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# THE INFLUENCE OF PRODUCTION AND OPERATING COSTS ON NET PROFIT WITH SALES VOLUME AS AN INTERVENING VARIABLE "A CASE STUDY AT THE TIMOR BLOCK BUILDING INDUSTRY"

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## ABSTRACT

This study examines the influence of production and operating costs on the company's net profit, with sales volume serving as an intervening variable. The case study focuses on the Timor Block Building Industry for the period 2014-2023. Using a quantitative approach, secondary data were collected through saturated sampling. Multiple linear regression and Sobel tests were employed to evaluate both direct and indirect relationships among the variables. The findings indicate that production costs have a positive and significant effect on both net profit and sales volume. Operating costs positively and significantly affect net profit, but negatively influence sales volume. Additionally, sales volume exhibits a significant negative effect on net profit and significantly mediates the relationships between production and operating costs and net profit. These results highlight the importance of efficiently managing both production and operational costs to enhance financial performance, with direct effects being more dominant than indirect effects through sales volume.

**KEYWORDS:** Production Costs, Operating Costs, Sales Volume, Net Profit.

## I. INTRODUCTION

In the modern economic system, profit serves as a key indicator of business success because it reflects managerial efficiency in generating revenue within a given period. To achieve optimal revenue, companies must cover their operational expenses, while net profit demonstrates the efficiency of asset utilization and the level of return on investment. Therefore, effective cost management becomes a crucial factor in ensuring operational continuity, financial stability, and overall firm value (Fathony & Wulandari, 2020).

Previous studies have examined the relationships between production costs, operating costs, and net profit in other countries with different economic conditions. However, in Timor-Leste, particularly in the construction material manufacturing sector, empirical evidence remains limited, especially given the relatively small contribution of this sector to the national economy. This literature gap underlies the focus of the present study, which aims to analyze the influence of production and operating costs

on net profit, both directly and indirectly through sales volume as an intervening variable, in order to support managerial decision making in local companies such as the Timor Block Building Industry.

**Table 1. Production Costs, Operating Costs, Sales Volume, and Net Profit at Timor Block Building Industry, 2014-2023**

| Year | Production Costs (Quarterly Average) $ | Operating Costs (Quarterly Average) $ | Sales Volume (Quarterly Average) Units | Net Profit (Quarterly Average) $ |
|---|---|---|---|---|
| 2014 | $ 5,919 | $ 3,118 | 603,141 | $ 318,622 |
| 2015 | $ 5,901 | $ 3,919 | 586,387 | $ 297,930 |
| 2016 | $ 5,950 | $ 3,825 | 573,889 | $ 304,405 |
| 2017 | $ 4,863 | $ 2,312 | 517,817 | $ 367,098 |
| 2018 | $ 5,392 | $ 3,531 | 587,593 | $ 310,269 |
| 2019 | $ 5,433 | $ 3,693 | 475,508 | $ 239,272 |
| 2020 | $ 5,175 | $3,603 | 433,778 | $ 289,594 |
| 2021 | $ 4,993 | $ 3,179 | 545,857 | $ 286,893 |
| 2022 | $ 5,385 | $ 3,500 | 567,406 | $ 279,126 |
| 2023 | $ 6,127 | $ 4,235 | 602,459 | $ 398,830 |

a. As can be seen from, Table 1. financial dynamics of the Timor Block Building Industry during the period 2014-2023 illustrates some from of instability,particulary during the period which were affected by the COVID-19 pandemic. (For example, there was a decrease in sales volume in 2020), which also impacted negatively on net profit of company. Another external factor was the general rise of prices of raw material while les to an increase in production costs in 2023. Finally, there has a rise in market competition as many more industries are prdoducing similar cosntruction materials.

b. The average sales volume moderates the relationship between production and operating costs (independent variables) and net profit (dependent variable), while also taking into account the external factors thar are beyond the company's control. This trend highlights the need for rapid and strategic adaptation in the Timor Block Building Industry to support effective financial planning and management.

c.

Based on the background and observed data trends, the research problems of this study can be formulated as follows: 1. How do production and operating costs influence net profit? 2.What is the relationship between production and operating costs and sales volume? 3. How does sales volume influence net profit? 4. Does sales volume mediate the relationship between production costs and net profit? 5. Does sales volume mediate the relationship between operating costs and net profit?

To address the set of question, the objectives of this study are as follows: 1.To determine the effect of production costs on net profit.2.To examine the effect of operating costs on net profit. 3. To analyze the effect of production costs on sales volume. 4. To analyze the effect of operating costs on sales volume. 5. To examine the effect of sales volume on net profit. 6. To evaluate sales volume as a mediating variable between production costs and net profit. 7. To evaluate sales volume as a mediating variable between operating costs and net profit.

## II. LITERATURE REVIEW

### A. Production Cost

Production costs are defined as the total financial resources expended by a company to transform raw materials into final products, representing economic sacrifices quantified in monetary terms to achieve production objectives (Mulyadi, (2015), as cited in Tiow *et al*., (2023). According to Argilés and Slof (2003), as cited in Vanparys (2018), manufacturing production costs encompass all expenditures on goods and services utilized in the production process, including raw materials, labor, and other relevant expenses, with a classification into direct costs (*e.g*., direct labor) and indirect costs. Furthermore, Nafarin (2009), as cited in Pratiwi (2020), emphasizes that production costs constitute a fundamental element in managerial accounting, serving as a basis for planning, operational control, and the assessment of efficiency.

In light of the definitions, production costs can be understood as an integral strategic tool for determining product selling prices and profit margins, where the total costs are divided by the production volume to calculate the cost per unit (Sinurat *et al*., 2021). Production Overhead Costs: Indirect costs such as auxiliary materials, asset depreciation, rent, electricity, machine maintenance, and internal factory expenses (Ramadhan *et al*., 2022).

### B. Operational Costs

Operational costs are defined as the economic sacrifices directly related Classification of Production Costs : Production costs can be classified as semi variable (mixed) costs, which combine fixed and variable elements. The total cost changes with activity volume but not proportionally (Mulyadi, 2015). Examples include electricity, repair, or maintenance costs, which contain a fixed component (such as a base cost) and a variable component (depending on usage). The main characteristic is the non-proportional change in total cost, with cost per unit decreasing as production volume increases. In

budgeting analysis, semi variable costs need to be separated into fixed and variable components to ensure accuracy across different capacity levels.

Elements of Production Costs : According to Mulyadi (2015), Riwayadi (2014), and Salman (2013) the main elements of production cost include:

1. Raw Material Costs: Costs for materials used in the final product, classified into direct (easily identifiable per unit) and indirect (required for the production process but not specific to each unit).
2. Labor Costs: Compensation costs for the physical or mental efforts of employees, including wages (hourly-based) and salaries (monthly-based).

to a company's normal operations, including general, selling, and administrative expenses, aimed at maintaining daily activities and generating revenue (Rusdiana, 2021), explain that operational costs are expenses arising from the activities of selling products and providing services, contributing to the development and success of the company. These costs encompass all commercial expenses except interest and income taxes. From these definitions, operational costs can be concluded as expenditures that support revenue efficiency and business continuity, with the main types being: fixed costs (unchanging despite fluctuations in activity volume, such as employee salaries or building rent) and variable costs (changing in line with sales, such as raw material or transportation costs).

Objectives of Operational Costs : The primary objective of operational costs is to manage economic resources to carry out operational activities, maintain revenue, and support the achievement of organizational goals (Brahim, 2021). Operational costs help companies allocate funds efficiently, minimize unnecessary expenditures, and ensure operational continuity in a competitive environment.

Components of operational costs : operational costs consist of the following main components (Ramadhan *et al*., 2022).

1. Acquisition or Procurement Costs: Expenses related to production and sales, including raw materials, direct labor, factory overhead, purchases, transportation, and costs associated with the sales process.
2. Selling and Marketing Costs: Costs supporting internal and external activities, such as employee wages, electricity, water, internet, transportation, consumables, shipping, marketing, rent, legal fees, depreciation, and taxes.

Classification of Operational Costs : The classification of operational costs is based on function and object to facilitate analysis and decision making (Supriyono, 2001):

- Based on Function: Production costs (materials, direct labor, overhead), general administrative costs (all administrative expenses).

- Based on Object or Cost Center: Direct costs (identifiable to specific objects) and indirect costs (allocated across multiple purposes).

This classification is relevant to this study as it helps differentiate operational costs that affect net profit in the building materials industry, such as administrative costs that may not be directly related to production.

Role and Control of Operational Costs : The control of operational costs plays a key role in achieving financial performance through planning, monitoring, and evaluation (Ashfahany, 2024). As a planning tool, operational costs are used to prepare realistic budgets based on past performance. As a service guideline, control focuses activities on efficiency. As a coordinator, control eliminates hierarchical barriers and ensures divisional accountability, using comparative analysis to identify deviations through benchmark standards (Ashfahany, 2024).

### C. Sales Volume

Sales volume is defined as a quantitative measure that reflects the total amount of products or services sold within a specific period, expressed in units such as pieces, kilograms, or liters (Rangkuti, 2009; Kotler, 2006). Zulkarnain (2012) explains that sales volume is the result of effective marketing activities, in which the sales force strives to distribute products, although an increase in sales volume does not always correspond proportionally with profit growth. Based on these definitions, sales volume can be concluded as an important indicator for monitoring the achievement of sales targets and the contribution to a company's operational performance.

Factors Influencing Sales Volume : The factors influencing sales volume are classified into internal and external aspects, which are essential for designing effective marketing strategies (Swastha, 2005 and Pakpahan, 2009).

1. Seller's Condition and Capacity: The competence of the sales force in understanding products, prices, transaction terms, and information quality, which helps build consumer trust.
2. Market Conditions: Market type (monopoly or competition), consumer groups, purchasing power, buying frequency, and preferences, all of which influence sales dynamics.
3. Capital: Financial resources used to support inventory, transportation, sales space, and promotional activities, determining operational efficiency.
4. Company Organizational Structure: Internal structures such as a professional sales department, which enhance adaptability to market changes.
5. Other Factors: Advertising, demonstrations, promotional campaigns, incentives, and distribution channels that drive customer loyalty and purchase frequency. Wider distribution channels may increase product recognition but also raise operational costs.

Indicators of Sales Volume: The main indicators of sales volume include price, promotion, product quality, and distribution channels, which collectively form the marketing mix (Oktavia, 2024).

1. Price: The amount paid by consumers, covering list price, discounts, promotions, and credit terms, which may stimulate or discourage purchasing behavior.
2. Promotion or Marketing: Activities that communicate product value through messages (clear and appealing), media (television, social media, brochures), and timing (strategic for campaign periods), increasing awareness and product attractiveness.
3. Product Quality: Aspects such as performance (effectiveness, speed), additional features, reliability (free from defects), and compliance with standards, all of which influence customer satisfaction and loyalty.
4. Distribution Channels: Distribution mechanisms such as agents, distributors, or digital platforms that facilitate product accessibility and directly affect sales volume and revenue.

**D. Net Profit**

Net profit is defined as the final result of a company's activities after deducting operational costs, total expenses, taxes, and other relevant costs, reflecting an increase in the owner's equity. Ismaya (2010), as cited in Pratiwi *et al*., (2023), net profit represents the financial outcome of business operations. Keiso *et al*. (2009), as cited in Simorangkir, (2021) also state that net profit is the return a company earns from its operational activities within a specific accounting period, after deducting related expenses. Furthermore, Soemarso (2004), as cited in Fernando, (2022) emphasizes that net profit is the result of revenues after subtracting operational costs and income taxes, which serves as a basis for dividend distribution to shareholders.

Types of Profit in Accounting: Accounting profit, which is measured based on the accrual basis, includes various types that differ in the extent to which costs are deducted. Among these types, net profit is the most relevant for this study because it serves as the final indicator of profit after all deductions. Unlike gross profit (which is the difference between revenue and expenses before tax), operating profit (after production costs), or profit before tax, net profit reflects the overall impact of operational costs and taxes on a company's performance. (Ahmad *et al*., 2022).

An income statements, which includes net income a usefull financial report that show a company's revenues and expenses over a specific period to determine its net income or loss. It is a key financial document that ssupport managerial decision making and empirical analysis. It is a usefull tool that:

1. Measures the efficiency of fund utilization, as reflected in the rate of return on investment (ROI).
2. Assesses the company's performance or achievements.
3. Predicst the company's future direction or the distribution of dividends in the future.

4. Provides guidance for strategic actions, based on past performance.
5. Determines the taxes that need to be paid.
6. Serves as a control instrument for the allocation of economic resources within the organization.
7. Acts as a motivation and control mechanism for managers in directing the company.
8. Provides a basis for the distribution of bonuses and compensation to employees.
9. Serves as a foundation to determine fiscal eligibility or obligations related to taxes associated with employment aspects.

## III. METHODOLOGY

As referred to earlier, companies must ensure business continuity, enhance firm value, and implement appropriate strategies in order to remain competitive in the market. To that ane, effective strategies can contribute to strong managerial performance, as the public generally assesses a company's success based on management's skills in demonstrating efficiency and its ability to generate future profits.

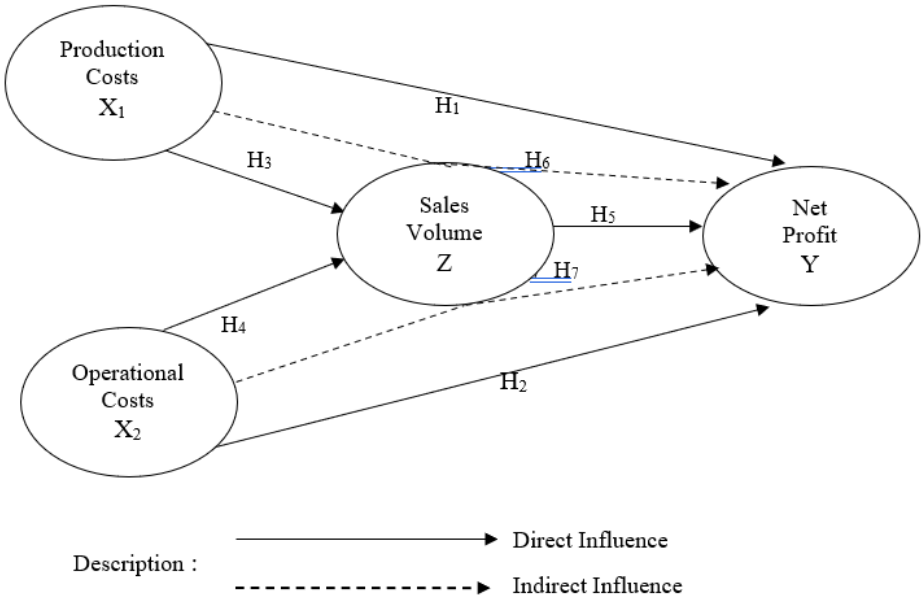


Figure 1. Conceptual Framework

### E. Type and Research Design

This study employs a quantitative approach based on positivist philosophy, which enables the analysis of relationships among variables through numerical data to objectively test hypotheses with reproducible results (Sugiyono, 2013). An explanatory design is applied to examine the influence of

production and operational costs on net profit, with sales volume as a mediating variable, in the Timor Block Building Industry.

### F. Research Location and Period

The research was conducted at TBBI, Timor-Leste, using secondary data derived from audite quarterly financial reports for the period 2014-2023. Data collection and analysis were performed in 2025 over a one month period to ensure accuracy and completeness.

### G. Sampling Technique

The dataset consists of TBBI's quarterly financial statements, comprising a total of 40 reports. Since complete data were available, the entire dataset was analyzed. This approach minimizes potential bias and allows for a comprehensive examination of cost fluctuations influenced by the pandemic and inflation.

### H. Types and Sources of Data

Type of Data: Secondary quantitative data, including production costs, operational costs, sales volume, and net profit.

Sources of Data: Internal documents of TBBI (audited quarterly and annual financial reports), supporting historical analysis without the need for primary data.

### I. Research Variables

The research variables consist of the following (Sugiyono, 2013):

Independent Variables (X): Production costs (X=) and operational costs (X2).

Dependent Variable (Y): Net profit.

Intervening Variable (Z): Sales volume.

### J. Data Analysis Techniques

The data grahered were then analyzed using IBM SPSS 21.0 with path analysis to examine direct and indirect causal relationships (Ghozali, 2016), (Prasetya 2016).

1. Descriptive Analysis: Describing the distribution of data (frequency,mean, and standard deviation).
2. Classical Assumption Tests:

- Normality test (Kolmogorov–Smirnov)
- Multicollinearity test (VIF < 10, CI < 30)
- Autocorrelation test (Durbin–Watson)
- Heteroscedasticity test (scatterplot)
- Coefficient of determination (adjusted $R^2$).

3. Hypothesis Testing:
   - Multiple regression for the models:
   - $Z = \alpha_1 + b_1X_1 + b_2X_2 + \varepsilon_1$
   - $Y = \alpha_2 + b_3X_1 + b_4X_2 + b_5Z + \varepsilon_2$
   - Path analysis to assess direct and indirect effects
   - Sobel test (statistic $\geqslant 1.96$) to determine mediation significance.

## IV. RESULTS

### K. Descriptive Statistical Analysis Results

Descriptive statistics, including mean, median, minimum, maximum, and standard deviation, were computed for production costs, operational costs, sales volume, and net profit. The results are summarized in Table 1.

**Table 2. Descriptive Statistical Analysis Results**

| i. | j. **Mean** | k. **Median** | l. **Minimum** | m. **Maximum** | n. **Standard Deviation** |
|---|---|---|---|---|---|
| Production Cost | 5,114 | 5,225 | 3,000 | 7,200 | 0.128 |
| Operating Cost | 3,547 | 3,505 | 2,025 | 5,500 | 0.828 |
| Sales Volume | 314,779 | 290,526 | 158,504 | 616,056 | 0.955 |
| Net Profit | 569,493 | 561,658 | 252,227 | 797,443 | 1.123 |

Production costs exhibit moderate variation (mean = 5,114, SD = 0.128), potentially due to fluctuations in production volume, raw material prices, process efficiency, and cost management policies. Operating costs show similar moderate variability (mean = 3,547, SD = 0.828), reflecting changes in operational scale, administrative efficiency, expenditure control, and resource utilization. Sales volume varies significantly (mean = 314,779, SD = 0.955), influenced by market demand fluctuations,

marketing strategies, production capacity, and local competition. Net profit demonstrates considerable variation (mean = 569,493, SD = 1.123), likely driven by cost fluctuations, sales changes, and external economic conditions affecting annual earnings.

## L. Classical Assumption Tests

The Kolmogorov-Smirnov test assessed normality of residual data, a core regression assumption. Data are normally distributed if Asymp. Sig. (2-tailed) > 0.05; otherwise, normality is unmet. Results are in Table 3

**Table 3. Normality Test**

| | | Production Cost | Operating Cost | Sales Volume | Net Profit |
|---|---|---|---|---|---|
| N | | 40 | 40 | 40 | 40 |
| Normal Parameters[a,b] | Mean | 4538.78 | 3547.03 | 554377.88 | 307278.93 |
| | Std. Deviation | 1383.706 | 828.728 | 116548.843 | 88956.635 |
| Most Extreme Differences | Absolute | .134 | .115 | .109 | .123 |
| | Positive | .134 | .115 | .094 | .123 |
| | Negative | -.105 | -.075 | -.109 | -.100 |
| Kolmogorov-Smirnov Z | | .849 | .727 | .687 | .778 |
| Asymp. Sig. (2-tailed) | | .466 | .666 | .734 | .580 |

Significance values (Asymp. Sig. 2-tailed) for Production Cost (0.466), Operating Cost (0.666), Sales Volume (0.734), and Net Profit (0.580) are all > 0.05, indicating no deviation from normality. Thus, data meet this assumption, supporting subsequent analysis validity.

## M. Multicollinearity Test

Multicollinearity tests were conducted to detect high correlations between independent variables in the regression model, which can affect coefficient estimates. In this study, Tolerance and Variance Inflation Factor (VIF) values were examined, with the criteria being Tolerance > 0.10 and VIF < 10. The results are presented in Table 4.

**Table 4. Multicollinearity Test**

| | Tolerance | VIF |
|---|---|---|
| Production Cost | 0.857 | 1.167 |
| Operating Cost | 0.891 | 1.123 |
| Sales Volume | 0.955 | 1.047 |

Tolerance values exceeded 0.10 and all VIFs were below 10 for Production Cost, Operating Cost, and Sales Volume, indicating no multicollinearity. Thus, the independent variables are free from multicollinearity, ensuring the reliability and stability of the regression model.

### N. Durbin-Watson Autocorrelation Test

Autocorrelation tests were conducted to detect correlation between residuals in period ttt and *t* 1*t*-1*t* 1, which can affect the validity of regression inferences. The Durbin-Watson (DW) test was used, with values ranging from 0 to 4: close to 2 indicates no autocorrelation, below 2 indicates positive autocorrelation, and above 2 indicates negative autocorrelation. The DW test results for this study (*e.g.*, DW = [concrete value]) are presented in Table 5.

**Table 5. Autocorrelation Test Results**

| Model | R | R Square | Durbin-Watson |
|---|---|---|---|
| 1 | 0.682[a] | 0.656 | 2.211 |

The Durbin-Watson (DW) test was conducted to detect autocorrelation in the regression model. The DW value obtained was 2.211, with lower and upper bounds of dl = 1.338 and du = 1.659, respectively (4-du = 2.341). Since the DW value falls between du and 4-du, it indicates that the model does not exhibit autocorrelation, confirming the reliability of the regression results.

### O. Test For Heteroskedasticity

The heteroscedasticity test was performed to examine whether the residual variance in the regression model is constant across observations. The results indicate no evidence of heteroscedasticity, confirming that the model meets the assumption of homoscedasticity.

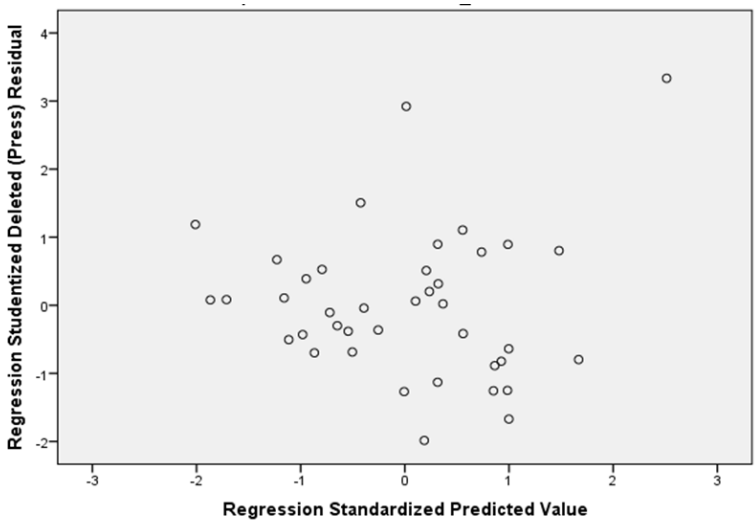


**Figure 2. Heteroscedasticity Test Results ; Scatterplot Dependent Variable : Net_Profit**

The residual scatter plot in Figure 2. shows no systematic pattern, indicating constant variance and confirming that the regression model meets the homoscedasticity assumption.

**P. Coefficient of Determination ($R^2$)**

The coefficient of determination ($R^2$) measures the extent to which a regression model explains the variation in the dependent variable through the independent variables. $R^2$ values range from 0 to 1, with lower values indicating a limited explanatory contribution of the independent variables. The results of the analysis, including the $R^2$ value, are presented in Table 6.

**Table 6. $R^2$ Test Results**

| Variable | R-Squared | Adjusted R- Squared |
|---|---|---|
| Production Cost and Operating Cost for Sales Volume | 0.608 | 0.586 |
| Production Cost, Operating Cost and Sales Volume for Net Profit | 0.682 | 0.656 |

The adjusted $R^2$ for Sales Volume is 0.586 (58.6%), indicating that Production Cost and Operating Cost explain 58.6% of the variation in Sales Volume, while the remaining 41.4% is influenced by other factors not included in the model. For Net Profit, the adjusted $R^2$ is 0.656 (65.6%), showing that Production Cost, Operating Cost, and Sales Volume collectively account for 65.6% of the variation, with 34.4% attributable to factors outside the scope of this study.

**G. Hypotheses Testing (Path Analysis)**

***1) Analysis of Direct and Indirect Causal Relationships (Path Analysis)***

**Table 7. Results Test t**

| | Standardized Coefficients (B) | Sig. | t | Description |
|---|---|---|---|---|
| Production Cost to Net Profit | 0.310 | 0.011 | 2.674 | Significant |
| Operating Cost to Net Profit | 0.527 | 0.000 | 4.623 | Significant |
| Production Cost to Sales Volume | 0.434 | 0.000 | 15.662 | Significant |
| Operating Cost to Sales Volume | -0.887 | 0.000 | -32.011 | Significant |
| Sales Volume to Net Profit | -0.375 | 0.002 | -3.407 | Significant |

Path analysis results (Table 7) indicate the following: Production Cost has a positive and significant effect on Net Profit (β = 0.301, t = 2.674, p = 0.011), while Operating Cost also positively influences Net Profit (β = 0.527, t = 4.623, p = 0.000). Production Cost positively impacts Sales Volume (β = 0.434, t = 15.662, p = 0.000), whereas Operating Cost negatively affects Sales Volume (β = -0.887, t = -32.011, p = 0.000). Interestingly, Sales Volume shows a negative and significant effect on Net Profit (β = -0.375, t = -3.407, p = 0.002). These findings confirm that all tested hypotheses are accepted, highlighting both direct and indirect effects of cost variables on Net Profit through Sales Volume.

### *2) Direct and Indirect Calculation Analysis*

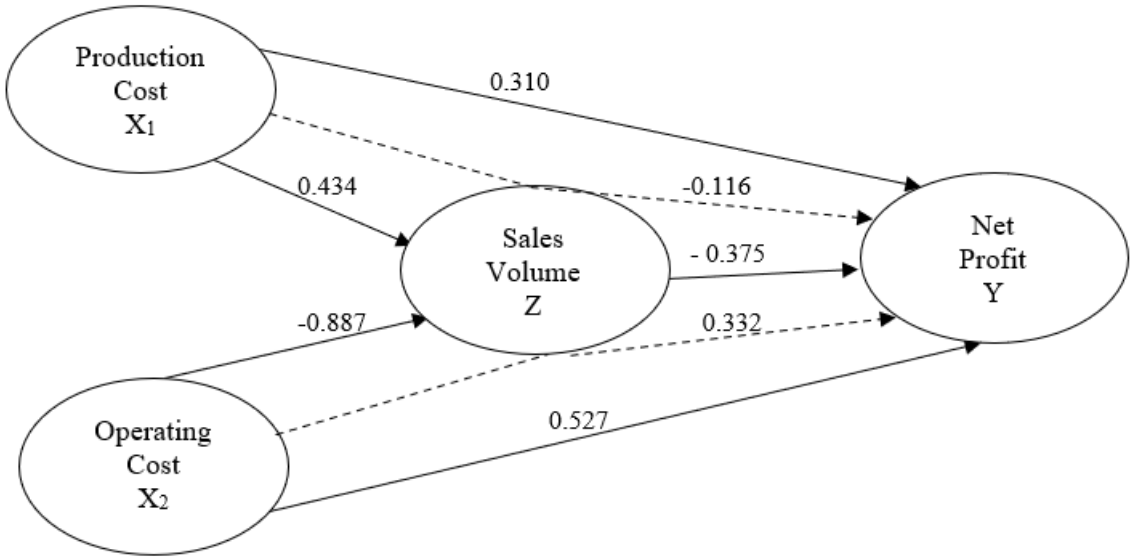


**Figure 3. Structural Relationship Analysis Results**

The path analysis shows that Production Cost positively and significantly affects Net Profit (β = 0.310; p = 0.011), and Operating Cost likewise has a positive and significant effect (β = 0.527; p = 0.000). Production Cost also increases Sales Volume (β = 0.434; p = 0.000), whereas Operating Cost reduces it (β = -0.887; p = 0.000). Sales Volume has a negative and significant effect on Net Profit (β = -0.375; p = 0.002). Indirectly, Production Cost decreases Net Profit through Sales Volume (-0.116), while Operating Cost indirectly increases Net Profit via Sales Volume (0.332).

**Table 8. Results Direct Influence on Net Profit**

| Variable Relationship | Koefisiente Beta | t | P-Value | Interpretation |
|---|---|---|---|---|
| Production Cost → Net Profit | 0.310 | 2.674 | 0.011 | Positive, Significant |
| Operating Cost→ Net Profit | 0.527 | 4.623 | 0.000 | Positive, Significant |
| Sales Volume → Net Profit | -0.375 | -3.407 | 0.002 | Negative, Significant |

The results show that Production Cost has a positive and significant effect on Net Profit (β = 0.310; t = 2.674; p = 0.011), indicating that efficient production investments contribute to higher profitability. Operating Cost also demonstrates a positive and significant influence on Net Profit (β = 0.527; t = 4.623; p = 0.000), suggesting that well-managed operational spending can enhance financial performance. In contrast, Sales Volume shows a negative and significant effect on Net Profit (β = -0.375; t = -3.407; p = 0.002), implying that increased sales volumes may reduce profit when margins or operating costs are not efficiently controlled.

**Table 9. Indirect Influence Results Through Sales Volume**

| Variable Relationship | Path | Calculation | Indirect Influence Calculation |
|---|---|---|---|
| Production Cost→ Sales Volume→ Net Profit | 0.310 x (-0.375) | -0.116 | -0.116 |
| Operating Cost→ Sales Volume→ Net Profit | -0.887 x (-0.375) | 0.332 | 0.332 |

Table 9 shows the indirect effects of Production Cost and Operating Cost on Net Profit through Sales Volume. The indirect effect of Production Cost (0.310 × -0.375 = -0.116) is negative, indicating that increases in production cost, although raising sales volume, ultimately reduce net profit. Conversely, the indirect effect of Operating Cost (-0.887 × -0.375 = 0.332) is positive, suggesting that efficient management of operating expenses can indirectly enhance net profit through their interaction with sales volume.

**Table 10. Total Influence Synthesis Results**

| Variable Independent | Direct Influence | Indirect Influence | Total Influence |
|---|---|---|---|
| Production Cost | 0.310 | -0.116 | 0.194 |
| Operating Cost | 0.527 | 0.332 | 0.859 |

Table 10 reports the total effects of Production Cost and Operating Cost on Net Profit, combining both direct and indirect pathways. Production Cost shows a total effect of 0.194, derived from a direct effect of 0.310 and an indirect effect of -0.116, indicating an overall positive influence despite a reduction through the sales volume pathway. Operating Cost demonstrates a total effect of 0.859, consisting of a direct effect of 0.527 and an indirect effect of 0.332, reflecting a consistently positive contribution to Net Profit when operational expenditures are efficiently managed.

## Q. Sobel Test

The Sobel test was used to determine whether the indirect effect of the independent variables on the dependent variable through the mediator is statistically significant.

**Table 11. Sobel Test Results**

| Variable Independent | a | Sa | b | Sb | Statistics Sobel (z) | Interpretation: |
|---|---|---|---|---|---|---|
| Production Cost ($X_1$) | 0.434 | 0.028 | -0.375 | 0.110 | -3.33 | Sales Volume significantly mediates the relationship between Production Cost and Net Profit, indicating a substantive indirect effect. |
| Operating Cost ($X_2$) | -0.887 | 0.028 | -0.375 | 0.110 | 3.39 | Sales Volume significantly mediates the relationship |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | | | between Operating Cost and Net Profit, with a positive indirect effect where Operating Cost indirectly increases Net Profit trought reduced Sales Volume. |

Table 11 shows that the Sobel test results for Production Cost (z = -3.33) and Operating Cost (z = 3.39) exceed the critical value of 1.96 in absolute terms, indicating that Sales Volume significantly mediates the relationship between each independent variable and Net Profit. Thus, the indirect effects are relevant, and mediation plays a notable role alongside direct effects.

## V. DISCUSSION

Based on the analysis in the study "Influence of Production Cost and Operating Cost on Net Profit through Sales Volume as an Intervening Variable," the following main results were obtained

### R. Influence of Production Cost on Net Profit

Based on Table 7, the Production Cost variable shows a positive and significant effect on Net Profit ( $\beta$ = 0.310; p = 0.011), indicating that increases in production-related expenditures, such as efficiency improvements or enhanced product quality, contribute meaningfully to higher net profit. Thus, H1, which states that Production Cost has a significant and positive influence on Net Profit, is accepted.

Previous research by Felicia & Gultom (2018), found that increases in production, quality, and promotion costs positively and significantly affect net profit, with a coefficient of determination of 78.2%. These findings are consistent with Porter's (1985) Competitive Advantage theory, which states that strategic investment in production activities enhances efficiency and strengthens competitive position. Similar support is provided by Chen et al. (2018), who demonstrated that continuous investment in quality and promotional activities improves product quality and increases profit margins. The alignment with these studies validates the positive relationship in this research, suggesting that production investments are a reliable driver of profitability across contexts.

### S. Influence of Operating Costs on Net Profit

As shown in Table 7, Operating Cost has a positive and significant effect on Net Profit ( $\beta$ = 0.527; p = 0.000), suggesting that expenditures aimed at improving operational efficiency contribute meaningfully to profitability. Therefore, H2, stating that Operating Cost has a significant and positive influence on Net Profit, is accepted.

Previous research by Smith & Johnson, (2020) reported a positive relationship between Operating Cost and Net Profit across various business sectors, aligning with the findings here. Similarly, Kumar and Singh (2022) found that Operating Cost has a positive and significant effect on Net Profit in Indian manufacturing firms ( $\beta \approx$ 0.45-0.50, $p < 0.01$), emphasizing that well-managed operational expenditures enhance long-term profitability. This consistency indicates that efficient operational spending can enhance financial outcomes, as observed in this study. The positive effect contributes a practical insight for managers, emphasizing cost optimization over mere reduction.

### T. Influence of Production Cost on Sales Volume

As shown in Table 7, Production Cost has a positive and significant effect on Sales Volume ( $\beta$ = 0.434; p = 0.000), suggesting that investments in production capacity or product quality can effectively increase sales. Therefore, H3, stating that Production Cost has a significant and positive influence on Sales Volume, is accepted.

Nilas (2022) found that Production Cost positively and significantly affects Sales Volume, indicating that effective cost management enhances company performance. Marketing costs also positively influence sales, suggesting that efficient allocation of production and marketing resources can increase sales volume. This is supported by Kotler (2015), who notes that higher production investment improves product quality and sales, a finding further reinforced by Lee and Kim (2019). The congruence with these studies highlights the broad applicability of production-focused strategies for sales growth.

### U. Influence of Operating Costs on Sales Volume

As shown in Table 7, Operating Cost has a negative and significant effect on Sales Volume ( $\beta$ = -0.887; p = 0.000), indicating that higher operational expenditures tend to reduce sales. This relationship may result from decreased efficiency, unbalanced cost allocation, or reduced market competitiveness. Therefore, H4, stating that Operating Cost has a negative and significant influence on Sales Volume, is accepted, highlighting the importance of effective cost management to maintain sales performance.

Simanjuntak et al.,(2024) found that Operating Cost and Sales Volume significantly affect company profit at PT Indofood Sukses Makmur Tbk, with increased sales and efficient cost management contributing positively to net profit. This aligns with Drucker's (1973) principle that higher operating costs can negatively impact sales due to reduced operational efficiency, a finding also supported by Garcia et al. (2021). The negative effect underscores the need for strategic cost control to sustain sales momentum.

**V. Influence of Sales Volume on Net Profit**

As shown in Table 7, Sales Volume has a negative and significant effect on Net Profit ( $\beta$ = -0.375; p = 0.002), suggesting that increased sales volumes may not always translate to higher profits if costs are not managed efficiently. Therefore, H5, stating that Sales Volume has a significant influence on Net Profit, is accepted, though the negative direction implies potential inefficiencies in cost control.

Azis et al., (2021). examined the role of sales volume in moderating the effect of production cost and operating cost on net profit. The results showed that Production Cost and Operating Cost have a negative impact on Net Profit, and Sales Volume can act as a moderating variable, reducing the negative impact of these costs on net profit. Thus, if sales volume increases, company profit is expected to rise. These results are supported by Brealey and Myers (2019) and Wang (2017), who note that increased sales volume is generally associated with higher net profit. However, the negative effect in this research contrasts with these studies, likely due to contextual differences such as high fixed costs or competitive pressures in the sampled industry. This unique finding suggests that sales expansion without cost optimization may erode profits, providing a cautionary perspective for business strategy in cost-sensitive industries.

**W. Sales Volume as a Mediating Variable in the Relationship between Production Cost and Net Profit**

Hypothesis H6 proposed that Sales Volume mediates the effect of Production Cost on Net Profit. The Sobel test (Table 11) shows a z-value of -3.33, which exceeds the significance threshold of 1.96 in absolute terms, indicating that Sales Volume significantly mediates this relationship. This suggests that the indirect effect through Sales Volume is substantive, complementing the direct effect of Production Cost on Net Profit.

Sopiah, (2024) found that, partially, Production Costs do not have a significant effect on Net Profit, while Operating Costs and Promotion Costs have a positive effect. Additionally, the combination of these costs simultaneously affects Net Profit, and Sales Volume functions as a moderating variable,

moderating the effect of Production Cost, Operating Cost, and Promotion Cost on Net Profit. These findings align with Wijaya and Santoso (2019) and Smith and Johnson (2018), who reported that Production Cost has a direct effect on profit, independent of sales volume. The significant mediation in this research contrasts with Sopiah's findings, possibly due to variations in sample characteristics or analytical methods, illustrating the context-specific nature of mediation.

### X. Sales Volume as a Mediating Variable in the Relationship between Operating Costs and Net Profit

Hypothesis H7 proposed that Sales Volume mediates the effect of Operating Cost on Net Profit. The Sobel test (Table 11) yields a z-value of 3.39, exceeding the significance threshold of 1.96 in absolute terms, indicating that Sales Volume significantly mediates this relationship. This suggests that the indirect effect through Sales Volume is substantive, complementing the direct effect of Operating Cost on Net Profit.

Hidayat & Sari (2023) examined the effects of Production Costs and Distribution Costs on Sales Volume and their impact on Net Profit at PT Nurul Amin, using 40 financial reports selected via purposive sampling. Path analysis showed that the indirect effects of Production and Distribution Costs on Net Profit through Sales Volume were smaller than the direct effects, a finding consistent with Dian Puspita et al. (2023) and Hayes (2013). While Hidayat found smaller indirect effects, the significant mediation in this research highlights that Sales Volume's role can be more pronounced in contexts with high operational variability.

## VI. CONCLUSIONS

This study has aimed to explore and verify the effects of production costs and operating costs on net profit, with sales volume as an intervening variable, in the Timor Block Building Industry during the period 2014-2023. Based on the statistical analysis and path analysis conducted, the main conclusions that can be drawn are as follows:

1. Production costs have a positive and significant effect on net profit. This indicates that an increase in production costs can contribute to higher profits through improved production efficiency and product quality, which enhance the company’s profitability margin.
2. Operating costs have a positive and significant effect on net profit. Evidence shows that efficiently managed operating costs can significantly contribute to revenue growth, as effective operational processes directly influence profitability.

3. Production costs have a positive and significant effect on sales volume. This means that investment in production, such as capacity enhancement and quality improvement, can stimulate increased sales.
4. Operating costs have a negative and significant effect on sales volume. This shows that high operating costs lead to increased selling prices, causing consumers to potentially switch to competing products.
5. Sales volume has a negative and significant effect on net profit. This indicates that an increase in sales volume does not contribute positively to profit because costs that are not proportional to sales may lead to a decline in net profit, even when sales volume increases.
6. Sales volume serves as a significant mediating variable between production costs and net profit. This means that production costs influence net profit both directly and indirectly through sales volume, with the indirect effect being substantive.
7. Sales volume serves as a significant mediating variable between operating costs and net profit. This implies that the effect of operating costs on net profit occurs both directly and indirectly through sales volume, enhancing the overall relationship.

## Y. Suggestions

This study provides several recommendations for future research. First, researchers are encouraged to include additional variables such as product quality, customer satisfaction, and marketing strategy to enhance the explanatory power of the model, as the current adjusted $R^2$ value of 0.682 indicates the presence of unobserved influencing factors. Adding these variables will improve model accuracy and strengthen decision-making for companies.

Second, future studies should examine different companies or sectors, including manufacturing and services, to compare results and test whether the relationships among production costs, operating costs, sales volume, and net profit remain consistent across contexts. This will help improve the generalizability, reliability, and applicability of the research model.

## Z. Implications

The study identifies two key implications for the Timor Block Building Industry. First, production costs have a positive and significant impact on sales volume. This means that strategic investments in production can enhance sales through better quality and capacity, allowing TBBI to offer competitive

products and attract more customers. Therefore, TBBI should continue prioritizing efficient production cost management to leverage this positive effect.

Second, operating costs have a negative and significant effect on sales volume. Higher operating expenses increase the final product price, making it less competitive, especially in markets where rivals offer lower prices. To address this, TBBI should regularly evaluate and optimize operational activities to reduce unnecessary expenses. Efficient operational management will allow the company to maintain competitive pricing, attract customers, and sustain sales performance.

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