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Strengthening Indonesia's Healthcare Resilience Through the Establishment of Local Medical Device Manufacturing

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ABSTRACT

Indonesia's healthcare system is still heavily dependent on imported dialyzers, with around 89% of national demand supplied from abroad. This high level of import reliance impacted to the healthcare sector to supply disruptions and ongoing capital outflow, the problems that became particularly apparent during the COVID-19 pandemic. Inline with the number of patients requiring routine dialysis is continue to increase, the demand for dialysis medical devices has also increased. This situation emphasizes the importance of developing local manufacturing facilities to strengthen healthcare resilience in Indonesia. This study assesses the feasibility of establishing a local dialyzer manufacturing facility in Indonesia through a case study of PT. Ichiban Medical Global (pseudonym name). The research uses a case study approach with primary data from internal company sources, including investment, cost, and operational projections, supported by secondary data from government regulations, BPJS Kesehatan, industry associations, and international health organizations. The analysis covers market demand, regulatory support under the Domestic Content Requirement (TKDN) policy, technical and operational readiness, and financial feasibility using capital budgeting methods. The results indicate strong and sustainable market demand supported by BPJS coverage and single-use dialyzer regulation, along with favorable government policies such as TKDN incentives and e-Catalog procurement. Financial analysis shows positive investment outcomes, with a positive Net Present Value, an Internal Rate of Return above the cost of capital, and an acceptable payback period. Overall, the study concludes that local dialyzer manufacturing is financially viable and strategically important for reducing import dependency and strengthening Indonesia's healthcare system.

Keywords: business feasibility, local content policy (TKDN), capital budgeting, medical device manufacturing, healthcare resilience

INTRODUCTION

The worldwide medical device industry has experienced substantial expansion since of technological advancements and increasing worldwide healthcare requirements, projected to reach $612 billion by the year of 2025 (EY, 2024). The Indonesian healthcare system requires immediate solutions for medical device self-resilience because of its current critical state. COVID-19 pandemic exposed the dangers of depending on foreign medical equipment imports which now influence current healthcare policy development (Ministry of Health Indonesia, 2021).

Medical device requirements in Indonesia become more difficult to meet since the country has huge population, more than 270 million people (BPS, 2023). The medical equipment shortages at hospitals throughout Indonesia result in negative outcomes for patients because of these system failures persist. Medical device

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imports account for 90% of all equipment particularly essential items such as dialysis consumables & machines and CT scanners (Indonesian Medical Device Manufacturers Association, 2022). The healthcare budget of Indonesia faces strain because of its dependence on imported medical devices while the country remains exposed to global health emergencies.

The shortage of dialysis equipment represents an urgent requirement for the country. Number of Indonesians with end-stage renal disease continues to grow impact of diabetes and hypertension cases increase while almost 500,000 people already live with this condition (Indonesian Nephrology Association, 2023). In the other hand, Indonesia imports all its dialyzers and associated components from abroad spending approximately $150 million per year (Ministry of Health, 2023). The annual export of medical equipment funds goes to foreign countries instead of supporting domestic manufacturing operations. This situation creates question about how long the healthcare system will remain dependent.

Table 1. Data of Import in Dialysis Equipment

Equipment Category	Import Dependency	Main Supplier Countries	Local Production Capability	Annual Import Value (USD)
Hemodialysis Machines	100%	Germany (62%), Japan (23%), China (15%)	None	$98 million
Dialyzer	89%	China (71%), Germany (18%), USA (11%)	Limited	$67 million
Blood Tubing Sets	93%	China (82%), Malaysia (12%), India (6%)	None	$28 million
Dialysis Solutions	85%	USA (54%), Japan (31%), South Korea (15%)	Limited	$17 million

PT Ichiban Medical Global stands as a market and industry leader which could transform the medical sector. The company stands at a critical point where expanding into dialyzer production will create major changes for Indonesia's medical infrastructure. The TKDN requirements and Government Regulation No. 29/2018 (Indonesian Ministry of Industry, 2018) establish conditions that support the development of such initiatives. The national healthcare priorities receive increasing support for medical products that Indonesia produces domestically (BPJS Kesehatan, 2022).

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The opportunity reaches further than basic import replacement. The successful manufacture of dialysis components in Indonesia would create employment opportunities while developing technological expertise and providing stable access to vital medical treatments. Healthcare providers express their strong dissatisfaction about unreliable product deliveries which local manufacturing could solve (Indonesian Hospital Association, 2023). The implementation of strategic partnerships and phased development approaches shows that developing nations can defeat substantial technological and financial barriers (OECD, 2022).

This research investigates PT. Ichiban Medical Global's ability to expand its manufacturing operations by focusing on dialysis equipment production. The research evaluates business potential while demonstrating how domestic manufacturing strengthens Indonesia's healthcare system. The ability to manufacture vital medical devices within domestic borders has become essential because medical supply chains continue to face instability.

RESEARCH METHODOLOGY

In this study, research design begins with the identification of issues and business opportunities. Data collection consists of primary and secondary data, where primary data comes from internal companies such as investment and cost data, while secondary data comes from external data such as data from health associations, BPS, WHO, etc. After all the data is collected, data analysis and tidying are carried out which will then be calculated for the feasibility study using the capital budgeting method. From the results of the analysis and calculation of the feasibility study using the capital budgeting method, conclusions and recommendations can be made for this project.

RESULT AND DISCUSSION

In this section, we will discuss further the potential for this investment to be carried out, starting from an in-depth market analysis, the market potential that can be achieved, a detailed analysis of the factory construction mechanism and a financial analysis of this project.

1. Market Analysis

In this section, we will analyze further the market potential that exists both in Indonesia and internationally, especially in the Southeast Asia region, which is the closest potential market to Indonesia.

a. Potential Local Market

Table 3. Estimated Indonesia's Potential Dialyzer Market

Year	Estimated Hemodialysis Patient (thousand)	Dialyzer Needed (pcs)	Estimated Market Value (BIDR)
2025	60	5,760,000	1,037
2026	65	6,232,320	1,122
2027	70	6,743,370	1,214
2028	76	7,296,327	1,313

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2029	82	7,894,625	1,421
2030	88	8,541,985	1,538
2031	92	8,892,206	1,601
2032	95	9,256,786	1,666
2033	99	9,636,315	1,735
2034	103	10,031,404	1,806
2035	107	10,442,691	1,880

The dialyzer market value in Indonesia will expand from IDR 1 trillion during 2025 to IDR 1.8 trillion by 2035 according to the table. The market will expand at 8% annually until 2030 before it slows down to 4% starting from 2031. The high import rate of 89% creates an excellent chance for domestic manufacturers to take over foreign dialyzer sales in Indonesia. PT. Ichiban Medical Global operates domestic manufacturing facilities which would enable the company to achieve minimum 50% market dominance in Indonesia.

b. Potential Regional Market (Southeast Asia)

Table 4. Estimated SEA's Potential Dialyzer Market

Year	Estimated Hemodialysis Patient (thousand)	Dialyzer Needed (pcs)	Estimated Market Value (BIDR)
2025	660	63,360,000	9,504
2026	708	67,921,920	10,188
2027	758	72,812,298	10,922
2028	813	78,054,784	11,708
2029	872	83,674,728	12,551
2030	934	89,699,309	13,455
2031	968	92,928,484	13,939
2032	1,003	96,273,909	14,441
2033	1,039	99,739,770	14,961
2034	1,076	103,330,402	15,500
2035	1,115	107,050,296	16,058

The dialyzer market value in Southeast Asia will expand from IDR 9.5 trillion in 2025 to more than IDR 16 trillion during the period from 2025 to 2035. The market will experience 7.2% annual growth until 2030 before it slows down to 3.6% starting from 2031. The Indonesian industry can capitalize on export possibilities through the production of internationally certified medical products.

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c. Competitive Landscape

Table 5. Competitive Advantage Comparison Import vs Local

Competitive Aspect	Global Manufacturers (Fresenius, Bbraun Baxter, Nipro, Toray)	Local Manufacturer (PT. Ichiban Medical Global)
Origin and Business Model	Manufactured overseas (Europe, USA, Japan, China) and imported through national distributors.	Produced domestically with a gradual increase in local component content under the TKDN policy.
Technology and Product Quality	Utilizes advanced filtration technology with CE/FDA certifications; strong global reputation.	Technology still in development: potential for improvement through technology transfer and joint research collaborations.
Regulatory Compliance	Fully compliant with international standards and globally recognized certifications.	Complies with national standards and progressing toward international certification.
Supply Chain Efficiency	Dependent on imports, resulting in longer lead times and higher logistics complexity.	Faster and more flexible distribution due to domestic production and localized logistics.
Government Support and TKDN Incentive	Not eligible for TKDN preferences and faces barriers in e-Catalog procurement.	Receives preferential treatment in government procurement and BPJS programs due to high TKDN value.
Brand Image and Market Trust	Strong brand reputation and high customer loyalty, particularly in private hospitals.	Still developing brand recognition and market trust where requires sustained branding and quality assurance efforts.
Market Potential and Growth Outlook	Relatively saturated in the premium market segment; limited growth potential.	Significant potential for expansion in public healthcare and national insurance program segments.

The comparison shows that global manufacturers lead Indonesia's dialyzer market through their advanced technology and established

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distribution networks and their well-known brand reputation. The domestic content policy (TKDN) together with quick supply chain response and rising government support for medical devices made in Indonesia enables PT Ichiban Medical Global to gain market advantages. Local manufacturers need to focus on improving their product quality and obtaining certifications and building customer trust to achieve better market positions in both Indonesian and Southeast Asian markets.

Table 6. Competitive Advantage Comparison Between Competitors

Company	Product & Technology Quality	Market Access & Distribution	Rationale
Fresenius Medical Care (Germany)	**9.5**	**9**	A global market leader with high-flux membrane technology and full international certification. It has an extensive distribution network and major contracts with private facilities
Nipro / Toray (Japan)	**9**	**8.5**	It excels in synthetic membrane technology and filtration efficiency; it has strong distribution in BPJS partner hospitals and mid-sized private hospitals.
Baxter (United States)	**8.5**	**8**	It focuses on integrated dialysis solutions with high quality standards; it has strong distribution in the premium segment, but public penetration is limited.
B. Braun Avitum (Germany)	**8**	**7.8**	It has a line of dialyzers (Diacap®) and integrated kidney therapy systems, but its primary focus is on dialysis clinic services, not mass supply.
PT. Ichiban Medical Global (Indonesia)	**7**	**7**	It is a local manufacturer with significant potential through support for local content standards (TKDN), logistical efficiency, and

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			access to e-Catalog procurement. However, it is still in the early stages of technology development and brand trust.

Based on a competitive analysis, the Indonesian dialyzer market is currently dominated by two major players: Fresenius Medical Care and Nipro Corporation. The two companies are nearly evenly matched in terms of technology and market share. Although their approaches differ Fresenius promotes global-scale treatment system integration, while Nipro relies on efficient manufacturing based in Asia, the two players remain at the top of the Indonesian market, with nearly equal market leadership status.

2. Policy and Regulation

In this section will discuss about the policy and regulation related to the dialysis project.

a. National Policy on Medical Device Self-Sufficiency

The Indonesian government has established domestic medical device industry development as its main national strategic objective. The Ministry of Industry together with the Ministry of Health established the Electromedical Device Industry Roadmap to support the national goal of reaching 60% medical device self-sufficiency by 2030. The COVID-19 pandemic exposed Indonesia's complete reliance on foreign medical supplies which led to a strengthened commitment for domestic production of medical devices. The establishment of dialyzer production in Indonesia represents a strategic initiative because dialyzers function as essential high-volume medical supplies for ongoing healthcare operations.

b. Dialyzer Manufacturing Regulations in Indonesia

The Ministry of Health (Kemenkes) and Ministry of Industry (Kemenperin) together with the National Agency of Drug and Food Control (BPOM) establish the regulatory framework which controls dialyzer manufacturing in Indonesia. Medical device producers need to get an AKD license and follow GMP guidelines and ISO 13485:2016 quality management standards. All commercial distribution of products requires performance and safety testing at the Center for Health Facility Security (BPFK). Strict entry requirements for manufacturers lead to better market acceptance because certified producers demonstrate international quality standards compliance.

c. Domestic Content Requirement (TKDN) Policy

Tingkat Kandungan Dalam Negeri (TKDN) policy functions as a important tools to boost local production within Indonesia's medical device industry. The Ministry of Industry conducts local content percentage assessments for

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products which determines their eligibility for public institutions procurement price benefits. The national e-Katalog system provides access to products that achieve at least 40% and more TKDN value while these products receive discounted prices during government procurement competitions. PT. Ichiban Medical Global benefits from this policy because it creates a competitive advantage for domestically produced dialyzers to compete against imported products that receive regulatory support.

d. National Procurement and BPJS Reimbursement Policy

The Ministry of Health operates the e-Catalog system which functions as the main system for national medical device procurement. The Ministry of Health follows Presidential Regulation No. 12 of 2021 by making TKDN verification a requirement for product access to the system. The BPJS Health program requires healthcare providers to maintain cost efficiency through its fixed per-session payment rate for hemodialysis services. PT. Ichiban Medical Global can boost BPJS operational efficiency and enhance national dialysis supply chain stability through its local manufacturing operations.

e. Local Manufacturing Benefit

The Indonesian government provides medical device manufacturers with different types of financial and non-financial benefits to boost their domestic production activities. The government provides duty-free status for machinery imports and raw materials as well as tax benefits and research and development funding support and access to industrial development zones. The Ministry of Investment (BKPM) supports domestic producers to establish partnerships with international companies for technology transfer and investment promotion. The incentives available to PT. Ichiban Medical Global can use to build its production capacity and create strategic technology partnerships for dialyzer membrane development and process optimization.

f. Implications for PT Ichiban Medical Global

The existing regulatory structure in Indonesia supports the development of domestic dialyzer manufacturing operations. The combination of TKDN enforcement with e-Catalog system preferences and industrial investment benefits establishes a clear path for market growth and competitive success. The process of meeting strict regulations becomes essential because it builds trust among customers who want to purchase domestic products. PT. Ichiban Medical Global needs to follow all regulations strictly while actively participating in national policy programs to become a leading domestic dialyzer manufacturer which will enhance Indonesia's healthcare security and medical device industry position in Southeast Asia.

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3. Technical and Operational Feasibility

In this section will be discussed about technical and operational readiness and feasibility form technology, production capability, human resource and other operational matters.

a. Technology Readiness and Production Capability

The technical feasibility evaluation determines when the selected technology becomes available for dialyzer manufacturing and how well the manufacturing plant meets international quality requirements. PT. Ichiban Medical Global uses hollow fiber membrane technology based on polysulfone (PSU) and polyethersulfone (PES) for dialyzer production because these materials serve as the main components in contemporary dialyzer manufacturing. The production process consists of spinning followed by potting and assembly and sterilization which need precise operations and complete quality control to meet ISO 13485 standards.

b. Supply Chain Structure and Dependency on Imported Materials

The production of dialyzers requires an intricate supply network which depends on essential materials including hollow fiber membranes and medical-grade plastic housings and end caps and potting resins. The membrane material stands as the most critical import-dependent component because Indonesian manufacturers lack the ability to produce membranes with suitable porosity and mechanical properties for hemodialysis treatment.

c. Human Resources and Knowledge Transfer Needs

The operational feasibility of the project depends on having enough skilled personnel who understand how to perform precise medical device manufacturing. PT. Ichiban Medical Global has created a workforce development strategy which includes process engineers and operators and quality assurance personnel and research and development (R&D) staff.

d. Conclusion of Technical and Operational Feasibility

PT Ichiban Medical Global demonstrates excellent technical and operational readiness for building its dialyzer manufacturing facility. The company has started partnership with multiple international partners who bring advanced expertise and readiness to work together to establish manufacturing facility. The supply chain demonstrates potential for localization while the workforce development plan ensures operational continuity. This project receives support from government initiatives and strategic alliances which positions it for commercial readiness and will enhance Indonesian medical device independence.

4. Financial Feasibility Analysis

This section evaluates the financial feasibility of PT. Ichiban Medical Global's dialyzer production facility development project. The analysis evaluates

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investment structure and costs through detailed quantitative methods. Deep analysis develops revenue forecasts based on market potential assessment, employs capital budgeting methods to determine essential investment feasibility indicators. The analysis evaluates how changes in vital project elements and outside threats affect the project's performance. This feasibility study establishes whether the investment will produce adequate and enduring economic returns during its extended period.

a. Investment & Cost Structure

This section outlines the investment composition and cost structure required for the construction of a dialyzer production facility. The section highlights the investment composition and cost structure. The analysis includes the estimated capital expenditure (CAPEX) and the annual operating costs (OPEX). The analysis uses CAPEX and OPEX as the basis for calculating the project's financial feasibility. The investment composition, cost structure, CAPEX, and OPEX determine the project's financial feasibility.

Investment

The investments to be made include land acquisition and construction of factory buildings, as well as procurement of machinery and production equipment. In addition to constructing the dialyzer manufacturing facility itself, the company will also need to establish a sterilization facility as part of the process after the product has been sterilized and finished to meet standards for sale and patient use. The investments required include the following:

Table 7. Investment Breakdown

Description	Value (BIDR)
Land	45,000,000,000
Manufacture Building	201,595,000,000
Machinery	241,672,675,000
Tools	2,208,454,783
Furniture & Supporting Infrastructure	635,000,000
Total	**491,111,129,783**

Operating Cost

The dialyzer plant requires operating costs (OPEX) to sustain its ongoing operations after the facility becomes operational. The financial analysis of project feasibility depends on these two cost categories which include fixed and variable expenses that affect annual profitability. The operating costs of a facility consist of five categories which include labor expenses and production and factory support expenses and general expenses and product development expenses and all other expenses. The calculation of Total OPEX depends on yearly manufacturing needs and shows growth

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according to production levels. The operating cost structure enables companies to determine gross margins and predict annual cash flow and evaluate how financial performance reacts to changes in prices and production levels and raw material expense fluctuations. The evaluation of locally produced dialyzers requires complete knowledge about operating expenses to determine their business viability and market competitiveness.

Labor Assumption

Regarding the workforce needed to carry out production and carry out manufacturing functions, the following assumptions regarding the number of workers needed are aligned with the output level in the production process for the first 5 year.

Table 8. Man power assumption

Function	Level	2027	2028	2029	2030	2031
Direct Labor	Operator	24	36	55	87	87
Direct Labor	Team Leader	1	5	7	10	10
Direct Labor	Supervisor	1	2	2	3	3
Direct Labor	Manager		1	1	1	1
Direct Labor	Gol 6					
Overhead/other	Operator	4	16	24	32	32
Overhead/other	Team Leader	2	5	6	7	7
Overhead/other	Supervisor	2	7	8	10	10
Overhead/other	Manager		2	3	4	4

Cost Structure

Table 9. Operating expenses (MIDR)

Description	2026	2027	2028	2029	2030	2031
Direct Labor	-	1,741	3,393	5,015	7,886	8,123
Personnel cost non DL	-	516	2,841	3,978	5,308	5,468
Utilities	-	2,703	4,054	6,082	9,172	9,172
Supporting production	-	4,250	4,750	5,250	6,000	6,000
Depreciation	-	33,704	33,704	33,704	33,704	33,696
General expense	-	3,726	3,726	3,726	3,726	3,726
Research & Development	1,500	3,000	3,000	-	-	-
Total	**1,500**	**49,639**	**55,468**	**57,754**	**65,797**	**66,184**

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The analysis above assumes both direct and supporting costs for manpower. Utilities costs include electricity, water, wastewater treatment, and other costs. Supporting production costs include sterilization and product validation, part replacement, and machine maintenance. Depreciation include all building & facilities and production & supporting machine that the depreciation time vary in each asset for 4-16 years. General expenses include costs such as security, catering, work equipment, and other costs. Finally, product development costs are assumed to begin one year before the facility is operational due to the need for product development prior to commercial production. These costs are expected to only arise in the first three years, until all products have been developed and are commercially viable.

b. Revenue Projection Scenario

This subchapter discusses revenue projections based on market potential and planned production capacity. Revenue growth scenarios are presented in two ways: a best-case scenario, which we believe will be achieved, and a worst-case scenario, designed to prepare for the worst-case scenario of this investment and to illustrate potential profit variations based on changes in sales volume assumptions. The simulation of revenue divided into 3 types of sales: sales to group (Affiliate), local and export.

Most likely Scenario

Table 10. Output projection most likely in unit (thousand)

Unit production (Thousand)	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036
Group (Affiliate)	600	600	600	600	600	600	600	600	600	600
Local	1,000	3,000	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500
Export	-	1,000	1,500	1,900	1,900	1,900	1,900	1,900	1,900	1,900
Total	1,600	4,600	5,600	6,000	6,000	6,000	6,000	6,000	6,000	6,000

Table 11. Output projection most likely in BIDR

Revenue (BIDR)	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036
Group (Affiliate)	60	60	60	60	60	60	60	60	60	60
Local	110	330	385	385	385	385	385	385	385	385
Import	-	100	150	190	190	190	190	190	190	190
Total	**170**	**490**	**595**	**635**	**635**	**635**	**635**	**635**	**635**	**635**

In the first year, the company's sales projection is 170 billion rupiah per year until it reaches maximum utilization in 2030 with sales of 635 billion rupiah per year and so on.

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Pessimistic Scenario

Table 12. Output projection Pessimistic in unit

Unit Production (Thousand)	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036
Group (Affiliate)	600	600	600	600	600	600	600	600	600	600
Local	800	2,400	2,800	2,800	2,800	2,800	2,800	2,800	2,800	2,800
Import	-	800	1,200	1,520	1,520	1,520	1,520	1,520	1,520	1,520
Total	1,400	3,800	4,600	4,920	4,920	4,920	4,920	4,920	4,920	4,920

Table 13. Output projection Pessimistic in BIDR

Revenue (BIDR)	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036
Group (Affiliate)	60	60	60	60	60	60	60	60	60	60
Local	88	264	308	308	308	308	308	308	308	308
Import	-	80	120	152	152	152	152	152	152	152
Total	148	404	488	520	520	520	520	520	520	520

c. Income Statement & Free Cash Flow Analysis

The following section explains how financial project performance evaluation was conducted by creating Income Statement projections and Free Cash Flow (FCF) models to determine long-term financial sustainability. The Income Statement projections demonstrate how the project will produce revenue while paying operating expenses to achieve net profitability during its entire operational period. The Free Cash Flow analysis demonstrates the total cash available for investors after subtracting capital expenses from operating expenses and working capital adjustments. The financial health assessment of a project depends heavily on these two analyses because they demonstrate its profitability and cash generation abilities and investment return support. The calculated financial feasibility metrics including NPV and IRR and payback period use the results from Income Statement and FCF projections as their main input data. The analysis establishes a solid base for PT Ichiban Medical Global to make investment choices regarding building a local dialyzer production facility. The scenario that we will discuss in this stage only for most likely scenario.

Income Statement

Table 14. Income Statement (in MIDR)

Description	2026	2027	2028	2029	2030	2031
Sales		170,000	490,000	595,000	635,000	635,000
COGS		(143,384)	(326,826)	(389,521)	(418,374)	(418,762)
Gross Profit		26,616	163,174	205,479	216,626	216,238
General Expense		(3,726)	(3,726)	(3,726)	(3,726)	(3,726)

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Research & Development	(1,500)	(3,000)	(3,000)	-	-	-
Profit Before Tax	(1,500)	19,890	156,448	201,753	212,900	212,513
Tax	-	(4,376)	(34,419)	(44,386)	(46,838)	(46,753)
Profit After Tax	(1,500)	15,515	122,030	157,368	166,062	165,760
EBITDA	(1,500)	53,595	190,153	235,458	246,604	246,209

Free Cash Flow

The free cash flow calculation assumes 45 days of inventory, 40 days of accounts payable, and 30 days of accounts receivable to account for changes in working capital. The FCF calculation is as follows:

Table 15. Table Error! No text of specified style in document.**-1 Free Cash Flow (in MIDR)**

Description	2026	2027	2028	2029	2030	2031
Net Income	-1,500	15,515	122,030	157,368	166,062	165,760
Depreciation	0	33,704	33,704	33,704	33,704	33,696
	0	0	0	0	0	0
Working Capital	*0*	*16,158*	*45,373*	*54,993*	*58,727*	*58,733*
Working Capital Changes	0	-16,158	-29,214	-9,621	-3,734	-5
Capital Expenditure	-491,111	0	0	0	0	0
Free Cash Flow	**-492,611**	**33,061**	**126,520**	**181,451**	**196,032**	**199,450**

d. Capital Budgeting Analysis

This section presents an investment feasibility analysis using the capital budgeting method, using the Net Present Value (NPV), Internal Rate of Return (IRR), and Payback Period as the parameters. These calculations aim to assess the profitability and feasibility of the investment in this project. Internal company has a policy that the maximum acceptable payback period is 7 year for the manufacture establishment. For the WACC that will be used for analysis, here's the calculation for determine WACC:

WACC Calculation

This company typically use internal funding bigger than loan to financing development projects within the company, in average about 65% from equity. Proportional assumption to applied to calculate the WACC is 65% equity and 35% debt. The WACC calculation is as follows:

WACC = 65% x 13.65% + 35% x 7.8%

=8.87% + 2.73% = **11.6%**

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With the combination equity and debt as above, we got the WACC by 11.6% that will be used for the next measurement analysis.

Capital budgeting analysis

To determine the feasibility of this project, we analyze the capital budgeting analysis as below based on assumption that we already put in previous section:

Most likely Scenario

Table 2. Capital budgeting analysis Most likely Scenario

NPV year 10	361,220,574,552
IRR	21.4%
Payback Period After Commercial	4 years 11 month

Based on measurement analysis above shows that the NPV for this project in year 10 is positive at 361 billion rupiah, indicating that the project will generate profits in the future. The IRR is 21.4%, far exceeding deposit and bond interest rates, which range from 6-8%, indicating a promising return. In terms of payback period, this project is targeted to return in 4 years and 11 months from the commercial year, which is far below the maximum acceptable payback period of 7 years.

Pessimistic scenario

Table 3. Capital budgeting analysis Pessimistic Scenario

NPV year 10	148,121,460,760
IRR	17.8%
Payback Period After Commercial	6 years 6 month

In the pessimistic scenario, the NPV is still at a positive level of 148 billion rupiah, where the IRR of 17.8% reflects a return projection that is still promising and the payback period of 6 years and 6 months still reflects an acceptable projection which is still below 7 years.

e. Sensitivity & Risk Analysis

This subsection assesses the project's financial resilience when key variables change. In this project, we already determine the key variables: Price, Volume, COGS, CAPEX & WACC. Sensitivity analysis and risk identification are used to assess the impact of market and operational fluctuations on investment feasibility.

Table 18. Sensitivity Analysis (in million)

NPV	-10%	-5%	Most likely	5%	10%	Range
Price	141,331	251,276	361,221	471,165	581,110	439,778
Volume	268,143	314,682	361,221	407,759	454,298	186,155
COGS	488,032	424,626	361,221	297,815	234,409	(253,623)
CAPEX	406,469	383,845	361,221	338,596	315,972	(90,498)
WACC	407,434	383,900	361,221	339,357	318,273	(89,161)

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Based on the sensitivity analysis that has been made above with a range of increases and decreases of 10% in each variable, for further analysis it is necessary to make a tornado and spider chart as follows.

Tornado chart

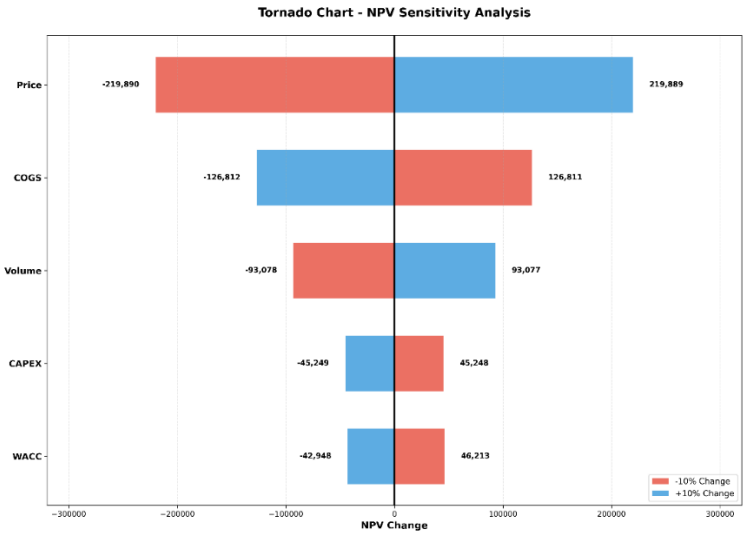

Figure 2. Tornado Chart Sensitivity Analysis

Spider Chart

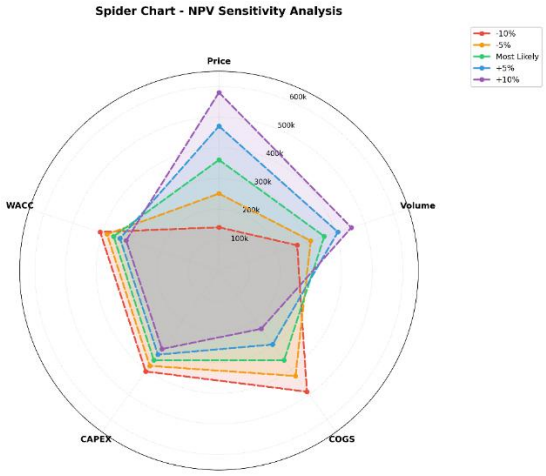

Figure 3. Spider Chart Sensitivity Analysis

Sensitivity Analysis Conclusion

The sensitivity analysis shows that the project's NPV of 361,221 million is highly sensitive to price changes, which represents the most critical risk factor with a potential swing of ±219,890 million (±60.9%). This is followed by COGS with an impact range of 253,623 million, demonstrating that cost management is the second most influential factor. Volume shows moderate sensitivity with a

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range of 186,155 million, while CAPEX and WACC exhibit relatively lower sensitivities with ranges of 90,498 million and 89,161 million respectively.

5. Strategic Partnership

The following section explains which partnership approaches will help PT. Ichiban Medical Global achieve success with its dialyzer production facility development project. The dialyzer industry depends on technological excellence and market access and stable supply chains to operate successfully so strategic partnerships with essential stakeholders become vital for achieving competitiveness and operational sustainability. The development of technical capabilities and product innovation depends on two essential partnership types which include government and BPJS Kesehatan collaboration and academic institution and international technology partner alliances. PT. Ichiban Medical Global will achieve faster project completion and national medical device production self-reliance through its integrated partnerships that deliver mutual benefits.

a. Potential Collaboration with Government & BPJS

PT. Ichiban Medical Global need to work together with the government and BPJS Kesehatan (Social Security Agency for Health) to achieve successful dialyzer commercialization in Indonesia. The Indonesian government supports higher Domestic Component Levels (TKDN) and medical device independence through its Ministry of Health and Ministry of Industry. The national procurement priority scheme through e-Catalog enables PT. Ichiban Medical Global to access better market opportunities for healthcare facilities that use BPJS services. The largest dialyzer consumer in Indonesia BPJS Kesehatan determines both the quantity of dialyzers needed and maintains stable market demand. PT. Ichiban Medical Global can build strategic business relationships through its delivery assurance programs and national supply stabilization initiatives and long-term contracts when it delivers products that meet clinical standards and reduce healthcare facility costs. The partnership enables both the continuation of hemodialysis services and establishes PT. Ichiban Medical Global as a vital domestic supplier within the BPJS supply network.

b. University & Partner Technology Collaboration

The company uses academic institution partnerships and technology partner alliances to build technical expertise and create new products. PT. Ichiban Medical Global should create research based university partnerships to improve materials science knowledge and train personnel and optimize manufacturing systems. The company can accelerate membrane technology progress through collaborative research activities and training programs and testing facilities which improve manufacturing efficiency. This project needs Chinese and European international technology partners to reach its first set of objectives. The foreign partners bring advanced production equipment and standardized processes and provide critical expertise for operating facilities at

international quality standards. Partnership enables organizations to create collaborative development programs for future membrane manufacturing which will boost domestic technology development and reduce dependence on imported materials. The company depends on academic and technology partnerships to build its technical abilities and business market position.

6. Summary of Findings

This study assesses the feasibility of establishing a dialyzer production facility in Indonesia by conducting a comprehensive evaluation of market, policy, technical-operational, financial, and partnership strategy aspects. The market analysis indicates that Indonesia has significant and sustainable demand potential, indicated by a significant increase in the number of chronic kidney failure patients and the utilization of hemodialysis services through the National Health Insurance (BPJS Kesehatan). The current dialyzer market remains heavily dependent on imported products, accounting for over 89% of the market, creating a strategic opportunity for domestic production to substitute imports.

CONCLUSION

Feasibility of Building a Local Dialyzer Manufacturing Facility in Indonesia. The project shows strong compliance with the market requirements, government policy, technical matters and financial feasibility.

Optimization of TKDN Policies for Competitive Advantage. The analysis shows that commercial success is greatly influenced by a company's ability to maximize the benefits of local content.

Strategic Partnerships to Enhance Market Access. Research results show that strategic partnerships serve as a vital element for risk reduction and market entry speed improvement.

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