JOURNAL OF SOCIAL SCIENCE
Printed ISSN: 2720-9938
Electronic ISSN: 2721-5202
jsss.co.id

SENSITIVITY ANALYSIS OF THE FINANCIAL VIABILITY OF HEALTH SERVICE LEVY RATES CASE STUDY: CONSTRUCTION OF SOUTH SURABAYA REGIONAL GENERAL HOSPITAL

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Abstract
This study aims to analyze the sensitivity of investment feasibility in the construction of South Surabaya Regional General Hospital using investment evaluation methods, namely Net Present Value (NPV), Internal Rate of Return (IRR), Benefit Cost Ratio (BCR), and Payback Period (PP). The study also evaluated the sensitivity of the investment to changes in the health service retribution tariff as well as operational management costs. Primary and secondary data were collected to analyze the investment cash flow, which includes the initial investment cost, operational expenses, and revenue from the health service tariff. The results of the analysis show that the investment is feasible with positive NPV parameters, IRR greater than the minimum rate of return, and an investment payback period that is faster than the planned period. Sensitivity analysis revealed that the management cost component and revenue from service tariffs are the main factors affecting investment feasibility. Additionally, the study emphasizes the importance of strategic tariff adjustments and operational efficiency in ensuring the project's sustainability. The results of this study can be a valuable reference for the Surabaya City Government in making evidence-based policies related to hospital tariff optimization schemes and cost management.

Keywords: Investment Feasibility Analysis, Hospital, Sensitivity.

INTRODUCTION
Universal Health Coverage (UHC) is a Surabaya City government program aimed at ensuring that all people can have their basic needs met, namely health services funded through the Surabaya City government's Regional Revenue and Expenditure Budget (APBD). With this program, underprivileged people can obtain health services without having to be burdened with large costs, in accordance with the principles of social justice and equitable access to services (Council et al., 2012). On the other hand, the Surabaya City government must also meet the costs required in the health sector, such as providing medical facilities, medical personnel, and necessary medicines as well as building better facilities and infrastructure to meet the health needs of citizens and strengthen the regional health system. Improved accessibility and quality of health services, leading to improved community welfare.

On the other hand, the Surabaya City Government is working to develop a holistically integrated medical tourism concept or Surabaya Medical Tourism (Pasopati et al., 2024). The program is designed to integrate quality healthcare services in addition to enjoying the city's top tourist destinations, so that visitors from home and abroad can enjoy professional medical care as well as explore the beauty and rich culture of Surabaya. Thus, Surabaya is not only a health center, but also a viable health tourism destination by offering a complete and comfortable experience for medical tourists. This

potential can attract tourists so that it can become a potential income for the city of Surabaya, and can encourage economic progress for Surabaya residents.

Based on (Prasetyo & Ratnasari, 2021), there are six factors that influence the attractiveness of health visits to Surabaya as a medical tourism destination, including the quality of professional and competent medical services being the main factor influencing the attractiveness of medical tourism, competitive medical fees and even being able to use BPJS services can be an important attraction for patients who will seek treatment in the city of Surabaya, the availability of modern and adequate health facilities and the latest medical equipment is one of the concerns for patients who will seek treatment, Surabaya has sufficient accessibility and infrastructure that can facilitate access and comfortable accommodation for patients and families, in addition to being a health service center Surabaya can be enjoyed as a local tourist city during the recovery and treatment period, and Surabaya has a safe and conducive environment that makes it comfortable for patients to choose Surabaya as a medical tourism city.

To assess investment in Hospital development, revenue, expenditure and financing must be considered based on the Hospital's management structure (Kourtis et al., 2021). These three components have a significant influence on the success of investment in the Hospital. The expenditure component consists of capital expenditure and operating expenditure. Meanwhile, the revenue component comes from grants from the Central Government, subsidies from the APBD, and service services (Purnama et al., 2024). The pattern of revenue components in the Surabaya City APBD is often unchanging, which will have an impact on limiting the allocation of priority expenditures, including health expenditures. To optimize health service operations, the Surabaya City Government is trying to make hospitals one of the sectors that contribute revenue to the APBD as well as a community service sector (Patriadi et al., 2023). Thus, the subsidy burden incurred through the allocation of APBD funds can be reduced and the sector can make an increasing contribution to APBD revenue each year. To achieve this goal, the analyst must be carried out in order to increase regional income which will be used to fulfill services in the form of operations, as well as medical equipment (Kutzin, 2001).

This study aim to determine the level of investment feasibility categorized under various possible tariff increase options. The analysis conducted not only aims to assess whether the investment is feasible, but is also able to show alternative patterns that limit each of the cost elements that can be applied. This can ensure that the investment made is still considered a viable investment and can generate the expected profit. This analysis can assess Surabaya Hospital services as a whole and help formulate service tariff policies and limit development management costs for project owners, especially the Surabaya City Government through the Surabaya City Health Office, by showing restrictions on the components of the levy tariff that can be adjusted.

LITERATURE REVIEW

Previous Research

Research on Financial Analysis of Building Projects (Case Study: Intensive Building Project of RSSA Malang) (Damayanti et al., 2014). The method used is project financial analysis, including calculation of NPV (Net Present Value), IRR (Internal Rate of Return), and Payback Period to assess investment feasibility. Based on the results of the analysis, the project is financially feasible with favorable profit projections for investors and parties involved in the project.

Research conducted by Eka Irawan (2020), namely the Economic Feasibility Analysis of the Construction of the Sadewa Building at KRMT Wongsonogoro Hospital, Semarang City, with a focus on analyzing the economic feasibility of building the Sadewa Building at KRMT Wongsonogoro Hospital, Semarang City. In this study, the cost-benefit analysis method is used to assess whether the economic benefits generated from the development project are greater than the costs incurred, both in the short and long term. The results of the study show that the construction of this building is considered economically feasible, with projected benefits greater than the costs incurred for construction and maintenance.

Rohrohmana (2024) Primary data were collected using field surveys and interviews; secondary data were collected through literature research and relevant agencies or organizations. Next, a SWOT (Strengths, Weaknesses, Opportunities, and Threats) analysis was conducted, which included revenue and cost projections, cash flow projections, and BEP (Break Even Point) calculations. Using situation analysis, it can be concluded that a workforce capable of managing the hospital is available due to the developmental nature of the existing Hospital. The hospital is in Quadrant I (Expansion/Growth) according to the SWOT demand analysis. This indicates that the best strategy is to capitalize on existing opportunities. Technically, the demand analysis does not raise any significant issues except operational funding. The financial analysis shows that the business is considered profitable. According to the BEP calculation, the total investment has experienced a return in the fifth year. The results show that Palaran Inpatient Hospital should be converted into a Class D Hospital.

This study will aim to determine the level of investment feasibility categorized based on various possible tariff increase options. The analysis conducted not only aims to assess whether the investment made is sufficiently feasible, but is also able to show alternative patterns that limit each of the cost elements that can be applied. This can ensure that the investment made is still considered a viable investment and can generate the expected profit. This analysis can assess Surabaya Hospital services as a whole and help formulate service tariff policies and restrictions on development management costs for project owners, especially the Surabaya City Government through the Surabaya City Health Office, by showing restrictions on management cost components and the amount of retribution rates that can be adjusted.

Research entitled Investment Sensitivity Analysis of the Grand Mangku Putra Hotel Rebranding Project in Cilegon City conducted by (Dharmika & Utomo, 2023). Investment analysis is carried out using the Net Present Value (NPV), Internal Rate of Return (IRR), and Payback Period (PP) methods. The results of the sensitivity analysis to changes in occupancy, rental prices, and operating costs of the investment were declared feasible. There is a positive NPV of Rp 47,809,917,835.31, an IRR of 66.21% (greater than MARR 6.925%), and a payback period of one year and ten months. Although the investment is considered profitable and has the potential to return capital, it is necessary to take precautions to prevent previous investment failures.

Research on the Technical and Financial Feasibility Study of the Construction of the National Hospital Malang (Lydianingtias & Arystianto, 2023) to assess the technical and financial feasibility of the construction of the National Hospital in Malang. The methods used include technical analysis related to structure, design, and technology to be used, as well as financial analysis using indicators such as ROI (Return on Investment), IRR (Internal Rate of Return), NPV (Net Present Value), and Payback

Period. The results of this study show that the project is technically and financially feasible, with significant profit potential and fulfillment of good construction standards.

Feasibility Study of Investment Development of a Clean Water Supply System for Increasing Water Source Discharge (Hardi et al., 2024). This study used technical analysis of the capacity of the water distribution network, financial analysis to evaluate the cost and return on investment, and social benefit analysis. The results show that the project is feasible because it can increase the capacity of clean water distribution and provide significant economic and social benefits to the community. From a civil engineering point of view, this study shows that effective technical design and careful investment planning are essential for water infrastructure projects.

Investment Evaluation

Investment is an activity of placing funds / costs in a certain period of time which aims to carry out the sustainability of a business so as to produce added value / profit. But to find out whether an investment will generate added value (profit) in a certain period or not, an evaluation analysis is needed that considers certain aspects (Giatman, 2011) In the investment process, it is necessary to look at the cash flow that describes the flow of income and expenditure of funds that take place during the specified investment period. So that this cash flow analysis becomes a mandatory thing to do to determine the value of money in the present with the future. There are several methods that can be used in analyzing the feasibility of an investment, among others, as follows:

1. Conventional method, using indicators:
    a. Total Profit (absolute profit)
    b. Marginal Efficiency of Capital (MEC)
    c. Accounting Rate of Return (ARR)
    d. Payback Period (PP).
2. Discounted Cash Flow (DCF) method, using the indicator:
    a. Net Present Value (NPV)
    b. Internal Rate of Return (IRR)
    c. Benefit Cost Ratio (BCR)
    d. Break Even Point (BEP)

Sensitivity Analysis

Sensitivity analysis is a method used to understand the impact of parameter changes on investment performance and profits obtained (Albawi et al., 2023). With this analysis, it is expected to be the basis for anticipating events that can cause the project to experience losses, as has happened in previous projects. This method begins by determining the success of the investment using Net Present Value (NPV), Internal Rate of Return (IRR), and Payback Period (PP), then proceeds with analysis.

Factors in investment execution greatly affect the feasibility of an investment. For certain parameters, sensitivity analysis can be prioritized. These parameters include those that are quite sensitive to investment feasibility and are common enough to be subjected to sensitivity analysis (Giatman, 2006):

a. Investment costs.
b. Revenue.
c. Expenses (capital expenditure, personnel expenditure, operational expenditure, etc.)
d. Interest Rate.

Source of Revenue from Hospital Retribution Rates

Based on Article 2 Paragraph (2) and Article 3 Paragraph (2) of the Regulation of the Minister of Health of the Republic of Indonesia Number 85 Year 2015 on the National Hospital Tariff Pattern, it can be concluded that:

1. Hospital tariffs managed by local governments that have implemented regional public service agency (BLUD) financial management are determined by the local government in accordance with the provisions of laws and regulations;

After Law No. 1 of 2022 on Financial Relations between the Central Government and Regional Governments came into effect, the Surabaya City Government created a regional regulation governing regional retribution. This law regulates and determines the types of local retribution. Surabaya City Local Regulation Number 7 Year 2023 regulates all types of local taxes and levies, including types of taxes and levies, tax subjects and taxpayers, tax subjects and levy payers, objects of taxes and levies, tax imposition basis, service usage rate of levies, when tax is payable, tax collection areas, and tax and levy rates. As mentioned in Article 55 of Surabaya City Regional Regulation Number 7 Year 2023 on Regional Taxes and Levies, the health service retribution rate is determined by considering the cost of health services, the ability of the community, the effectiveness of health service control, and aspects of justice. Interest, capital, and operational costs are included in the cost category.

Surabaya City Regional Regulation Number 7 Year 2023 on Regional Taxes and Levies regulates the structure of health service levy rates based on the group, type, classification, category, and component of health services. The retribution rates for each service in a hospital, such as South Surabaya Hospital, are described in the appendix which is inseparable from this Regional Regulation. The tariffs are as follows: :

a. General Medicine Service
b. Operative Medical Actions
c. Emergency Services
d. Dental Treatment Services.

RESEARCH METHOD

Research Subject

The subject of this research is South Surabaya Hospital, which is located on Jalan Mastrip, Karangpilang District, Surabaya. Surabaya Selatan Hospital was built by the Surabaya City Government Health Office.

The selection of the location of South Surabaya Hospital is based on several aspects that consider geographical, demographic and economic conditions. Geographically, Karangpilang Sub-district is a potential location to be considered as the area is densely populated. Demographically, the population in Karangpilang Sub-district is quite dense at 115,320.00 people as recorded in the Population and Civil Registration Office. Then the last consideration is the economic aspect, where the construction location of the South Surabaya Hospital is located on Surabaya City Government asset land, of course this is profitable in terms of investment considering that no more cost allocation is needed for land acquisition. In terms of building the Hospital has been operating, in terms of improving service optimization, further development is carried out so that the community can be served optimally.

Data

The data in this study includes primary and secondary data. Primary data itself consists of interviews and observations at South Surabaya Hospital. The secondary data used in this study are project investment value, detailed health service data, and hospital operational and maintenance cost data.

Revenue Analysis Technique

For revenue analysis, identification and analysis of data that has been obtained related to revenue is carried out, which includes:

1. The Health Service Tariff refers to the existing service tariffs of Surabaya City Government Hospitals, as stipulated in Surabaya City Regional Regulation Number 7 of 2023 concerning Regional Taxes and Levies;
2. Subsidies sourced from the Surabaya City Regional Revenue and Expenditure Budget (APBD) are carried out by calculating the total hospital revenue minus the hospital management costs. From the results of these calculations will be obtained the amount of hospital management cost subsidies provided by the Surabaya City Government for the management of South Surabaya Hospital.

RESULTS AND DISCUSSION

Project Investment Cost Data

Investment costs at East Surabaya Hospital are data obtained from the Surabaya City Government Health Office Budget Work Plan (RKA) which is allocated within a period of one year. The details of investment costs are as follows:

1. Pre-construction costs include:
    a. Environmental impact and analysis (EIA) fees;
    b. Traffic impact and analysis (Andalalin) fee
2. Construction costs include:
    a. Structure cost;
    b. Architectural fees;
    c. Infrastructure and utility costs;
    d. Construction OHS costs.
3. Construction supervision/management fee
4. Medical equipment procurement costs
5. Equipment and machinery procurement costs
6. Hospital management information system cost
    a. Server
    b. Furniture, computers, and other office equipment
    c. Ambulance emergency;

The following is a breakdown of investment costs for the South Surabaya Hospital, Karangpilang District, presented in the table below:

Table 1. Investment Cost of South Surabaya Hospital

NO	Investment Costs	Allocation (Rp)
1.	Pre-Construction Cost	677.155.500
2.	Construction Cost	349.365.609.832
3.	Construction Management Fee	2.366.276.739
4.	Procurement cost of medical equipment	70.000.000.000

5.	Equipment and machinery procurement costs	10.218.709.909
6.	Management information system costs hospital operations (IT)	1.000.000.000
	Total	**433.627.751.980**

Source: Section Procurement Goods/Services and Administration

Based on the description in table 1, the components that make up the investment cost of the South Surabaya Hospital are pre-construction costs, construction costs, construction management costs, medical equipment procurement costs, equipment and machinery procurement costs and hospital management information system costs amounting to Rp. 433,627,751,980. The component with the largest value in this investment is the cost of hospital construction, which amounted to Rp. 349,365,609,832.

Revenue Source Data

Referring to Government Regulation Number 47 of 2021 concerning the Implementation of the Hospital Sector, local government hospitals are required to provide 60% of the total beds for standard class inpatient services. This service is intended for patients of health insurance beneficiaries (PBI) in accordance with applicable regulations. With a total of 100 beds, the number of beds for standard class is calculated as 60 units (100 x 60%). Based on this provision, and considering the projected visits of PBI patients, it is necessary to analyze the separation of revenue from the National Health Insurance (JKN) and the general tariff, which is detailed as follows:

Table 2. Hospital Revenue Projections

No.	Revenue Description	Total (Rp)
SERVICE REVENUE		
1	BPJS Outpatient	56.285.798.400
2	General Outpatient	37.523.865.600
3	BPJS Hospitalization	6.356.800.000
4	General Hospitalization	4.237.920.000
5	BPJS EMERGENCY ROOM	3.456.000.000
6	General Emergency Room	2.304.000.000
7	BPJS Surgery	7.340.544.000
8	General Surgery	4.893.696.000
9	Laboratory	2.259.600.000
10	Radiology	1.994.400.000
11	Pharmacy	900.000.000
12	Ambulance	126.000.000
13	Corpse Service	75.000.000
OTHER INCOME		
1	Room Rental	21.600.000
2	Education, Training and Research	120.000.000

3	Medical Resume	9.000.000
4	Parking	245.543.500
Total Revenue (IDR)		**128.149.847.499**

Source: Surabaya City Health Office, processed by the author (2024)

From the total revenue requirement, a value of Rp. 128,149,847,499 was obtained. The source of income with the largest value in the overall Surabaya Surabaya Hospital income is income sourced from outpatient services which is the core service at South Surabaya Hospital services, namely Rp. 56,285,798,400 for BPJS outpatient and Rp. 37,523,865,600 for General outpatient.

Sensitivity Analysis of Health Service Retribution Rates

Sensitivity analysis of health service levy rates is planned in two scenarios. The scenarios are pessimistic and optimistic scenarios, which are described in the following conditions.

In the pessimistic condition sensitivity analysis, it is assumed that a decrease in revenue of 0.5%-2.4% reflects an economically unfavorable scenario. In this situation, when revenue falls by 1.8%, the project is categorized as unviable, indicating that the economic value of the project is below the acceptable threshold, in the case below the IRR condition of 12.90% is below the MARR which is 12.97%. This indicates that the project revenue is not able to cover the investment or operational costs that have been set. So that sensitivity to declining revenues must be a major concern in project risk management, with mitigation strategies such as cost efficiency or diversification of revenue sources. The pessimistic conditions are described in the table as follows.

Table 3. Sensitivity Analysis with Revenue Decline Scenario

Alternative 1 (Decrease in income)					
Changes	**Investment Parameters**				**Conclusion**
	NPV (Rp)	**IRR %**	**PP (Year)**	**BCR**	
0,50%	289,998,055,160	13.27	6.31	1.22	Worth
0,65%	288,009,840,452	13.23	6.32	1.22	Worth
0,75%	286,684,363,979	13.20	6.32	1.21	Worth
1,25%	280,056,981,616	13.06	6.35	1.21	Worth
1,45%	277,406,028,671	13.01	6.36	1.21	Worth
1,65%	274,755,075,726	13.01	6.36	1.21	Worth
1,80%	272,766,861,018	12.90	6.37	1.21	Not Feasible
2,00%	270,115,908,073	12.85	6.38	1.21	Not Feasible
2,20%	267,464,955,128	12.79	6.39	1.21	Not Feasible
2,40%	264,814,002,183	12.73	6.40	1.20	Not Feasible

Source: Author's Preparation

In the optimistic scenario, revenues are projected to increase between 10%-20%, reflecting potential economic growth or the success of the business strategy. Under

these conditions, the project is categorized as viable at all levels of revenue increase, as financial indicators such as NPV, PP, BCR and IRR show positive values. The slightest increase in revenue provides an additional margin of safety, so the project has the ability to pay obligations and provide better returns. Therefore, this optimistic scenario shows the better potential of the project if market conditions are favorable, while giving investors confidence in the success of the project. The optimism can be illustrated in the following table.

Table 4. Sentivity Analysis with Revenue Increase Scenario

Alternative 2 (Increase in income)					
Changes	**Investment Parameters**				**Conclusion**
	NPV (Rp)	**IRR %**	**PP (Year)**	**BCR**	
10%	429,173,084,774	16.06	6.85	1.28	Worth
11%	442,427,849,499	16.31	6.80	1.29	Worth
12%	455,682,614,225	16.55	6.76	1.29	Worth
13%	468,937,378,950	16.80	6.72	1.30	Worth
14%	482,192,143,675	17.04	6.68	1.31	Worth
15%	495,446,908,400	17.27	6.64	1.31	Worth
16%	508,701,673,125	17.51	6.60	1.32	Worth
17%	521,956,437,850	17.74	6.56	1.32	Worth
18%	535,211,202,575	17.98	6.52	1.33	Worth
19%	548,465,967,301	19.04	6.49	1.34	Worth
20%	591,204,766,610	19.04	6.30	1.36	Worth

Discussion

Based on the analysis conducted, it can be concluded that the investment in the construction of the South Surabaya Regional General Hospital (RSUD Surabaya Selatan) is financially feasible. The evaluation results, using parameters such as Net Present Value (NPV), Internal Rate of Return (IRR), Benefit Cost Ratio (BCR), and Payback Period (PP), indicate significant potential profitability. The NPV of the project is positive, amounting to IDR 289 billion under stable conditions, indicating that the project is capable of generating net profits exceeding the investment costs. Furthermore, the project's IRR of 13.27% exceeds the Minimum Acceptable Rate of Return (MARR) of 12.97%, meeting the financial feasibility criteria. The payback period (PP) is shorter than the planned investment period, while the BCR value exceeds 1 (1.22–1.36), further confirming that the financial benefits of the project outweigh its costs.

However, sensitivity analysis reveals that the project is highly vulnerable to changes in revenue. Under a pessimistic scenario, where revenue decreases by 1.8%, the project becomes financially unfeasible. This is due to the decline in IRR to 12.90%, falling below the MARR of 12.97%. Thus, the risk of revenue decline should be a primary focus in the project's management. Recommended mitigation measures include improving operational cost efficiency and diversifying revenue sources to ensure financial stability. Conversely, in an optimistic scenario, a revenue increase of 10% to 20% significantly enhances the project's feasibility. For instance, a 20% revenue increase results in an NPV of IDR 591 billion and an IRR of 19.04%. These findings indicate that

the project would be more profitable if market conditions support revenue growth, whether through optimal tariff strategies or increased service volumes.

The largest component of the investment cost for this project comes from the physical construction of the hospital, amounting to IDR 349.37 billion out of the total investment cost of IDR 433.63 billion. Other cost components include the procurement of medical equipment, hospital management information systems, and pre-construction costs such as environmental impact assessments (EIA) and traffic impact assessments (Andalalin). Meanwhile, the primary revenue source for the hospital comes from BPJS outpatient services, contributing the largest portion at IDR 56.28 billion, followed by general outpatient services at IDR 37.52 billion. This indicates the significant potential of healthcare services as the main source of income for RSUD Surabaya Selatan.

The findings of this study provide critical implications for the Surabaya City Government in formulating policies related to hospital service tariffs and operational cost efficiency. Optimizing service tariffs and strategically managing costs are key steps to ensure the sustainability of this project. Additionally, integrating healthcare services with the potential for medical tourism in Surabaya could serve as a significant additional revenue stream, ultimately supporting the contribution of the health sector to regional revenue (PAD). Therefore, these findings can serve as a reference for policymakers in managing the healthcare sector more effectively and sustainably.

CONCLUSION

Based on the results of the sensitivity analysis of the two conditions under review, it can be concluded that the project's viability is highly dependent on changes in revenue. In the pessimistic condition, a decrease in revenue of up to 1.80% resulted in the project becoming financially unviable. This shows that the project has a high level of sensitivity to a decrease in revenue. In contrast, under optimistic conditions, both a 1%-10% increase in revenue makes the project viable in all categories. Thus, to ensure the sustainability of the project, it is important to mitigate the risk of revenue decline and cost increase, while maximizing the potential for revenue increase and expenditure efficiency.

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