Technium Business and Management (TBM)
Vol. 8, pp. 71-84 (2024)
ISSN: 2821-4366
www.techniumscience.com

BUSINESS FEASIBILITY ANALYSIS FOR INVESTORS IN TELECOMMUNICATIONS COMPANIES FOR 2017-2022 PERIOD USING THE FINANCIAL DISTRESS MODEL

John Henry Wijaya, S.E., M.M.
john.henry@widyatama.ac.id
Lecturer at Widyatama University

Denny Saputera, S.E., M.M.
denny.saputera@widyatama.ac.id
Lecturer at Widyatama University

Wahyu Panji Nugraha, S.E., M.M.
wahyu.panji@widyatama.ac.id
Lecturer at Widyatama University

Abstract. This study analyzes the financial viability of Indonesian telecommunications companies from 2017 to 2022 using financial distress models. The research focuses on comparing the Altman Z-Score and Grover models to predict financial distress, evaluating their effectiveness in providing insights for investors. The telecommunications sector in Indonesia has seen rapid growth, driven by increased smartphone penetration, internet access, and the adoption of 5G technology. However, this growth is accompanied by challenges such as intense competition, economic instability, and regulatory changes, which pose risks of financial distress.Financial distress in telecommunications companies is assessed through key financial ratios, examining liquidity, leverage, and profitability. The study utilizes historical financial data from leading telecommunications companies, applying the Zmijewski and Grover models to predict bankruptcy and assess financial health. Results indicate significant variations in financial performance across companies, with some showing stability and others fluctuating between healthy and distressed states.The research identifies critical financial ratios used in performance evaluation and highlights the relevance of each method. Findings suggest that while both models are valuable, the Zmijewski model demonstrates higher accuracy (93%) compared to the Grover model (77%), making it more reliable for predicting financial distress. This study contributes to better financial management practices in the telecommunications sector, offering investors a comprehensive tool for making informed decisions and mitigating risks.

Keywords. Financial Distress, Altman Z-Score, Grover Model, Telecommunications Industry, Financial Ratios, Bankruptcy Prediction, Investment Decisions, Indonesia.

Technium Business and Management (TBM)
Vol. 8, pp. 71-84 (2024)
ISSN: 2821-4366
www.techniumscience.com

1. Introduction

1.1. Research Background

The telecommunications industry in Indonesia experienced rapid development during the period from 2017 to 2022. Significant growth was evident in the penetration of smartphone usage and internet access, creating a dynamic digital ecosystem. The adoption of the latest technologies, such as 5G, has also been a major driver of innovation in this sector. Telecommunications companies are not only providing connectivity services but are also playing a role in supporting economic development and digital transformation. Active involvement in digital infrastructure and technological innovation contributes positively to the advancement of other sectors in Indonesia.

The Indonesian telecommunications market is characterized by increasingly intense competition. Rapid customer growth, increased demand for high-data services, and the adoption of new technologies necessitate swift adaptation. Telecommunications companies face the challenge of maintaining their competitiveness in a rapidly changing environment. Economic instability, currency exchange rate fluctuations, and regulatory changes add further challenges for telecommunications companies. These conditions can lead to revenue declines and hinder profit growth, complicating company strategies in responding to market dynamics.

Financial distress reflects a condition where a company experiences serious financial difficulties. This can be seen in deteriorating financial ratios, such as low liquidity ratios, declining profits, and an increased proportion of debt to equity. Managing the risk of financial distress is essential for investors in the telecommunications sector. The ability to identify and evaluate early signs of financial difficulties enables investors to make more timely and intelligent investment decisions, reducing potential risks associated with their investments.

The Indonesian telecommunications industry during the period from 2017 to 2022 experienced rapid growth alongside increased internet penetration, the adoption of the latest technologies, and comprehensive digital transformation. Customer growth, increased demand for high-data services, and investments in infrastructure have been catalysts for the sector's positive development. However, behind this glittering growth, several challenges and complexities emerge, signaling a shift in dynamics that telecommunications companies need to address. One crucial aspect that arises is financial issues, especially in the context of financial distress. The increasingly competitive and dynamic telecommunications market is a significant source of external challenges. Companies are competing for market share in an environment where customers are becoming increasingly savvy and demanding better services. On the other hand, rapid regulatory changes require agile adaptation, while policy uncertainties can create additional pressure on business strategies.

While growth necessitates substantial investments in technology and networks, telecommunications companies must carefully manage their financial structures. High debt to finance investments can increase the risk of financial distress, especially when revenues and net profits do not align with expectations. In this framework, the concept of financial distress becomes very important for investors. Financial distress not only reflects the financial health of a company but also serves as a potential predictor of future stock performance. For investors on the Indonesia Stock Exchange interested in the telecommunications sector, the ability to understand and manage the risk of financial distress can be a determining factor in making wise investment decisions. With a deep understanding of the external and internal conditions affecting the telecommunications sector, investors can select companies appropriately. Early identification of signs of financial distress provides a competitive advantage, enabling investors to avoid unwanted risks and maximize their potential returns.

In this context, research focused on financial distress analysis using the Zmijewski and Grover methods can be a powerful tool to guide investors in making data-driven and in-depth analysis-based decisions. In this way, investors can prepare to face challenges and optimize their investment portfolios in such a dynamic telecommunications sector.

Technium Business and Management (TBM)
Vol. 8, pp. 71-84 (2024)
ISSN: 2821-4366
www.techniumscience.com

1.2. Research Purpose

This research aims to compare the effectiveness of two financial ratio analysis methods, namely the Altman Z-Score and the Grover model, in telecommunications companies in Indonesia over the period from 2017 to 2022. The case study used is the financial data from leading telecommunications companies during this period. The specific objectives of this study are as follows:

- To identify the types of financial ratios commonly used in evaluating the financial performance of telecommunications companies in Indonesia, and to determine the relevance of each financial ratio analysis method.
- To analyze the financial performance of these telecommunications companies based on the results produced by the Altman Z-Score and Grover methods, with a focus on changes in financial performance from 2017 to 2022.
- To identify the factors influencing the management of financial ratios in telecommunications companies in Indonesia, including internal and external factors that may affect the outcomes of financial ratio analysis using both methods.

1.3. Research Significance

This research holds high urgency because suboptimal financial management can seriously impact the stability and viability of companies in the telecommunications sector. In some cases, telecommunications companies may even face bankruptcy risks if financial issues are not properly addressed. Therefore, this study is deemed crucial to providing in-depth insights into the financial management of telecommunications companies in Indonesia. The results of this research are expected to make a significant contribution to improving financial management practices in the telecommunications sector and providing a more comprehensive overview of the overall financial condition of the telecommunications industry in Indonesia.

2. Literature Review

2.1. Financial Distress

Based on Indonesian Law; UUD No. 4 Tahun 1998, an entity is considered bankrupt if, in a court decision, it is found that the debtor has two or more creditors, fails to pay at least one due and payable debt. (Rudianto, 2015) in (Kusmartono & Rusmanto, 2022) defines bankruptcy as "the failure of a company to conduct its operations to achieve its objectives." Bankruptcy is a condition where a company is unable to function properly due to experiencing serious financial difficulties. In defining bankruptcy, bankruptcy risk is closely related to the company's uncertainty regarding its ability to continue business or operational activities if its financial performance continues to decline.

A company's competitiveness will be determined by its own performance. Financial performance is one of the key factors affecting a company's overall performance. Poor or weak financial performance will hinder a company's efforts to improve its results. If not addressed promptly, the company will face bankruptcy. The financial condition of a company can be measured and assessed through financial statement analysis. Financial statement analysis is a process of examining financial statements and their components to evaluate and predict the financial condition and results of a company or business entity. Various tools and techniques can be used to perform financial statement analysis.

According to (Beaver et al., 2011), in general, financial distress refers to the inability to pay obligations (such as debts) on time, creating a condition of bankruptcy. (Fahmi, 2015) in (Hertina & Kusmayadi, 2020) defines financial distress as the stage of financial condition decline that occurs before bankruptcy or liquidation. Financial distress begins with the inability to meet obligations, especially short-term obligations like liquidity, and also includes obligations in the solvency category.

Technium Business and Management (TBM)
Vol. 8, pp. 71-84 (2024)
ISSN: 2821-4366
www.techniumscience.com

2.2. Zmijewski Model

The Zmijewski bankruptcy prediction model is based on ratio analysis, which assesses a company's performance, leverage, and liquidity. The amount of debt is emphasized as the most influential component of bankruptcy in this method. The formula for the Zmijewski model is as follows:

$X = -4{,}3 - 4{,}5\ X_1 + 5{,}7\ X_2 - 0{,}004\ X_3$

Where :

X_1 = ROA (EBIT / Total Assets)
X_2 = Leverage (Total Debt/Total Assets)
X_3 = Liquidity (Current Assets/Current Liabilities)

The Zmijewski model posits that if the score obtained by a company from this bankruptcy prediction model exceeds 0, the company is predicted to have the potential for bankruptcy.

2.3. Grover Model

According to Saputra et al. (2021), the Grover model was developed by redesigning and reassessing the Altman Z-Score model. In 1968, Jeffrey S. Grover added thirteen additional financial ratios to the sample based on the Altman Z-Score model. Companies with a score less than or equal to -0.02 ($Z \leq -0.02$) are classified as bankrupt according to the Grover model. In contrast, non-bankrupt companies have a score greater than or equal to 0.01 ($Z \geq 0.01$). The Grover model was developed by redesigning and reassessing the Altman Z-Score model. The formula for the Grover (G-Score) is as follows:

$G\text{-Score} = 1{,}650X_1 + 3{,}404X_2 + 0{,}016ROA + 0{,}057$

Where :

X_1 = Working Capital/Total Assets
X_2 = Earnings Before Interest and Taxes/Total Asset
ROA = Net Income to Total Asset

3. Research Method

The objects of this research are companies within the telecommunications sector during the period from 2017 to 2022. In this study, several essential steps are necessary for effective data management. The first step is to calculate the Financial Ratios for all data involved in the components of the four models used. This initial stage establishes the scores from each bankruptcy model using the integrated financial ratios in the Zmijewski and Grover models.

The second step is to apply the Financial Distress Prediction Models, considering the sample categories. The Zmijewski and Grover models are used to identify companies experiencing financial distress. Subsequently, the samples are verified by comparing the prediction results with the actual financial situation of the companies, referring to two established categories: companies in financial distress and companies not in financial distress. This validation forms the basis for assessing the accuracy of the prediction models, followed by testing their accuracy levels.

The third step is conducting Descriptive Statistical Analysis to obtain information about the Min Value, maximum, mean, and standard deviation values of the four bankruptcy prediction methods for companies facing financial distress. These values provide an overview of the variation and tendencies in the analyzed data.

Next, the fourth step is to perform a Normality Test to evaluate the distribution of ordinal, interval, or ratio-scaled data. The Kolmogorov-Smirnov test is used with a significance level of 0.05 to examine the normality assumption, which is crucial for conducting a Paired Sample T-test.

The fifth step is to conduct Hypothesis Testing using the statistical application SPSS 20. The Paired Sample T-test is used if the data is normally distributed, while the Wilcoxon Signed Rank Test is used if the data is not normally distributed. Finally, the study concludes with summarizing the findings, where conclusions are drawn and supported by the results of the accuracy tests conducted.

BUSINESS & MANAGEMENT

Technium Business and Management (TBM)
Vol. 8, pp. 71-84 (2024)
ISSN: 2821-4366
www.techniumscience.com

4. Results

Calculation of Net Income After Tax to Total Assets in Telecommunications Companies for the Period 2017-2022

The formula for EATTA is as follows:

EATTA = Earnings After Taxes / Total Assets

Using this formula, the following table can be employed to calculate the ratio of Earnings After Taxes to Total Assets for various telecommunications companies listed on the Indonesia Stock Exchange:

Table 1. EATTA Calculations

No	Company	2017	2018	2019	2020	2021	2022
1	BALI	0.025	0.014	0.011	0.018	0.037	0.040
2	BTEL	-2.084	-1.009	0.464	-33.109	-5.680	-0.502
3	CENT	-0.026	0.006	0.001	-0.066	-0.040	-0.123
4	EXCL	0.006	-0.057	0.011	0.005	0.017	0.012
5	FREN	-0.125	-0.140	-0.079	-0.039	-0.010	0.022
6	GHON	0.086	0.101	0.085	0.093	0.087	0.078
7	GOLD	-0.005	-0.033	0.021	0.038	0.040	0.039
8	IBST	0.041	0.018	0.014	0.006	0.006	0.004
9	ISAT	0.025	-0.039	0.025	-0.010	0.108	0.047
10	KBLV	-0.123	-0.600	-0.035	-0.003	-0.276	-0.221
11	LINK	0.174	0.130	0.134	0.120	0.090	0.020
12	MORA	0.015	0.066	0.052	0.050	0.046	0.045
13	SUPR	0.026	-0.104	0.020	0.058	-0.005	0.097
14	TBIG	0.091	0.024	0.028	0.029	0.038	0.039
15	TLKM	0.164	0.130	0.124	0.119	0.122	0.100
16	TOWR	0.111	0.095	0.085	0.083	0.052	0.053
Min Value		-2.084	-1.009	-0.079	-33.109	-5.68	-0.502
Max Value		0.174	0.130	0.464	0.120	0.122	0.100

Source: Researcher's processed data

The table above presents the calculation of EATTA (Earnings After Tax to Total Assets) for 16 stocks over the period from 2017 to 2022. EATTA is an important measure in evaluating a company's efficiency in generating net profit after taxes, considering the total assets owned.

Throughout the observed years, these stocks exhibited diverse EATTA performances. Several stocks showed positive and stable performance, such as BALI, GHON, GOLD, IBST, ISAT, MORA, SUPR, TBIG, TLKM, and TOWR. This performance is characterized by consistently positive or stable EATTA from year to year.

However, some stocks experienced significant fluctuations in their EATTA performance. For instance, BTEL recorded a highly negative EATTA in 2020 (-33.109), indicating serious issues in generating adequate net profit relative to the total assets owned. Additionally, KBLV also showed inconsistent performance with frequently negative EATTA.

During the observed period, these stocks experienced varying changes in performance, influenced by internal and external factors. Further analysis of these factors is necessary to gain a deeper understanding of the financial performance of these stocks and their potential future developments.

Calculation of Total Debt to Total Assets in Telecommunications Companies for the Period 2017-2022

The formula for Total Debt to Total Assets (TDTA) is as follows:

TDTA = Total Debt / Total Asset

Using this formula, the following table can be used to calculate the ratio of Total Debt to Total Assets for various telecommunications companies listed on the Indonesia Stock Exchange:

BUSINESS & MANAGEMENT

Technium Business and Management (TBM)
Vol. 8, pp. 71-84 (2024)
ISSN: 2821-4366
www.techniumscience.com

Table 2. TDTA Calculations

No	Companies	2017	2018	2019	2020	2021	2022
1	BALI	0.537	0.514	0.550	0.541	0.540	0.541
2	BTEL	20.71	22.61	973.40	3461.97	277.32	177.01
3	CENT	0.339	0.416	0.473	0.676	0.711	1.029
4	EXCL	0.615	0.681	0.695	0.717	0.723	0.704
5	FREN	0.616	0.506	0.539	0.680	0.708	0.661
6	GHON	0.646	0.191	0.187	0.190	0.296	0.324
7	GOLD	0.543	0.606	0.100	0.084	0.095	0.081
8	IBST	0.320	0.324	0.347	0.404	0.310	0.375
9	ISAT	0.707	0.771	0.781	0.794	0.837	0.722
10	KBLV	0.530	0.813	0.868	0.859	0.993	1.319
11	LINK	0.215	0.211	0.300	0.407	0.461	0.573
12	MORA	0.734	0.831	0.828	0.760	0.687	0.581
13	SUPR	0.675	0.745	0.733	0.697	0.724	0.522
14	TBIG	0.875	0.873	0.821	0.745	0.766	0.746
15	TLKM	0.435	0.431	0.469	0.510	0.475	0.457
16	TOWR	0.621	0.650	0.683	0.702	0.816	0.780
Min Value		0.215	0.191	0.100	0.084	0.095	0.081
Max Value		20.71	22.61	973.40	3461.97	277.32	177.01

Source: Researcher's processed data

The table above displays the calculation of TDTA (Total Debt to Total Assets) for 16 stocks over the period from 2017 to 2022. TDTA is a financial ratio used to evaluate the proportion of a company's total debt to its total assets.

During the observed period, these stocks showed variation in their TDTA performance. Some stocks had relatively low and stable TDTA, indicating that their proportion of debt to total assets tends to be controlled. For example, stocks such as BALI, EXCL, GOLD, IBST, TLKM, and TOWR exhibited stable TDTA within a reasonable range.

However, some stocks showed significant fluctuations in their TDTA. For instance, BTEL had extremely high TDTA in 2018 (973.40) and 2020 (3461.97), which may indicate issues in the company's financial structure. Similarly, KBLV showed a significant increase in TDTA from year to year.

Additionally, some stocks experienced considerable fluctuations in their TDTA from year to year, such as GHON, ISAT, LINK, MORA, and SUPR. These fluctuations may reflect changes in the companies' financial structures or debt management strategies.

Calculation of Current Assets to Current Liabilities in Telecommunications Companies for the Period 2017-2022

The formula for CACL (Current Assets to Current Liabilities) is as follows:

CACL = Current Assets / Current Liabilities

Using this formula, the following table can be used to calculate the ratio of Current Assets to Current Liabilities for various telecommunications companies listed on the Indonesia Stock Exchange:

Table 3. CACL Calculations

No	Companies	2017	2018	2019	2020	2021	2022
1	BALI	0.580	0.579	0.325	0.581	0.655	0.612
2	BTEL	0.0005	0.0001	0.0004	0.0024	0.0212	0.0119
3	CENT	1.038	1.206	1.023	0.224	0.983	1.419
4	EXCL	0.471	0.448	0.335	0.401	0.369	0.394
5	FREN	0.400	0.325	0.289	0.314	0.241	0.273

Technium Business and Management (TBM)
Vol. 8, pp. 71-84 (2024)
ISSN: 2821-4366
www.techniumscience.com

6	GHON	0.318	0.723	0.666	0.331	0.303	0.315
7	GOLD	0.648	0.645	3.635	4.277	3.547	3.025
8	IBST	1.416	1.202	1.473	1.155	2.808	1.945
9	ISAT	0.585	0.375	0.562	0.423	0.401	0.520
10	KBLV	0.189	0.055	0.084	0.027	0.032	0.346
11	LINK	1.214	0.983	0.635	0.274	0.438	0.192
12	MORA	3.536	1.546	0.874	1.438	1.002	1.202
13	SUPR	2.482	1.349	1.126	0.839	0.715	0.339
14	TBIG	0.991	0.315	0.526	0.234	0.358	0.408
15	TLKM	1.048	0.935	0.714	0.673	0.886	0.782
16	TOWR	1.367	0.478	0.542	0.178	0.338	0.252
Min Value		0.0005	0.0001	0.0004	0.0024	0.0212	0.0119
Max Value		3.536	1.546	3.635	4.277	3.547	3.025

Source: Researcher's processed data

The table above illustrates the calculation of CACL (Current Assets to Current Liabilities) for telecommunications companies listed on the Indonesia Stock Exchange during the period from 2017 to 2022. CACL is a financial ratio used to evaluate a company's ability to pay off its short-term debts using its short-term assets.

During the observed period, these stocks exhibited varying performances in their CACL. Some stocks maintained stable and reasonable CACL, indicating that the companies had a good ability to cover their short-term liabilities with their short-term assets. For instance, stocks such as BALI, EXCL, FREN, ISAT, TBIG, and TLKM showed relatively stable CACL from year to year, despite minor fluctuations.

However, some stocks experienced significant fluctuations in their CACL. For example, MORA had a very high CACL in 2017 (3.536) but saw a significant decline in subsequent years. Similar trends were observed in stocks like CENT, GOLD, IBST, and SUPR, which also showed considerable fluctuations in their CACL performance from year to year.

Additionally, there were stocks that experienced significant increases or decreases in their CACL performance from year to year, such as BTEL, KBLV, and TOWR. This might reflect changes in the companies' financial structures or shifting market conditions.

Calculation of Working Capital to Total Assets in Telecommunications Companies for the Period 2017-2022

The formula for WCTA (Working Capital to Total Assets) is as follows:

WCTA = Working Capital / Total Asset

Using this formula, the following table can be used to calculate the ratio of Working Capital to Total Assets for various telecommunications companies listed on the Indonesia Stock Exchange:

Table 4. WCTA Calculations

No	Companies	2017	2018	2019	2020	2021	2022
1	BALI	-0.085	-0.063	-0.177	-0.062	0.232	-0.062
2	BTEL	-1.193	-0.051	-626.64	-269.26	-43.11	-28.45
3	CENT	0.006	0.030	0.005	-0.506	-0.001	0.034
4	EXCL	-0.142	-0.150	-0.225	-0.166	-0.181	-0.182
5	FREN	-0.159	-0.163	-0.157	-0.149	-0.167	-0.135
6	GHON	-0.252	-0.036	-0.028	-0.090	-0.170	-0.181
7	GOLD	-0.138	-0.071	0.250	0.249	0.224	0.147
8	IBST	0.055	0.025	0.052	0.017	0.154	0.097
9	ISAT	-0.132	-0.247	-0.154	-0.208	-0.270	-0.150
10	KBLV	-0.314	-0.546	-0.519	-0.724	-0.929	-0.850

Technium Business and Management (TBM)
Vol. 8, pp. 71-84 (2024)
ISSN: 2821-4366
www.techniumscience.com

11	LINK	0.037	-0.003	-0.077	-0.262	-0.113	-0.322
12	MORA	0.207	0.062	-0.031	0.063	0.001	0.040
13	SUPR	0.096	0.046	0.017	-0.022	-0.065	-0.147
14	TBIG	-0.001	-0.151	-0.069	-0.288	-0.129	-0.119
15	TLKM	0.011	-0.014	-0.075	-0.091	-0.028	-0.055
16	TOWR	0.043	-0.107	-0.075	-0.404	-0.219	-0.164
Min Value		-1.193	-0.546	-626.64	-269.26	-43.11	-28.45
Max Value		0.207	0.062	0.25	0.249	0.232	0.147

Source: Researcher's processed data

The table above displays the calculation of WCTA (Working Capital to Total Assets) for various stocks during the period from 2017 to 2022. WCTA is a financial ratio that measures a company's ability to use its working capital to generate revenue.

During the observed period, these stocks exhibited variations in their WCTA performance. Some stocks had stable or positive WCTA, indicating that the companies had a good ability to manage their working capital to support operations and growth.

Stocks such as IBST, GOLD, MORA, and SUPR showed relatively stable or positive WCTA from year to year. This indicates that these companies had sufficient working capital to sustain their operations.

However, some stocks showed fluctuations or poor WCTA performance. For instance, BTEL had very low or even negative WCTA in some years, which might indicate issues in the company's working capital management. Similar trends were observed in stocks like BALI, EXCL, ISAT, KBLV, and LINK, which also showed fluctuations or less favorable WCTA performance.

It is important to note that extremely low or negative WCTA can indicate high liquidity risk for a company, as it may struggle to meet its short-term financial obligations.

Calculation of Earnings Before Interest and Taxes to Total Assets in Telecommunications Companies for the Period 2017-2022

The formula for EBITTA (Earnings Before Interest and Taxes to Total Assets) is as follows:

EBITTA = Earnings Before Interest and Taxes / Total Assets

Using this formula, the following table can be used to calculate the ratio of Earnings Before Interest and Taxes to Total Assets for various telecommunications companies listed on the Indonesia Stock Exchange:

Table 5. EBITTA Calculations

No	Companies	2017	2018	2019	2020	2021	2022
1	BALI	0.065	0.062	0.066	0.077	0.096	0.093
2	BTEL	-2.24	-1.020	-1.484	1.223	1.754	-0.502
3	CENT	-0.003	0.035	0.031	0.008	0.003	-0.037
4	EXCL	0.029	-0.048	0.041	0.008	0.045	0.041
5	FREN	-0.093	-0.102	-0.059	-0.020	0.005	0.013
6	GHON	0.121	0.152	0.110	0.122	0.115	0.106
7	GOLD	0.014	0.032	0.039	0.046	0.052	0.050
8	IBST	0.045	0.037	0.035	0.018	0.023	0.032
9	ISAT	0.079	-0.008	0.067	0.038	0.163	0.092
10	KBLV	-0.126	-0.498	-0.036	-0.009	-0.288	-0.187
11	LINK	0.235	0.195	0.195	0.178	0.138	0.052
12	MORA	0.038	0.118	0.1043	0.117	0.106	0.104
13	SUPR	0.108	0.107	0.097	0.093	0.109	0.136
14	TBIG	0.117	0.108	0.109	0.104	0.102	0.099
15	TLKM	0.221	0.188	0.191	0.176	0.171	0.143

BUSINESS & MANAGEMENT

Technium Business and Management (TBM)
Vol. 8, pp. 71-84 (2024)
ISSN: 2821-4366
www.techniumscience.com

16	TOWR	0.182	0.165	0.141	0.133	0.081	0.104
	Min Value	-2.24	-1.02	-1.484	-0.02	-0.288	-0.502
	Max Value	0.235	0.195	0.195	1.223	1.754	0.143

Source: Researcher's processed data

The table above shows the calculation of EBITTA (Earnings Before Interest, Taxes, Depreciation, and Amortization) for various stocks during the period from 2017 to 2022. EBITTA is a metric used to evaluate a company's operational performance without considering the impact of interest costs, taxes, depreciation, and amortization.

During the observed period, these stocks exhibited variations in their EBITTA performance. Some stocks recorded positive and stable EBITTA, indicating good operational performance year over year. For instance, stocks such as BALI, EXCL, GHON, GOLD, IBST, ISAT, LINK, MORA, SUPR, TBIG, TLKM, and TOWR showed relatively stable or even increasing EBITTA from year to year. This indicates that these companies consistently generated operational profits.

However, some stocks showed significant fluctuations in their EBITTA performance. For example, BTEL experienced large fluctuations, with negative EBITTA in some years (such as 2017, 2018, and 2022), but also recorded significant positive EBITTA in 2020 and 2021. Additionally, stocks like FREN and KBLV experienced considerable fluctuations in their EBITTA performance from year to year. This may reflect the challenges faced by these companies in consistently generating operational profits.

Analysis of Bankruptcy Using the Zmijewski Model on Telecommunications Companies Listed on the Indonesia Stock Exchange for the Period 2017-2022

The Zmijewski bankruptcy prediction model is based on ratio analysis, which evaluates a company's performance, leverage, and liquidity. The amount of debt is emphasized as the most influential component of bankruptcy in this method. The formula for the Zmijewski model is as follows:

$X = -4,3 - 4,5\ X1 + 5,7\ X2 - 0,004\ X3$

Where:

X1 = ROA (EBIT / Total Assets)

X2 = Leverage (Total Debt/Total Assets)

X3 = Liquidity (Current Assets/Current Liabilities)

According to the Zmijewski model, if a company's score from this bankruptcy prediction model exceeds 0, the company is predicted to be at risk of bankruptcy. Applying this formula, the Zmijewski calculations for sixteen telecommunications companies listed on the Indonesia Stock Exchange have been derived as follows;

Table 6. Prediction of Company Bankruptcy using the Zmijewski Model (X-Score)

Companies	2017		2018		2019		2020		2021		2022	
	X	Prediction	X	Prediction	X	Prediction	X	Prediction	X	Prediction	X	Prediction
BALI	-1.35	H	-1.43	H	-1.21	H	-1.30	H	-1.39	H	-1.40	H
BTEL	123.15	B	129.12	B	5542.03	B	19877.97	B	1602.00	B	1006.93	B
CENT	-2.25	H	-1.96	H	-1.61	H	-0.15	H	-0.07	H	2.12	B
EXCL	-0.82	H	-0.16	H	-0.39	H	-0.24	H	-0.25	H	-0.34	H
FREN	-0.22	H	-0.78	H	-0.87	H	-0.25	H	-0.22	H	-0.64	H
GHON	-1.00	H	-3.67	H	-3.62	H	-3.64	H	-3.01	H	-2.80	H
GOLD	-1.18	H	-0.69	H	-3.84	H	-4.01	H	-3.95	H	-4.03	H
IBST	-2.66	H	-2.54	H	-2.39	H	-2.03	H	-2.57	H	-2.19	H
ISAT	-0.38	H	0.27	B	0.04	B	0.27	B	-0.01	H	-0.40	H
KBLV	-0.72	H	3.04	B	0.81	B	0.62	B	2.60	B	4.22	B
LINK	-3.86	H	-3.69	H	-3.20	H	-2.52	H	-2.08	H	-1.13	H

Technium Business and Management (TBM)
Vol. 8, pp. 71-84 (2024)
ISSN: 2821-4366
www.techniumscience.com

MORA	-0.20	H	0.14	B	0.18	B	-0.20	H	-0.60	H	-1.19	H
SUPR	-0.58	H	0.42	B	-0.21	H	-0.59	H	-0.15	H	-1.76	H
TBIG	0.28	B	0.57	B	0.25	B	-0.18	H	-0.11	H	-0.22	H
TLKM	-2.57	H	-2.44	H	-2.19	H	-1.93	H	-2.14	H	-2.15	H
TOWR	-1.27	H	-1.03	H	-0.79	H	-0.67	H	0.12	B	-0.09	H

Source: Researcher's processed data

Where:
B = Bancruptcy
H = Healthy

The table above presents the results of the Zmijewski method calculations to determine the bankruptcy status (bankrupt or not bankrupt) of companies based on several recent financial years. The Zmijewski method uses various financial ratios to evaluate the likelihood of a company's bankruptcy.

Here is the analysis of the Zmijewski method calculation results for each company:

- BALI: BALI has a "Healthy" (H) status throughout the observed period, consistently showing a negative Z-score below 1, indicating good financial stability.
- BTEL: BTEL has a "Bankrupt" (B) status throughout the period 2017-2022. The very high Z-score indicates a significant risk of bankruptcy in recent years.
- CENT: CENT has a fluctuating status. Although most years are marked as "Healthy" (H), in 2022, its status changed to "Bankrupt" (B), indicating volatility in the company's financial condition.
- EXCL, FREN, GHON, GOLD, IBST, LINK, MORA, SUPR, TBIG, TLKM, and TOWR: All these companies have a "Healthy" (H) status throughout the period 2017-2022, although some have experienced fluctuations in their Z-scores from year to year.
- ISAT and KBLV: ISAT and KBLV have shown changes in status from "Healthy" (H) to "Bankrupt" (B) or vice versa from year to year, indicating volatility in their financial conditions.

Several companies have demonstrated stability in their financial conditions with a consistent "Not Bankrupt" (TB) status, while others have experienced significant fluctuations or risks of bankruptcy. Further analysis of the factors influencing these financial ratio values is necessary to gain a deeper understanding of the companies' financial conditions.

Analysis of Bankruptcy Using the Grover Model on Telecommunications Companies Listed on the Indonesia Stock Exchange for the Period 2017-2022

According to Saputra et al. (2021), the Grover Model was developed by redesigning and reassessing the Altman Z-Score model. In 1968, Jeffrey S. Grover incorporated thirteen additional financial ratios into the sample based on the Altman Z-Score model. Companies with a score less than or equal to -0.02 ($Z \leq -0.02$) are classified as bankrupt according to the Grover model. Conversely, companies with a score greater than or equal to 0.01 ($Z \geq 0.01$) are classified as non-bankrupt.

The Grover Model refines and extends the Altman Z-Score by incorporating additional financial ratios, thus enhancing its predictive power. The formula for the Grover (G Score) is as follows:

G-Score = 1,650X1+3,404X2+0,016ROA+0,057

Where:

X1 = Working Capital / Total Assets
X2 = Earnings Before Interest and Taxes / Total Asset

This model provides a comprehensive assessment of a company's financial health by evaluating key financial indicators such as working capital, profitability, and return on assets. The inclusion of additional financial ratios in the Grover Model allows for a more nuanced analysis of a company's likelihood of bankruptcy, making it a valuable tool for investors and financial analysts.

BUSINESS & MANAGEMENT

Technium Business and Management (TBM)
Vol. 8, pp. 71-84 (2024)
ISSN: 2821-4366
www.techniumscience.com

Table 7. Prediction of Company Bankruptcy using the Grover Model (G-Score)

Companies	2017		2018		2019		2020		2021		2022	
	G	Prediction	G	Prediction	G	Prediction	G	Prediction	G	Prediction	G	Prediction
BALI	0.14	H	0.17	H	-0.02	B	0.22	TB	0.77	TB	0.27	TB
BTEL	-9.55	B	-3.52	B	-1038.96	B	-440.60	B	-65.19	B	-48.69	B
CENT	0.05	H	0.23	H	0.17	H	-0.75	B	0.16	TB	-0.02	B
EXCL	-0.08	B	-0.36	B	-0.17	B	-0.19	B	-0.09	B	-0.10	B
FREN	-0.53	B	-0.56	B	-0.41	B	-0.26	B	-0.20	B	-0.12	B
GHON	0.06	H	0.52	H	0.39	H	0.33	TB	0.17	TB	0.12	TB
GOLD	-0.12	B	0.05	H	0.61	H	0.63	TB	0.60	TB	0.47	TB
IBST	0.30	H	0.23	H	0.27	H	0.15	TB	0.39	TB	0.33	TB
ISAT	0.11	H	-0.38	B	0.03	H	-0.16	B	0.17	TB	0.13	TB
KBLV	-0.89	B	-2.55	B	-0.93	B	-1.17	B	-2.46	B	-1.99	B
LINK	0.92	H	0.72	H	0.60	H	0.23	TB	0.34	TB	-0.29	B
MORA	0.53	H	0.57	H	0.36	H	0.56	TB	0.42	TB	0.48	TB
SUPR	0.59	H	0.50	H	0.42	H	0.34	TB	0.32	TB	0.28	TB
TBIG	0.46	H	0.18	H	0.31	H	-0.06	B	0.19	TB	0.20	TB
TLKM	0.83	H	0.68	H	0.59	H	0.51	TB	0.60	TB	0.46	TB
TOWR	0.75	H	0.44	H	0.42	H	-0.15	B	-0.03	B	0.14	TB

Source: Researcher's processed data

Where:
B = Bancruptcy
H = Healthy

The table above presents the results of the Grover method calculations to determine the bankruptcy status (bankrupt or not bankrupt) of companies based on several recent financial years. The Grover method uses a combination of financial ratios to evaluate the likelihood of a company's bankruptcy.

Based on the Grover method calculations, the bankruptcy status of companies in certain years can be summarized as follows:

- BALI: From 2017 to 2022, BALI has shown a fluctuating status. In 2017, BALI was declared "Not Bankrupt" (NB), but in 2019 its status changed to "Bankrupt" (B) before returning to "Not Bankrupt" in the subsequent years.
- BTEL: BTEL was marked as "Bankrupt" (B) throughout the observed period from 2017 to 2022. This indicates serious financial issues within the company.
- CENT: CENT exhibited a fluctuating status, being "Not Bankrupt" (NB) in some years and "Bankrupt" (B) in others. Notably, its status changed from "Not Bankrupt" to "Bankrupt" in 2020 and then reverted to "Not Bankrupt" in 2021.
- EXCL, FREN, GOLD, IBST, ISAT, KBLV, LINK, MORA, SUPR, TBIG, TLKM, and TOWR: All these stocks maintained a "Not Bankrupt" (NB) status throughout the period 2017-2022, although some experienced fluctuations in their financial ratio values from year to year.

Some stocks have shown fluctuations in their bankruptcy status from year to year, while others have demonstrated stability with a consistent status. It is crucial to further analyze the factors influencing these financial ratio values to understand the companies' financial conditions and associated bankruptcy risks.

Technium Business and Management (TBM)
Vol. 8, pp. 71-84 (2024)
ISSN: 2821-4366
www.techniumscience.com

Descriptive Statistic

Table 8. Descriptive Statistic

Statistic	Values
Min Value	-1038.96
Max Value	19877.97
Standard Deviation	1390.92417
Mean	119.6583
Median	-0.14

Source: Researcher's processed data

The provided table summarizes key statistics of a dataset:

- Minimum Value: −1038.96 The smallest value in the dataset, indicating negative values or outliers.
- Maximum Value: 19877.97 The largest value, suggesting significant positive outliers.
- Standard Deviation: 1390.92417 Indicates substantial variability around the mean.
- Mean: 119.6583 The average value, but high disparity with the median suggests skewness.
- Median: −0.14 The middle value of the dataset, indicating a skewed distribution with a long positive tail.

These statistics highlight a dataset with considerable variability, skewness, and outliers.

Normality Test

Table 9. Normality Test

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
HASIL_SCORE	.506	222	.000	.075	222	.000

a. Lilliefors Significance Correction

Source: Researcher's processed data

Based on the table above, it can be seen that the significance value is 0.000 < 0.05, which means that the data used is not normally distributed, so here we use the whiteny test;

Table 10. Whiteny Test

Ranks

	METODE	N	Mean Rank	Sum of Ranks
HASIL_SCORE	ZMIJEWSKI	111	82.72	9182.00
	GROVER	111	140.28	15571.00
	Total	222		

Source: Researcher's processed data

Technium Business and Management (TBM)
Vol. 8, pp. 71-84 (2024)
ISSN: 2821-4366
www.techniumscience.com

Table 11. Wilcoxon W Test

Test Statistics[a]

	HASIL_SCORE
Mann-Whitney U	2966.000
Wilcoxon W	9182.000
Z	-6.676
Asymp. Sig. (2-tailed)	.000

a. Grouping Variable: METODE

Source: Researcher's processed data

Based on the statistical tests in the table 10 and table 11, it can be seen that the significance value is 0.000 < 0.05, this means that there is a significant difference between the Zmijewski and Grover methods.

Accuracy Level

Table 12. Accuracy Level Recapitulation of the Zmijewski Models and Grover Model

Model	Healthy	Bankrupt	Total	Level of Accuracy
Zmijewski Model	89	7	96	93%
Grover Model	74	22	96	77%

Source: Researcher's processed data

From table 12 above, we can learn that; The Zmijewski Model demonstrates superior accuracy (93%) compared to the Grover Model (77%). This indicates a higher reliability of the Zmijewski Model in correctly predicting the financial status of firms.

The Zmijewski Model misclassifies fewer firms (7) as bankrupt than the Grover Model (22), suggesting it is less prone to false negatives (classifying healthy firms as bankrupt). The Zmijewski Model correctly identifies a higher number of healthy firms (89) compared to the Grover Model (74).

5. Conclussion

Zmijewski Model

The financial health of companies in the telecommunications industry was assessed using the Zmijewski model over a six-year research period from 2017 to 2021. The analysis revealed that four companies were categorized as financially unhealthy or experiencing financial difficulties, as they showed signs of bankruptcy for three consecutive years.

Grover Model

Similarly, the financial health of companies in the telecommunications industry was evaluated using the Grover model over the same six-year period. The results indicated that four companies were deemed financially unhealthy or facing financial problems, evidenced by consecutive bankruptcy indications for three years.

Comparison Between the Two Bankruptcy Analysis Models

The research findings indicate a significant difference between the Zmijewski and Grover models. The mean rank values were 82.72 for Zmijewski and 140.28 for Grover, with a significance value of 0.000 < 0.05. This suggests a statistically significant difference in the outcomes of the two methods.

Technium Business and Management (TBM)
Vol. 8, pp. 71-84 (2024)
ISSN: 2821-4366
www.techniumscience.com

Accuracy Levels Between the Two Bankruptcy Analysis Models

Based on the accuracy calculations, the Zmijewski method proved to be more adequate for the telecommunications industry, achieving an accuracy rate of 93%, compared to the Grover method, which only attained an accuracy rate of 77%.

6. References

[1] Beaver, W. H., Correia, M., & McNichols, M. F. (2011). Financial statement analysis and the prediction of financial distress. Foundations and Trends® in Accounting, 5(2), 99–173.

[2] Fahmi, I. (2015). Pengantar Manajemen Keuangan Teori dan Soal Jawab. Alfabeta.

[3] Ghozali, I. (2016). Aplikasi Analisis Multivariate dengan Program IBM SPSS. Yogyakarta. Dalam Universitas Diponegoro Yogyakarta.

[4] Hertina, D., & Kusmayadi, D. (2020). Comparative analysis of the Altman, Springate, Grover and Zmijewski models as predicting financial distress. PalArch's Journal of Archaeology of Egypt/Egyptology, 17(5), 552–561.

[5] Kusmartono, H., & Rusmanto, T. (2022). Model prediksi kebangkrutan pada perusahaan perusahaan properti-konstruksi di Indonesia. SOSIOHUMANIORA: Jurnal Ilmiah Ilmu Sosial Dan Humaniora, 8(2), 158–172. https://doi.org/10.30738/sosio.v8i2.12298

[6] Primasari, N. S. (2017). Analisis Altman Z-Score, Grover Score, Springate, Dan Zmijewski Sebagai Signaling Financial Distress (Studi Empiris Industri Barang-Barang Konsumsi Di Indonesia). Accounting and Management Journal, 1(1).

[7] Rudianto. (2015). Akuntansi Koperasi (3 ed.). Erlangga.

[8] Saputra, I., Hermanto, W. C., Azmi, Z., & Akhmad, I. (2021). Bankruptcy Analysis Using Atlman Z-Score, Springate, Zmijweski, Foster, and Grover at Bank Mandiri Tbk. Research In Accounting Journal, 1(3), 431–439.

[9] Undang-undang (UU) Nomor 4 Tahun 1998 tentang Penetapan Peraturan Pemerintah Pengganti Undang-Undang Nomor 1 Tahun 1998 tentang Perubahan atas Undang-Undang tentang Kepailitan Menjadi Undang-Undang