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Analyzing Financial Vulnerability in Indonesia's Post-Pandemic Tech and Transport Landscape

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Abstract

Purpose – *This research aims to determine the effect of sales growth, debt to asset ratio, operating cash flow, and intellectual capital on financial distress in technology as well as transportation and logistics sector companies listed on the Indonesia Stock Exchange during the post-pandemic recovery digital transformation era (2021-2024).*

Design/methodology/approach – *This research uses quantitative data. The sample in this study were technology, transportation and logistics sector companies listed on the Indonesia Stock Exchange as many as 48 companies observed over four years, resulting in 192 firm-year observations. Financial Distress is measured using the Altman Z-Score and analyzed using panel data regression with the Random Effect Model in E-Views 9, grounded in Signaling Theory, Trade Off Theory, and the Resource-Based View.*

Findings – *The results of this study showed that Sales Growth has a positive and statistically insignificant effect on Financial Distress (t = 0.816). Debt to Asset Ratio has a negative and statistically significant effect on Financial Distress (t = -4.322). Operating Cash Flow has a negative and statistically significant effect on Financial Distress (t = -1.897). Meanwhile, Intellectual Capital has a positive and statistically insignificant effect on Financial Distress (t = 0.222).*

Research limitations/implications – *This study implies that companies in the technology, transportation and logistics sectors should prioritize stable operating cash flows and disciplined debt utilization to mitigate Financial Distress during the post-pandemic period.*

JEL : G30, G32, G33

INTRODUCTION

In recent years, Indonesia's national economy has demonstrated a clear recovery trajectory following the COVID-19 pandemic, accompanied by increased economic activity across multiple sectors. Data from Statistics Indonesia (BPS) show that Indonesia's economic growth reached 5.03% in 2024, maintaining a stable level above 5% since 2023, after rebounding to 3.69% in 2021 from the contraction experienced in 2020. This recovery reflects strengthened household consumption, investment expansion, and export performance, supported by accommodative fiscal and monetary policies in the post-pandemic "new normal" era (https://www.bps.go.id). These macroeconomic trends indicate not only cyclical recovery but also structural transformation within the Indonesian economy (Faisal & Sari, 2023).

The 2021–2024 period represents a critical phase of structural change, particularly marked by accelerated digitalization and intensified national logistics activity. Government initiatives to strengthen the digital ecosystem, expand transportation infrastructure, and integrate supply chains have reshaped business operations across sectors. One of the most prominent policies is the implementation of the National Logistics Ecosystem (NLE), which leverages digital platforms to integrate logistics processes, reduce transaction costs, and improve efficiency across ports, customs, and distribution networks. Such policies position the technology as well as transportation and logistics sectors as strategic drivers of Indonesia's long term economic competitiveness (https://www.ekon.go.id).

According to data from the Indonesia Stock Exchange (IDX), approximately 44 technology firms and 36 transportation and logistics firms were actively listed during the study period. Both sectors experienced relatively high sales growth between 2021 and 2024, driven by rising demand for digital services, e-commerce, electronic payment systems, and efficient logistics solutions connecting cities and islands. These developments signal strong growth potential and reinforce the strategic importance of technology and logistics in supporting Indonesia's modern, digitally integrated economy.

Despite these favorable growth prospects, technology as well as transportation and logistics sectors are also characterized by high volatility and substantial capital requirements, making them particularly vulnerable to financial distress. Rapid expansion often requires significant upfront investment in digital infrastructure, fleets, warehousing systems, information technology, and skilled human capital. When revenue growth is not accompanied by sufficient operational efficiency and liquidity, firms may face cash flow constraints and rising financial risk. Consequently, high growth does not necessarily translate into financial resilience, especially in periods of economic transition (https://www.hsb.co.id). Financial Distress refers to a condition in which a company experiences cash flow shortages to meet its debt obligations, even though its business model and products remain viable and attractive (Altman et al., 2019). When a company experiences Financial Distress, it tends to incur higher costs compared to companies that do not face such conditions, which can ultimately reduce firm value (Natasya & Kristanti, 2019).

In this context, variables such as Sales Growth, Debt to Asset Ratio, Operating Cash Flow, and Intellectual Capital become important to analyze. Sales Growth reflects a company's ability to increase revenue. The Debt to Asset Ratio indicates the financing structure and leverage risk. Operating Cash Flow represents the company's ability to generate cash from its core operating activities. Meanwhile, Intellectual Capital reflects the company's capability to

utilize its resources to create added value.

This study is expected to provide empirical contributions to enhancing the understanding of factors that influence Financial Distress and to serve as a reference for management and investors in assessing financial health and making strategic decisions in rapidly growing sectors in Indonesia, particularly the technology as well as transportation, and logistics sectors. Financial Distress is influenced by various factors, including Sales Growth, as examined in studies by (Bintari & Rahayu, 2022; Kwok & Bangun, 2023; Oktaviani & Lisiantara, 2022; Ratuela et al., 2022; Suwarno & Putri, 2022). Another factor is the Debt to Asset Ratio, as discussed in studies by (Mukaromah et al., 2022; Oktaviana et al., 2023; Pandegirot et al., 2019; Rahma & Rinaldi, 2024; Yudiawati & Indriani, 2016). Operating Cash Flow has been examined in studies by (Alverina & Sjarief, 2025; Annabila & Rasyid, 2022; Febrianti et al., 2023; E. Fitriani et al., 2023; Sholikha et al., 2024). Likewise, Intellectual Capital has been examined in studies by (Maulana et al., 2023; Mondayri & Tresnajaya, 2022; Safenida & Vestari, 2023; Tjahjana & Oktorina, 2023).

In this study, Sales Growth is examined as one of the variables because it reflects a company's ability to maintain its economic position (Oktaviani & Lisiantara, 2022). Companies that are able to maintain or consistently increase Sales Growth tend to demonstrate healthy performance and are likely to have a lower risk of bankruptcy. Therefore, Sales Growth is considered an important indicator in assessing a company's sustainability prospects, particularly in the highly dynamic technology sector. This is supported by the study of Oktaviani & Lisiantara, (2022) on tourism, restaurant, and hotel service companies, which found that Sales Growth does not affect Financial Distress. Similarly, Suwarno & Putri, (2022) found that Sales Growth does not affect Financial Distress in food and beverage companies. Kwok & Bangun, (2023) also reported no effect of Sales Growth on Financial Distress in manufacturing companies. In contrast, Bintari & Rahayu, (2022) found that Sales Growth has a negative effect on Financial Distress in the technology sector. Likewise, Ratuela et al., (2022) reported a negative and significant effect of Sales Growth on Financial Distress in manufacturing companies.

The Debt to Asset Ratio is selected to assess capital structure and leverage levels. This ratio indicates the proportion of a company's assets financed by debt. A higher debt ratio implies a greater risk of Financial Distress if the company fails to manage its obligations properly. A healthy capital structure is essential in determining a company's resilience to economic fluctuations and rising financial costs. This is particularly important for the technology sector, which often relies on debt for expansion, and the transportation and logistics sector, which depends heavily on large capital investments.

This is supported by Rahma & Rinaldi, (2024), who found that the Debt to Asset Ratio has a negative effect on Financial Distress in the consumer staples sector. Pandegirot et al., (2019) found a significant effect of the Debt to Asset Ratio on Financial Distress in property and real estate companies. Oktaviana et al., (2023) also found a negative and significant effect in the consumer staples sector. Meanwhile, Yudiawati & Indriani, (2016) found a positive and significant effect of the Debt to Asset Ratio on Financial Distress in manufacturing companies. However, these findings contrast with Mukaromah et al., (2022), who found that the Debt to Asset Ratio does not affect Financial Distress in transportation companies.

Operating Cash Flow is used to measure company liquidity through cash generated from core operating activities. Strong liquidity indicates that a company can meet its short-

term obligations without relying on external financing or additional debt. This is particularly important for the technology, transportation, and logistics sectors, which require smooth cash flows to finance daily operations, including fleet maintenance, fuel costs, and delivery expenses. Therefore, Operating Cash Flow is used as an indicator to assess the potential for Financial Distress.

This is supported by Sholikha et al., (2024), who found that Operating Cash Flow does not affect Financial Distress in the heavy constructions and civil engineering subsector. Similarly, E. Fitriani et al., (2023) found no significant effect on Operating Cash Flow on Financial Distress in the transportation and logistics sector. Febrianti et al., (2023) also reported no significant effect in retail companies, and Annabila & Rasyid, (2022) reported similar findings in the basic and chemical industry subsector. In contrast, Alverina & Sjarief, (2025) found that Operating Cash Flow has a negative effect on Financial Distress in the energy sector.

Meanwhile, Intellectual Capital is also an important factor influencing Financial Distress. Intellectual Capital represents a company's intangible assets, such as managerial capabilities, skilled human resources, efficient organizational processes, and technological innovation, which are used to create added value and competitive advantage. Effective management of Intellectual Capital is crucial for the technology, transportation, and logistics sectors, which rely heavily on knowledge, information system, and operational efficiency to ensure business sustainability. Companies that can optimally manage and utilize Intellectual Capital tend to experience a lower risk of Financial Distress, as their performance and efficiency are generally superior to those that do not.

This is supported by Tjahjana & Oktorina, (2023), who found that Intellectual Capital has a negative effect on Financial Distress in the tourism and recreation industry as well as the transportation and logistics sector. Safenida & Vestari, (2023) also found that Intellectual Capital consistently affects Financial Distress in manufacturing companies. Similarly, Maulana et al., (2023) reported a negative and significant effect of Intellectual Capital on Financial Distress in manufacturing companies. In contrast, Mondayri & Tresnajaya, (2022) found that Intellectual Capital does not significantly affect Financial Distress in the infrastructure sector. By combining these four variables, this study aims to comprehensively assess corporate financial health, encompassing growth capability, capital structure, liquidity, and the management of intangible assets that reflect a company's ability to create value through innovation and knowledge. This study focuses on dynamic and capital-intensive sectors, namely technology, transportation and logistics, and is expected to provide a more comprehensive understanding of the factors influencing Financial Distress.

This research aims to address the research gap by simultaneously examining the technology as well as transportation and logistics sectors during the 2021–2024 post-pandemic recovery period. This period is characterized by accelerated digitalization, high capital requirements, and structural changes in industries driven by government policies. The novelty of this study lies not only in the inclusion of two sectors, but also in its comparative and integrated approach to understanding how firm growth, leverage, liquidity, and knowledge based resources jointly influence financial distress within the same macroeconomic and regulatory environment. Unlike previous studies that generally focus on a single sector or pre-pandemic conditions, this research captures sectoral differences within a unified analytical framework, thereby providing a more accurate depiction of financial risk dynamics in industries undergoing digital transformation.

Previous studies on factors influencing financial distress have produced inconsistent findings due to differences in research contexts. Most studies focus on a single industry sector with relatively similar financial characteristics, making the results difficult to generalize to other sectors that have different cost structures, capital requirements, and cash flow patterns. In addition, differences in research periods, particularly between the pre-pandemic and post-pandemic periods have led to changes in economic conditions and corporate financial behavior, which in turn affect the relationships among variables. The inconsistency in findings is also influenced by differences in sample firm characteristics, such as business maturity and expansion strategies, as well as variations in measurement and data processing methods. These conditions indicate the existence of a research gap that necessitates reexamining the determinants of financial distress in dynamic and high-risk sectors, so that the resulting empirical evidence can provide more relevant and contextual insights.

LITERATUR REVIEW

Signaling Theory

According to Spence, (1973), signaling theory explains that parties who possess superior information will send signals through certain actions so that other parties can assess characteristics or qualities that cannot be directly observed, thereby reducing information asymmetry in the market. Based on signaling theory, Sales Growth and Operating Cash Flow can be used to reflect a company's financial condition. Companies with high levels of Sales Growth and Operating Cash Flow can serve as positive signals to external parties that the company is in a healthy condition, thereby reducing the risk of Financial Distress, and vice versa.

Trade Off Theory

Kraus & Litzenberger, (1973) explain that companies determine an optimal capital structure by balancing the tax benefits of debt usage (tax shield) against the bankruptcy costs arising from debt. When these two factors are balanced, the company achieves an optimal level of leverage that can maximize firm value. The Debt to Asset Ratio is an indicator that reflects the proportion of a company's financing derived from debt. An optimal level of the Debt to Asset Ratio indicates that the company can utilize debt to obtain tax benefits without generating excessive Financial Distress risk.

Resource-Based View Theory

Barney, (1991) explains that resources that are valuable, rare, difficult to imitate, and non-substitutable form the basis for sustainable competitive advantage, enabling companies to maintain their performance in the face of industry competition. In this study, Resource-Based View Theory is used to explain the role of Intellectual Capital as an intangible asset that can influence the risk of Financial Distress. The theory emphasizes that companies can strengthen their financial position and reduce Financial Distress risk through effective management of these valuable and rare resources.

Financial Distress

Financial Distress is a condition in which a company experiences insufficient cash flow

to meet its debt obligations, even though its business model and products remain viable and attractive (Altman et al., 2019).

Sales Growth

Sales Growth is a ratio that reflects the revenue generated from the sale of goods or services and is used to project a company's future growth (N. Fitriani, 2025).

Debt to Asset Ratio

Debt to Asset Ratio is the ratio of total liabilities to total assets. This ratio emphasizes the importance of debt financing by indicating the percentage of a company's assets that are financed by debt (Darmawan, 2019).

Operating Cash Flow

Operating Cash Flow represents cash flows generated from a company's primary revenue-producing activities and other activities that are neither investing nor financing activities, while all other transactions and events are not considered investing or financing activities (Rustiana et al., 2022).

Intellectual Capital

Intellectual Capital can be defined as the aggregate value generated by three main organizational elements (human capital, structural capital, and customer capital) related to knowledge and technology that provide added value to the company in the form of organizational competitive advantage (Arifin et al., 2021).

Hypotheses development

Sales Growth on Financial Distress

Sales Growth reflects a company's ability to generate revenue as well as maintain its operational performance. Sales Growth can be used to measure a company's ability to increase sales from year to year. Sales have a positive effect on business performance because sales must be supported by assets; when sales increase, assets must also increase (Syalomytha & Natalia, 2023). High Sales Growth indicates that the company is able to expand its market share, increase sales volume, and strengthen its financial position. Increasing cash flows from sales can be used to meet the company's obligations, which in turn can reduce the potential occurrence of Financial Distress. Conversely, companies with declining or stagnant Sales Growth may signal weakening operational performance and are more likely to experience Financial Distress.

Companies that seek to maintain and increase Sales Growth generally provide positive signals to investors and creditors regarding their future prospects and financial stability. This condition reflects management's ability to manage operational activities effectively and efficiently to gain confidence in the company's business continuity. This is in line with signaling theory, which states that companies provide information or signals to external parties regarding their financial performance to demonstrate favorable conditions and prospects. Such positive signals can reduce risk perceptions related to the potential occurrence of Financial Distress.

This explanation is consistent with the study conducted by Ratuela et al., (2022) on

manufacturing companies listed on the Indonesia Stock Exchange during 2018–2020, which found that Sales Growth has a negative effect on Financial Distress. This finding indicates that higher Sales Growth reduces the likelihood of a company experiencing Financial Distress. Similarly, the study by Bintari & Rahayu, (2022) on technology sector companies listed on the Indonesia Stock Exchange during 2015–2020 also found that Sales Growth has a negative effect on Financial Distress.

Based on the previous studies and the explanation of the effect of Sales Growth on Financial Distress, the hypothesis proposed in this study is as follows:
H_1: Sales Growth has a negative effect on Financial Distress.

Debt to Asset Ratio on Financial Distress

Debt to Asset Ratio is a ratio that measures the proportion of a company's assets financed by debt. This ratio indicates the extent to which funds used by the company originate from liabilities relative to total assets. Debt refers to all obligations owned by the company, including both short-term and long-term debt. Creditors tend to prefer a lower debt ratio because it indicates higher fund security (Pandegirot et al., 2019). A high Debt to Asset Ratio indicates that the company relies heavily on external financing, which leads to increased interest expenses and debt repayment obligations. If revenue is insufficient to cover financial expenses, this condition may trigger Financial Distress. Meanwhile, a very low Debt to Asset Ratio may indicate that the company has not optimally utilized the potential tax savings from debt usage (tax shield). Therefore, it is important for companies to balance the benefits and costs of debt usage to ensure that the resulting capital structure remains optimal and does not trigger excessive Financial Distress risk.

This explanation aligns with the principles of trade off theory, which states that companies attempt to balance the tax benefits of debt against the potential costs of financial distress in order to achieve an optimal level of debt. Wise use of debt can provide benefits such as tax savings that increase firm value. On the other hand, excessive debt can increase bankruptcy risk due to higher interest burdens and liquidity pressure. Therefore, effective management of debt levels is crucial for companies to reach an equilibrium point that reduces the likelihood of Financial Distress. Accordingly, companies that are able to maintain an optimal Debt to Asset Ratio tend to have a healthier and more stable capital structure, consistent with the principles of trade off theory.

This explanation is supported by the study conducted Yudiawati & Indriani, (2016) on manufacturing companies listed on the Indonesia Stock Exchange during 2012–2014, which found that Debt to Asset Ratio has a positive effect on Financial Distress.

Based on the previous studies and the explanation of the effect of Debt to Asset Ratio on Financial Distress, the hypothesis proposed in this study is as follows:
H_2: Debt to Asset Ratio has a positive effect on Financial Distress.

Operating Cash Flow on Financial Distress

Financial Distress may occur due to insufficient operating revenue to cover operating expenses and the inability to fulfill future obligations (Sholikha et al., 2024). Operating Cash Flow is one of the main indicators used to assess a company's ability to generate cash from its operational activities, such as the sale of goods or services. High Operating Cash Flow indicates that the company is able to generate stable revenue and has sufficient internal funding sources,

reducing its dependence on external financing to support daily operational activities. Companies with positive and stable Operating Cash Flow demonstrate healthy business sustainability and are less likely to experience Financial Distress. Conversely, prolonged negative Operating Cash Flow indicates financial pressure, even when accounting profits appear positive (Saputra et al., 2025).

In line with signaling theory, companies with high levels of Operating Cash Flow provide positive signals to investors, creditors, and shareholders regarding their financial condition and future prospects. Operating Cash Flow serves as a signal of management effectiveness in managing and maintaining profitability and liquidity. Companies with strong Operating Cash Flow are perceived to have the ability to generate sustainable revenue. Furthermore, Operating Cash Flow is an important consideration for investors and creditors in assessing investment feasibility and financing risk (Saputra et al., 2025).

This explanation is consistent with the findings of Alverina & Sjarief, (2025) on energy sector companies listed on the Indonesia Stock Exchange during 2020–2022, which found that Operating Cash Flow has a negative effect on Financial Distress. Similarly, the study by E. Fitriani et al., (2023) on transportation and logistics sector companies listed on the Indonesia Stock Exchange during 2019–2022 also found that Operating Cash Flow has a negative effect on Financial Distress.

Based on the previous studies and the explanation of the effect of Operating Cash Flow on Financial Distress, the hypothesis proposed in this study is as follows:
H_3: Operating Cash Flow has a negative effect on Financial Distress.

Intellectual Capital on Financial Distress

Intellectual Capital is an intangible asset that represents the value of knowledge, skills, experience, and innovation possessed by a company. The main components of Intellectual Capital include human capital, structural capital, and customer capital, which collectively contribute to creating added value for the company. Proper management of Intellectual Capital can enhance operational efficiency, accelerate innovation processes, and strengthen relationships with customers and business partners. Companies with high Intellectual Capital tend to be more adaptive to changes in the business environment, which helps strengthen their financial position. Consequently, optimal management of Intellectual Capital enhances a company's ability to create long-term value and reduces the potential occurrence of Financial Distress.

An increasing trend in Intellectual Capital over the long term indicates that the company's value added is improving and its financial position is strengthening, thereby reducing the likelihood of Financial Distress. Conversely, a declining trend in Intellectual Capital may signal a deterioration in the company's financial condition, leading toward Financial Distress (Safenida & Vestari, 2023).

This argument aligns with Resource-Based View Theory, which states that the utilization of unique resources enables companies to create competitive advantages that differentiate them from competitors. Resource-Based View Theory explains that companies benefit when they possess competent resources that other firms do not have (Maulana et al., 2023). In this context, Intellectual Capital serves as a strategic resource that can create added value for the company. Through optimal utilization of Intellectual Capital, companies can improve performance efficiency and minimize the risk of Financial Distress.

These findings are consistent with the study conducted by Tjahjana & Oktorina, (2023) on tourism and recreation industries as well as transportation and logistics sector companies listed on the Indonesia Stock Exchange during 2019–2021, which found that Intellectual Capital has a negative effect on Financial Distress. Similarly, the study by Safenida & Vestari, (2023) on manufacturing companies listed on the Indonesia Stock Exchange during 2012–2016 also found that Intellectual Capital has a negative effect on Financial Distress.

Based on the previous studies and the explanation of the effect of Intellectual Capital on Financial Distress, the hypothesis proposed in this study is as follows:
H_4: Intellectual Capital has a negative effect on Financial Distress.

RESEARCH METHOD

This study aims to examine the relationship between the independent variables, namely Sales Growth, Debt to Asset Ratio, Operating Cash Flow, and Intellectual Capital, and the dependent variable, Financial Distress. The main focus of this study is to test hypotheses that explain the causal relationships among the variables. The research paradigm adopted is positivism with a deductive approach. This study employs a quantitative research method with a case study strategy at the organizational level as the unit of analysis. The researcher's level of involvement is minimal, and the study is conducted in a non-contrived setting, in which the data are obtained from the actual conditions of the companies. The sampling technique used is non-probability sampling with a purposive sampling approach, where samples are selected based on specific criteria relevant to the research objectives. The study utilizes panel data that combines cross-sectional and time-series data, with the data analysis focused on hypothesis testing.

Table 1. Operationalization of Research Variabel

Variable	Dimension / Formula	Source
Sales Growth	$SG = Sales_t - Sales_{t-1} / Sales_{t-1}$	(Oktaviani & Lisiantara, 2022)
Debt to Asset Ratio	DAR = Total Debt/Total Asset	(Rahma & Rinaldi, 2024)
Operating Cash Flow	OCF = Operating Cash Flow/Current Liability	(Alverina & Sjarief, 2025)
Intellectual Capital	VAIC = VACA + VAHU + STVA Description: VA = Output – Input Output : total sales and other income Input : selling expenses and other expenses excluding employee expenses VACA = VA/CE CE : available funds; equity	(Pulic, 1998)

Variable	Dimension / Formula	Source
	VAHU = VA/HC HC : employee expenses STVA = VA/SC SC : VA-HC	
Financial Distress	$Z = 1{,}2X_1 + 1{,}4X2 + 3{,}3X_3 + 0{,}6X_4 + 1{,}0X_5$ Description: X1 = Working Capital/Total Asset X2 = Retained Earning/Total Asset X3 = Earnings Before Interest and Taxes (EBIT)/Total Asset X4 = Market Value of Equity/ Total Liabilities X5 = Sales/Total Asset	(Altman, 1968)

The population of this study comprises all technology as well as transportation and logistics companies listed on the Indonesia Stock Exchange (IDX) during the 2021–2024 period. The research sample was selected using a purposive sampling technique, with criteria including companies that were consistently listed on the IDX and had published complete annual financial statements throughout the 2021–2024 period. Based on these criteria, 48 companies obtained for each year of observation, resulting in a total of 192 firm-year observations.

The data used in this study are secondary data, which are obtained from existing sources in the form of published reports. Specifically, the data consist of financial statements and annual reports of technology as well as transportation and logistics sector companies listed on the Indonesia Stock Exchange (IDX) for the 2021–2024 period. These data were obtained from the companies' annual financial reports accessed through the official IDX website, www.idx.co.id.

RESULTS

Table 2. Descriptive Test Results

Variable	N	Min	Max	Mean	Std. Dev
SG	192	-0.985000	17.84000	0.410411	1.668117
DAR	192	0.023000	4.082000	0.483854	0.536201
OCF	192	-26.67500	5.534000	0.201151	2.508996
IC	192	-80.98600	309.8350	4.915427	26.98256
FD	192	-39.96400	103.0930	7.301609	18.77729

Description:
SG = Sales Growth, DAR = Debt to Asset Ratio, OCF = Operating Cash Flow, IC = Intellectual Capital, FD = Financial Distress
Source: Processed data (2025)

Based on the results of the descriptive statistical analysis presented in Table 2, this study

examines four independent variables and one dependent variable, namely Sales Growth, Debt to Asset Ratio, Operating Cash Flow, Intellectual Capital, and Financial Distress. The purpose of this analysis is to describe the general characteristics of the research data based on the minimum, maximum, mean, and standard deviation values of each variable. The data were obtained from 192 observations of companies in the technology as well as transportation and logistics sectors during the 2021–2024 period.

Based on the descriptive statistics table, the Sales Growth variable has a minimum value of −0.985000 and a maximum value of 17.84000, with a mean value of 0.410411. The highest Sales Growth value was observed in Wira Global Solusi Tbk in 2021, while the lowest value was recorded in Hensel Davest Indonesia Tbk in 2024. The standard deviation of 1.668117, which is higher than the mean value, indicates a relatively high dispersion of data. This suggests that the data are heterogeneous, with substantial differences among observations.

Furthermore, the Debt to Asset Ratio variable has a minimum value of 0.023000 and a maximum value of 4.082000, with a mean value of 0.483854. The highest Debt to Asset Ratio was found in Envy Technologies Indonesia Tbk in 2024, while the lowest value was observed in Global Sukses Solusi Tbk in 2021. The standard deviation of 0.536201 exceeds the mean value, indicating a relatively high level of data dispersion. This condition reflects variability and significant differences across observations. The Operating Cash Flow variable has a minimum value of −26.67500 and a maximum value of 5.534000, with a mean value of 0.201151. The highest Operating Cash Flow value was recorded by Pelayaran Nelly Dwi Putri Tbk in 2023, while the lowest value was observed in Tourindo Guide Indonesia Tbk in 2021. The standard deviation of 2.508996, which is greater than the mean, indicates a high degree of dispersion, suggesting considerable variation among the observed data.

Meanwhile, the Intellectual Capital variable has a minimum value of −80.98600 and a maximum value of 309.8350, with a mean value of 4.915427. The highest Intellectual Capital value was found in Pelayaran Samudera Indonesia Tbk in 2022, whereas the lowest value was observed in Mitra International Resources (formerly Mitra Rajasa Tbk) in 2022. The standard deviation of 26.98256, which is substantially higher than the mean value, indicates a high level of variability and significant differences among observations.

Finally, the Financial Distress variable has a minimum value of −39.96400 and a maximum value of 103.0930, with a mean value of 7.301609. The highest Financial Distress value was recorded in Global Sukses Solusi Tbk in 2021, while the lowest value was found in Envy Technologies Indonesia Tbk in 2023. The standard deviation of 18.77729, which exceeds the mean value, indicates a relatively high dispersion of data, suggesting heterogeneity and considerable variation across observations.

Selection of the Best Panel Data Model

Chow Test

Decision making criteria and based on the value of F calculated:

- If the probability value < 0.05 and the calculated F-statistic > F-table value, then a better model is Fixed Effect Model.
- If the probability value > 0.05 and the calculated F-statistic < F-table value, then a better model is Common Effect Model.

Table 3. Chow Test

Effects Test	Statistic	d.f.	Prob.
Cross-section F	3.473028	(47,140)	0.0000
Cross-section Chi-square	148.388504	47	0.0000

Source: Processed data (2025)

Based on the results of the Chow Test conducted using E-Views 9, the probability value of the cross-section F is 0.0000, which is lower than the 5% significance level (α = 0.05). This result indicates that the most appropriate model is the Fixed Effect Model (FEM). Therefore, it is necessary to conduct the Hausman Test to determine the more suitable model between the Fixed Effect Model and the Random Effect Model.

Hausman Test
Decision making criteria and based on the value of F calculated:
- If the probability value < 0.05 and the calculated Chi-Square value > Chi-Square table value, then the Fixed Effect Model is more appropriate.
- If the probability value > 0.05 and the calculated Chi-Square value < Chi-Square table value, then the Random Effect Model is more appropriate.

Table 4. Hausman Test

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	4.854138	4	0.3026

Source: Processed data (2025)

The results of the Hausman Test show a probability value of 0.3026, which is greater than the 5% significance level (α = 0.05). This result indicates that the most appropriate model is the Random Effect Model (REM). Therefore, it is necessary to conduct the Lagrange Multiplier Test to determine the more suitable model between the Common Effect Model and the Random Effect Model.

Lagrange Multiplier Test
Decision making criteria and based on LM values:
- If the significance value of Both Breusch–Pagan < 0.05 and the calculated LM value > Chi-Square table value, then the Random Effect Model is more appropriate.

- If the significance value of Both Breusch–Pagan > 0.05 and the calculated LM value < Chi-Square table value, then the Common Effect Model is more appropriate.

Table 5. Langrange Multiplier Test

	Test Hypothesis Cross-section	Time	Both
Breusch-Pagan	39.32536 (0.0000)	0.119339 (0.7298)	39.44470 (0.0000)
Honda	6.270993 (0.0000)	0.345455 (0.3649)	4.678535 (0.0000)
King-Wu	6.270993 (0.0000)	0.345455 (0.3649)	1.871004 (0.0307)
Standardized Honda	6.657094 (0.0000)	0.796455 (0.2129)	0.108469 (0.4568)
Standardized King-Wu	6.657094 (0.0000)	0.796455 (0.2129)	-0.579479 --
Gourierioux, et al.*	--	--	39.44470 (< 0.01)
*Mixed chi-square asymptotic critical values:			
1%	7.289		
5%	4.321		
10%	2.952		

Source: Processed data (2025)

Based on the results of the Lagrange Multiplier Test, the significance value of the Both Breusch–Pagan test is 0.0000, which is lower than the 5% significance level (α = 0.05). Therefore, the most appropriate model to be used is the Random Effect Model (REM).

Hypothesis Test

Table 6. Partial Test (Random Effect Model)

No	Variable	Prediction	Coefficient	t-Statistic	Prob
1	C		13.13407	5.695211	0.0000

2	SG	-	0.547921	0.815747	0.20785
3	DAR	+	-12.20008	-4.322340	0.0000
4	OCF	-	-1.045905	-1.896943	0.0297
5	IC	-	0.011414	0.222284	0.41215
R-Squared					0.119390
Adjusted R-Squared					0.100553
F-Statistic					6.338187
Prob (F-Statistic)					0.000084

Description:
Significance level 5%
SG = Sales Growth, DAR = Debt to Asset Ratio, OCF = Operating Cash Flow, IC = Intellectual Capital, FD = Financial Distress
Source: Processed data (2025)

Partial Test (t-test)

The partial test aims to determine whether each independent variable individually has a significant effect on the dependent variable. Based on the test results using the Random Effect Model (REM), the following conclusions can be drawn:

1. Sales Growth has no effect on Financial Distress.
   The first hypothesis (H_1) in this study states that Sales Growth affects Financial Distress. The data processing results show that the calculated t-value is 0.815747 < t-table value of 1.677. Since this study employs a one-tailed hypothesis test, the probability value is divided by two, resulting in 0.4157/2 = 0.20785. This value is greater than the significance level of 0.05 (5%), indicating that Sales Growth does not have a significant effect on Financial Distress. Therefore, H_0 is accepted and H_1 is rejected. This finding suggests that high Sales Growth does not necessarily indicate lower financial burdens, as the profits generated may still be limited, thereby increasing the likelihood of Financial Distress.
2. Debt to Asset Ratio affects Financial Distress.
   The second hypothesis (H_2) states that Debt to Asset Ratio affects Financial Distress. The results show that the calculated t-value is −4.322340 < t-table value of 1.677. Using a one-tailed test, the probability value is divided by two, resulting in 0.0000/2 = 0.0000. This value is lower than the significance level of 0.05 (5%), indicating a significant effect of Debt to Asset Ratio on Financial Distress. Therefore, H_0 is rejected and H_1 is accepted. This result indicates that companies can optimize their debt usage and fulfill long-term obligations to reduce the risk of Financial Distress.
3. Operating Cash Flow affects Financial Distress.
   The third hypothesis (H_3) states that Operating Cash Flow affects Financial Distress. The calculated t-value is −1.896943 < t-table value of 1.677. Since a one-tailed test is applied, the probability value is divided by two, resulting in 0.0594/2 = 0.0297. This value is lower than the significance level of 0.05 (5%), indicating a significant effect of Operating Cash Flow on Financial Distress. Therefore, H_0 is rejected and H_1 is accepted. This finding shows that companies with higher Operating Cash Flow from operational activities tend to have a lower potential for Financial Distress.
4. Intellectual Capital has no effect on Financial Distress.

The fourth hypothesis (H_4) states that Intellectual Capital affects Financial Distress. The data analysis shows a calculated t-value of 0.222284 < t-table value of 1.677. Since this study uses a one-tailed test, the probability value is divided by two, resulting in 0.8243/2 = 0.41215. This value is greater than the significance level of 0.05 (5%), indicating that Intellectual Capital does not have a significant effect on Financial Distress. Therefore, H_0 is accepted and H_1 is rejected. This result suggests that companies have not yet optimally managed professional resources, resulting in employee-related costs that do not generate maximum benefits for the company.

Coefficient of Determination Test (Adjusted R-Squared)

Based on the regression analysis results, the Adjusted R-Squared value of 0.100553 indicates that 10.0553% of the variation in the Financial Distress variable can be explained by the independent variables used in this study, namely Sales Growth, Debt to Asset Ratio, Operating Cash Flow, and Intellectual Capital. Meanwhile, the remaining 89.9447% is explained by other factors not included in this model, such as Profitability (Oktaviani & Lisiantara, 2022), Liquidity (Bintari & Rahayu, 2022), Leverage (Ratuela et al., 2022), Free Cash Flow (Suwarno & Putri, 2022), Operating Capacity (Kwok & Bangun, 2023), Working Capital Turnover (Rahma & Rinaldi, 2024), Institutional Ownership (Pandegirot et al., 2019), Total Asset Turnover Ratio (Oktaviana et al., 2023), Current Ratio (Yudiawati & Indriani, 2016), Return on Assets (Mukaromah et al., 2022), Gender Diversity (Alverina & Sjarief, 2025), Firm Size (Sholikha et al., 2024), Solvency (E. Fitriani et al., 2023), Enterprise Risk Management (Tjahjana & Oktorina, 2023), Business Risk (Safenida & Vestari, 2023), and Good Corporate Governance (Mondayri & Tresnajaya, 2022), as documented in previous studies.

DISCUSSIONS

The Effect of Sales Growth on Financial Distress

The results of testing the first hypothesis (H_1) indicate that Sales Growth has a positive but insignificant effect on Financial Distress. Therefore, the first hypothesis (H_1), which states that Sales Growth has a negative effect on Financial Distress, is rejected. This finding indicates that an increase in sales is not necessarily followed by an improvement in a company's financial condition, particularly in the technology as well as transportation and logistics sectors in Indonesia during the post-pandemic recovery period.

From a theoretical perspective, this result does not fully support Signaling Theory, which suggests that sales growth can serve as a positive signal to investors and creditors regarding a firm's financial health. In practice, Sales Growth is often associated with a company's ability to generate sufficient revenue to cover operational costs and financial obligations. However, the findings of this study indicate that in the technology and logistics sectors, Sales Growth does not function as a strong signal of a lower risk of Financial Distress.

This phenomenon can be explained by industry-specific characteristics. Technology and logistics companies generally face highly aggressive cost structures, where increases in sales are frequently accompanied by even greater increases in operating costs, such as digital marketing expenses, distribution costs, fleet maintenance, and continuous investment in technological infrastructure. As a result, sales growth does not automatically translate into

higher profits or stronger operating cash flows. This condition suggests that volume-based growth without cost efficiency may instead exert pressure on a company's financial stability.

In addition, companies with high Sales Growth tend to require additional capital to support business expansion, including fleet additions, capacity expansion of facilities, and the development of digital systems. When internal funding is insufficient, companies rely on external financing, particularly debt. If such expansion does not immediately generate stable cash flows, the risk of Financial Distress may increase. This finding is consistent with Pecking Order Theory, which emphasizes that the risk of Financial Distress is not determined by sales growth itself, but rather by how the company finances that growth.

The results of this study are consistent with prior research conducted by Oktaviani & Lisiantara, (2022) on tourism, restaurant, and hotel service companies listed on the Indonesia Stock Exchange (IDX) during 2018–2020. Similar findings were also reported by Suwarno & Putri, (2022) in manufacturing companies listed on the IDX during 2017–2021, as well as by Kwok & Bangun, (2023) in manufacturing companies listed on the IDX during 2018–2020. The similarity of these findings is attributed to the fact that increased sales in these sectors typically require substantial costs, such as production, operational, and investment expenses. Consequently, sales growth is not necessarily accompanied by higher cash flows or improved financial conditions, which may instead trigger the risk of Financial Distress despite increasing Sales Growth.

The Effect of Debt to Asset Ratio on Financial Distress

The results of testing the second hypothesis (H_2) indicate that the Debt to Asset Ratio has a significant negative effect on Financial Distress. Therefore, the second hypothesis (H_2), which states that the Debt to Asset Ratio has a positive effect on Financial Distress, is rejected. Thus, this finding does not strongly support the Trade Off Theory. From a theoretical perspective, Trade Off Theory suggests that the use of debt provides benefits in the form of tax shields but also increases the risk of bankruptcy when debt levels become excessive. However, in the technology as well as transportation and logistics sectors in Indonesia, debt does not necessarily reflect financial weakness. Instead, a high debt ratio may indicate a firm's ability to access external financing, which in turn reflects creditors' confidence in the firm's prospects and overall financial viability.

Within the industry context, debt is generally used to finance long term productive assets, such as logistics fleets, warehouses, digital distribution systems, and technological modernization. Debt that is allocated to productive investments has the potential to improve operational efficiency and enhance firm competitiveness, thereby ultimately reducing the risk of Financial Distress. In this sense, well managed debt can function as a mechanism for strengthening the financial structure rather than as a source of financial risk.

This finding is also consistent with Agency Theory, particularly from the perspective of debt discipline. The obligation to make regular interest and principal payments encourages managers to act more prudently, be more selective in investment decisions, and focus on projects that generate stable cash flows. Such discipline indirectly improves efficiency and reduces the likelihood of Financial Distress.

The results of this study are consistent with prior research by Rahma & Rinaldi, (2024) in primary consumer goods companies listed on the IDX during 2018–2022, Pandegirot et al., (2019) in property and real estate companies listed on the IDX during 2013–2017, Oktaviana et

al., (2023) in primary consumer goods companies listed on the IDX during 2017–2021, and Mukaromah et al., (2022) in transportation companies listed on the IDX during 2014–2017. The similarity of these findings can be attributed to the fact that companies in these sectors generally require substantial external financing to support operations and expansion. In these contexts, debt usage does not necessarily indicate poor financial conditions, as it is commonly employed to support operational activities and asset investments. When debt is properly managed and generates revenue, the Debt to Asset Ratio can reduce the risk of Financial Distress.

The Effect of Operating Cash Flow on Financial Distress

The results of testing the third hypothesis (H_3) indicate that Operating Cash Flow has a significant negative effect on Financial Distress. Therefore, the third hypothesis (H_3), which states that Operating Cash Flow has a negative effect on Financial Distress, is accepted. This finding strongly supports signaling theory, which suggests that companies with strong Operating Cash Flow provide positive signals to investors and creditors regarding their performance.

High Operating Cash Flow reflects a company's ability to meet short-term obligations and finance its operational activities without relying on additional external funding. This condition reduces the company's exposure to Financial Distress. Operating Cash Flow serves as a strong signal for investors and creditors in assessing a company's ability to avoid Financial Distress.

Companies in the technology and transportation and logistics sectors depend heavily on working capital to support daily operations. Therefore, the stability of Operating Cash Flow is critical in these sectors. If Operating Cash Flow is insufficient to cover operational costs, companies may be forced to seek external financing. Failure to manage resulting obligations effectively increases vulnerability to Financial Distress.

These findings are consistent with studies conducted by Sholikha et al., (2024) in the heavy construction and civil engineering sub-sector during 2020–2022, Febrianti et al., (2023) in retail companies during 2017–2021, and Annabila & Rasyid, (2022) in the basic and chemical industry sub-sector during 2017–2019. These results indicate that higher Operating Cash Flow reduces the likelihood of Financial Distress.

The Effect of Intellectual Capital on Financial Distress

The results of testing the fourth hypothesis (H_4) indicate that Intellectual Capital has a positive but insignificant effect on Financial Distress. Therefore, the fourth hypothesis (H_4), which states that Intellectual Capital has a negative effect on Financial Distress, is rejected. Consequently, this finding does not strongly support Resource-Based View Theory which argues that Intellectual Capital is a strategic resource capable of creating sustainable competitive advantage. However, in the technology and logistics sectors, Intellectual Capital in practice requires substantial costs, including employee training, recruitment of skilled professionals, system development, and technological research. The benefits of these investments are long-term in nature and are not always immediately reflected in financial performance or cash flows.

In the short term, high levels of investment in Intellectual Capital may instead increase a company's financial burden and put pressure on cash flow, thereby raising the potential for

Financial Distress. This finding can be explained by Agency Theory, which suggests that management has discretion in making long-term investment decisions oriented toward reputation building, innovation, and growth, even though the economic benefits may not be immediately realized by shareholders.

Furthermore, this result is consistent with the study conducted by Mondayri & Tresnajaya, (2022) on infrastructure sector companies listed on the IDX during 2016–2019, which found that Intellectual Capital has a positive effect on Financial Distress. The similarity of these findings may be explained by the fact that these sectors require substantial investments in Intellectual Capital, while financial returns are not immediately realized. Consequently, increased Intellectual Capital may raise the risk of Financial Distress.

CONCLUSIONS

This study aims to analyze the effect of Sales Growth, Debt to Asset Ratio, Operating Cash Flow, and Intellectual Capital on Financial Distress in Technology as well as Transportation and Logistics sector companies listed on the Indonesia Stock Exchange (IDX) during the period 2021–2024. Based on the results of the analysis and discussion presented in the previous chapters, the conclusions of this study are as follows:

1. Sales Growth (SG) does not have a significant effect on Financial Distress in technology as well as transportation and logistics sector companies listed on the Indonesia Stock Exchange (IDX) during the 2021–2024 period. This indicates that an increase in Sales Growth cannot necessarily be used as a positive signal of a company's financial condition.
2. Debt to Asset Ratio (DAR) has an effect on Financial Distress in technology as well as transportation and logistics sector companies listed on the Indonesia Stock Exchange (IDX) during the 2021–2024 period. This suggests that a higher level of debt usage increases the risk of Financial Distress.
3. Operating Cash Flow (OCF) has an effect on Financial Distress in technology as well as transportation and logistics sector companies listed on the Indonesia Stock Exchange (IDX) during the 2021–2024 period. This finding indicates that an increase in Operating Cash Flow can serve as a positive signal that the company is capable of meeting its obligations, operating more efficiently, and becoming more resilient to the risk of Financial Distress.
4. Intellectual Capital (IC) does not have a significant effect on Financial Distress in technology as well as transportation and logistics sector companies listed on the Indonesia Stock Exchange (IDX) during the 2021–2024 period. This indicates that investments in Intellectual Capital may increase financial burdens, thereby making companies appear more vulnerable to Financial Distress.

SUGGESTIONS

This study is expected to provide insights for future research by considering the following recommendations:

1. Future researchers are encouraged to include additional variables such as profitability, liquidity, firm size, corporate governance, free cash flow, gender diversity, enterprise risk management, business risk, and other relevant factors.
2. Future studies may expand the research object to other sectors, such as the financial sector, manufacturing sector, energy sector, and property and real estate sector, in order to obtain a broader perspective and compare the characteristics of Financial Distress across different industries.
3. Future research may apply alternative Financial Distress measurement models, such as the Springate model or the Zmijewski model, to provide a more comprehensive perspective in identifying Financial Distress conditions.
4. Future studies may incorporate moderating or intervening variables in examining the relationship between Sales Growth, Debt to Asset Ratio, Operating Cash Flow, Intellectual Capital, and Financial Distress, to identify which variables act as moderators or intervening mechanisms.

LIMITATIONS

This study has several limitations that may affect the research results. Not all companies have complete and accessible financial statements and annual reports during the observation period, resulting in data incompleteness and limiting the number of companies that could be included as research samples. In addition, this study relies solely on secondary data, which prevents the researcher from fully ensuring the absolute accuracy of the data used.

IMPLICATIONS

Based on the conclusions presented above, the implications that can be drawn are as follows:

For Academics

This study is expected to enrich literature in the fields of financial accounting and financial management. It focuses on Financial Distress in technology as well as transportation and logistics sector companies, with particular emphasis on analyzing factors that contribute to Financial Distress risk. Specifically, this study examines the effects of Sales Growth (SG), Debt to Asset Ratio (DAR), Operating Cash Flow (OCF), and Intellectual Capital (IC). Therefore, the findings of this study are expected to provide additional references and enhance academic understanding regarding the determinants that can be used to predict Financial Distress conditions.

For Companies

This study is expected to provide valuable insights for companies in the technology as well as transportation and logistics sectors in identifying factors that can be used to predict Financial Distress. Companies should pay close attention to the balance between business growth, financing structure, and operational capability to avoid increasing the risk of Financial Distress. Effective and efficient financial management is expected to help companies maintain financial stability and minimize the risk of Financial Distress. Therefore, companies are encouraged to

exercise greater caution in decision-making related to resource management and financial planning. The results of this study can be used as a reference for management in formulating more appropriate financial and operational strategies to support long-term business sustainability and performance.

For Regulators

For regulators or policymakers, this study indicates that Financial Distress conditions in technology as well as transportation and logistics sector companies cannot be assessed based on a single financial performance indicator. Although some companies exhibit increasing sales growth, the findings show that capital structure and the ability to generate operating cash flows play a more critical role in reflecting Financial Distress risk. This suggests that the financial stability of companies in these sectors requires comprehensive supervision. Therefore, active involvement from regulators such as the Financial Services Authority (OJK) and the Indonesia Stock Exchange (IDX) is necessary to strengthen risk-based supervisory policies, particularly through monitoring leverage ratios, operating cash flows, and intellectual capital disclosures. With appropriate and long-term oriented regulatory support, potential Financial Distress can be identified at an early stage, thereby maintaining sector stability and investor confidence in the Indonesian capital market.

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