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The Financial Feasibility of Launching a New Product at PT. Refractorindo Graha Dinamika

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ABSTRACT

This study investigates the financial feasibility of launching a new product—plastic refractories—at PT. Refractorindo Graha Dinamika. The company aims to diversify its offerings while maintaining competitiveness in Indonesia's growing refractory market. The study employs a structured methodology that begins with a comprehensive business environment analysis using PESTLE and Porter's Five Forces frameworks, then calculates the company's Weighted Average Cost of Capital (WACC), and constructing a detailed five-year cash flow projection. Capital budgeting metrics—Net Present Value (NPV), Internal Rate of Return (IRR), Profitability Index (PI), Payback Period (PP), and Discounted Payback Period (DPP)—are applied to evaluate the financial feasibility of investing in three locally sourced manufacturing machines essential for producing plastic refractories. The results indicate that the new product is financially feasible, with a positive NPV, an IRR exceeding the WACC, and acceptable payback periods. Sensitivity analysis using Monte Carlo simulation further assesses the impact of uncertainties in sales volume on financial outcomes. The study offers insights for PT. Refractorindo Graha Dinamika's management regarding the decision whether to accept or reject the acquisition of new capital investments.

Keywords: *Capital Budgeting; Financial Feasibility; Monte Carlo Simulation; Plastic Refractories; Sensitivity Analysis.*

ABSTRAK

Studi ini menyelidiki kelayakan finansial peluncuran produk baru—refraktori plastik—di PT. Perusahaan bertujuan untuk mendiversifikasi penawarannya sambil mempertahankan daya saing di pasar refraktori Indonesia yang sedang berkembang. Studi ini menggunakan metodologi terstruktur yang dimulai dengan analisis lingkungan bisnis yang komprehensif menggunakan kerangka kerja PESTLE dan Porter's Five Forcess, kemudian menghitung Weighted Average Cost of Capital (WACC) perusahaan, dan membangun proyeksi arus kas lima tahun yang terperinci. Metrik penganggaran modal—Nilai Sekarang Bersih (NPV), Tingkat Pengembalian Internal (IRR), Indeks Profitabilitas (PI), Periode Pengembalian (PP), dan Periode Pengembalian Diskon (DPP)—diterapkan untuk mengevaluasi kelayakan finansial berinvestasi dalam tiga mesin manufaktur yang bersumber secara lokal yang penting untuk memproduksi refraktori plastik. Hasilnya menunjukkan bahwa produk baru layak secara finansial, dengan NPV positif, IRR melebihi WACC, dan periode pengembalian yang dapat diterima. Analisis sensitivitas menggunakan simulasi Monte Carlo lebih lanjut menilai dampak ketidakpastian volume penjualan terhadap hasil keuangan. Studi ini menawarkan wawasan bagi manajemen PT Refractorindo Graha Dinamika mengenai keputusan apakah akan menerima atau menolak akuisisi investasi modal baru.

Kata kunci: Penganggaran Modal; Kelayakan Finansial; Simulasi Monte Carlo; refraktori plastik; Analisis Sensitivitas.

Volume 7 Nomor 3 (2025) 1233 – 1244 P-ISSN 2656-2871 E-ISSN 2656-4351
DOI: 10.47467/alkharaj.v7i3.6313

INTRODUCTION

Refractory is a material that is resistant to decomposition by heat or chemical attack, while retaining its strength and rigidity at high temperatures (Allaby & Allaby, 1999). In the global market, refractory growth is emerging significantly with the latest estimated market size at 55.16 million tons in 2024 and is expected to reach 67.12 million tons by 2029, growing at a CAGR of 4% during the 2024-2029 forecast period (Mordor Intelligence, 2024). In Indonesia, there was a spike in imports of refractory materials for the past three years, notably in 2022 with the amount of US$390.30 million (Kahfi, 2024). This shows that refractories are an important commodity in Indonesia. However, it can also explain that Indonesia has a dependency on imported refractories, not produced locally by private or public companies. To counter this dependency, the Association of Refractory & Insulation Indonesia was established in November 2019 to support local production of refractory materials. This study will explore one of the firms listed in the association based on its financial aspect.

PT. Refractorindo Graha Dinamika (RGD) was established to serve refractory and insulation services for multi-range industries in Indonesia. In 2021, the company began to expand its operations to the manufacture of refractory materials. The main product that was sold to customers is called castable refractory. However, there are challenges related to the sustainability of the company's manufacturing department. Based on the data provided by the finance department, the profit value of the company is only 23,61%. This result is below the 30% of profit margin that was established by the management. This suggests that selling only castable refractory products will not be sustainable to generate long-term profits. To address this issue, the top management of the company has decided to diversify the risk by starting research and development for a new product, which is called plastic refractory.

To produce this new type of product, the company must acquire specialized machines. In preparation for investing in these machines, the procurement department has received price quotations from potential vendors, in which the estimated total fixed capital investment is approximately Rp765 million. The decision to construct the machines locally was influenced by the previous experience of acquiring the machine to produce refractory products through import, which incurred a significantly higher cost of approximately Rp2 billion. Following this, the decision to launch a new product will have to avoid any financial risks to the company. Therefore, the objective of this study is to determine the financial feasibility of launching a new product by analyzing the cost of constructing the required machines, and the financial benefit of producing and selling the product.

The theoretical foundation for this study is derived from financial management, particularly capital budgeting metrics. According to Gitman & Zutter (2015), capital budgeting is the process of evaluating long-term investments and selecting the ones that are consistent with the firm's goal of maximizing the owner's wealth. The approach to capital budgeting involves estimating the future operating cash flows that a firm expects after implementing a new project (Ross et al., 2016). In

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this regard, The discount rate is the minimum expected rate of return an investment must offer to be attractive. The term for this specific rate of return is the Weighted Average Cost of Capital (WACC). To determine the WACC, both the cost of debt and the cost of equity must be measured first (Brealy et al., 2020).

Regarding metrics of capital budgeting, Clayman et al. (2012) present the Net Present Value (NPV), Profitability Index (PI), Payback Period (PP), Discounted Payback Period (DPP), and Internal Rate of Return (IRR). NPV measures the difference between the present value of an investment's benefits and its costs. PI is the index of financial feasibility that aligns with the result of NPV. Both PP and DPP measure the number of years required to recover the initial investments in a project. Lastly, the IRR is the discount rate that makes the NPV of an investment to equal zero.

Previous studies on capital budgeting suggest that its metrics effectively capture the financial feasibility of various projects. For instance, Yuvita (2018) has conducted a study to measure the feasibility of investments in tugboats and barges with results showcasing a positive NPV of Rp40.625.847.662 and other related metrics indicating that the project is financially feasible. In addition, a study by Nainggolan (2023) also concluded that the investment for an oil recovery project in Indonesia was feasible. To conclude, the result of this study must assist the company in making a decision regarding the acceptance or rejection of investments in new machines for producing plastic refractories.

METHODOLOGY

This study uses quantitative methods to analyze the value of investments related to the launch of the new product in PT. Refractorindo Graha Dinamika. The data is primarily collected from various stakeholders of the company, which includes the data on initial investments of machines, the cost of goods sold (COGS), operating expenses, and the sales forecast of the new product. These data would be incorporated to construct a cash flow projection for five years, as the management seeks a reasonable level of predictability because the new product is prone to market conditions and technological changes.

Aside from collecting the data related to sales and costs of the product, this study utilizes the latest audited financial statement of PT. Refractorindo Graha Dinamika, with the purpose to analyze the company’s capital structure and calculate the Weighted Average Cost of Capital (WACC). Furthermore, this study also uses secondary data from online credible sources such as Yahoo Finance, MarketWatch, and public company’s official websites. These data are important to determine the cost of equity, which requires a beta coefficient that is derived by re-levering the beta from comparable companies within the same industry as the company in this study.

After constructing the cash flow and determining the WACC, this study employs capital budgeting that serves as a tool to evaluate the financial feasibility of launching the new product. Five criteria of capital budgeting will be implemented in

Volume 7 Nomor 3 (2025) 1233 – 1244 P-ISSN 2656-2871 E-ISSN 2656-4351
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this study. The criteria are Net Present Value (NPV), Profitability Index (PI), Payback Period (PP), Discounted Payback Period (DPP), and Internal Rate of Return (IRR). Furthermore, a sensitivity analysis using Monte Carlo simulation will be applied to generate probability distributions related to the sales volume. To complete the study, a business environment analysis will be conducted based on the concept of Porter's Five Forces and PESTLE.

RESULT AND DISCUSSION

Porter's Five Forces

This analysis helps business to understand the factors that influence probability (Porter, 2008). In this study, the results are: (1) threat of new entrants; the refractory industry requires significant capital investment and technical expertise, which create high entry barriers, (2) bargaining power of suppliers; raw materials to produce refractories are primarily sourced internationally, giving suppliers considerable leverage, (3) bargaining power of buyers; refractory clients often demand high-quality products at competitive prices which resulted in buyers with significant bargaining power to switch suppliers, (4) threat of substitutes; substitutes materials such as thermal insulation or cheaper refractory alternatives will pose a moderate threat to the company, (5) competitive rivalry; the Indonesian refractory market is moderately competitive, with established players and imports dominating the landscape.

PESTLE

This analysis helps business to evaluate their external environment, with the purpose of identifying potential opportunities and threats (Perera, 2017). In this study, the results are: (1) political; Indonesia's government policies aim such as tax incentives and infrastructure projects create opportunities for the company to benefit from increased industrial activity, (2) economic; despite the global uncertainties, Indonesia's GDP growth has remained stable throughout the years, but challenges such as currency depreciation will affect production costs due to the company importing of raw materials, (3) social; increasing industrialization in Indonesia created an opportunity for the company to strengthen its customer base, (4) technological; advancements in technology are transforming the refractory industry, focusing more on developments of automation and eco-friendly production methods, (5); legal, the company must comply with manufacturing standards, labor laws, and environmental regulations to avoid legal penalties, (6) environmental; the pressure to adopt sustainable practices suggests that the company should address concerns related to environmental such as waste management.

Weighted Average Cost of Capital (WACC)

The prerequisites of WACC are the measurement of both the cost of debt and the cost of equity. This study implements Damodaran's synthetic rating to estimate the cost of debt before tax. Using the EBIT and interest expenses from PT.

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Refractorindo Graha's financial statement, the cost of debt before tax is 9,60%. Then, the Indonesian corporate tax was applied to arrive at a cost of debt after tax, which is 7,49%. For the cost of equity, the beta coefficient from re-levering comparable companies' beta is 0,87%. The risk-free rate and equity risk premium are obtained from Damodaran's country default spreads and risk premiums. By taking into account these three components, the cost of equity is 12,95%.

After computing both the cost of debt after tax and the cost of equity, the next step is identifying the weight of debt and the weight of equity, which can be obtained through the book value for each respective capital. Both the book value was directly taken from PT. Refractorindo Graha Dinamika's financial statement. The result of the WACC calculation is 10,98% as presented in the following table:

Table 1. Weighted Average Cost of Capital

Components	Values
Book Value of Equity	21.282
Book Value of Debt	12.032
Total Value of Capital	33.133
Weight of Equity	63,88%
Weight of Debt	36,12%
Cost of Equity	12,95%
Cost of Debt After Tax	7,49%
Weighted Average Cost of Capital	10,98%

Capital Budgeting Analysis

Before evaluating the financial feasibility, it is important to note that the plan to launch a new product is incremental in nature. Therefore, the cash flow for the new product must be constructed first. The relevant aspects of cash flow would be sales, cost of goods sold (COGS), and operating expenses. The COGS would be the purchase of raw materials and import costs, while the operating expenses are transportation, consumables, marketing costs, ground rent, maintenance, and utilities. Sales of the new product serve as the cash inflow, while the COGS and operating expenses as the cash outflow. The following table is the result of incorporating all the numbers to construct the cash flow projection for five years:

Table 2. Cash Flow Projection Results

Year	2025	2026	2027	2028	2029
Cash inflows	2.590.000.000	2.715.052.650	2.836.005.294	2.951.756.707	3.061.210.756
- Cash outflows	1.986.968.445	2.082.904.997	2.175.696.150	2.264.497.079	2.348.466.863

Volume 7 Nomor 3 (2025) 1233 – 1244 P-ISSN 2656-2871 E-ISSN 2656-4351
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Net cash flows	Rp603.031.555	Rp632.147.653	Rp660.309.144	Rp687.259.628	Rp712.743.893

Besides determining the WACC and cash flow projection, there is one specific element that is heavily tied to the capital budgeting analysis, which is called fixed capital investment. This is because capital budgeting is all about evaluating whether the proposed investment will be worth more than it costs (Ross et al., 2016). In this study, the company will have to purchase new machines to manufacture the new product. The details for the value of investments are in the following table:

Table 3. Fixed Capital Investments and Depreciation

Components	Values
Purchase of new assets	525.000.000
Installation services	240.000.000
Total fixed investments	Rp765.000.000
Salvage value (10%)	Rp76.500.000
Depreciation expense	Rp137.000.000

After determining all the necessary measurements, the final step is to evaluate the financial feasibility of the new product using the capital budgeting analysis. The metrics are Net Present Value (NPV), Profitability Index (PI), Payback Period (PP), Discounted Payback Period (DPP), and Internal Rate of Return (IRR). In regards to this, the following is the result of the capital budgeting analysis:

Table 4. Summary of Capital Budgeting Results

Metrics	Values
Net Present Value (NPV)	Rp1.277.239.117
Profitability Index (PI)	2,67
Payback Period (PP)	1,58 years
Discounted Payback Period (DPP)	1,63 years
Internal Rate of Return (IRR)	63,28%

Net Present Value (NPV)

The Net Present Value of Rp 1.277.239.117 is positive; therefore it indicates that it is financially feasible to manufacture the new product. The figure below showcases the cumulative present value of cash flows from the year 2024 to 2029, with the cumulative value at year 5 being the net present value:

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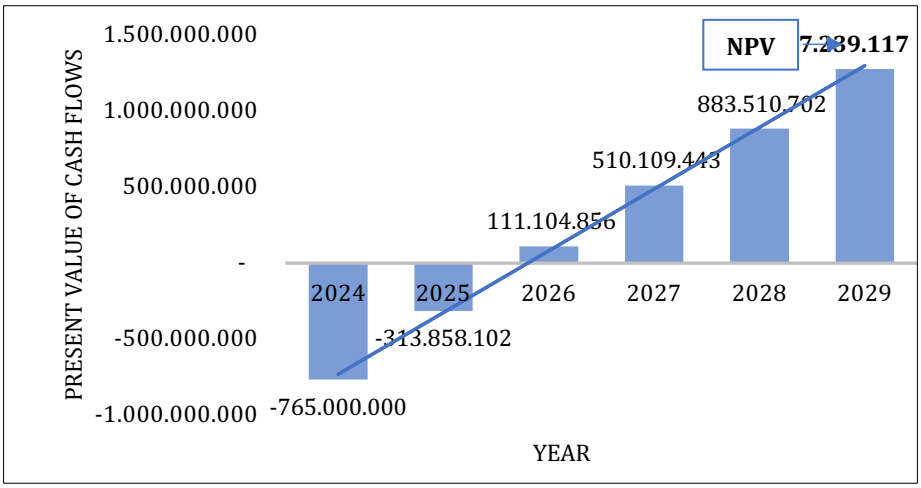
Volume 7 Nomor 3 (2025) 1233 – 1244 P-ISSN 2656-2871 E-ISSN 2656-4351
DOI: 10.47467/alkharaj.v7i3.6313



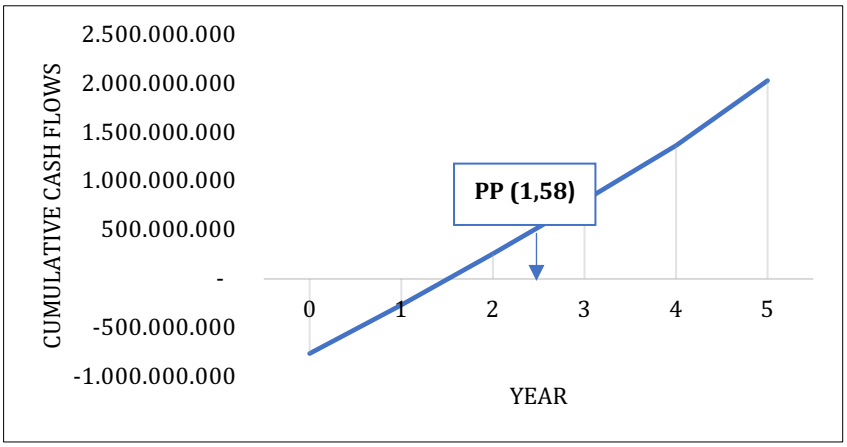
Picture 1. Cumulative PV of Cash Flows (2024 – 2029)

Profitability Index

A Profitability Index greater than 1 indicates that it is financially feasible to manufacture the new product because the Net Present Value is positive. In contrast, a profitability index of less than 1 suggests that it is not financially feasible because the Net Present Value is negative. Based on the result, the Profitability Index is 2.67, indicating that it is financially feasible to invest in new machines to produce plastic refractories.

Payback Period (PP)

PT. Refractorindo Graha Dinamika's management has designated a payback period of less than two years for the plastic refractories, prioritizing the availability of cash to support the sale of other refractory products. The analysis shows that the Payback Period is 1.58 years, which means this result is ideal because the company can recover the initial investments in less than the two years that the company has designated. The visualization of the PP is as follows:



Picture 2. Payback Period

Al-Kharaj: Jurnal Ekonomi, Keuangan & Bisnis Syariah
Volume 7 Nomor 3 (2025) 1233 – 1244 P-ISSN 2656-2871 E-ISSN 2656-4351
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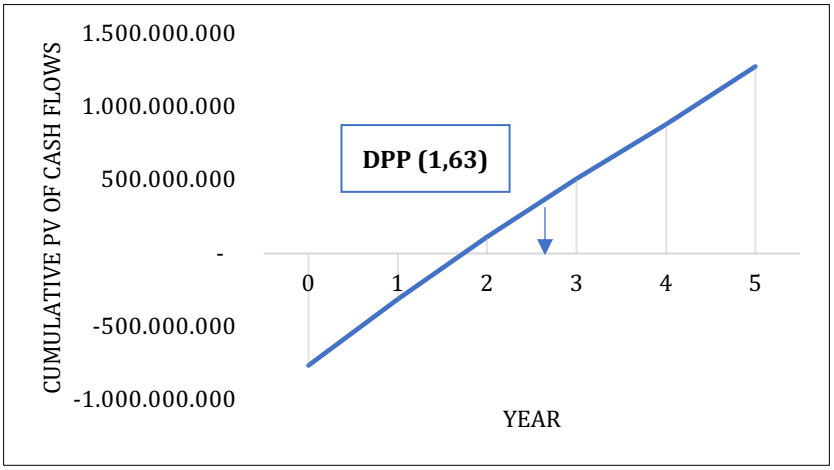
Discounted Payback Period (DPP)

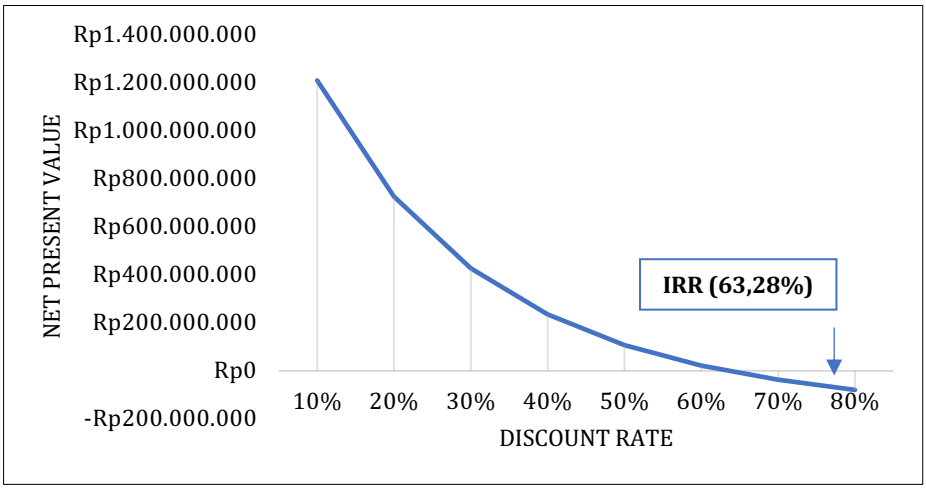
Differing from the Payback Period, the Discounted Payback Period considers the time value of money by discounting future cash flows. In this metric, the discount rate of 10,98% was taken into account to determine the present value of cash flows. The result of a Discounted Payback Period equals 1.63 years, which is also ideal for the company. The visualization of the DPP is as follows:



Picture 3. Discounted Payback Period

Internal Rate of Return (IRR)

To be considered financially feasible, the IRR must be greater than WACC. The capital budgeting analysis resulted in an internal rate of return of 63.28%, which shows a greater percentage compared to the cost of capital of 10,98%, suggesting that the new product is expected to generate a significant return on investment. The following picture showcases the IRR that makes the NPV become zero:



Picture 4. Internal Rate of Return

Al-Kharaj: Jurnal Ekonomi, Keuangan & Bisnis Syariah
Volume 7 Nomor 3 (2025) 1233 – 1244 P-ISSN 2656-2871 E-ISSN 2656-4351
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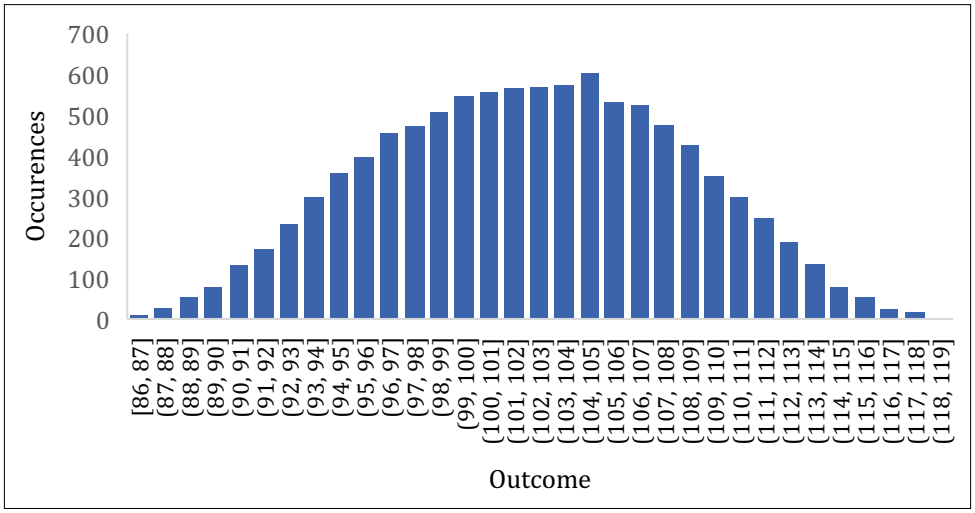
Monte Carlo Simulation

Based on the capital budgeting analysis results, investing in new machines to produce the new product is financially feasible for PT. Refractorindo Graha Dinamika. However, it is important to acknowledge that there are still uncertainties in the results, notably regarding the sales forecast of plastic refractories. As such, the Monte Carlo is used to generate numerous numbers to estimate the probability of different sales volumes. According to the data of sales forecast, the plastic refractory product has an expected sales quantity of 100 tons per year. Aligning it with the capital budgeting results, at minimum the amount of sales volume should be 40 tons with an average selling price of Rp25.000 per kg. The Monte Carlo simulation was run for 10.000 trials with sales volume as the variable.



Picture 5. Sales Volume Simulation with Monte Carlo

The result of the Monte Carlo simulation shows that there is a 100% probability that the sales volume will be greater than 40 tons, which means there is an absolute certainty that selling plastic refractories can generate a positive NPV. Therefore, PT. Refractorindo Graha Dinamika should proceed to invest in new machines to launch the new product on the market.

CONCLUSION AND SUGGESTION

This study aimed to determine the financial feasibility of the launch of the new product at PT. Refractorindo Graha Dinamika by implementing capital budgeting analysis. Based on the results, the Net Present Value (NPV) of Rp 1,277,239,117 indicates that the investment in new machines to produce plastic refractories is expected to yield significant returns over the projected 5-year period. This is supported by a Profitability Index (PI) of 2.67, which exceeds the threshold of 1, confirming that the anticipated cash inflows from selling new products will substantially surpass the initial investment costs. In addition, the analysis suggested that the Payback Period is 1.58 years, which is in alignment with the company's

Volume 7 Nomor 3 (2025) 1233 – 1244 P-ISSN 2656-2871 E-ISSN 2656-4351
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management preference for recovering investments in less than two years. The rapid recovery of capital is beneficial for the cash flow of the company and supports the manufacturing of other refractory products. Aside from that, the discounted payback period of 1.63 years showcases the attractiveness of launching a new product and provides a more conservative estimation of the investment's recovery timeline. The last metric of the analysis, which is the Internal Rate of Return (IRR) of 63.28% was shown to be significantly higher than the Weighted Average Cost of Capital (WACC) of 10.98%. This indicates that the launch of a new product is expected to generate returns that exceed the cost of financing.

Moreover, the result of capital budgeting was examined further through sensitivity analysis, which employed Monte Carlo simulation, resulting in valuable insights regarding the sales volume assumptions. These insights revealed that there is a 100% probability that sales will exceed 40 tons, which represents the minimum threshold for achieving a positive net present value (NPV). This analysis increases the reliability of the sales forecasts and the overall financial projections, thereby enhancing the confidence in the decision to invest in the new machinery to manufacture the plastic refractories. In conclusion, PT. Refractorindo Graha Dinamika should proceed with the investment in new machinery for the production of plastic refractories. By leveraging the insights gained from this study, the company will potentially ensure a successful product launch and sustained growth in the market.

For suggestions, the management of PT. Refractorindo Graha Dinamika needs to conduct a careful implementation of capital budgeting analysis. Following the launch of plastic refractories, the finance department should coordinate with the manufacturing, procurement, and sales marketing departments to regularly update the capital budgeting analysis, ensuring that it reflects the changes in market conditions, raw material prices, and production costs. To improve the accuracy and reliability of capital budgeting analysis, future research with similar objectives should conduct a more detailed market analysis to understand the competitive landscape and consumer preferences for plastic refractories. This could involve gathering data on market trends and customer feedback to refine the sales forecasts. In addition, future research could perform a capital budgeting analysis for a longer period (e.g., 10 years) to assess the projection of long-term financial performance. The analysis may also include the impact of macroeconomic variables such as exchange rates on profitability, particularly due to the procurement of raw materials from international vendors. These suggestions will certainly contribute to the overall growth and sustainability of PT. Refractorindo Graha Dinamika.

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DOI: 10.47467/alkharaj.v7i3.6313

REFERENCES

Allaby, A., & Allaby, M. (1999). *A dictionary of earth sciences*. Oxford University Press.

Andrey Yurkov. (2014). The Properties of Refractory and Heat Insulation Materials. *In Refractories for Aluminium: Electrolysis and the Cast House* (pp. 1–63). Springer Nature. https://doi.org/10.1007/978-3-319-11442-2_1

Baker, H. K., & English, P. (2011). *Capital Budgeting Valuation: Financial Analysis for Today's Investment Projects*. New Jersey: John Wiley & Sons

Berk, J. B., Demarzo, P. M., & Stangeland, D. (2020). *Corporate Finance*. Pearson Canada.

Boslaugh, S. (2007). *Secondary data sources for public health: A practical guide*. New York, NY: Cambridge.

Brealey, R. A., Myers, S. C., & Allen, F. (2020). *Principles of corporate finance* (13th ed.). McGraw-Hill Education.

Clayman, M. R., Fridson, M. S., & Troughton, G. H. (2012). *Corporate Finance Workbook*. John Wiley & Sons.

Damodaran, A. (2015). *Applied corporate finance* (4th ed.). Wiley.

Dannels, S. A. (2018). Research Design. *In The Reviewer's Guide to Quantitative Methods in the Social Sciences* (pp. 402–416). Routledge. https://doi.org/10.4324/9781315755649-30

Fardiansyah, J. (2022). *Feasibility Analysis of New Production Project by Denim Industry: Case Study on Voute Company*. *Master's Final Project*. Institut Teknologi Bandung.

Fauzi, I. A. (2019). *Financial Feasibility Study of Fish Processing Factory of PT. XYZ. Master's Final Project*. Institut Teknologi Bandung.

Gitman, L. J., & Zutter, C. J. (2015). *Principles of Managerial Finance* (14th ed.). Pearson Education Limited.

Horne, J. C., & Jr, J. M. (2008). *Fundamentals of Financial Management*. London: Prentice Hall

Hox, J. J., & Boeije, H. R. (2005). Data Collection, Primary vs. Secondary. *Encyclopedia of Social Measurement*, 1(1), 593–599. https://doi.org/10.1016/B0-12-369398-5/00041-4

Kahfi. (2024, May 3). *Menangkap Cuan Permintaan Pasar Refraktori*. Bisnis Indonesia : Navigasi Informasi Bisnis Terpercaya; bisnisindonesia.id. https://bisnisindonesia.id/article/menangkap-cuan-permintaan-pasar-refraktori

Volume 7 Nomor 3 (2025) 1233 – 1244 P-ISSN 2656-2871 E-ISSN 2656-4351
DOI: 10.47467/alkharaj.v7i3.6313

Kwak, Y. H., & Ingall, L. (2007). Exploring Monte Carlo Simulation Applications for Project Management. *Risk Management*, 44-57

Mordor Intelligence. (2024). Refractories Market Size, Share | 2024 - 2029 | Industry Analysis. https://www.mordorintelligence.com/industry-reports/refractories-market

Nainggolan, B. H. W. (2023). *Capital Budgeting for Investment Decision in Oil and Gas Development of PT. Energy Sumber Perkasa: A Case Study*. *Master's Final Project*. Institut Teknologi Bandung.

O'Driscoll, M. (2018, December 18). *China's refractory mineral supply – a New World: review & outlook*. Industrial Minerals Networking | IMFORMED. https://imformed.com/chinas-refractory-mineral-supply-a-new-world-review-outlook/

Okokpujie, I. P., Essien, V., Ikumapayi, O. M., Nnochiri, E. S., Okokpujie, K., & Akinlabi, E. T. (2022). An Overview of Thermal Insulation Material for Sustainable Engineering Building Application. *International Journal of Design & Nature and Ecodynamics, 17*(6), 831–841. https://doi.org/10.18280/ijdne.170603

Perera, R. (2017). *The PESTLE Analysis*. Nerdynaut.

Porter, M. E. (2008). *The Five Competitive Forces that Shape Strategy*. Harvard Business Review. 86(79-93).

Ross, S. A., Westerfield, R., Jordan, B. D., & Roberts, G. S. (2016). *Fundamentals of Corporate Finance*. Mcgraw-Hill Education.

Samosir, A. (2007). *Analysis of Investment Risk in Additional Production Line at PT. XYZ with Capital Budgeting Method*. *Master's Final Project*. Institut Teknologi Bandung.

Teall, J., & Hasan, I. (2009). *Quantitative Methods for Finance and Investments*. John Wiley & Sons.

Vanderstoep, S. W., & Johnston, D. D. (2008). *Research Methods for Everyday Life: Blending Qualitative and Quantitative Approaches*. John Wiley & Sons.

Vartanian, T. P. (2011). *Secondary data analysis*. New York, NY: Oxford.

Wee, R., & Sulaiman, S. (2024, April 17). *Indonesia's plunging rupiah twists the policy plot*. Reuters. https://www.reuters.com/markets/asia/indonesias-plunging-rupiah-twists-policy-plot-2024-04-17/

Yuvita, A. (2018). *Investment Valuation of Tugboat and Barge Using Capital Budgeting and Freight Rate Sensitivity Analysis*. *Master's Final Project*. Institut Teknologi Bandung.