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PREDICTION ANALYSIS USING THE MODIFIED ALTMAN Z-SCORE MODEL IN INFRASTRUCTURE COMPANIES ON THE IDX 2021-2025 PERIOD

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ABSTRACT

This study employs a descriptive quantitative approach using the Modified Altman Z-Score model to assess the financial health and bankruptcy risk of infrastructure companies. The model utilizes four financial ratios: Working Capital to Total Assets (X1), Retained Earnings to Total Assets (X2), Earnings Before Interest and Taxes to Total Assets (X3), and Book Value of Equity to Total Liabilities (X4). The analysis is based on annual financial statements from 2021–2024 and the third-quarter (Q3) 2025 interim financial statements of eight selected companies. The results indicate significant differences in financial conditions across the infrastructure sector. State-owned construction companies, namely Waskita Karya (WSKT) and Wijaya Karya (WIKA), consistently remained in the Distress Zone, with declining Z-Score values that eventually became negative. Adhi Karya (ADHI), Pembangunan Perumahan (PTPP), and Jasa Marga (JSMR) were generally classified in the Grey Zone, reflecting vulnerable but relatively stable conditions. Meanwhile, Bukaka Teknik Utama (BUKK), Citra Marga Nusaphala Persada (CMNP), and Nusantara Infrastructure (META) consistently occupied the Safe Zone. Overall, low profitability and high debt levels were identified as the primary factors contributing to bankruptcy risk among several issuers.

INTRODUCTION

The infrastructure sector is a key pillar of economic development in Indonesia. Adequate infrastructure not only facilitates the distribution of goods and services but also enhances national competitiveness amidst increasingly fierce global competition. According to data from the Central Statistics Agency (BPS, 2022), the construction

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sector contributes more than 10% to Indonesia's Gross Domestic Product (GDP), making it one of the largest contributing sectors after manufacturing and trade.

During President Joko Widodo's administration (2014-2024), infrastructure development was a priority program through the National Strategic Projects (PSN). The construction of toll roads, airports, ports, dams, and even high-speed trains was undertaken on a massive scale to stimulate economic growth (Sulung, U., & Muspawi, M, 2024). However, this ambitious program has come at the cost of increasing debt burdens for state-owned construction companies, known as BUMN Karya. Data from the Ministry of State-Owned Enterprises (SOEs) in 2023 showed that the total liabilities of four major state-owned construction companies PT Waskita Karya (Persero) Tbk, PT Wijaya Karya (Persero) Tbk, PT PP (Persero) Tbk, and PT Adhi Karya (Persero) Tbk had exceeded IDR 120 trillion, with a very high debt-to-equity ratio (Breuer et al., 2025).

This situation was exacerbated by the COVID-19 pandemic in 2020, which caused numerous project delays, decreased revenue, and disrupted cash flow. Research by Hidayat (2021) found that the majority of construction companies in Indonesia experienced financial distress during the pandemic, with significant declines in operating revenue and profitability (Yan et al., 2026).

Entering the 2021-2023 period, several companies attempted to recover by restructuring debt, injecting state capital (PMN), and resuming national strategic projects. Despite signs of improvement, most infrastructure companies continued to record net losses and struggled to maintain liquidity. 2024 will be a challenging transition period, as debt burdens remain high while project financing needs continue to rise. A 2024 report by PwC Indonesia noted that the debt-to-equity ratio of several state-owned construction companies reached more than five times, far exceeding healthy construction industry standards (Hesse & Loy, 2025).

These pressures have put a number of infrastructure companies at risk of bankruptcy. Bankruptcy is a serious risk, with persistent declines in profits. This risk can impact the company's survival and business objectives (Tyaga dan Kristanti, 2020).

Therefore, predictive bankruptcy analysis is crucial as a tool for early assessment of the likelihood of bankruptcy (Sulistyowati, P., & Manajemen, P, 2023). This analysis helps companies and stakeholders take various preventive measures to avoid significant losses and better manage financial risks through the use of predictive models based on financial ratios and historical company data (Zhao et al., 2024a). One popular predictive analysis is the Altman Z-Score model Altman (2017). The Altman Z-Score model is a popular method for predicting bankruptcy using a combination of several key financial ratios reflecting a company's liquidity, profitability, leverage, and activity (Altman, 1968).

Previous research on financial distress using the Altman Z-Score model has been extensively conducted in the manufacturing, banking, mining, and pharmaceutical sectors. Study (Ardan, 2024) only analyzing the effect of financial distress on stock prices without looking at the long-term trend of the company's financial condition. Study (Syahputra et al., 2025) focuses on coal mining companies, while (Sulistyowati & Manajemen, 2023) researching the banking sector.

Meanwhile, specific research on the infrastructure sector, particularly post-COVID-19 pandemic and during the national development transition period of 2021-

Vol. 9, No. 2 / May 2026
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2025, remains relatively limited. Furthermore, most previous studies only used annual data and did not include interim data for the current year (Q3 2025) to assess the latest dynamics of company performance (Syahputra, D., Mujanah, S., & Halik, A, 2025). Therefore, this study aims to fill this research gap by analyzing trends in the financial health of infrastructure companies more comprehensively using the Modified Altman Z-Score model for the 2021-2025 period.

This model can be modified to accommodate various company characteristics or market conditions. It generates a score that is then used to classify companies into three bankruptcy risk categories: safe, gray, and dangerous (Hapsari, E. I, 2012).

Therefore, this study is crucial for analyzing the financial health of infrastructure companies for the 2021-2025 period using the Modified Altman Z-Score model. The results are expected to provide a more comprehensive picture of the actual condition and prospects for the sustainability of infrastructure companies in Indonesia (Ross, S. A, 1977). Furthermore, this research is an original scientific work compiled based on the results of analysis and data processing conducted independently by the researcher. All data sources used in this study are derived from official financial reports published by the relevant PT. Therefore, this research does not contain elements of plagiarism, duplication, or other people's work. All sources have been cited in accordance with applicable scientific writing standards (Lerinsa, F, 2021).

LITERATURE REVIEW

Definition of Bankruptcy

According (Hanafi & Breliastiti, 2016), Bankruptcy not only refers to a legally defined state of insolvency, but also encompasses a state of financial distress where a company experiences cash flow difficulties, preventing optimal operational activities. In the current Indonesian context, the issue of bankruptcy is increasingly relevant, especially for infrastructure companies (Muslihat, A., 2018). This sector is characterized by capital intensity and a high dependence on external funding. State-owned construction companies, which have been the driving force behind infrastructure development during the Joko Widodo era, face the risk of bankruptcy due to high debt burdens and cash flow disruptions during the Covid-19 pandemic.

Causes of Bankruptcy

According (Hanafi & Breliastiti, 2016), Weak internal governance is a major trigger that makes companies vulnerable to financial failure. These internal factors include an unhealthy capital structure, managerial weaknesses, poor operational performance, and a lack of innovation (Zhao et al., 2024b). In addition to internal factors, external conditions also have a significant impact. According to (Brigham dan Houston, 2019), External factors are often beyond the control of company management, but their impact can threaten business sustainability. Some of these external factors include the Global Economic Crisis and Pandemic, Changes in Government Regulations and Policies, Industry Competition, and Social and Political Conditions (Brenes et al., 2022).

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Benefits of Bankruptcy Information

Bankruptcy potential analysis is not only important for academic purposes. Bankruptcy information can serve as an early warning system, enabling stakeholders to take precautions before a company's condition worsens (Altman, 2000), Bankruptcy prediction has strategic value in financial decision-making, investment, and public policy. For company management, it helps them evaluate their operational and funding strategies. For investors and creditors, it helps them measure the level of investment risk. For academics and researchers, bankruptcy information serves as a foundation for developing predictive models and enriching the financial literature (Amelia, R. W, 2023).

Supporting Theory

Several relevant theories that serve as the basis for this research include Agency Theory, Signaling Theory, and Trade-Off Theory. Agency Theory explains the potential for conflicts of interest in financing decision-making, Signaling Theory emphasizes the importance of financial information as a signal for investors, while Trade-Off Theory illustrates the dilemma companies face in utilizing debt (Alif Pipin Kharisma et al., 2025). By combining these three theories, this study provides a strong conceptual basis for analyzing the financial health of infrastructure companies in the 2021-2025 period using the Modified Altman Z-Score model (Ningsih, S., & Permatasari, F. F., 2018).

Bankruptcy Prediction Model

Bankruptcy prediction is an important area of study in financial management because it can provide an early indication of a company's potential for failure (Beaver, 1966) emphasizes univariate analysis by comparing financial ratios between bankrupt and non-bankrupt companies. (Altman, 1968) developed a Z-Score model using multivariate discriminant analysis (MDA). This model combines five key financial ratios. In addition to Altman, several other models have also been developed, such as the Springate Model (1978), which uses four financial ratios and has proven effective in Canada, and the Ohlson O-Score (1980), which is based on logistic regression with nine variables.

In the context of the 2021-2025 period, the use of the Modified Altman Z-Score becomes highly relevant. This model can be used to assess the financial condition of infrastructure companies after the Covid-19 pandemic. Thus, the Modified Altman Z-Score model serves not only as a financial analysis tool but also as an instrument for understanding the interaction between economic factors, public policy, and the sustainability of the national infrastructure sector (Brigham, E. F., & Houston, J. F, 2019).

Framework

This study uses the Modified Altman Z-Score model to analyze the potential bankruptcy of infrastructure companies. This model links four key financial ratios: Working Capital to Total Assets (X_1), Retained Earnings to Total Assets (X_2), Earnings Before Interest and Tax to Total Assets (X_3), and Book Value of Equity to Total Liabilities (X_4) to the company's financial health. The Z-Score calculation results are then used to classify companies into the safe zone, gray zone, or danger zone (Aprilianti

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et al., 2025).

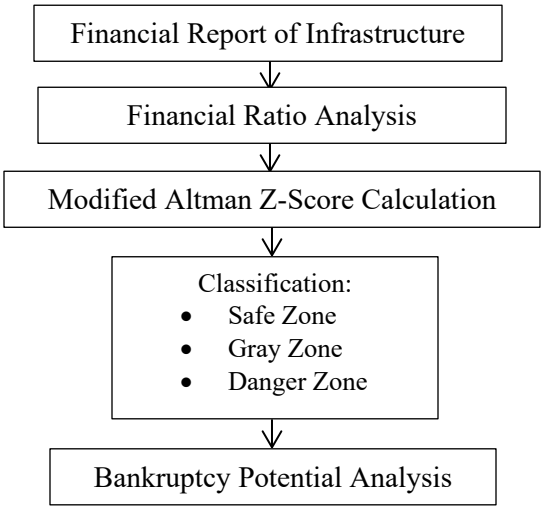

Figure 1. Framework of Thought

RESEARCH METHODS

This research uses a quantitative approach with descriptive methods. This quantitative approach was chosen because this research focuses on analyzing data in the form of figures from companies' financial reports, which are then processed using mathematical formulas to generate predictive values. The descriptive method is used to describe the financial health of infrastructure companies listed on the Indonesia Stock Exchange (IDX) for the period 2021-2025. The population in this study is all companies in the infrastructure, utilities, and transportation sectors listed on the Indonesia Stock Exchange (IDX) for the period 2021-2025. The research sample was determined using a purposive sampling technique.

The research sample includes PT Adhi Karya (Persero) Tbk, PT Waskita Karya (Persero) Tbk, PT Wijaya Karya (Persero) Tbk, PT PP (Persero) Tbk, PT Jasa Marga (Persero) Tbk, PT Nusantara Infrastructure Tbk, PT Citra Marga Nusaphala Persada Tbk, and PT Bukaka Teknik Utama Tbk. This study used secondary data in the form of annual financial reports and audited financial reports of infrastructure companies listed on the Indonesia Stock Exchange (IDX) for the period 2021-2025.

The data collection technique for this study was conducted using the documentation method, namely collecting data from existing records or archives, supplemented by library research (Revo et al., 2026). The data analysis technique used was quantitative descriptive analysis using the Modified Altman Z-Score model (1995). The formula used in this study is as follows:

$$\boldsymbol{Z = 6,56\ (X1) + 3,26\ (X2) + 6,72\ (X3) + 1,05\ (X4)}$$

In this formula, the ratio used consists of four variables, namely, the X1 ratio or Working Capital to Total Assets (WCTA), the X_2 ratio or Retained Earnings to Total Assets (RETTA), the X_3 ratio or Earning Before Interest and Tax to Total Assets

Jurnal Akuntansi, Manajemen Dan Ekonomi Islam (JAM-EKIS)
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DOI: https://doi.org/10.36085/jam-ekis

(EBITTA), and the X_4 ratio or Book Value of Equity to Book Value of Debt (BVEBVD).

RESEARCH RESULTS AND DISCUSSION

RESEARCH RESULTS

Working Capital to Total Assets Ratio (X_1)

This variable measures a company's liquidity level by comparing working capital to total assets. The calculation formula is:

$$X_1 = \frac{\text{Working capital}}{\text{Total Assets}}$$

Table 1. Working Capital to Total Assets Ratio (X_1 or WCTA) Value in the 2021-2025 Q3 Period

Corporate Name	X1 WCTA					Mean
	2021	2022	2023	2024	2025	
PT Adhi Karya Tbk	0,011866841	0,124427847	0,088890937	0,070454686	0,06303022	0,071734106
PT Wijaya Karya Tbk	0,003128367	0,046616248	-0,11572438	0,176461047	0,163221222	0,054740501
PT Waskita Karya Tbk	0,148521309	0,121928882	-0,012385669	-0,026707242	-0,019427974	0,042385861
PT Pembangunan Pemerintahan	0,06453013	0,097685929	0,066273804	0,11453009	0,124280462	0,093460083
PT Jasa Marga Tbk	-0,016324179	0,003776905	-0,114810607	-0,09597495	-0,072228763	-0,059112319
PT Nusantara Infrastructure Tbk	0,101018301	-0,088441335	0,075307114	0,070075926	0,07060172	0,045712345
PT Citra Marga Nusaphala Persada Tbk	-0,082253691	-0,116475681	-0,102414807	0,008103216	-0,007614622	-0,060131117
PT Bukaka Teknik Utama Tbk	0,067340959	0,078369543	0,000868525	0,033304906	0,01272551	0,038521889

Table 1 shows the X_1 ratio or WCTA values of the sample companies, which include eight infrastructure companies, across five financial reporting periods. Based on the analysis, the highest ratio value was obtained in 2021 by PT Waskita Karya Tbk at 0.148521309. Subsequently, in 2022 and 2023, PT Adhi Karya Tbk had the highest WCTA ratio values, namely 0.124427847 and 0.088890937. Meanwhile, in 2024 and 2025, PT Wijaya Karya Tbk showed the highest X_1 ratio among other companies, namely 0.176461047 and 0.163221222. The average WCTA value during the five financial reporting periods of PT Pembangunan Pemerintahan Tbk showed the highest results compared to other companies, amounting to 0.093460083. In addition, there are 2 companies recorded as having a negative average ratio value, namely PT Jasa Marga Tbk and PT Citra Marga Nusaphala Persada Tbk.

Retained Earnings to Total Assets Ratio (X_2)

This ratio indicates a company's ability to generate retained earnings from its

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total assets. This indicator is crucial because it shows how much of a company's assets are generated from profits and not from debt or external capital. This indicator can demonstrate a company's resilience during economic market turmoil. The RETTA ratio can be calculated using the following formula:

$$X2 = \frac{\text{Retained earning}}{\text{Total Assets}}$$

Table 2. Retained Earnings to Total Assets Ratio (X2 or RETTA) for the 2021-2025 Q3 Period

Corporate Name	X2 RETTA					Mean
	2021	2022	2023	2024	2025	
PT Adhi Karya Tbk	0,051161898	0,052887671	0,057725626	0,072811968	0,076008926	0,062119218
PT Wijaya Karya Tbk	0,005988567	0,004407959	-0,104046793	-0,144806653	-0,217741109	-0,091239606
PT Waskita Karya Tbk	-0,057539051	-0,083624681	-0,125372362	-0,188755118	-0,246645911	-0,140387424
PT Pembangunan Pemerintahan	0,061004637	0,063562046	0,073300965	0,080562239	0,082206863	0,07212735
PT Jasa Marga Tbk	0,135099885	0,180216518	0,175304395	0,191362165	0,183980311	0,173192655
PT Nusantara Infrastructure Tbk	0,079056964	0,053186279	0,08322491	0,148086926	0,163497079	0,105410432
PT Citra Marga Nusaphala Persada Tbk	0,269447478	0,276307467	0,282863458	0,299139376	0,321698419	0,28989124
PT Bukaka Teknik Utama Tbk	0,472086306	0,466156983	0,430646556	0,450202082	0,204560989	0,404730583

The calculation of the retained earnings ratio to total assets can be seen in Table 2. The table shows that the highest X_2 ratio value for 4 periods, namely 2021-2024, was found in PT Bukaka Teknik Utama Tbk with values of 0.472086306, 0.466156983, 0.430646556, 0.450202082. Meanwhile, in 2025, the highest X2 ratio value was shown in PT Citra Marga Nusaphala Persada Tbk with a nominal value of 0.321698419. The highest average value for five periods was obtained by PT Bukaka Teknik Utama Tbk showing the highest results with a value of 0.404730583.

Earnings Before Interest and Tax to Total Assets Ratio (X_3)

The X_3 ratio can represent a company's capacity to utilize all of its assets to generate operating profit, before being affected by financing structures (interest) and fiscal obligations (taxes). In this context, profit before tax is understood as net profit before being reduced by financial expenses and income tax. The X_3 ratio can be calculated using the following formula:

$$X3 \text{ or } EBITTA = \frac{\text{Earnings Before Interest and Tax}}{\text{Total Assets}}$$

Table 3. Value of the Ratio of Earnings Before Interest and Taxes to Total Assets

Jurnal Akuntansi, Manajemen Dan Ekonomi Islam (JAM-EKIS)
Vol. 9, No. 2 / May 2026
Online ISSN: 2655-6359, Print ISSN: 2656-436X
DOI: https://doi.org/10.36085/jam-ekis

(X3 or EBITTA) in the Period 2021-2025 Q3 Q3

Corporate Name	X3 EBITTA					Mean
	2021	2022	2023	2024	2025	
PT Adhi Karya Tbk	0,032770858	0,033962938	0,040652727	0,040417741	0,020196956	0,033600244
PT Wijaya Karya Tbk	0,019513334	0,020620318	-0,069102012	0,012925515	-0,020683936	-0,007345356
PT Waskita Karya Tbk	0,036234427	0,03101038	0,006740022	0,006150885	-0,010312144	0,013964714
PT Pembangunan Pemerintahan	0,04158478	0,036790658	0,032728506	0,04811168	0,032867689	0,038416663
PT Jasa Marga Tbk	0,065118769	0,08351114	0,08907741	0,069642685	0,048053476	0,071080696
PT Nusantara Infrastructure Tbk	0,031393246	0,033399455	0,077294045	0,084572532	0,026264448	0,050584745
PT Citra Marga Nusaphala Persada Tbk	0,072226642	0,068410303	0,082676589	0,075194365	0,057059155	0,071113411
PT Bukaka Teknik Utama Tbk	0,130625631	0,099493875	0,10821826	0,077763442	0,029627918	0,089145825

Based on the calculation results of Table 4.3, PT Bukaka Teknik Utama Tbk obtained the highest X_3 ratio value during 2021 to 2023 with values of 0.130625631, 0.099493875, and 0.10821826. In 2024, PT Nusantara Infrastructure Tbk recorded the highest X_3 ratio value, namely 0.084572532. In 2025, the highest value was obtained by PT Citra Marga Nusaphala Persada Tbk with a value of 0.057059155. The highest average X_3 ratio value for five periods was obtained by PT Bukaka Teknik Utama Tbk with a value of 0.089145825. Meanwhile, the calculation at PT Wijaya Karya Tbk recorded a negative average X_3 result with a value of -0.007345356.

Book Value of Equity to Book Value of Debt Ratio (X_4)

This variable measures a company's ability to cover all its liabilities using the book value of its equity. The book value of equity is derived from the company's total equity, while the book value of debt, or total liabilities, is calculated by adding short-term and long-term liabilities. The X_4 ratio is calculated using the following formula:

$$X4 = \frac{\text{Book Value of Equity}}{\text{Total Debt}}$$

Table 4. Book Value of Capital to Debt Value (X4 or BVEBVD) in the 2021-2025 Period Q3

Corporate Name	X4 BVEBVD					Mean
	2021	2022	2023	2024	2025	
PT Adhi Karya Tbk	0,165224082	0,283153016	0,294782149	0,381399646	0,405457335	0,306003246
PT Wijaya Karya Tbk	0,335608031	0,303825991	0,169680501	0,229688256	0,176967372	0,24315403
PT Waskita Karya Tbk	0,175418674	0,169604552	0,138122464	0,113808995	0,064794029	0,132349743
PT	0,347450683	0,346356423	0,365944588	0,369057437	0,380224928	0,361806812

Jurnal Akuntansi, Manajemen Dan Ekonomi Islam (JAM-EKIS)
Vol. 9, No. 2 / May 2026
Online ISSN: 2655-6359, Print ISSN: 2656-436X
DOI: https://doi.org/10.36085/jam-ekis

Corporate Name	X4 BVEBVD					Mean
	2021	2022	2023	2024	2025	
Pembangunan Pemerintahan						
PT Jasa Marga Tbk	0,336670849	0,391060013	0,430429967	0,691722728	0,648425233	0,499661758
PT Nusantara Infrastructure Tbk	1,042034399	0,453991268	5,880616558	7,019259696	7,861383777	4,45145714
PT Citra Marga Nusaphala Persada Tbk	2,179850751	1,77716024	1,519139311	1,552677887	1,75405777	1,756577192
PT Bukaka Teknik Utama Tbk	1,739455129	1,574531649	1,179054659	1,250301224	0,454137464	1,239496025

Based on the calculation results in Table 4.4, the highest X_4 ratio value in 2021 and 2022 was found in PT Citra Marga Nusaphala Persada Tbk. Meanwhile, PT Nusantara Infrastructure Tbk recorded the highest X_4 ratio value compared to other companies during 2023, 2024, and 2025. Meanwhile, PT Nusantara Infrastructure Tbk had the highest average value, namely 4.45145714. These eight companies recorded a positive average X_4 value, which reflects that the company did not experience any solvency problems during the five periods.

Modified Z-Score Results

Table 5. Modified Z-Score Values for Bankruptcy Predictions of Infrastructure Companies Listed on the Indonesia Stock Exchange in 2021-2025 Q3

No	Corporate Nem	Year	*Z-Score* Value	Zone Interpretation
1.	PT Adhi Karya Tbk	2021	0,63833972	Danger Zone
		2022	1,514202093	Grey Zone
		2023	1,35401767	Grey Zone
		2024	1,371626605	Grey Zone
		2025	1,222721087	Grey Zone
2.	PT Wijaya Karya Tbk	2021	0,523562852	Danger Zone
		2022	0,77775836	Danger Zone
		2023	-1,384545473	Danger Zone
		2024	1,013546911	Danger Zone
		2025	0,407714888	Danger Zone
3.	PT Waskita Karya Tbk	2021	1,214407437	Grey Zone
		2022	0,913711537	Danger Zone
		2023	-0,29964235	Danger Zone
		2024	-0,629707797	Danger Zone
		2025	-0,932777052	Danger Zone
4.	PT Pembangunan Pemerintahan	2021	1,266465709	Grey Zone
		2022	1,458939431	Grey Zone

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Online ISSN: 2655-6359, Print ISSN: 2656-436X
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No	Corporate Nem	Year	Z-*Score* Value	Zone Interpretation
		2023	1,277894679	Grey Zone
		2024	1,724771092	Grey Zone
		2025	1,703381249	Grey Zone
5.	PT Jasa Marga Tbk	2021	1,124441529	Grey Zone
		2022	1,584090218	Grey Zone
		2023	0,8688864	Danger Zone
		2024	1,188552688	Grey Zone
		2025	1,129720982	Grey Zone
6.	PT Nusantara Infrastructure Tbk	2021	2,225504491	Grey Zone
		2022	0,294347282	Danger Zone
		2023	7,459391245	Safe Zone
		2024	8,88101155	Safe Zone
		2025	9,42709782	Safe Zone
7.	PT Citra Marga Nusaphala Persada Tbk	2021	3,113020886	Safe Zone
		2022	2,46241737	Grey Zone
		2023	2,400976693	Grey Zone
		2024	3,163969378	Safe Zone
		2025	3,223983102	Safe Zone
8.	PT Bukaka Teknik Utama Tbk	2021	4,684990174	Safe Zone
		2022	4,355633037	Safe Zone
		2023	3,374839398	Safe Zone
		2024	3,521525592	Safe Zone
		2025	1,426292116	Grey Zone

Based on the modified Z-Score calculations for eight infrastructure sector companies for the 2021-2025 period, the companies' financial health fluctuated. In 2021, only two companies were in the Safe Zone, while in 2022, the figure decreased to just one company. Conditions worsened in 2023, with three companies entering the Danger Zone, including PT Waskita Karya Tbk and PT Wijaya Karya Tbk, which recorded negative scores. This condition continued into 2024. In 2025 (Q3), only one company was in the Safe Zone, while the other two companies remained in the Danger Zone. Consistently, PT Wijaya Karya Tbk showed the most vulnerable condition, having been in the Danger Zone for five consecutive years.

PEMBAHASAN

1. PT Adhi Karya Tbk

PT Adhi Karya Tbk was in the Danger Zone in 2021 with a Z-Score of 0.63, indicating a high risk of bankruptcy. However, in the 2022-2025 period, the company successfully emerged from the distress zone and moved into the Grey Zone with a score of 1.22-1.51. Despite showing signs of recovery, the company has not yet reached the Safe Zone due to ongoing challenges such as low solvency and suboptimal profitability.

Jurnal Akuntansi, Manajemen Dan Ekonomi Islam (JAM-EKIS)
Vol. 9, No. 2 / May 2026
Online ISSN: 2655-6359, Print ISSN: 2656-436X
DOI: https://doi.org/10.36085/jam-ekis

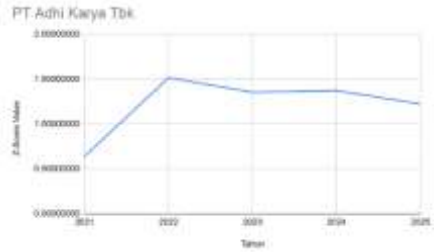

Figure 2. Z-Score Trend of PT Adhi Karya Tbk

2. PT Wijaya Karya Tbk

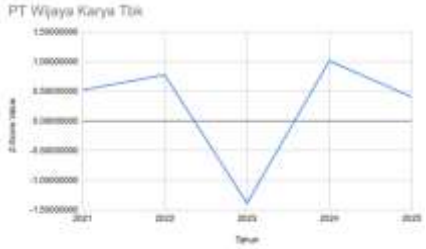

Figure 3. Z-Score Trend of PT Wijaya Karya Tbk

PT Wijaya Karya Tbk consistently remained in the Danger Zone during the 2021–2025 period. A significant decline occurred especially in 2023, when the Z-Score reached -1.38. This condition indicates serious pressure on the company's profitability and capital structure. The high debt burden of long-term infrastructure projects has caused the company to experience liquidity pressure and a significant increase in interest expenses. This phenomenon aligns with the Trade-Off Theory, which explains that while the use of debt can indeed accelerate company expansion, exceeding optimal capacity actually increases the risk of financial distress (Souisa et al., 2024). Furthermore, delays in government project payments and the slow recovery of the construction sector post-pandemic have also worsened the company's cash flow. These current conditions indicate that aggressive project expansion without a balanced ability to generate adequate operating profits can increase the potential for company bankruptcy (Manda et al., 2024).

3. PT Waskita Karya Tbk

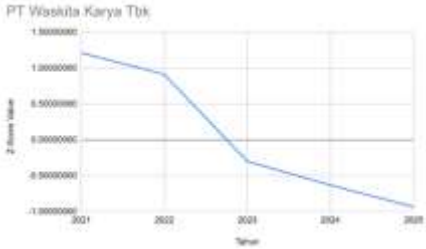

Figure 4. Z-Score Trend of PT Waskita Karya Tbk

Jurnal Akuntansi, Manajemen Dan Ekonomi Islam (JAM-EKIS)
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The condition of PT Waskita Karya Tbk is most worrying because the Z-Score continues to decline, reaching negative levels in 2024 and 2025. This indicates that the company is simultaneously experiencing pressures on liquidity, profitability, and solvency. High reliance on debt financing to finance national strategic projects has resulted in an unhealthy capital structure. From an Agency Theory perspective, this condition may reflect overly aggressive expansion decisions by management, increasing the company's long-term risk. The company's debt restructuring has not been able to significantly improve operational profitability because interest expenses and long-term liabilities remain very high (Maulana et al., 2023).

4. PT Pembangunan Perumahan Tbk

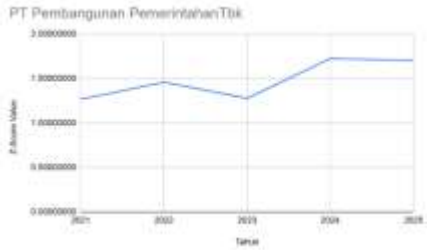

Figure 5. Z-Score Trend of PT Pembangunan Pemerintahan Tbk

PT Pembangunan Perumahan Tbk demonstrated relatively stable performance, with a Z-score in the Grey Zone for the 2021-2025 period, ranging from 1.27 to 1.72. This stability is supported by positive operational performance and maintained liquidity. However, low solvency remains a major factor hindering the company from achieving the Safe Zone.

5. PT Jasa Marga Tbk

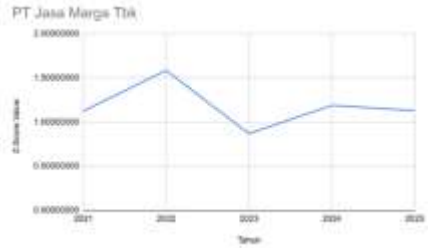

Figure 6. Z-Score Trend of PT Jasa Marga Tbk

PT Jasa Marga Tbk is predominantly in the Grey Zone with a Z-Score ranging from 1.20 to 1.30. However, it briefly entered the Danger Zone in 2023 with a score of 0.86. This condition is influenced by its high debt burden and limited liquidity. However, stable operating income helps the company maintain a relatively manageable financial condition.

Jurnal Akuntansi, Manajemen Dan Ekonomi Islam (JAM-EKIS)
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6. PT Nusantara Infrastructure Tbk

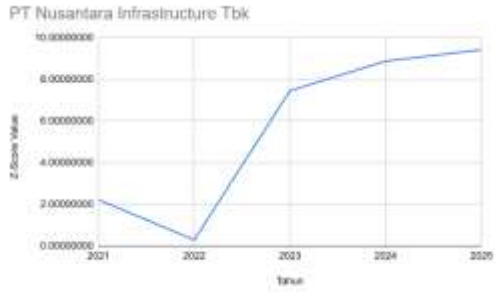

Figure 7. Z-Score Trend of PT Nusantara Infrastructure Tbk

PT Nusantara Infrastructure Tbk demonstrated significant improvement, moving from a Danger Zone at the beginning of the period to a Safe Zone in 2025, with a Z-Score of 9.42. This improvement was driven by improvements in its capital structure, particularly increased equity, which strengthened solvency and significantly reduced the risk of bankruptcy (Aradhana Sorout & Netra Pal Singh, 2025).

7. PT Citra Marga Nusaphala Persada Tbk

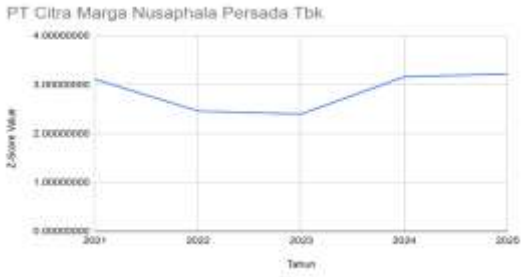

Figure 8. Z-Score Trend of PT Citra Marga Nusaphala Persada Tbk

PT Citra Marga Nusaphala Persada Tbk demonstrated a stable and healthy financial condition, with the majority of its assets in the Safe Zone and its Z-Score increasing from 3.11 to 3.22 at the end of the period. This performance is supported by consistent profitability and a strong capital structure, thus the company has a low risk of bankruptcy.

8. PT Bukaka Teknik Utama Tbk

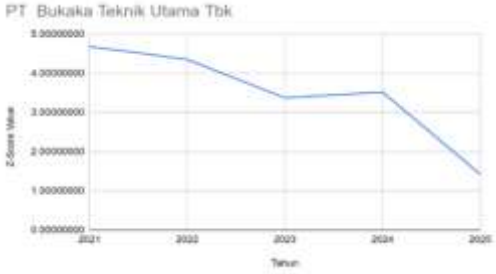

Figure 9. Z-Score Trend of PT Bukaka Teknik Utama Tbk

Jurnal Akuntansi, Manajemen Dan Ekonomi Islam (JAM-EKIS)
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PT Bukaka Teknik Utama Tbk demonstrated excellent financial performance and consistently remained in the Safe Zone from 2021 to 2024, with a peak value of 4.68. However, in 2025, the Z-Score decreased to 1.42, entering the Grey Zone due to declining profitability and operational efficiency. Despite this, the company's overall financial fundamentals remain relatively strong.

CONCLUSION

Based on data analysis using the Modified Altman Z-Score model on eight infrastructure subsector companies from 2021 to 2025 (Q3 data), researchers concluded the following dynamics of the financial condition of infrastructure companies:

1) 2021 marked the beginning of the post-pandemic recovery period, with a clear polarization in financial health. The State-Owned Construction Company (ADHI, WIKA, WSKT) began the period in the Distress Zone, with ADHI recording the lowest score at 0.63. Conversely, private companies such as BUKK and CMNP began the year in relatively healthy condition in the Safe Zone.
2) 2022, several issuers made efforts to improve their financial positions. ADHI successfully climbed to the Grey Zone, indicating improved working capital efficiency. This year, BUKK reached its peak financial performance with a score of 4.68. Meanwhile, META recorded its lowest point at 0.29 due to investment burden pressure.
3) 2023 was the most crucial and stressful year for this sector. WIKA experienced a drastic decline, reaching negative -1.38, and JSMR briefly fell into the Danger Zone with a score of 0.86. This indicates that interest expenses and short-term debt began to significantly erode operational asset productivity in most of the sample.
4) 2024, entered this year, a structural recovery trend was observed in several companies. CMNP successfully re-entered the Safe Zone with a score of 3.16 after previously being stuck in the Grey Zone. This sector showed signs of stabilization, although state-owned enterprises (SOEs) such as WIKA and WSKT were still unable to emerge from the Danger Zone due to deep capital deficits.
5) 2025 (Q3 Data): The end of the observation period showed a very extreme separation in financial conditions. META made a remarkable jump to 9.42 (Safe Zone) thanks to massive capital restructuring. Meanwhile, WSKT recorded its lowest score at -0.93. In general, this period concluded with companies with capital flexibility remaining in the Safe Zone, while state-owned construction companies remained in the Grey Zone and at risk.

Companies in the distressed category are advised to undertake debt restructuring, operational efficiency measures, and project expansion controls to improve solvency. Investors should also consider trends in profitability and company leverage before making investment decisions in the infrastructure sector.

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