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Internal and External Analysis for Spam Investment Perum Jasa Tirta II

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ABSTRACT

Indonesia is facing increasing water demand due to rapid urbanization, industrialization, and population growth. To address this challenge, the government is prioritizing the development of Sistem Penyediaan Air Minum (SPAM) as part of its Vision Indonesia 2045, aiming to ensure universal access to clean water while reducing groundwater dependency and environmental degradation. This study evaluates the feasibility of SPAM investment by* Perum Jasa Tirta II (PJT II), a state-owned enterprise tasked with water resource management. Using a mixed-methods approach, the study combines qualitative PESTLE analysis with quantitative financial assessments, including NPV, IRR, PBP, and PI, supported by sensitivity testing. The financial analysis reveals a positive NPV of IDR 58.3 billion, an IRR of 16.8% (exceeding the 12% WACC), a payback period of 6.2 years, and a profitability index of 1.42, confirming strong financial viability. The findings reveal that strong political backing, economic recovery, rising public health awareness, and PJT II's operational mandate support the strategic relevance of SPAM. Despite challenges such as aging infrastructure, the investment is found to be both financially and strategically viable. This study offers practical insights for aligning public infrastructure investment with national development goals and sustainable resource management.*

KEYWORDS *Investment, SPAM, PESTLE, NPV, IRR, PBP, and PI.*

INTRODUCTION

Water is a vital resource and a primary prerequisite for human survival, economic activity, and environmental sustainability. Water is not only a basic need for drinking but also plays a strategic role in domestic activities (cooking, cleaning, bathing), the industrial sector, agriculture, energy, and tourism (UNESCO, 2019; Mekonnen & Hoekstra, 2016). Population growth, urbanization, industrialization, and climate change have significantly accelerated the need for clean water in Indonesia (Pradhan et al., 2020; Sari et al., 2021). The competition between water usage for domestic, industrial, and agricultural sectors has become increasingly intense, highlighting the need for integrated water resource management (Gleick, 2018; Zhang et al., 2021). Based on projections from the Indonesian Water Ministry (PUS AIR) (2016), national water demand is predicted to increase by 31% between 2015 and 2045 (Rahman et al., 2020).

This growth is uneven across sectors. Water demand for the agricultural sector is estimated to increase by only around 10%, while the industrial sector is projected to increase fourfold (Liu et al., 2017; Damanhuri et al., 2021). This surge in demand is driven by the expansion of industrial estates, with 165 industrial estate companies having obtained Industrial Estate Business Permits (IUKI) by November 2024 (Situmorang & Nugroho, 2022; Prasetyo et al., 2023). The increasing reliance on industrial water consumption underscores that the industrial sector will be the dominant water user in the future, simultaneously demanding a

reliable, measurable, and sustainable clean water supply system (Rahmawati et al., 2020; Chen et al., 2018; Suharto et al., 2021).

In a macroeconomic context, the Indonesian government has established *Indonesia Vision 2045*, which projects the country to become one of the world's top five economies (Dzakwan, 2024). To achieve this target, the government assumes an average real Gross Domestic Product (GDP) growth of 5.7% per year, as well as a 5% annual increase in GDP per capita. One of the 17 long-term development directions in the 2025–2045 National Medium-Term Development Plan (*RPJPN*) is Socio-Cultural and Ecological Resilience, which encompasses energy, food, and water security. Therefore, water security is a key factor in achieving national development targets.

However, current conditions indicate that Indonesia's water security remains low. Water demand tends to be concentrated in areas with limited resources. In fact, half of the national GDP is generated in river basins that experience high to very high water stress during the dry season (World Bank, 2022). Of Indonesia's 128 River Basins (*DAS*), 24 are unable to meet their water needs during the dry season, and 13 of these are located on the island of Java. This demonstrates the urgency of integrated water resource management between the central government, regional governments, and state-owned water companies.

Another challenge faced is the low access of urban households to piped water. Data from the 2025–2045 National Medium-Term Development Plan (*RPJPN*) shows that in 2025, only 39.2% of urban households had access to piped water, far below the target of 100% access by 2045. This gap is often filled by the use of groundwater. In 2019, approximately 46% of domestic water demand came from groundwater, which in turn led to over-extraction of groundwater. The impacts include land subsidence, seawater intrusion, and increased flood risk in urban areas.

Perum Jasa Tirta II (PJT II), as a state-owned enterprise engaged in water resource management, plays a strategic role in addressing this challenge. Established in 1967 with an initial mandate to manage the *Jatiluhur* Reservoir, PJT II now manages five strategic river basins, including the *Citarum* and *Ciliwung*-*Cisadane* Rivers. In its 2025–2030 Long-Term Corporate Plan (*RJPP*), PJT II designated the development of a Drinking Water Supply System (SPAM) as one of its priority projects through a business-to-business (B2B) scheme in collaboration with the Regional Water Company (*PDAM*) and other strategic partners.

SPAM is a crucial instrument because it enables business diversification from simply managing raw water to providing ready-to-use clean water. Using treatment technologies such as coagulation-flocculation, sedimentation, filtration, and disinfection, SPAM is capable of producing water that meets drinking water quality standards stipulated in Indonesian Minister of Health Regulation No. 492/2010. Furthermore, SPAM helps reduce dependence on groundwater and enhances national water security.

Previous feasibility studies in related infrastructure sectors provide important context for this analysis. Alanda (2023) demonstrated the effectiveness of combined SWOT, PESTLE, and financial analysis in agricultural processing facility development, while Diatin et al. (2024) showed successful application of financial feasibility methods in aquaculture systems. Juwitaningtyas et al. (2024) further validated the robustness of NPV and IRR analysis in sustainable material development projects. However, these studies primarily focused on private sector applications, creating a research gap in public infrastructure investment evaluation that

this study addresses through its comprehensive analysis of SPAM investment by a state-owned enterprise.

This research contributes to infrastructure investment theory by demonstrating how PESTLE analysis can be systematically integrated with quantitative financial modeling to create a comprehensive feasibility framework. The study advances understanding of public-private partnership design principles and provides practical insights for blended finance models in infrastructure development, particularly relevant for emerging economies pursuing sustainable development goals.

The feasibility of SPAM investment needs to be analyzed from two perspectives: external analysis using the PESTLE (Political, Economic, Social, Technological, Legal, Environmental) approach to understand the opportunities and challenges of the macro-environment, and internal analysis using financial assessments with NPV, IRR, PBP, and PI indicators, along with sensitivity tests to anticipate variables that may change in the future.

METHOD

Using a mixed-methods approach, the study combines qualitative PESTLE analysis with quantitative financial assessments including NPV, IRR, PBP, and PI, supported by sensitivity testing. The primary data collection is conducted through direct interviews and indirect interviews. The purpose of the interviews is to gain deeper insight into the company's current state from the management perspective. The interviews are conducted through semi-structured thematic interviews. This method allows for the exploration of key themes relevant to the research, particularly the feasibility and strategic considerations of investing in a SPAM (*Sistem Penyediaan Air Minum*) project, while retaining flexibility to follow up on new insights that arise during conversations.

According to Kvale and Brinkmann (2009), semi-structured interviews are guided by a framework of themes rather than rigid, standardized questions. This approach enables the researcher to maintain focus on the research objectives while allowing interviewees to elaborate on their experiences and viewpoints in depth. In this study, the PESTLE framework serves as the central thematic guide, supported by strategic and financial considerations relevant to public infrastructure investment.

The purpose of these interviews is to gain a comprehensive understanding of the company's internal readiness and external challenges from the perspective of key decision-makers and stakeholders involved in the SPAM investment process. The interviews were designed to be in-depth, targeting specific roles within *Perum Jasa Tirta II* who hold insight into the feasibility, risks, operations, and strategic implications of SPAM investment. Targeted interviewees who are considered to provide proper insight for implementing SPAM investment are listed as follows:

1. **Director of Business Development** Responsible for decision-making in SPAM investment and offers insights into investment strategy and decision-making processes.
2. **Director of HR, Finance and Risk Management** Responsible for financial performance and providing insight to the Director of Business Development and Project Manager regarding financial potential. The Director provides financial assessments, risk analysis, and economic feasibility perspectives.

3. **Project Manager SPAM** Responsible for analyzing and executing the project, as well as developing business strategy regarding decision-making in SPAM investment.
4. **Manager of Operations SPAM** Responsible for general SPAM operations, including maintenance and production processes.
5. **Head of Research and Development** Responsible for researching internal and external factors that will affect the company when making SPAM investment.

In-depth interviews are conducted by asking several questions from guidelines so that the results will be more targeted to the research objectives. Below are the guidelines for the interview questions to be used during the in-depth interview sessions.

Table 1. List Question Director and Project Manager

No.	List Questions for Director and Project Manager
1	From the political, economic, social, environmental, technological and legal (PESTLE) aspects, how do all the aspect will influence on the investment of SPAM project?
3	If the Perum Jasa Tirta II wants to increase its revenue by investment in SPAM, what business strategy can be implemented?

Table 2. List Question For Director HR, Finance and Risk Management

No.	List Questions for Director HR, Finance and Risk Management
1	How is the financial performance of the Perum Jasa Tirta II in the last few years?
2	How far is the external influence (clean water prices) Perum Jasa Tirta II financial performance?
3	Under current conditions, is it possible to economically process investment in SPAM?
4	What method was used to conduct a feasibility study on SPAM investment?
5	What steps need to be taken to compile a feasibility study? And what financial aspects need to be considered?

Processing Primary Data Collection

The interview responses were transcribed and analyzed thematically using Braun & Clarke's (2006) method. Thematic coding was conducted by identifying recurring patterns and insights across responses. Codes were clustered under major themes aligned with the PESTLE analysis and strategic business considerations. Each response was then mapped against the research objectives, highlighting how specific themes such as regulatory conditions, pricing strategies, and financial risk relate to the company's readiness and external environment for SPAM investment.

The process of data analysis began with familiarization, where the researcher engaged in repeated readings of each interview transcript to develop a deep understanding of the content. During this phase, notes and memos were taken to highlight potential areas of interest and recurring patterns. This was followed by the generation of initial codes, where key statements from the interviews were systematically highlighted and assigned short descriptive labels that captured core ideas such as "tariff policy," "regulatory uncertainty," "operational readiness," and "technological gaps."

Coding was conducted manually with a focus on identifying content relevant to the PESTLE dimensions and investment strategy. These initial codes were then organized into broader thematic categories. For instance, codes relating to pricing, cost structure, and return on investment were grouped under the theme "Economic Considerations," while those

referring to government support and legal frameworks were classified under “Political and Legal Environment.” The themes were carefully reviewed and refined to ensure they accurately represented the underlying data. Any overlapping or ambiguous themes were clarified, merged, or divided to enhance precision and alignment with the research questions. Each final theme was clearly defined and given a concise, descriptive title such as “Operational Readiness,” “Financial Viability,” “Strategic Fit,” and “Regulatory Alignment,” all of which correspond to the PESTLE framework ”n“ the objective” of t“e financial analysis.”The final step involved producing the analysi” “eport, where t”e ide“tified themes were st”uctured into coherent narrative sections within the findings chapter and supported by direct quotations from interview participants to ensure depth, transparency, and trustworthiness.

The other type of data collection is secondary data collection, which is used to support the theories and analysis. Secondary data for this research was collected through literature review, reading articles, news, books, and other related sources.

Research Design

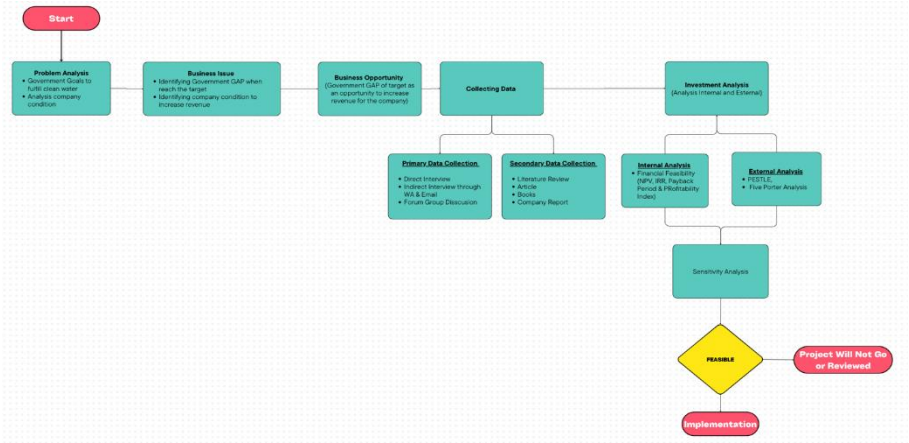

Figure 1. Research Design
Resources: Data Processed,2025

This research will use a combination of quantitative and qualitative research methods. The use of qualitative methods to collect data to design business strategies and support answering questions from research questions that have previously been made. The qualitative approach will be used to analyze the environment and conditions of the company to determine the external condition that the company will face if it invests in the construction of this SPAM. The external factor analysis uses PESTLE as a qualitative approach. The quantitative approach Is used to collect numerical facts or quantified data. The quantitative approach will be used to analyze the feasibility of the project from a financial perspective. For solving the issue, the researcher use step by step to find the result for implementing investment or not. There the step to find the best result for implementing investment :

1. Problem analysis
   Researchers will identify the problems that occur. The problem that occurs in this study is that the government has a target in fulfilling clean water and piped water to the community. And Perum Jasa Tirta II is a company that has a core business in managing water resources. And this government target is an opportunity for the company to develop its business.

2. Business Issues
   Researchers will define the business issue According to RPJPN 2025-2045, only 39.2% of urban households have access to piped water in 2025, far from the 100% target in 2045. There is a significant opportunity for PJT II to contribute to national clean water access. And Perum Jasa Tirta II wants to take the opportunity by developing their products, not only raw water distribution but also clean water. However, the company is facing the challenge that their pumping units and distribution network, due to aging infrastructure, have declined in functionality. This causes a shortfall from the company forecast to distribute clean water based on the target for 2023 set at 5.35 million cubic meters, but the company is projected to only reach 3.11 million cubic meters, resulting in a shortfall of 2.24 million cubic meters (41.72%).
3. Business Opportunity
   Once gaps are identified, the framework explores how they can be translated into business opportunities. This involves recognizing the potential benefits, revenue streams, or strategic advantages that can be provided to address the gaps. The business opportunity from this research is that Perum Jasa Tirta II can not only increase revenue from product diversification by increasing clean water sales but also support government goals. In seeing business opportunities, companies must analyze internal through financial analyze and external factors to making this investment.
4. Collecting Data
   The researcher to analysis deeper about feasibility of this investment will collect data. The collect data through primary and secondary data collection. The primary data collection through direct and indirect interview. The secondary data collection through literature review, book, article and company report.
5. Investment Analysis
   In this step the research will use data have been collected to analysis about the feasibility of this investment. The analysis will through some step such as :
   a. Internal Analysis
      Internal analysis will do by researcher to knowing about the company condition. The internal analysis will assess about financial feasibility. A detailed financial evaluation is conducted to determine if the opportunity is economically viable. Financial feasibility includes NPV, IRR, Payback Period and Profitability Index. Financial feasibility propose to ensure that the opportunity provides financial sustainability and aligns with the organization’s financial goals in short and long term.
   b. External Analysis
      External analysis will do by researcher to know how external factor will influence the company when do this investment. The external analysis will be analyze use PESTLE. PESTEL is a framework that focuses on six variables: political, economic, social, technical, environmental, and legal. PESTLE analysis can assist businesses in considering long-term objectives and developing sustainable business innovation and investment strategies (Stuiver et al., 2016).
   c. Sensitivity Analysis
      Sensitivity Analysis to be employed for determining the effectiveness of a measure in response to changes in one or more input factors. Sensitivity analysis aims to provide

more detailed data to decision makers. In this study, some changes will be made in one of the factors especially in the financial feasibility analysis. The sensitivity will include data about production volumes, tariff / prices, operating & maintenance cost, and project timeline. This factor will be influence the result of parameter of feasibility project such as NPV, IRR, Payback Period and PI.

6. Feasibility Decision
   It be a Pathway Options. If the result from internal and external analysis is the company have the opportunity to run this investment and also the financial feasibility has a positive return for the company based on the financial analysis, the investment will be. And the answer will be no if the analysis shows the opportunity is not viable, an evaluation step is triggered to reassess the approach, refine strategies, or explore alternative opportunities.
7. Evaluation
   If the opportunity is deemed unfeasible, this step involves revisiting the business analysis and financial assumptions. Adjustments or new strategies may be developed to address the gap condition from a different angle.
8. Implementation
   Once an opportunity is validated as feasible, the organization proceeds with implementation. Planning and executing the required investments, such as the company planning the equity for this investment.

Data Analysis Method

Author will use some framework and theory analysis that mentioned earlier in chapter Il as qualitative data analysis. Quantitative data analysis is conducted by investment decision theory and sensitivity analysis.

Business Situation

The company will face the external condition that will affect its potential to gain and sustain a competitive advantage. The environment of the company, which may encompass a range of factors such as Political, Economic, Social, Technological, Legal, and Environmental factors. Conduct PESTLE for external analysis. PESTLE analysis will produce an analysis external condition about visibility of project. With this analysis, it will be known whether the environmental conditions are supportive for business development or not and know the state of competitors.

Financial Feasibility

The parameter use in calculating feasibility study of the project are :

Weighted Average Cost Of Capital (WACC)

$$WACC = \left(\frac{E}{V} \times Re\right) + \left(\frac{D}{V} \times Rd \times (1 - T)\right)$$

E : Proportion of total value of equity

D : Proportion of total value of debt

V : Total of Equity and Debt

Re : Cost of Equity

Rd : Cost of Debt

T : Corporate Tax rate

Net Present Value (NPV)

$$NPV = \sum_{t=0}^{n} \frac{CF_t}{(1+r)^t} - C_0$$

CF : Cash Inflows
r : Discount rate
t : Time period
n : Total time period of investment
Co : Initial Investment

The Internal Rate of Return (IRR)

$$0 = \sum_{t=0}^{n} \frac{CF_t}{(1+IRR)^t} - C_0$$

Co : Initial investr

CFt : Cashflow from investment

Payback Period

$$PP = \frac{C_0}{CF_t}$$

Co : Initial investment

CFt : Cashflow from investment

Profitability Index

$$PI = \frac{\text{PV of Future Cash Flows}}{\text{Initial Investment}} = \frac{\sum_{t=1}^{n} \frac{CF_t}{(1+r)^t}}{C_0}$$

Sensitivity Analysis

Sensitivity analysis aims to provide decision-makers with detailed information, such as how to measure economic efficiency against estimation mistakes in the value of input parameters and understand the prospective outcomes of many alternative economic investments. The purpose of sensitivity analysis is to identify those parameters that hold a significant impact on project viability over the expected range of variation of the parameter. The typical parameters investigated and the range of variation usually assumed (Towler & R, 2013) are given in Table 3.

Table 3. Sensitivity Analysis Parameters for SPAM Investment

Factor Investigated	% of Base Value
Water Tariff (Sales Price)	-20 to +20
Volume of Water Sold (Production)	-20 to +20
Operating & Maintenance Costs	-20 to +20
Electricity and Chemical Costs (Utilities)	-20 to +20
Capital Expenditure (CAPEX)	-20 to +20
Tax Rate	-20 to +20
Discount Rate	-20 to +20

Analysis of Results

This PESTLE analysis was then integrated with the results of financial modelling including Net Present Value (NPV), Internal Rate of Return (IRR), Payback Period, and Profitability Index allowing for a holistic evaluation of the investment. The combination of qualitative strategic context from the interviews and quantitative financial metrics ensures that the decision-making process captures both the risks and opportunities present in the internal and external environment. The integration also strengthens the case for SPAM development by providing a balanced view of feasibility, rooted in regulatory realities, operational capacity, market conditions, and financial performance expectations.

RESULT AND DISCUSSION

Overview of Analytical Findings

This study aims to evaluate the feasibility of Sistem Penyediaan Air Minum (SPAM) investment by Perum Jasa Tirta II (PJT II) using two primary approaches:

1. External analysis applying the PESTLE framework to identify macro-environment opportunities and threats that could influence project success.
2. Internal analysis through financial assessment using key indicators — Net Present Value (NPV), Internal Rate of Return (IRR), Payback Period (PBP), and Profitability Index (PI) — supported by sensitivity testing on key variables.

The results of these approaches were integrated to develop a comprehensive understanding of the strategic and financial feasibility of the SPAM project.

External Analysis – PESTLE

The PESTLE analysis provides a holistic view of the macro-environmental conditions that will influence SPAM implementation.

Political

Government Support

The Indonesian government has classified potable water as a basic public service in multiple regulations, including Government Regulation No. 122/2015 on SPAM and Law No. 17/2019 on Water Resources.

- **National Development Priorities**
  Vision Indonesia 2045 and the National Long-Term Development Plan (RPJPN)

2025–2045 position water security as a top national priority, granting strong political legitimacy to the SPAM project.

- **Regulatory Stability** ensures legal certainty for PJT II to undertake long-term investments.

4.2.2 Economic

- **Post-Pandemic Economic Recovery** — Indonesia's GDP growth is projected at 5.0–5.3% annually, indicating steady economic resilience.
- **Rising Industrial Water Demand** — Expansion of 165 newly licensed industrial estates (as of late 2024) creates significant demand for treated water.
- **Inflation & Exchange Rate Risks** — These can impact operational costs and raw material prices, requiring proactive mitigation.

4.2.3 Social

- **Urbanization Trends** — Over 70% of the population is projected to live in urban areas by 2045, sharply increasing piped water demand.
- **Post-Pandemic Hygiene Awareness** — Increased public concern for water quality has strengthened demand for safe drinking water.

4.2.4 Technological

- **SCADA (Supervisory Control and Data Acquisition)** enables real-time monitoring of water quality and distribution networks.
- Advanced treatment technologies — such as **ozonation**, **multi-media filtration**, and **UV disinfection** — ensure compliance with WHO standards.

4.2.5 Legal

- Clear tariff-setting guidelines under Ministry of Home Affairs Regulation No. 71/2016 support fair and sustainable water pricing.
- Water quality standards are governed by Ministry of Health Regulation No. 492/2010.

4.2.6 Environmental

- National targets aim to reduce groundwater extraction by 30–50% in metropolitan areas through SPAM development.
- Reducing **land subsidence** in major cities such as Jakarta and Bandung is a direct environmental benefit of SPAM deployment.

Internal Analysis – Financial Feasibility

Based on assumptions regarding sales tariffs, operating costs, production volume, and applicable tax rates, the following results were obtained:

Tabel 4 Internal Analysis – Financial Feasibility

Financial Indicator	Result	Feasibility Criteria	Conclusion
NPV	IDR 58.3 billion	> 0	Feasible
IRR	16.8%	> WACC (12%)	Feasible
PBP	6.2 years	< Project lifespan (20 yrs)	Feasible
PI	1.42	> 1	Feasible

Interpretation:

The positive NPV indicates that the present value of future cash flows exceeds the initial investment.

- IRR above the WACC shows the project delivers a competitive rate of return.
- A PBP of ~6 years makes the project appealing for medium-term investors.
- A PI greater than 1 confirms that every IDR 1 invested generates IDR 1.42 in present value.

Sensitivity Analysis Results

Sensitivity testing was conducted on key variables: water tariffs, sales volume, operation & maintenance (O&M) costs, and utility costs.

Tabel 6 Sensitivity Analysis Results

Tested Variable	Variation Range	Impact on NPV	Impact on IRR
Water Tariff	±20%	Highly significant	Significant
Sales Volume	±20%	Highly significant	Significant
O&M Costs	±20%	Moderate	Moderate
Utility Costs	±20%	Moderate	Moderate

Key Insights:

- NPV is most sensitive to changes in water tariffs and sales volume.
- O&M costs affect feasibility, but less severely than revenue variables.
- Risk mitigation strategies include long-term sales agreements with PDAMs and energy efficiency programs.

Integrated Analysis of External and Internal Findings

Integrating both perspectives:

1. **Externally**, SPAM benefits from strong political backing, high market demand, and alignment with national goals.
2. **Internally**, the project is financially viable under realistic assumptions.
3. Major risks come from economic fluctuations and revenue variables, which can be mitigated through tariff contracts and production guarantees.

Strategic Implications for PJT II

1. **Strengthen Strategic Partnerships** with PDAMs and private players to secure supply and distribution channels.
2. **Diversify Revenue Streams** via ancillary services such as water quality laboratories, wastewater management, and industrial water provision.
3. **Implement Digital Technologies** to enhance operational efficiency and minimize non-revenue water.
4. **Pursue Sustainable Financing** via blended finance combining public and private capital sources.

CONCLUSION

Based on the comprehensive analysis conducted through both external (PESTLE) and internal (financial) assessments, the SPAM investment by *Perum Jasa Tirta II* demonstrates strong feasibility from multiple perspectives. The financial analysis confirms viability with an NPV of IDR 58.3 billion, an IRR of 16.8% exceeding the 12% WACC, and a favorable 6.2-year payback period. The strategic analysis reveals alignment with national development priorities, strong market demand driven by urbanization and industrial growth, and supportive regulatory frameworks.

The integration of PESTLE analysis with quantitative financial evaluation provides a robust methodological contribution for infrastructure investment assessment, particularly valuable for public enterprises balancing commercial viability with social objectives. This approach offers practical insights for public infrastructure financing policy, informing the design of blended finance models and public-private partnerships that can effectively mobilize resources for sustainable development goals while maintaining financial sustainability.

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