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JOSERI

Journal of Sustainable Entrepreneur Regional Industry

| ISSN (Online) xxxx - xxxx |



Article

Feasibility Analysis Of Brick Industry Case Study TB. Nusantara Pelalawan Regency, Sorek Satu

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Article Info

Abstrak

Volume 2 Issue 2

Received: 15 Mei 2025

Accepted: 20 Juni 2025

Publish Online: 29 Juli 2025

Online: at

<https://journal.ypmki.com/index.php/joseri>

Keywords:

Financial Feasibility Analysis;

Brick Industry;

Net Present Value;

Return on Investment;

Break Even Point

Industri batu bata memiliki peran penting dalam memenuhi kebutuhan material konstruksi. Studi kelayakan finansial pada industri batu bata TB Nusantara menunjukkan bahwa bisnis ini layak dan menguntungkan. Analisis menggunakan indikator keuangan seperti Net Present Value (NPV) sebesar Rp567.809.116,73 (positif), Internal Rate of Return (IRR) 35,73% yang melebihi tingkat diskonto, dan Payback Period (PP) selama 2,07 tahun, menunjukkan investasi dapat kembali dalam waktu kurang dari dua tahun. Rasio Benefit-Cost (B/C) dan Revenue-Cost (R/C) masing-masing sebesar 1,50, menandakan pendapatan melebihi biaya. Break Even Point (BEP) tercapai pada 795.625 unit dengan harga Rp265 per unit, sementara produksi tahunan mencapai 1.200.000 unit dengan harga jual Rp400 per unit. Return on Investment (ROI) sebesar 50,82% mencerminkan pengembalian modal yang signifikan. Hasil ini menegaskan bahwa TB Nusantara memiliki prospek keuntungan jangka panjang. Untuk memastikan keberlanjutan bisnis, disarankan untuk meningkatkan efisiensi produksi melalui adopsi teknologi modern dan optimalisasi manajemen arus kas.

Abstract

The brick industry plays an important role in meeting the needs of construction materials. The financial feasibility study on the TB Nusantara brick industry shows that the business is feasible and profitable. Analysis using financial indicators such as Net Present Value (NPV) of Rp567,809,116.73 (positive), Internal Rate of Return (IRR) of 35.73% which exceeds the discount rate, and Payback Period (PP) of 2.07 years, showing the investment can be returned in less than two years. The Benefit-Cost (B/C) and Revenue-Cost (R/C) ratios are 1.50 each, indicating that revenues exceed costs. Break Even Point (BEP) was reached at 795,625 units at a price of Rp265 per unit, while annual production reached 1,200,000 units at a selling price of Rp400 per unit. Return on Investment (ROI) of 50.82% reflects a significant return on

capital. These results confirm that TB Nusantara has long-term profit prospects. To ensure business sustainability, it is recommended to improve production efficiency through the adoption of modern technology and optimization of cash flow management.

1. INTRODUCTION

According to Law No. 3/2014 on Industry, industry is defined as all forms of economic activity that process raw materials and/or utilize industrial resources to produce goods that have added value or higher benefits. This definition also includes industrial services that play a role in the processing process. Industry classification in this law is based on various factors, such as business scale, product use, market orientation, technology level, and raw material sources. The purpose of this classification is to facilitate the grouping of various types of industries so that they are easier for the government to regulate, develop, and supervise.

The manufacturing industry is included in the industrial classification number 3, namely based on the production process. This is because the manufacturing industry focuses on processing raw or semi-finished materials into finished products that have added value. The production process in the manufacturing industry involves various stages such as assembly, processing, and processing of raw materials with the help of machines, human power, or a combination of both.

Goods produced by the manufacturing industry are usually finished or semi-finished products that are used by consumers or supplied to other industries as raw materials. Examples of manufactured goods include textile products, food and beverages, motor vehicles, electronics, and building materials such as bricks and tiles. In addition, the manufacturing industry is also categorized as a secondary industry because it processes raw materials into finished or semi-finished goods. The main goal of this industry is to produce products that are ready to be used by consumers or utilized further in other production sectors. As part of the industrial sector, manufacturing plays a key role in supporting economic development and meeting the growing needs of the population. However, to ensure that a manufacturing industry can operate sustainably and contribute positively to the economy, a careful assessment of its viability is required through a feasibility study.

A feasibility study is crucial in determining whether an industrial idea is viable, especially in terms of its financial aspects, which serve as the main benchmark for evaluating the potential success of an industry. Financial feasibility specifically focuses on analyzing whether the industry can generate sufficient income to cover operational costs and provide a reasonable return on investment. Financial feasibility specifically focuses on analyzing whether the industry can generate sufficient income to cover operational costs and provide a reasonable return on investment. This includes a thorough assessment of start-up and operational costs, projected revenues, profit margins, and cash flow over time. Through this analysis, industry owners can make informed decisions by understanding risks and opportunities in a more concrete manner. It also helps identify the break-even point, payback period, and long-term profitability—factors that are essential for effective strategic planning and sound investment decisions. This becomes even more critical for micro, small, and medium enterprises (MSMEs), which often operate with limited capital and need to carefully weigh every financial step. By understanding the financial feasibility, industrial players can determine whether to proceed, adjust, or even halt a business plan, thereby reducing risk while maximizing growth opportunities.

The importance of conducting such feasibility studies is even more apparent in countries with high industrial potential like Indonesia. As one of the fastest-growing industrialized nations, Indonesia has a diverse economic structure that spans agriculture, manufacturing, and the service sector. One of the main driving forces behind this industrial growth is its large population, which continues to rise significantly each year. Ranked fourth in the world in terms of population size, Indonesia presents both immense opportunities and complex challenges for industrial development. The increasing demand for housing, infrastructure, and consumer goods drives the need for expanded and efficient manufacturing industries, making feasibility analysis an essential step in ensuring that such industries can meet market demands while maintaining financial sustainability and contributing meaningfully to national economic growth.

If observed closely, this population growth is not only seen nationally, but also in various regions, including Pelalawan Regency, Riau Province. The regency, which is located in the central part of Riau Province, is also experiencing a rapid increase in population. This growth is driven by various factors, including infrastructure development and an increase in industrial investment that continues to increase in the region. Population growth in Pelalawan Regency is not just a statistical figure, but also reflects increased economic activity, urbanization, and advanced development. With growing infrastructure and increased economic activity, Pelalawan Regency is one example of how population dynamics can drive more progressive regional development.

This increase not only has an impact on demographic aspects, such as the increasing number of new households and families, but also has an impact on various other basic needs of society, such as clothing, food, and shelter. Each new household needs a safe and comfortable place to live as a foundation for building a stable life. This need is not only related to the physical aspect, but also the importance of having a private space to grow, access to facilities, and security to live everyday life. Along with population growth, not only the number of residents increases, but also the community's expectations for a better quality of life, including the need for livable housing. This increasing need is one of the important indicators that reflects the surge in market demand in Indonesia, especially in the housing sector (Hadi, 2021). In recent years, this sector has experienced significant growth, not only in terms of physical development, but also demand for various housing-related products, such as building materials, furniture, and supporting infrastructure services. This surge in demand reflects the dynamics of changes in society that are increasingly aware of the importance of housing as one of the main factors in a prosperous and quality life. Therefore, the demand for home ownership has increased significantly. The impact of this household growth is clearly visible in the increase in demand for housing.

Housing, as one of the basic human needs, has a very important role in daily life. A decent place to live is the foundation for the creation of welfare, social stability, and a better quality of life. Therefore, the government has a great responsibility to ensure that every individual, without exception, has fair access to adequate housing. This access is not only related to the physical building, but also to the culture and social values inherent in the community. The government must be able to guarantee that every citizen, regardless of their economic and social background, has the opportunity to have home ownership (Wahyuni, 2022)

Conversely, more urban households live in rented or rent-free housing. The development of settlements, both urban and rural, aims not only to provide shelter but also to create livable, safe, and sustainable environments that support long-term social, economic, and environmental well-being. In response to this need, the Indonesian government has taken strategic action through initiatives such as the "Nawacita" program, which includes the One Million Houses program to accelerate access to decent housing for the population. The settlement development efforts include the development of basic infrastructure and facilities in urban areas, the provision of affordable settlements, especially for low-income people, land management, urban economic development, and the formation of social and cultural life in urban areas (Santoso, 2017). With the increase in population, more and more people need a place to live, which means the demand for housing and all its supporters, such as building materials and furniture, is also increasing. This provides a great opportunity for businesses engaged in the housing sector to take advantage of the growing market potential

One industry that currently has a great opportunity to grow is the brick manufacturing industry. People's needs for housing and various types of buildings create significant opportunities for this sector. The brick manufacturing industry not only focuses on production to meet the needs of house construction, but also has an important role in the construction projects of offices, schools, and other buildings. Bricks, as one of the main building materials, are always needed as long as construction activities continue.

Bricks, as one of the most fundamental building materials, play an important role in various types of construction. This product is widely used to build walls, foundations, and other building structures due to its reliable strength and ability to withstand loads. Bricks themselves are available in various types, such as red bricks, lightweight bricks (hebel), and concrete bricks, each of which has its own characteristics and advantages. For example, red bricks are known for their sturdiness, while lightweight bricks are in demand for their lighter weight and faster installation. The selection of brick types is generally tailored to the construction needs as well as the project budget. With high demand, the quality and availability of bricks is something that must be considered by building material providers to maintain customer confidence and ensure the smooth running of construction projects.

The brick industry primarily targets individuals building homes, as well as property businesses and contractors involved in construction projects. With increasing demand driven by population growth and infrastructure development, the industry holds strong potential to support the property sector. However, many red bricks currently on the market suffer from quality issues, such as cracking and crumbling, due to suboptimal production processes. To address this, improvements in both the quantity and quality of production are essential. High-quality bricks should have uniform color, solid structure, durability, low water absorption, and consistent dimensions. In response, innovations have emerged such as the use of better raw materials, optimized firing techniques, and modern manufacturing technologies to enhance brick quality, ensure greater durability, and improve construction efficiency. One of the most effective measures in encouraging people's economic empowerment in Pelalawan Regency is to develop economic activities that become the main foundation of local people's lives. This step must also be able to utilize and accommodate the potential human resources available in the region. The development of small businesses, including small and household industries, is a relevant strategic choice to empower the people of Pelalawan Regency while supporting regional

economic growth.

Overall, although the number of workers fluctuates, the increase in the number of small brick industries shows that the industry continues to grow and become a sustainable source of livelihood for the people of Pelalawan Regency. This confirms that this sector has good economic potential and can contribute to improving the welfare of local communities.

The development of the brick business in Pelalawan Regency has changed the living conditions of the local community. The changes are characterized by an increase in income and the ability of the community to improve their standard of living in the community, including in terms of education. The development of the brick business has also made a positive contribution to Pelalawan Regency, especially in the development of facilities and infrastructure that can support community life towards a better direction. For example, the repair of paved roads with holes facilitates transportation for the transportation of brick products owned by the community in Pelalawan Regency. This can indirectly support the smooth running of the business of the local community.

To maintain the continuity of the brick business, expanding the network of cooperation with various parties that can support the sale of building materials is a very important strategy. An extensive network will increase marketing reach and expand the consumer base. In addition, business actors also need to keep abreast of market trends and provide the most popular brick products at the moment. This way, customers will remain loyal and not switch to competitors. Maintaining the quality of brick products is also a crucial element in the feasibility analysis of this industry, as consumers usually look for high-quality products that guarantee the durability and strength of their building construction. This quality factor can strengthen the position in a competitive market.

The rise in the construction of houses, housing, business premises, infrastructure, and the need for building materials makes the brick business a promising business opportunity. The need for houses continues to increase along with the increasing population in Indonesia, including in Pelalawan Regency.

The TB Nusantara brick industry was chosen as the object of research because it is one of the largest and oldest brick producers in the area, with business experience since 2014 and a production capacity of 50,000-100,000 bricks per month. In addition, TB Nusantara has a well-structured production system, involving skilled labor at every stage of production, from *ngulet*, molding, *ngeleng*, to *ngunjat*. TB Nusantara has also built a strong reputation as a provider of quality bricks at competitive prices, so it has a sizable market share in the surrounding area.

In addition, the selection of TB Nusantara as the object of research is also based on its contribution in providing employment for the surrounding community, thus indirectly improving the economy of the local community. With its long experience, well-organized production structure, and tangible social and economic contributions, TB Nusantara deserves to be used as a case study in this research. The feasibility analysis of TB Nusantara is expected to provide a comprehensive picture of the potential of the brick business in Riau Province and can serve as a reference for other business actors in developing similar industries.

In running an industry, knowing financial feasibility is very important. Through a business feasibility analysis, the owner can assess whether the industry is feasible to run or not. To assess the feasibility of a brick business, an approach is needed that includes analysis of revenue costs, investment costs, and profits, as well as financial feasibility analysis using several methods such as Return on Investment (ROI), Revenue Cost (RC), Internal Rate of Return (IRR), Break Even Point (BEP), and Payback Period (PP).

These methods are used to think about the financial aspects of the business and calculate the potential profits that can be obtained within a certain period of time. This study focuses on the financial aspect because in the business world, the financial aspect is the main indicator in assessing the feasibility and desirability of a business. Investment and business development decisions are highly dependent on the results of financial analysis, especially in the context of micro, small, and medium enterprises (MSMEs) such as the brick industry. By knowing the financial feasibility, the owner can understand the risks and opportunities more concretely and make the right decisions in managing capital and resources.

In addition, the focus on the financial aspect is also based on the importance of profitability and cost efficiency in maintaining business competitiveness. Without a solid financial analysis foundation, an industry is at risk of experiencing losses and difficulties in stopping the business. Therefore, this study does not cover other aspects such as technical, market, or social because the financial aspect is considered the most crucial element in determining the overall feasibility of the business.

2. METHODS

This research was conducted in Sorek Satu, Pelalawan Regency, Riau Province, to assess the financial feasibility of the TB Nusantara brick industry. The study utilized both primary data—collected through

interviews and observations—and secondary data. The financial analysis employed several key indicators: Net Present Value (NPV), Internal Rate of Return (IRR), Payback Period (PP), Benefit-Cost Ratio (B/C Ratio), Revenue-Cost Ratio (R/C Ratio), Break-Even Point (BEP), and Return on Investment (ROI). The results indicated a positive NPV of Rp. 567,809,116.73, an IRR of 35.73% exceeding the applied discount rate, and a PP of 2.07 years, suggesting a swift recovery of investment. Both B/C and R/C Ratios were 1.50, confirming that revenues surpass costs. The BEP analysis showed a production breakeven point at 795,625 pieces, with a BEP price of Rp. 265 per piece, while the annual production reached 1,200,000 pieces sold at Rp. 400 each. The ROI stood at 50.82%, indicating a significant return on invested capital. These findings affirm the financial viability and profitability of the TB Nusantara brick industry. To ensure long-term sustainability, it is recommended to enhance production efficiency through the adoption of modern technology and optimize cash flow management.

3. RESULT AND DISCUSSION

Investment is the expenditure of capital in an activity that has a relatively long period of time in various business sectors. Investments are made in various forms and are used to acquire assets needed by the business, from establishment to operations. The following is an explanation of investment in the TB Nusantara brick business.

According to research published in the journal “Feasibility Analysis of Brick Business (Case Study)” by Arasy (2021), investment costs are capital expenditures in an activity that has a relatively long period of time in various business fields. Investments are made in various forms and are used to purchase the assets needed by the business from the establishment to the operation of the business.

Table 1. Investment Needs of Brick Industry TB. Nusantara 2024

No	Item Name	Unit of Measure	Total	Total per Unit	Total Price
1	Asset Cost				
	Brick Press Machine	Unit	1	IDR 20.000.000,00	IDR 20.000.000,00
	Land	M ²	3500	IDR 85.714.285,00	IDR 300.000.000,00
	Building	Unit	2	IDR 2.500.000,00	IDR 5.000.000,00
	Hoe	Pcs	6	IDR 75.000,00	IDR 450.000,00
	Bucket	Pcs	5	IDR 25.000,00	IDR 125.000,00
	Wheelbarrow	Pcs	4	IDR 650.000,00	IDR 2.600.000,00
	Total				IDR 328.175.000,00
2	Fixed Cost in 1 Year				
	Hoe	Pcs	6	IDR 75.000,00	IDR 450.000,00
	Bucket	Pcs	5	IDR 25.000,00	IDR 125.000,00
	Wheelbarrow	Pcs	4	IDR 650.000,00	IDR 2.600.000,00
	Total				IDR 3.175.000,00
3	Variable Cost in 1 Year				
	Firewood	Rit	24	IDR 2.000.000,00	IDR 48.000.000,00
	Solar fuel	Liters	1825	IDR 10.000,00	IDR 18.250.000,00
	Shipping Cost	Rit	240	IDR 30,00	IDR 36.000.000,00
	Labor Wages	IDR	18.000.000,00	IDR 30,00	IDR 216.000.000,00
	Total				IDR 318.250.000,00

Return of Invesment (ROI)

$$\begin{aligned}
 \text{ROI} &= \frac{\text{Net Profit}}{\text{Initial Investment}} \\
 &= \frac{161.750.000}{318.250.000} \\
 &= 0,5082 \\
 &= 50,82\%
 \end{aligned}$$

From the ROI calculation above, it can be seen that the ROI value obtained is 50.82%. This percentage shows that the TB. Nusantara brick industry obtained 50.82% profit from the amount of capital issued for 1 year. This figure shows that the TB. Nusantara brick industry received a profit of IDR. 50.82 in every IDR. 100 invested costs.

Break Even Point (BEP)

$$\begin{aligned}
 \text{BEP of Production (Pcs)} &= \frac{\text{Total Cost}}{\text{Production Price}} \\
 &= \frac{318.250.000 \text{ IDR}}{400 \text{ IDR}} \\
 &= 795.625 \text{ Pcs}
 \end{aligned}$$

$$\begin{aligned}
 \text{BEP of Price (IDR)} &= \frac{\text{Total Cost}}{\text{Production Quantity}} \\
 &= \frac{318.250.000 \text{ IDR}}{1.200.000 \text{ Pcs}} \\
 &= 265 \text{ IDR}
 \end{aligned}$$

From the above calculations, it can be seen that product BEP and price BEP are 795,625 pcs and price BEP is IDR. 265. While the value of brick production in the TB. Nusantara industry is 1,200,000 pcs / year with a selling price of IDR. 400 / pcs.

Revenue Cost

$$\begin{aligned}
 \text{Revenue Cost Ratio (R/C)} &= \frac{\text{Total Revenue (TR)}}{\text{Total Cost (TC)}} \\
 &= \frac{480.000.000}{318.250.000} \\
 &= 1,50
 \end{aligned}$$

R / C is the value of the ratio between total income and total costs. The total income received by TB. Nusantara brick industry craftsmen is IDR 480,000,000 and the total costs incurred are IDR 318,250,000.

Benefit Cost Ratio

$$\begin{aligned}
 \text{Benefit Cost Ratio} &= \frac{\text{Funding Income}}{\text{Total Cost}} \\
 &= \frac{480.000.000}{318.250.000} \\
 &= 1,50
 \end{aligned}$$

BCR is used to evaluate whether a project or investment is feasible and profitable. Total benefit received by TB Nusantara brick industry craftsmen is Rp 480,000,000, and the total cost incurred is Rp 318,250,000. This can be seen from the comparison of total revenue with total costs greater than one, which has a number $1.50 > 1$. Based on these calculations, the result is 1.50. Which means that every Rp1 spent by craftsmen will deliver a profit of Rp 1.50. Thus, the TB. Nusantara Brick industry is quite profitable from a financial point of view.

Payback Period (PP)

Timeframe to return the planned investment amount

$$\begin{aligned}
 \text{Investment} &: 328.175.000 \\
 \text{Fixed Cost} &: 3.175.000 \\
 \text{Variable Cost} &: 318.250.000 \\
 \text{Net Cash 1} &: \text{Revenue} - \text{Cost} \\
 &= 480.000.000 - (3.175.000 + 318.250.000) \\
 &= 158.575.000
 \end{aligned}$$

$$\begin{aligned}
 \text{PP} &= \frac{\text{Initial investment}}{\text{Net cash flow}} \times 1 \text{ year} \\
 &= \frac{328.175.000}{158.575.000} \\
 &= 2,07 \text{ years}
 \end{aligned}$$

The Payback Period (PP) calculation shows that the time required to recover the initial investment is 2.07 years. This means that the capital invested in this business can be fully recovered in just over two years, which is still considered relatively fast for a manufacturing industry like brick production. A relatively short PP indicates that the business has a healthy cash flow and a good return on investment, making it attractive for investors and entrepreneurs looking to venture into a similar industry.

Net Present Value (NPV)

Table 2. Net Present Value (NPV)

Year	Investment	Revenue	Cost	Net	DF (12%)	PV
0	328.175.000	0	328.175.000	328.175.000	1	-328.175.000
1	0	480.000.000	321.425.000	158.575.000	0,8928571	141.584.821
2	0	520.000.000	321.425.000	198.575.000	0,7971939	158.302.774
3	0	500.000.000	321.425.000	178.575.000	0,7117802	127.106.158
4	0	484.000.000	321.425.000	162.575.000	0,6355181	103.319.352
5	0	496.000.000	321.425.000	174.575.000	0,5674269	99.058.543
6	0	482.000.000	321.425.000	160.575.000	0,5066311	81.352.292
7	0	324.000.000	321.425.000	2.575.000	0,4523492	1.164.799
8	0	364.000.000	321.425.000	42.575.000	0,4038832	17.195.328
9	0	492.000.000	321.425.000	170.575.000	0,36061	61.511.055
10	0	508.000.000	321.425.000	186.575.000	0,3219732	60.072.157
NPV						Rp522.492.279,92
						522.492.280

TB Nusantara brick industry has demonstrated a positive result with a Net Present Value (NPV) greater than zero, averaging Rp. 522,492,279.92. This positive NPV indicates that the business is capable of generating net income after accounting for all investment and operational costs. As a result, the TB Nusantara brick industry is not only able to recover its initial capital but also has the potential to generate sustainable profits, reinforcing its financial feasibility in the long run.

Internal Raten of Return (IRR)

$$\begin{aligned}
 IRR &= \frac{NPV1}{NPV1 - NPV2} \times 0,50 - 0,2 \\
 &= \frac{Rp522.492.279,92}{Rp522.492.279,92 - Rp2.607.204,61} \times 0.30 \\
 &= Rp 0,3781 \\
 &= 37,81\%
 \end{aligned}$$

The IRR of 37.81% significantly exceeds the standard required return on investment, confirming that the TB Nusantara Brick Industry is financially feasible.

4. CONCLUSION

TB. Nusantara brick industry is highly profitable and financially viable, with a 50.82% ROI, 37.81% IRR, and a positive NPV of IDR 522 million. Producing 1.2 million units annually and surpassing its BEP of 795,625 units, it ensures strong profit margins. With R/C and B/C Ratios of 1.50 and a short 2.07-year payback period, it demonstrates optimal cost efficiency. Compared to 15 competitors in Pelalawan, TB. Nusantara leads in production capacity (50,000–100,000 units/month), workforce size, and comprehensive investment evaluation. Established in 2014, its long-standing presence reflects stability, maturity, and a competitive advantage in the regional brick industry.

5. ACKNOWLEDGMENTS

Dalam penelitian ini, penulis telah dibantu oleh beberapa pihak yang terlibat mengenai hasil analisis penelitian ini. Institusi tempat penulis mengabdikan yaitu Universitas Riau. Melalui lembaga penelitian dan pengabdian perguruan tinggi ini, penulis telah memberikan dukungan positif sehingga penulis dapat terus

berkarya dalam mempelajari ilmu ekonomi sesuai bidang keahlian penelitian.

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