls needs to take into account the fiscal condition of the government. In the future if there are any alternative financing other than	Partnership-improvement

ATLAS.ti reference	*Quotation*	*Codes*
	fully government funding, such as excess revenue on roads with high feasibility, it is possible that shadow tolls can be applied in the country, especially for toll roads that are financially less attractive to investors.	

G5: Toll Road Specialist, BPJT

ATLAS.ti reference	*Quotation*	*Codes*
12:33	Efficiency and maximum profit are the goals of a private parties. They are very aware of this, so if they do not complete the construction as per schedule, they will not immediately get revenue. If they do not maintain the quality of the construction properly, the initial costs incurred are not commensurate with the operational expenses, which are expected to be lower. They must be very aware of this risk so that the business plan during the concession period can be met and efficiency can be obtained at several points.	Cost-saving investment: higher construction costs, less maintenance costs
14:01	Correct, by having less maintenance during the operation, we could reduce congestions on toll roads.	Cost-saving investment: less maintenance costs, higher traffic safety
21:19	In the conventional project, as the entire implementation process from planning, funding, land acquisition, construction to maintenance is carried out by the government, all risks should be borne by the government itself. With private parties' involvement in PPP, some risks can be allocated to them. For instance, on toll roads, under the BOT scheme, the government will be accountable for risk related to land acquisitions. While the risk absorbed by the toll road operator is risk associated with construction and operation phase. This sharing of project risks will stimulate infrastructure development, given the government's budgetary constraints in the conventional project.	Risk sharing
32:09	Based on some experiences, potential time overruns on toll roads under PPP have been caused by a number of factors, including delays in financial close with the funding bank, poor contractor cash flow in the Contractor Pre Financing scheme, weather and the land acquisition process.	Risk sharing: less time overruns
36:11	Other economic advantages, such as reduced vehicle operating costs, may be added to the environmental benefits of pollution reduction.	Partnership-improvement; Actual tolls: better liveability

A.2. Private Party

P1: Maintenance Manager, PT JJC

ATLAS.ti reference	*Quotation*	*Codes*
3:35	Based on Ministerial Regulation No. 20 of 2020, toll road concessions in Indonesia could come from government initiatives (unsolicited) and business entity initiatives (solicited). The distribution of duties and authorities of each stakeholder will be different for both initiatives. Meanwhile, the MBZ toll road project was initiated by a business entity.	Partnership-arrangement
7:03	On the government side, in this case Ministry of Public Works and Housing, there are 2 directorates who are responsible for toll road PPP projects in Indonesia. First, the **Directorate General of Highways** is the directorate general who has the task of carrying out the formulation and implementation of policies in the field of road administration in accordance with the provisions of laws and regulations.	Public Party-responsibilities

ATLAS.ti reference	*Quotation*	*Codes*
	Second, the **Directorate General of Infrastructure Financing** is the directorate general who has the task of carrying out the formulation and implementation of policies in the field of public works and housing infrastructure financing in accordance with the provisions of laws and regulations. Third, the **Toll Road Authority Agency (BPJT)** is an agency established by the Minister, under and responsible to the Minister for carrying out the implementation of the toll road PPP project, working together with the business entity.	
10:07	Yes, I agree that PPP will result in a better cost-saving investment. The reason is because the contract is made bundled between the Construction and Operation/Maintenance (OM). So, the initiator will be responsible for the whole process, from preparation to implementation.	Cost-saving investment; Private Party-responsibilities
11:27	In the conventional scheme, these two things are separated, and the greatest risk lies with the government as the initiator. Meanwhile, with PPP, by implementing the Availability Payment (AP) payment system, everything will be paid truly based on the services provided. Thus, cost-saving investment is much higher than conventional.	Cost-saving investment; Risk sharing
15:32	Compared to conventional, I see that PPP has potential benefits related to less time overruns and cost overruns which could eventually lower the construction costs.	Cost-saving investment: higher construction costs; Risk sharing: less time overruns, less cost overruns
16:05	Actually, what makes construction costs expensive is because the government has to expense a large amount of money at one time if it is initiated by the government. Meanwhile, the government budget is very limited. So, with a conventional scheme, for example, the MBZ project might be completed within 5 years, depending on the availability of the existing government budget. However, with PPP projects it could be done faster because there is an integration of work that results in efficiency. Faster here also means more costs can be saved.	Cost-saving investment: higher construction costs; Risk sharing: less time overruns, less cost overruns
19:07	Yes, it is clear that there are more risks to the government if we do with conventional way. It's even contractors and operators in carrying out maintenance, there is actually no risk whatsoever. Now, with PPP, there are several risks that can be transferred, one of which is related to cost overruns that is transferred to private parties. However, if there is a delay due to the completion of land acquisition, it remains a risk for the government, as well as the adjustment of toll rates.	Risk sharing: less cost overruns
36:05	We have implemented such a shadow toll system through payment for service availability or AP, but this has only been applied to national roads where there are no toll tariffs. So indeed, road users do not have to pay. The government will make a return on investment through the AP. Well, in my opinion, it's actually a kind of Revenue Guarantee, so there's no risk of revenue in the business entity. But, in fact, the government's capacity is not yet able to carry out shadow tolls on toll roads.	Shadow tolls

P2: Sr. Technical Manager, PT JJC

ATLAS.ti reference	*Quotation*	*Codes*
04:00	PT JJC has two responsibilities including construction and maintenance during the concession period in the MBZ toll road project.	Private Party-responsibilities
05:55	I agree that by giving the responsibility to the private sector to carry out the construction process as well as maintenance, we have an incentive to make a cost-saving investment. However, the government sometimes does not care about the problems that occur in the field, so that the risk we bear becomes greater through this PPP strategy.	Cost-saving investment: higher construction costs, less maintenance costs; Risk sharing: lower political risks

ATLAS.ti reference	*Quotation*	*Codes*
06:15	With PPP, the government doesn't care if the revenue we get from the operations is not as expected as the business plan that has been made.	Private Party-new impacts
06:22	Logically, it is true that the construction costs should be higher, but in reality, the construction costs would be the same compared to traditional procurement as to win the project during the tendering process, we must provide a competitive bid price as well.	Cost-saving investment: higher construction costs
10:08	The PPP process allows us to have cheaper maintenance costs, but it is undeniable that sometimes there are unexpected costs that reduce the efficiency, for example costs related to road pavement maintenance.	Cost-saving investment: less maintenance costs
12:20	In the MBZ project, I realise that the travel time loss was reduced, because we don't need to take a longer time to do the repairments, usually at night we start repairing, then we can get it done in the morning.	Cost-saving investment: less travel time loss
16:08	Of course, the risks are distributed better in this PPP project, so that the construction process can be completed more quickly, but if it is not done with a good quality control during the construction it will also affect the quality of the road.	Risk sharing: less time overruns; Partnership-improvement
22:03	PPP allows us to set higher tolls for returning our investment, however, road users may become more reluctant to this.	Actual tolls: higher tolls
23:02	The Suramadu bridge project, for example, was initially operated with user charges, but now it is free, so the government has to pay debts to the private party conducting the operation, PT Jasa Marga.	Shadow tolls
24:04	Yes, I agree if road users have incentives for PPP projects that apply user chargers' system, so there is a potential for mobility loss in the road.	Actual tolls: mobility loss
26:06	With actual tolls the traffic volume can be lower, thus we would have a potential social benefit of higher traffic safety.	Actual tolls: higher traffic safety
27:23	Road users will greatly benefit from shadow tolls, but perhaps the compensation is that they have to pay more taxes so that the government is able to make a return on investment to private parties.	Shadow tolls; Partnership-improvement
30:02	PT Jasa Marga has 2 subsidiaries, PT JMTO is responsible for operational of the road, for example providing traffic patrol services and managing tolls collection, meanwhile, technical maintenance is handled by PT JMTM.	Private Party-responsibilities
31:58	In essence, this PPP strategy really helps the government in accelerating infrastructure procurement in the country as it reduces the government's budget deficit.	Actual tolls: reduced budget deficit; Shadow tolls: reduced budget deficit

P3: Toll Road Investment Planning Dept. Head, PT JMBD

ATLAS.ti reference	*Quotation*	*Codes*
12:02	PT JMBD is the investor or developer for the MBZ toll road project. In this sense, we are accountable for managing and controlling the whole corporation from private section in every stage of the project.	Private Party-responsibilities
13:10	This project is considered unsolicited since it was initiated by the private sector.	Partnership-arrangement
14:16	Both operation and maintenance of the project is performed by PT JJC, a subsidiary of PT JMBD.	Private Party-responsibilities
15:44	We, from the private sector, especially as the holder of the major debtor, are trying very hard to create efficiency during the operational phase, so that we can leverage the cost-saving investment from the toll road under PPP. I would say this would have a positive impact on the return on investment that we have made.	Cost-saving investment: higher construction costs, less maintenance costs
17:08	If we look at the specifications, the PPP project and the conventional project are actually not much different because in Indonesia both refer to the Minimum Service Standards (SPM) that have been set by the government. However, to ensure good quality, as we are also responsible for maintenance, we have no problem paying higher costs during construction in order to mitigate the risk of cost overruns during the operational phase.	Cost-saving investment: higher construction costs, less maintenance costs
20:08	To receive periodic tolls adjustment (every 2 years) from the government,	Cost-saving investment:

ATLAS.ti reference	*Quotation*	*Codes*
	we must maintain the quality of the roads during the operational phase. This tolls adjustment will determine the rate of our return on investment. Therefore, we need to include this consideration into our business plan properly, then we can provide a good quality of the maintenance process.	higher road's quality; Actual tolls: higher revenue
22:03	This project prove that, under PPP, efficiency during operational phase may be increased. However, there are two types of maintenance, periodic and non periodic. The efficiency is particularly anticipated in non-periodic maintenance, such as substantial repair required due to poor soil conditions. Meanwhile, the government has actually regulated periodic maintenance in the SPM.	Cost-saving investment: less maintenance costs
26:03	Risk sharing in PPP is indeed more well allocated, as it is no longer one-sided. For instance, the government will bear the risk of land acquisition during the preparation phase. In the construction phase, if there is a delay, we must carry the risk. And, in operational phase, if we fail to maintain the road's quality as per request, we should also bear the risk of tolls adjustment delay.	Risk sharing
30:10	The distribution of risks, especially in Indonesia, are explicitly regulated in the Toll Road Concession Agreement (PPJT).	Risk sharing
31:52	The risk of cost overruns is indeed the responsibility od the private sector. But the private sector has greater fiscal capability; for instance, in this project, 70% of the funding comes from bank loans and 30% from our own equity. Therefore, after we have acquired investment credit, it is easier to make a payment request to the bank for each term. As a result of our greater financial flexibility, projects may be finished more quickly than those with fully government funding.	Risk sharing: less time overruns
33:59	In order to avoid monopolies in the private sector, the PUPR Ministerial Regulation mandates that business participating in PPP projects should establish a consortium. Consequently, private parties often engage in Joint Ventures (JV).	Partnership-arrangement
35:10	In Indonesia, the IIGF (PT PII) is charged for guaranteeing the private sector from risks that the government should bear. In other words, the government receives a kind of insurance from PT PII.	Partnership-arrangement
38:01	The government may compensate private parties in the form of cash or an extension of the concession period. In Indonesia, however, the concession period is also set for a maximum of 50 years. In addition, compensation through tolls is controlled so as not to exceed the upper limit (ATP).	Partnership-arrangement
41:22	We may request for compensation from the government if they are overdue in issuing the tolls adjustment when we have fulfilled the SPM during the operation of the road.	Partnership-arrangement
42:05	Typically, SPM is evaluated via operational and functional feasibility tests, and only then can a new tolls be adjusted by the government.	Partnership-arrangement
44:13	Regarding the actual tolls collection in Indonesia, road users will pay tolls using e-money, which will be collected by the bank. The toll operator may then complete the settlement process with the bank to get the money transferred.	Partnership-arrangement
46:09	Shadow tolls, in my view, will encourage more private parties to invest in the toll road project since the government will pay us directly. Thus, we would have a greater assurance of return on our investments.	Partnership-arrangement; Shadow tolls
58:06	Considering the concept, I would say that higher tolls in PPP with actual tolls would be better for the government in maintaining their cash flow, but this does not imply their cash flow will increase.	Partnership-improvement