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TRANSACTION COST MANAGEMENT STRATEGIES FOR SMALL-SCALE PPP PROJECT CASE STUDY OF MADIUN CITY STREET LIGHTING

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Abstract: *Small-scale Public-Private Partnership (PPP) projects offer local governments an opportunity to enhance regional development. However, these schemes are often perceived to incur higher transaction costs compared to conventional PPP projects. This study seeks to identify the factors contributing to increased transaction costs in small-scale PPP projects, using the Madiun City Street Lighting PPP project as a case study. Employing a qualitative research methodology by studying the related literature and interviewing the consultant of the project, this study gathers pertinent information regarding the transaction costs associated with the Madiun City Street Lighting PPP project, which serves as a pioneering example of small-scale PPP initiatives in Indonesia. This paper analyzes that project value, complexity process, coordination, parties' capacity, opportunistic behavior, and contract change put higher transaction cost on small-scale PPP project proportionally. However, the analysis reveals that the complexity of coordination between local government authorities and the Regional House of Representatives (DPRD) can be effectively managed by the contracting agency (PJPK) of the Madiun City Street Lighting PPP project.*

Keywords: *transaction costs, small-scale PPP, local government, city street lighting*

1. Introduction

To address infrastructure needs, which are a priority in national development (Badan Perencanaan dan Pembangunan Nasional, 2023), the Indonesian government is exploring various alternative financing methods beyond the conventional use of the state budget (APBN/APBD). One increasingly popular financing scheme, both internationally and in Indonesia, is the Public-Private Partnership (PPP) scheme, known locally as the Government and Business Entity Cooperation (Kerjasama Pemerintah Badan Usaha/KPBU) scheme. This scheme was introduced in Indonesia as a response to the significant delays in public infrastructure procurement following the 1997 monetary crisis that precipitated the reform era (Surachman et al., 2020).

As the demand for infrastructure financing continues to grow, the KPBU scheme has emerged as a prominent approach for infrastructure development and public service provision. However, the implementation of PPPs presents substantial challenges, particularly related to project management complexities (Delhi & Mahalingam, 2017). The PPP scheme inherently involves a

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higher number of stakeholders compared to projects funded solely by the APBN budget, due to the contractual agreements between the government and private business entities. One critical aspect of managing such projects is the issue of transaction costs, which require careful consideration and management.

Street lighting infrastructure (Alat Penerangan Jalan/APJ) presents a compelling case for the study of transaction costs. Beyond its primary function of illuminating roadways at night, street lighting significantly contributes to public safety by deterring crime, thereby serving a critical public interest. Consequently, the government has an obligation to ensure the effective procurement and provision of street lighting infrastructure. The authority for the development and implementation of APJ infrastructure projects, including those under the PPP scheme, often resides at the local government level. These small-scale projects can exhibit varying transaction cost levels compared to large-scale PPP projects managed at the central government level.

Madiun Regency, located in East Java Province, Indonesia, has encountered significant challenges related to public street lighting. Insufficient illumination on various roadways has created security risks and impeded economic activities, particularly during nighttime hours. In response, the Madiun Regency government has adopted a PPP scheme for its street lighting project. Given the project's scale and the regional scope of the cooperation agreement, the Madiun street lighting project is categorized as a small-scale PPP.

In a small-scale PPP scheme, the regional government acts as the contracting authority (Penanggung Jawab Perjanjian Kerjasama/PJPK) and engages with private business entities, necessitating different coordination techniques compared to those employed by the central government. These techniques are typically less complex at the regional level but can still introduce significant additional transaction costs. Thierie & De Moor (2017) assert that small-scale PPP projects can experience elevated transaction costs due to these unique coordination challenges and differing project characteristics.

The Madiun street lighting PPP project, which integrates considerations of energy conservation, is designed to comply with the regulations stipulated in Minister of National Development Planning/Head of the National Development Planning Agency Regulation No. 2 of 2020, Article 3, paragraph K. This regulation specifies that public street lighting and/or energy efficiency projects are eligible for collaboration under the PPP scheme. The selection of a PPP scheme is predicated on the criterion that it should be more effective and efficient than alternative procurement schemes, including those funded through the state budget (Anggaran Pendapatan dan Belanja Negara/APBN). Within the PPP framework, the project's investment returns are structured through an Availability Payment mechanism, a decision that can significantly impact the transaction costs associated with small-scale projects.

The emergence of transaction costs in small-scale PPPs is a critical issue in the context of Indonesia's development. Analyzing the transaction costs associated with the Madiun street lighting PPP project is particularly intriguing, as these costs are not directly tied to the production of goods or services but rather to the processes involved in implementing and managing the transactions. Elevated transaction costs can impede the effectiveness and efficiency of small-scale PPP projects, making it imperative to thoroughly understand and manage these costs. This study aims to identify and analyze the transaction costs that arise in small-scale PPPs, with a specific focus on comparing these costs to those in central-level PPP projects. The Madiun street lighting PPP project serves as the case study for this research.

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While previous studies have provided valuable insights, there remains a significant gap in the literature concerning the specific dynamics of transaction costs in small-scale PPPs in Indonesia. To address this gap, this study is structured into several sections. Initially, a literature review on transaction costs in project financing will be presented. This will be followed by a detailed discussion of the research methodologies employed. The subsequent section will analyze the transaction costs identified in the Madiun street lighting PPP project. Finally, the study will conclude with a synthesis of the findings and their implications.

2. Research Method

This research employs a qualitative approach utilizing literature review methods and information from the source person, who is actively involved in the preparation of the APJ Madiun project. This methodological choice enables an in-depth understanding of the concept and dynamics of transaction costs in small-scale PPPs by analyzing existing literature comprehensively (Creswell, 2014). Data were collected from various secondary sources, including scientific journals, books, policy reports, and official documents pertinent to the research topic. Data analysis involved identifying key themes and patterns emerging from the literature review, providing a structured understanding of the transaction costs associated with small-scale PPPs (Merriam & Tisdell, 2015).

Additionally, this research integrates data from FGDs conducted with stakeholders involved in the small-scale PPP street lighting project in Madiun. This approach provides detailed insights into the specific transaction costs encountered in this project. The FGD data complemented the literature review, comprehensively explaining the transaction cost conditions that arise in small-scale PPP projects such as the APJ Madiun initiative.

Transaction costs in the context of Public-Private Partnerships (PPP) refer to the expenses required to establish and sustain a partnership. According to Soliño & Gago de Santos (2010), these costs encompass legal, financial, and technical consultation expenses borne by both the public and private sectors from the project planning stage through to the end of the concession period and project agreement. Dudkin & Välilä (2005) further elaborate that transaction costs include planning, negotiation, monitoring, and dispute resolution costs, each with its specific financial implications.

Planning Costs involve all expenses necessary to design and prepare the project prior to implementation. This includes feasibility studies, risk analyses, environmental assessments, and technical designs. Feasibility studies, for instance, are extensive processes requiring specialized expertise to evaluate the economic, technical, and environmental viability of the project (Zhang et al., 2015). These assessments are crucial to ensuring that the project can be executed within the set objectives and budgetary constraints.

Negotiation Costs entail expenses incurred during the negotiation process between the government and private entities to finalize a contract agreement. These negotiations often demand substantial time and resources as they involve detailed discussions on the rights and obligations of each party, risk allocation, and financial terms (G. Hodge & Greve, 2018). This category also includes fees for legal consultants, technical advisors, and financial experts engaged in the negotiation process.

Monitoring Costs are associated with overseeing and ensuring that the project progresses according to the agreed-upon plans and conditions specified in the contract. Effective supervision

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is essential to guarantee that the private sector adheres to the established quality and timeline standards. These costs cover expenditures for supervisory teams, quality audits, and performance monitoring systems (Grimsey & Lewis, 2004). Effective monitoring can help identify and address issues early, thereby mitigating the risk of project failure.

Dispute Resolution Costs arise from the need to resolve conflicts that may occur during project implementation. These disputes could pertain to changes in the scope of work, discrepancies in performance, or payment issues. Dispute resolution mechanisms, such as mediation, arbitration, or litigation, all entail significant costs (Koppenjan & Enserink, 2014). Efficient and effective dispute resolution is critical to maintaining project continuity and fostering good relations between the government and private entities.

These studies contribute significantly to understanding the complexities and dynamics inherent in implementing small-scale PPP projects. Several researchers have identified factors that influence the magnitude of transaction costs, such as project complexity, institutional capacity, and the transparency of procurement processes (G. A. Hodge et al., 2010; J. Liu et al., 2014). Transaction costs in PPPs are frequently higher than anticipated due to uncertainties and complexities in the negotiation and contract implementation processes (G. Hodge & Greve, 2018). Studies indicate that transaction costs can be mitigated through enhanced transparency, the adoption of clear contractual standards, and increased institutional capacity (Roumboutsos & Saussier, 2014).

Research on transaction costs in regional small-scale PPPs indicates that these costs tend to be higher compared to large-scale projects. This disparity is attributed to limited administrative and institutional capacity at the regional level, as well as a lack of experience and expertise in PPP implementation (Iossa, 2015; Zhang et al., 2015). Small-scale PPP projects often encounter challenges related to transparent and effective procurement processes, which subsequently elevate transaction costs.

A synthesis of these studies suggests that managing transaction costs in small-scale PPPs requires a holistic and contextual approach. Effective strategies include leveraging information technology to enhance transparency and efficiency, providing training for regional officials on PPP management, and utilizing standard contract templates (Hart, 2017). Furthermore, policy measures aimed at strengthening institutional capacity at the regional level are crucial to ensuring more effective and efficient PPP implementation (T. Liu et al., 2016).

3. Results and Discussion

Transaction costs are a critical factor in the successful execution of infrastructure development projects utilizing the PPP scheme. For small-scale PPP projects, the relatively lower project value compared to central-level PPPs means that procurement costs often constitute a larger proportion of the contract value. This discrepancy arises because the processes involved in planning, procurement, implementation, and evaluation for small-scale PPPs are as complex and rigorous as those for central-level projects (Engel et al., 2014).

The APJ PPP project in Madiun Regency exemplifies local government initiatives aimed at enhancing street lighting quality to improve public safety and comfort. This project leverages a PPP scheme to mitigate regional budget constraints and benefit from private sector expertise and efficiency (Zhang et al., 2015). The implementation process encompasses several stages, including planning, contract negotiation, implementation, and supervision. The project employs Light-

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Emitting Diode (LED) technology, known for its energy efficiency and longer lifespan compared to conventional lighting. Additionally, the street lighting system incorporates smart lighting technology, enabling the adjustment of light intensity based on actual needs, thus optimizing energy consumption (Roehrich et al., 2014).

3.1. The Scheme of Small-Scale PPP APJ Madiun

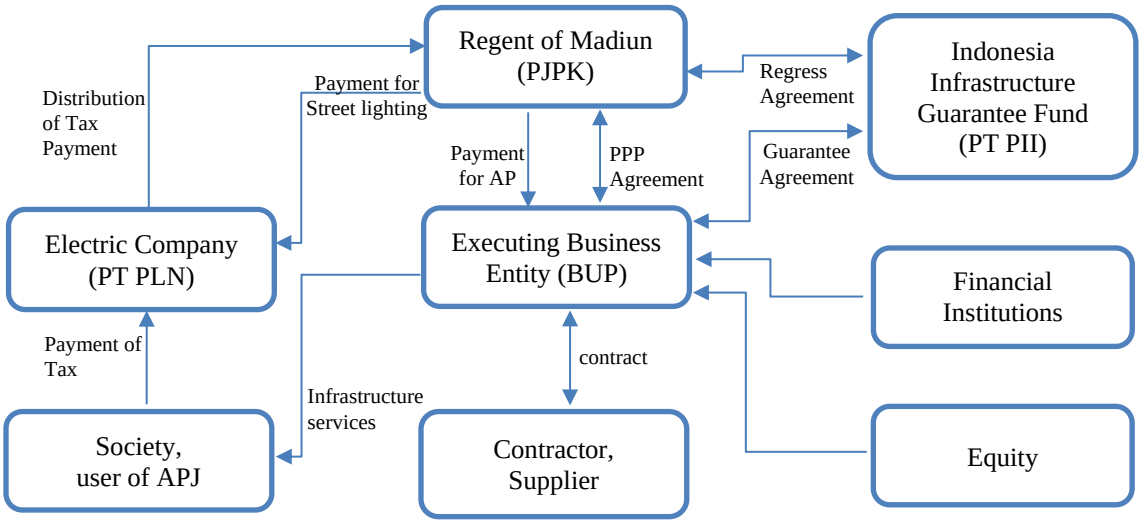
The APJ Madiun PPP project represents a collaboration between the Madiun Regency Government and private business entities, with the Regent of Madiun acting as the Contracting Agency (PJPK). The business entity that wins the auction is responsible for providing the street lighting infrastructure and may subcontract construction work to third-party contractors. For financing, the winning business entity can seek credit support from financial institutions or banks, in addition to utilizing its equity (Grimsey & Lewis, 2004). The resulting infrastructure will be accessible to road users, with electricity supplied by PLN, which receives payments from the Madiun Regency Government.

In the PPP scheme, a winning bidder then will form an executing business entity (*Badan Usaha Pelaksana*/BUP). This BUP will have a PPP agreement with the contracting agency (*Penanggung Jawab Proyek Kerja Sama*/PJPK).

Based on the PPP agreement then the BUP will do contract with contractors as third parties to execute infrastructure development. With regard to guarantee, Indonesia Infrastructure Guarantee Fund (*PT Penjaminan Infrastructure Indonesia*/PT PII) has a guarantee agreement with the BUP to guarantee the PJPK Availability Payment (AP). As a consequence of the guarantee, PT PII has a regress agreement with the PJPK to collect the PJPK for what PT PII has paid to guarantee BUP, in order to fulfill the related financial obligations.

A detailed depiction of the APJ Madiun PPP scheme is as follows:

Small-Scale PPP Project Structure APJ Madiun



Source: Suhendra et al. (2023)

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The BUP has equity to finance infrastructure development. Financial institution/Banks lend money to the BUP to fill the gap of financing. The BUP provides infrastructure services of street lighting (*Alat Penerangan Jalan*/APJ) to society as the user. For this, the PJPK provides payment for of AP according to the availability of services provided by the BUP. Related to this AP, people pay tax of street lighting to local government through the state-owned electricity company (*PT Perusahaan Listrik Negara*/PT PLN). The PT PLN then distribute the tax payment of street lighting to Regent of Madiun as the local government which also the PJPK of this project.

3.2. Identification of Small-Scale PPP Transaction Costs compared to General/Central level PPP Transaction Costs

Smaller-scale PPP projects tend to incur relatively higher transaction costs compared to their larger counterparts when evaluated against the total project costs (Suhendra et al., 2023). This observation is supported by empirical studies such as those by De Schepper et al. (2015a) and Dudkin & Välilä (2005). The following section identifies transaction costs that arise in small-scale PPPs compared to central government PPP projects, drawing on literature and the case study of the APJ Madiun:

1) Project Value and Procurement Costs.

   The relatively smaller project value of small-scale PPPs, as compared to central-level PPPs, leads to proportionally higher procurement costs. This is because the procedural stages—planning, procurement, implementation, evaluation, and monitoring—are similarly rigorous for both small-scale and central-level PPPs. De Schepper et al. (2015b) indicate that smaller projects face higher transaction costs during the procurement stage. Moreover, KPMG (2010) found that bidding costs in Australia are influenced by project size.

   According to the information of the source person, the modest project value dissuades several business entities from submitting proposals due to insufficient profit margins, further escalating transaction costs as the proposal submission process must be repeated multiple times. Additionally, the increase in Value Added Tax (VAT) impacts the potential profitability for business entities, thereby influencing their willingness to engage in small-scale PPPs (Koppenjan & Enserink, 2014).

2) Complexity and Length of PPP Processes.

   Prospective bidders perceive the small-scale PPP process as overly complex and protracted. For instance, the APJ Madiun project employs the Availability Payment method for investment return, resulting in an extended preparation period that can lead to changes in the material standards initially planned for the project (Grimsey & Lewis, 2004). This prolonged process not only heightens transaction costs but also introduces uncertainties that can deter participation from potential business entities.

3) Coordination Among Stakeholders.

   Small-scale PPP projects involve more intricate coordination due to the necessity of aligning efforts not only between the regional PJPK and regional business entities but also with the technical ministries of the central government and the regional legislative body (DPRD).

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This results in higher transaction costs for small-scale PPPs. PPP projects are inherently information-intensive, primarily due to the extensive number of stakeholders from various disciplines. The complexity of information and coordination in PPP projects is driven by several factors:

a) Diverse Stakeholders: PPP projects involve a broad spectrum of stakeholders, including government bodies, private partners, financial institutions, consultants, and the community. Each stakeholder group has distinct information needs and perspectives that must be managed effectively (Reeves, 2008).

b) Parallel Processes and Tight Timelines: Multiple processes in a PPP project must be completed concurrently within stringent timelines, necessitating exceptional coordination and information management to ensure all parties are working with consistent and timely information (Akintoye & Beck, 2009).

c) Diverse Documentation: PPP projects generate a vast array of documents, such as feasibility studies, contracts, progress reports, and risk analyses. These documents are often produced using different software or systems, adding complexity to information management (Grimsey & Lewis, 2004).

Nevertheless, In the APJ Madiun PPP Project, coordination did not face significant constraints. This success can be attributed to the strong communication links between the Madiun Regency government, as the PJPK, and the Madiun Regency DPRD. According to FGD results, both formal and informal communication channels between the local government and the DPRD were highly effective. Initially, the APJ Madiun PPP project was not included in Presidential Regulation Number 8 of 2019 concerning the Acceleration of Economic Development in East Java. However, due to the supportive vision and mission of Madiun Regency, the APJ Madiun PPP Project was eventually proposed.

Moreover, synchronization among Regional Apparatus Organizations (OPDs) in the APJ Madiun PPP Project proceeded smoothly. This was contrary to the expected challenges in coordination among OPDs. Both legislative and executive branches in Madiun Regency had a clear understanding of the primary objective, which was to provide public street lighting services efficiently.

4) The Quality of Parties Involved in PPP Projects and its Impact on Transaction Costs.

The capacity of regional PJPKs (Project Implementing Units), regional business entities, and local lenders is generally lower compared to their central-level counterparts. This disparity is primarily due to the lack of familiarity with the PPP framework and the intricate requirements associated with project procurement via PPPs. Boyer & Scheller (2017) notes that state and local governments often have limited experience with PPP schemes, attributing this to several factors:

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a) Lack of Direct Exposure and Experience: Many local governments have never been involved in PPP projects, leading to a deficiency in practical knowledge regarding the operational dynamics and intricacies of such projects (Mendel, 2020).

b) PPP Complexity: PPP projects entail complex contractual structures, intricate risk-sharing arrangements, and distinct financing mechanisms compared to traditional government projects. This complexity demands a profound understanding that many regional public officials lack (Raisbeck et al., 2010).

c) Resource Limitations: Many local governments are constrained by insufficient human and financial resources to manage PPP projects effectively. These limitations encompass a lack of trained staff and the financial means to conduct comprehensive feasibility studies or obtain technical consultations (Reeves, 2015).

Due to the limited capacity of the parties involved in small-scale PPPs, enhanced credit mechanisms are essential to address the poor creditworthiness of local governments and the inadequate capacity of local banks to assess such projects accurately.

In contrast, the competency limitations of the PJPK in managing the APJ Madiun PPP Project have been mitigated effectively. The Madiun Regency Government, serving as the PJPK, has proficiently managed the administrative processes and demonstrated a thorough understanding of the PPP framework. The Madiun Regency Government actively sought information and adhered to compliance requirements within the PPP process, thereby enhancing its capacity to meet PPP demands.

From the perspective of lenders, local banks' ability to participate as project financiers remains lower compared to national banks. Moreover, the capacity of local business entities, particularly in terms of capital, is also limited when compared to national-level business entities (de Araújo et al., 2017).

5) Opportunistic Behavior and Information Asymmetry in PPP Projects.

Opportunistic behavior and information asymmetry significantly contribute to elevated transaction costs in PPP projects. These issues often stem from imperfect information and the potential for one party to exploit its informational advantage over another. Incomplete information can lead to adverse selection and moral hazard, increasing the ex-post risk that a party might exploit contractual terms for its benefit (Dan Wood & Bohte, 1989).

Opportunistic behavior typically requires informal mechanisms for mitigation due to its illicit nature. This behavior may manifest during three project phases: the planning phase concerning search and information costs, the procurement phase involving negotiation costs, and the implementation phase regarding monitoring and enforcement costs (Nguyen & Pham, 2016). Lack of transparency in the procurement process can foster suspicion and disputes, thereby escalating dispute resolution costs (Engel et al., 2014).

6) Contract Change Costs in Small-Scale PPP Projects.

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Contract change costs (cost overruns) tend to be higher in small-scale PPP projects. Cruz & Sarmento (2021) attribute these costs to the difficulty in finding an optimal trade-off between transactional costs and the contractual level of detail. Smaller projects often face more contract change costs due to adjustments needed after the commencement of construction. Cost overruns in infrastructure projects are primarily driven by contract modifications post-construction contract completion. (Cantarelli et al., (2012); Verweij, (2015), and Verweij et al., (2015) found that in the Netherlands, projects with smaller values were relatively less likely to experience contract changes than larger projects.

In the Madiun PPP Project, the construction process began even before the fulfillment of financial close, in accordance with the Regulation of the Minister of National Planning and Development/Bappenas Number 7 of 2023. Article 52 states that fulfilling financing is not a preliminary condition for small-scale PPPs. While this provision can lower transaction costs by reducing the time and expenses related to clarifying the start of construction, it can also increase transaction costs due to potentially larger contract adjustments resulting from non-fulfillment of financial close.

3.3. Transaction Cost Management Strategy

Based on the identification of transaction costs previously explained, several efforts can be made to manage and reduce transaction costs in street lighting PPP projects. These efforts include:

1) Utilizing Information Technology: The adoption of information technology can significantly enhance the transparency and efficiency of procurement and supervision processes, reducing associated transaction costs (G. Hodge & Greve, 2018).
2) Training and Capacity Building: Providing comprehensive training and capacity building for local government officials on PPP management can help mitigate negotiation and monitoring costs. This training should focus on the specific requirements and complexities of PPP projects (Roumboutsos & Pantelias, 2014).
3) Standard Contract Templates: The use of clear and comprehensive standard contract templates can minimize potential disputes and related dispute resolution costs. Standard contracts ensure that all parties have a common understanding of the terms and reduce ambiguities that can lead to conflicts (Yescombe, 2017).
4) Risk Evaluation and Optimal Risk Allocation: Effective risk evaluation and optimal risk allocation are crucial for managing transaction costs in PPP projects. Understanding the priorities of each party during negotiations can streamline the PPP process and reduce the costs incurred during negotiations (Grimsey & Lewis, 2004).
5) Developing Institutionalization in PPP Projects: To address high transaction costs and improve PPP project outcomes, several key institutional measures should be implemented:
   a) Political Awareness: Strong political commitment is essential to support and develop effective PPP programs.

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b) Government Management: Competent and proactive management by government bodies is required to regulate and oversee PPP projects.
c) Regulatory Mechanism: A well-designed regulatory mechanism ensures transparency, accountability, and effectiveness in PPP projects.
d) Government Capacity: Enhancing government capacity in understanding and implementing PPPs is critical for success.
e) Rules and Procedures: Consistent and transparent rules and procedures across all levels of government are necessary to streamline PPP processes.
f) PPP Units: Establishing PPP units at various government levels facilitates coordination and knowledge sharing about PPPs.
g) Funding and Priorities: Aligning funding and infrastructure investment priorities with the use of PPPs can promote their effective utilization.
h) Learning from International Experience: Drawing insights from successful international PPP case studies can provide best practices for implementation.
i) Institutional Reform: Further institutional reforms are needed to address the challenges of PPPs, including high transaction costs and lengthy tender periods.

Collaboration and Learning: Encouraging intergovernmental collaboration and continuous learning from PPP experiences can improve project practices and outcomes.

4. Conclusion

Transaction costs are a critical component that must be effectively managed in small-scale PPP projects, such as street lighting initiatives. Generally, transaction costs in small-scale PPPs can be higher compared to central-level PPPs due to the relative scale of the projects. However, these increased transaction costs can be minimized to ensure the success of small-scale PPP projects.

In the case of the Madiun APJ PPP Project, which is considered a small-scale PPP, potential increases in transaction costs have been minimized due to the harmonious coordination between the regional government of Madiun Regency and the Madiun Regency DPRD. Both entities support the development of the APJ Madiun infrastructure, recognizing the urgency of enhancing street lighting in the region.

The parties involved in the project have also contributed to minimizing transaction costs by adjusting and improving their capacities for the implementation of the APJ Madiun PPP Project. The PJPK (Project Initiator) has consistently strived to comply with all PPP process requirements. However, local financial institutions and lenders have not been able to participate as effectively due to their limited capacity and experience.

Contract costs and changes have not experienced significant increases compared to PPPs in general, as the construction implementation does not have to wait for financial fulfillment. Nevertheless, this condition could potentially lead to increased transaction costs in the future due to the likelihood of contract modifications.

The successful implementation of small-scale PPPs requires robust government support to prioritize the development of existing infrastructure. Efforts to reduce transaction costs should include the use of information technology to enhance transparency and efficiency, training and

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capacity-building for PJPK candidates, the use of comprehensive standard contracts, risk evaluation and optimal risk allocation, and the development of institutionalization models.

By adopting these measures, small-scale PPP projects can be executed more effectively, ensuring that transaction costs do not impede their success.

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