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AUTHORS

Eka Handriani 

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Eka Handriani, Ph.D., Faculty of
Economics and Business, Darul Ulum
Islamic Centre Sudirman University,
Indonesia.

Eka Handriani (Indonesia)

THE ROLE OF DEBT IN OPTIMIZING THE CAPITAL STRUCTURE OF MANUFACTURING FIRMS IN INDONESIA

Abstract

This study aims to examine the underlying reasons why manufacturing firms in Indonesia utilize both short-term and long-term debt. Specifically, it investigates the roles of profitability, firm size, investment, asset tangibility, non-debt tax shields, and monitoring mechanisms in influencing corporate decisions regarding the use of short-term and long-term debt within their capital structure. The paper seeks to identify the most significant determinants of capital structure among Indonesian manufacturing firms. The study employs a sample of 58 manufacturing companies listed on the Indonesia Stock Exchange (IDX), covering a total of 580 firm-year observations over the period from 2011 to 2023. Structural equation modeling (SEM) using LISREL is applied as the primary analytical tool. The findings reveal that manufacturing firms investing in real sectors through fixed assets tend to rely on long-term debt financing. In contrast, those allocating capital to intangible or non-fixed assets prefer short-term debt instruments. Moreover, the study uncovers that the capital structure of Indonesian manufacturing firms is more heavily influenced by short-term debt, particularly in response to short-term working capital needs and market demand fluctuations. The study further suggests the necessity of exploring unrelated diversification as a potential indicator of managerial opportunism in the context of both short-term and long-term debt financing decisions.

Keywords

profitability, firm size, investment, tangibility

JEL Classification

G32, G40

INTRODUCTION

Capital structure is a critical element in corporate financial decision-making, as it significantly influences both profitability and firm value (Doruk, 2022; Ritchken & Wu, 2021). One of the core components of capital structure is debt, which can be utilized to finance business operations and investment activities (Ahmed et al., 2024). Manufacturing firms in Indonesia frequently rely on debt financing to support business expansion, enhance production capacity, and broaden market reach. A moderate use of debt can improve firm profitability by providing additional capital for expansion and productive investments (Mansi et al., 2021). Within the context of Indonesian manufacturing firms, companies maintaining an optimal debt ratio tend to exhibit higher returns on assets and equity compared to those overly dependent on equity financing (Cao & Wang, 2021). According to Bernard et al. (2020), debt used for investment purposes is often sourced through a single type of borrowing rather than a diversified loan structure, a decision that necessitates strategic corporate management.

Debt management policy plays a crucial role in ensuring corporate sustainability (Cheng et al., 2025). However, this policy remains underexplored, particularly within the context of manufacturing firms



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in developing countries. While several studies have examined this issue in specific sectors such as hospitality (Mueller & Sensini, 2021), energy (García & Herrero, 2021), and small and medium enterprises (Czerwonka & Jaworski, 2021), empirical investigations focusing on the manufacturing sector in developing economies like Indonesia are still limited. The scarcity of research in such settings highlights a significant gap in the literature. Some studies suggest that manufacturing firms tend to favor long-term debt to finance their investments, yet this area remains insufficiently addressed. This study seeks to examine whether both long-term and short-term debt policies are influenced by factors such as profitability, firm size, investment, asset tangibility, non-debt tax shields, and corporate governance, where governance is represented by board size and board independence.

1. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

Capital structure constitutes a pivotal element in a firm's financial decision-making process, as it significantly affects profitability, exposure to financial risk, and overall firm valuation. Profitability, in particular, plays a determining role in shaping a firm's preference between internal and external sources of financing. Drawing upon the pecking order theory, firms exhibit a hierarchy in financing preferences, favoring internal funds, primarily retained earnings, over external capital, such as debt or equity. Within the context of Indonesian manufacturing firms, enterprises with higher profitability levels typically possess more substantial internal financial resources, thereby diminishing their dependence on debt financing.

While the pecking order theory highlights a strong inclination toward internal financing, alternative theoretical frameworks acknowledge the strategic role of debt in capital structure optimization. The trade-off theory, initially formulated by Kraus and Litzenberger (1973), posits that firms aim to strike an equilibrium between the fiscal benefits of debt, namely the interest tax shield, and the financial distress costs that may arise from excessive leverage. In the manufacturing sector, characterized by capital-intensive operations and long investment horizons, the prudent use of long-term debt can yield considerable tax-related advantages (Brigham & Ehrhardt, 2008). Empirical findings by Haron et al. (2021) further underscore that while profitable firms often eschew high levels of debt, they do not completely forgo its use. Instead, they adopt a strategic approach, leveraging debt to improve capital allocation efficiency and enhance shareholder

value. Consequently, capital structure decisions among manufacturing firms in Indonesia reflect a synthesis of multiple financial theories, where both the potential tax advantages and the risks associated with insolvency are carefully weighed in pursuit of an optimal financing mix.

Higher profitability tends to have a negative impact on the use of debt in a firm's capital structure. This is due to several factors related to the preferences for internal versus external financing that companies have. In line with this, according to the pecking order theory, firms with higher profitability tend to prioritize internal financing, specifically retained earnings, as their primary source of funding. This is because profitable companies typically have more stable cash flows and greater internal funds available to finance expansions or investments, thus reducing the need to rely on debt (Myers & Majluf, 1984). Recent studies indicate that manufacturing firms with high profitability tend to avoid excessive debt and prefer to utilize retained earnings (Ayalew, 2021; Chandra et al., 2022). Overall, the negative relationship between profitability and capital structure in Indonesia can be understood because more profitable firms have greater internal resources, reducing the need to use debt as a source of financing.

Larger firms typically enjoy greater access to capital markets, allowing them to develop more diversified capital structures (Matemilola et al., 2025). Their perceived stability often translates into lower borrowing costs, enabling more efficient debt utilization and alignment with the trade-off theory (Bajaj et al., 2021). In contrast, smaller firms tend to face higher financial constraints and rely more heavily on internal financing sources. In Indonesia, well-established manufacturing firms with substantial asset bases are generally more ca-

pable of leveraging debt, resulting in higher debt ratios. Investment needs aimed at securing future profitability often demand significant capital for expansion or asset acquisition. These investment demands influence capital structure decisions, particularly the choice between internal financing, such as retained earnings, and external financing through debt or equity. In the Indonesian context, the relationship between investment and capital structure tends to be negative, as firms predominantly rely on internal financing. This tendency reflects a broader aversion to the financial risks associated with debt, especially in situations where future earnings remain uncertain. Additionally, firms often encounter difficulties in securing external debt financing for projects perceived as high-risk or long-term. Consequently, many firms adopt a conservative financial approach, avoiding excessive leverage and prioritizing financial stability. This strategy is primarily driven by the intention to minimize bankruptcy risk.

However, the tendency to avoid risk can be mitigated when firms possess high asset tangibility. Firms with greater tangibility typically find it easier to access debt financing, as tangible assets can be pledged as collateral, thereby reducing the lender's risk exposure. A higher proportion of tangible assets increases the likelihood that a firm will incorporate debt into its capital structure. The trade-off theory supports this perspective, positing that firms with high tangibility are more inclined to use debt, as they are better positioned to balance the tax advantages of debt financing against a lower probability of financial distress (Yakubu et al., 2021). In Indonesia, where lending practices are heavily reliant on collateral, firms with high tangibility are more likely to obtain loans at more competitive interest rates. Empirical research further supports this notion, indicating that higher tangibility levels are associated with greater debt usage in the capital structure (Jensen & Meckling, 1976). Therefore, tangibility plays a critical role in corporate financing decisions, encouraging a greater reliance on debt as a primary source of funding.

According to the trade-off theory, firms with high levels of non-debt tax shields (NDTS) tend to adopt more conservative capital structures, as they are able to benefit from tax advantages without incurring additional financial risk through

debt (Gabrielli, 2023). NDTS refers to tax-deductible expenses other than interest payments, such as depreciation and amortization. These shields serve to reduce a firm's tax burden without relying on debt financing to obtain further tax benefits. In the context of manufacturing firms in Indonesia, which typically possess substantial fixed assets such as machinery and buildings, depreciation expenses create significant opportunities for NDTS. This condition reduces the firms' dependence on debt-based financing. Conversely, firms with low NDTS are more likely to rely on debt to benefit from interest expense deductions as a tax strategy. Therefore, NDTS plays a critical role in capital structure decisions, whereby firms with high NDTS are more inclined to favor internal financing or equity over debt.

According to agency theory, the relationship between the owners of a firm (principals) and managers (agents) is often misaligned due to differences in interests and access to information. Agency theory highlights the issues that arise from such goal divergence between principals and agents (Kast & Rosenzweig, 1972). Effective corporate governance can mitigate agency problems by ensuring that managers act in the best interests of shareholders through adequate monitoring and the implementation of appropriate incentive mechanisms. Corporate governance refers to the systems, processes, and rules that govern how a company is directed and controlled. Its primary objective is to ensure that corporate activities are conducted in a transparent, efficient, and accountable manner, aligned with the interests of shareholders and other stakeholders.

Corporate governance comprises several interrelated components, including board size and board independence. A larger board size tends to bring diverse expertise and perspectives, thereby enabling more prudent financial decision-making. In the context of capital structure, firms with larger boards are generally more conservative in their use of debt to avoid excessive financial risk. This aligns with agency theory, in which the board serves to minimize conflicts between management and shareholders, including those related to financing decisions. In Indonesia's manufacturing sector, limited access to external financial resources makes the board's role even more critical.

Empirical studies indicate that firms with larger boards tend to have lower debt ratios, as debt-related decisions are made with greater caution and oversight (Haron et al., 2021).

Moreover, board independence plays a vital role in capital structure decision-making, as independent directors are more likely to act objectively and represent shareholder interests. Evidence from international journals suggests that more independent boards are inclined to avoid excessive debt due to greater awareness of bankruptcy risk and agency costs. Independent directors are also more effective in monitoring managerial actions to prevent value-destroying financing decisions. Consequently, firms with a higher proportion of independent directors are more likely to adopt a conservative capital structure, characterized by lower debt ratios, to maintain financial stability and sustainability. Based on theoretical insights and prior empirical research, as outlined above, the optimal capital structure for manufacturing firms differs from that of firms in other industries. This paper seeks to investigate the determinants of capital structure and the role of corporate governance. It also aims to examine how optimal capital structures can be achieved in the context of a developing country such as Indonesia. Drawing from the literature, this study presents the following hypotheses to guide the empirical investigation:

H_1 : Profitability has a negative effect on the capital structure.

H_2 : Firm size has a positive effect on the capital structure.

H_3 : Investment has a negative effect on the capital structure.

H_4 : Investment mediates the effect of profitability on capital structure.

H_5 : Investment mediates the effect of firm size on capital structure.

H_6 : Investment mediates the effect of tangibility on capital structure.

H_7 : Tangibility has a positive effect on the capital structure.

H_8 : Non-debt tax has a negative effect on the capital structure.

H_9 : Board size has a positive effect on the capital structure.

H_{10} : Board independence has a positive effect on the capital structure.

2. METHODOLOGY

This study investigates the determinants of capital structure of manufacturing firms in Indonesia. Currently, the Indonesia Stock Exchange (IDX) lists 229 manufacturing firms. This study examined 58 manufacturing firms with 580 observations during the period from 2011 to 2023. The sample focused on those that provided complete data and were not suspended by the Indonesia Stock Exchange (IDX) in the form of financial reports to analyze the relationships among business size, investment, tangibility, non-debt tax shields, board size, and board independence. Data from the years 2019, 2020, and 2021 were excluded from the analysis due to the COVID-19 pandemic, as it significantly impacted the financial state of many

Table 1. Research variables

No.	Variable		Measurement
1.	Profitability	PROF	Earnings before interest and taxes (EBIT)/total assets
2.	Long-Term Debt	DTAR	Debt to asset ratio (the ratio of total liabilities/total assets)
	Short-Term Debt	TDCA	
3.	Firm's Size	FIRS	Ln Total Assets
4.	Investment	RnD	Research and development/sales
5.	Tangibility	TANGI	Fixed assets/total assets
6.	Non-debt tax shield	NODE	Depreciation/total assets
7.	Board Size	BOZI	Total number of board members
8.	Board Independence	BOIN	Number of independent members/total board members

enterprises during that period. This exclusion was implemented to mitigate the influence of the financial challenges associated with the pandemic.

This study utilized operational definitions of the examined variables derived from various sources. Table 1 summarizes these definitions.

This study utilized panel data to examine the relationships among the variables and their effects based on Model (1) and Model (2). The data were analyzed using linear structural relationships. The analysis comprised several stages, including descriptive analysis, data screening, evaluation of model fit, and hypothesis testing. To assess the role of long-term debt and short-term debt, the following models were used:

Model 1

$$\begin{aligned} DTAR_{it} = & \alpha + \beta_1 DPROF_{it} + \beta_2 FIRS_{it} \\ & + \beta_3 RnD_{it} + \beta_4 TANGI_{it} + \beta_5 NODE_{it} \\ & + \beta_6 BOZI_{it} + \beta_7 BOIN_{it} + \varepsilon_{1it}. \end{aligned} \quad (1)$$

Model 2

$$\begin{aligned} TDCA_{it} = & \alpha + \beta_1 DPROF_{it} + \beta_2 FIRS_{it} \\ & + \beta_3 RnD_{it} + \beta_4 TANGI_{it} + \beta_5 NODE_{it} \\ & + \beta_6 BOZI_{it} + \beta_7 BOIN_{it} + \varepsilon_{2it}. \end{aligned} \quad (2)$$

3. RESULTS

Table 2 presents the descriptive statistics of the study's key variables, including profitability, long-term debt, short-term debt, firm size, investment, tangibility, non-debt tax shield (NDTS), board size, and board independence. The findings indi-

cate that the average tangibility is 20.9%, suggesting that, on average, 20.9% of total company assets are composed of tangible assets such as property, plant, equipment, and inventory. The average profitability of 70.5% implies that, on average, firms in the sample generate operating income amounting to 70.5% of their total assets, reflecting high asset efficiency across the observed manufacturing firms.

The mean long-term debt ratio stands at 61.70%, indicating that long-term liabilities account for 61.70% of the firms' capital structure. Meanwhile, the average short-term debt is recorded at 28.97%, demonstrating that approximately 28.97% of total financing is derived from short-term liabilities. The average firm size, measured logarithmically, is approximately 27.5, with a standard deviation reflecting significant variation in firm size among manufacturing firms in Indonesia.

Additionally, the average tangibility of 0.39 highlights the sector's moderate reliance on fixed physical assets. The mean non-debt tax shield (NDTS) is 62.7%, suggesting that 62.7% of the firms' taxable income is effectively offset or reduced by non-debt-related tax deductions, such as depreciation and investment credits. The average board size is approximately 4.55 members, indicating that most Indonesian manufacturing firms operate with relatively small boards comprising four to five directors. Lastly, board independence is reported at an average of 1.65 members per board, signifying a relatively limited presence of independent commissioners within corporate governance structures in the sector.

This study proposes 10 hypotheses. The results of the hypothesis testing are contingent upon the *t*-value. Table 3 presents the results of the direct effect tests.

Table 2. Descriptive statistics

Stat.	TANGI	ROA	DTAR	TDCA	FIRS	TANGI	NODE	RnD	BOZI	BOIN
Mean	2.095	7.0506	61.703	37.972	27.506	0.3947	62.772	1.1990	4.515	1.4345
Median	1.194	4.8351	39.996	38.200	7.7667	0.6161	4.3034	0.17129	0.1953	1.3906
Maximum	26.08	124.52	916.343	875.80	13.770	0.7304	110.89	479.319	10	3
Minimum	0.381	-2.2214	32.810	22.810	23.247	0.0665	19.779	2.71206	1	1.0909
Std. Dev.	2.714	11.321	86.866	83.022	2.9214	2.4886	10.057	2.40779	1.5399	1308.15
Skewness	5.174	2.9611	3.9662	3.7907	1.6786	-1.429	2.6357	18.6224	0.1037	2.29933
Kurtosis	32.69	24.370	32.736	31.288	7.3708	6.2789	21.6896	21.8225	2.2303	1.95445
Jarque-Bera	24762.7	12056.3	23427.62	22391.	752.11	640.69	10730.1	555.538	488.922	415.581
Probability	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Table 3. Direct effects

Paths	Unstandardized Estimate	Standardized Coefficient	t-value
PROF → DTAR	-0.03	-0.01	-1.93*
FIRS → DTAR	-0.33	-0.10	-1.72*
RnD → DTAR	0.24	0.21	1.99*
TANGI → DTAR	0.04	0.17	2.24**
NODE → DTAR	-1.14	-0.23	-1.24*
BOZI → DTAR	-0.09	-0.16	-1.63*
BOIN → DTAR	0.32	0.30	1.08**
PROF → TDCA	-0.31	-0.01	-2.08*
FIRS → TDCA	0.02	0.22	2.01**
RnD → TDCA	0.01	0.18	2.23*
TANGI → TDCA	-0.30	0.42	1.92**
NODE → TDCA	1.23	-1.03	-1.62
BOZI → TDCA	-0.16	-0.21	-2.55*
BOIN → TDCA	1.05	0.26	1.95*

Note: * significant at $\alpha = 5\%$, ** significant at $\alpha = 10\%$.

The indirect effect test was conducted in this study using the Sobel test. This analysis examined the indirect impacts of: (1) investment on capital structure through the mediation of profitability, (2) research and development (R&D) on capital structure through the mediation of firm size, and (3) R&D on capital structure through the mediation of tangibility. The results of the indirect effect test are presented in Table 4.

This study puts forward its first hypothesis, which posits that profitability has a significant and negative effect on capital structure. Upon empirical testing, this hypothesis is validated, with a t-value of -1.93 for long-term debt capital structure and -2.08 for short-term debt capital structure, in alignment with the pecking order theory. Thus, Hypothesis 1 is supported. Moreover, Hypotheses 2, 3, 7, and 8 are also supported, indicating robust relationships between the tested variables and capital structure. Conversely, Hypotheses 9 and 10 are rejected, suggesting that the expected theoretical relationships do not hold in this context. Firms possessing substantial assets that are eligible to

be used as collateral are more likely to secure higher levels of debt. The ownership of significant tangible assets, which are widely accepted as collateral, facilitates borrowing. The availability of such assets enhances the firm's relationship with external stakeholders by providing greater assurance to lenders. This condition enables firms with adaptive capital structures to access debt financing more readily.

The mediating effects tested in Hypotheses 4 and 5 are supported, as indicated by a correlation coefficient (ρ) of 0.003 with a p-value < 0.05 for long-term debt, and a ρ of 0.005 with a p-value < 0.05 for short-term debt. Further analysis under Hypothesis 5 reveals a ρ of 0.001 ($p < 0.05$) for long-term debt and ρ of 0.002 ($p < 0.05$) for short-term debt, reinforcing the presence of significant mediating relationships. However, Hypothesis 6 is rejected. The results show a correlation coefficient (ρ) of 0.730 with a p-value > 0.05 for long-term debt, and a ρ of 0.501 with a p-value also exceeding 0.05 for short-term debt. These findings indicate the absence of statistically significant mediation effects under this hypothesis.

Table 4. Indirect effects

Paths	Statistical Test	p-value	Standard Error	Decision
RnD → PROF → DTAR	0.30	0.003	0.021	p-value < 0.05 Supported
RnD → FIRS → DTAR	0.02	0.001	0.022	p-value < 0.05 Supported
RnD → TANGI → DTAR	0.73	0.730	0.296	p-value > 0.05 Not Supported
RnD → PROF → TDCA	0.01	0.005	0.421	p-value < 0.05 Supported
RnD → FIRS → TDCA	1.02	0.002	0.125	p-value < 0.05 Supported
RnD → TANGI → TDCA	1.31	0.501	0.120	p-value < 0.05 Not Supported

4. DISCUSSION

This study examines both short-term and long-term debt independently. The analysis of debt factors reveals significant disparities between long-term and short-term debt. The findings of this study corroborate the results of several previous studies. Cappa et al. (2020) and Hussain et al. (2023) indicated that tangibility is positively associated with long-term debt but negatively associated with short-term debt. Notably, although the results differ, the analysis demonstrates that manufacturing enterprises engage in real sector investments to finance fixed tangible assets, while non-fixed assets are funded through short-term debt.

Furthermore, this study demonstrates that non-debt tax shields increase the short-term debt ratio while simultaneously decreasing the long-term debt ratio. A significant difference exists between the short-term and long-term debt ratios. It was estimated that an increase in non-debt tax shields negatively impacts overall debt levels. This finding indicates that non-debt tax shields serve as a substitute for the tax benefits associated with long-term debt financing in relation to depreciation. When firms participate in tax protection schemes, long-term debt is typically utilized. Conversely, short-term debt can be employed to finance indirect investments in long-term assets.

The results of this study suggest that profitability is negatively correlated with both debt metrics, consistent with the pecking order theory. Firms tend to utilize profits to fund investments. This finding implies that, in general, firms prefer to use internal funds over external funds, regardless of the nature of the assets to be financed (such as tangible or intangible assets).

In addition, firm size is identified as a crucial factor in determining debt levels. Specifically, firm size is positively associated with short-term debt but negatively correlated with long-term debt ratios. This finding suggests that larger manufacturing firms tend to engage in short-term securitization, which is inversely related to their reliance on long-term bank loans. This may imply that smaller firms possess limited assets, resulting in weaker credit ratings and restricted access to long-term loans.

Furthermore, this study finds that investment has a favorable effect on capital structure, consistent with previous research (de la Fuente & Velasco, 2020; Im et al., 2020). This suggests that both long-term and short-term debt can serve as predictors of a firm's future growth. According to the pecking order theory, debt increases when investment exceeds retained earnings and decreases when investment is less than retained earnings. This study provides strong evidence that manufacturing firms in Indonesia generally prioritize balancing current and future funding costs. As a result, firms with high investment opportunities maintain a low debt risk capacity to avoid financing investments through riskier equity issuance. The findings support the pecking order theory, indicating that manufacturing firms in Indonesia tend to prioritize internal funding sources when their debt ratio is below the optimal level.

Conversely, empirical evidence indicates that both board size and board independence negatively affect long-term debt while positively influencing short-term debt within corporate structures. This finding suggests that many public firms, where individuals with highly independent boards control the majority of shares, do not necessarily experience enhanced performance. These results align with previous studies conducted by Delgado-García et al. (2023) and Nguyen et al. (2022), which demonstrated a negative relationship between board independence and firm value. This relationship contradicts the principles of agency theory, which posits that independent boards serve to monitor managers whose interests may diverge from those of owners and shareholders. However, this perspective does not apply to public firms with concentrated ownership, where the alignment of ownership and control is strong, thereby reducing the necessity for external independent board members. More importantly, the inclusion of independent board members who often possess limited knowledge and understanding of the firm's operations may lead to an emphasis on short-term objectives rather than long-term sustainability.

Based on the results of this study, particularly regarding the negative impact of board size

on capital structure, several conclusions can be drawn. First, in developing manufacturing organizations, all managerial actions are observable. Thus, board size does not significantly influence the control mechanisms in place. Second, as organizations expand, managers tend to accrue greater power and influence due to their specialized knowledge, which is essen-

tial for making informed investment decisions. This shift diminishes the relevance of board size within the monitoring framework. Third, agency theory posits that the necessity for monitoring systems arises from asymmetric information resulting from the separation of ownership and management, a dynamic that can compromise shareholder interests.

CONCLUSION

This study aims to analyze the role of both short-term and long-term debt in shaping the optimal capital structure of 58 manufacturing companies in Indonesia. The findings reveal the importance of short-term debt as a primary source of financing for manufacturing companies, particularly for small to medium-sized enterprises that face limitations in accessing long-term debt. The study demonstrates that the capital structure of Indonesian manufacturing firms is more influenced by short-term debt than long-term debt, especially in responding to short-term working capital needs and market demand fluctuations. However, manufacturing firms tend to use long-term debt cautiously due to the volatile market risks. Additionally, the findings indicate that firms that successfully maintain a balanced long-term debt ratio tend to have a higher market value compared to companies that rely solely on equity financing or short-term debt.

The empirical model of this study exclusively addresses the determinants of capital structure and the internal corporate governance systems relevant to agency theory. That is why future research should incorporate several considerations. First, it is recommended that external corporate governance be included in the development of both the proposed grand theoretical and empirical research model. Second, unrelated diversification variables should be examined as proxies for opportunistic managerial behavior. Third, the use of non-linear data analysis models is suggested to obtain more accurate results.

AUTHOR CONTRIBUTIONS

Conceptualization: Eka Handriani.
Data curation: Eka Handriani.
Formal analysis: Eka Handriani.
Funding acquisition: Eka Handriani.
Investigation: Eka Handriani.
Methodology: Eka Handriani.
Project administration: Eka Handriani.
Resources: Eka Handriani.
Software: Eka Handriani.
Supervision: Eka Handriani.
Validation: Eka Handriani.
Visualization: Eka Handriani.
Writing – original draft: Eka Handriani.
Writing – review & editing: Eka Handriani.

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