ANALYSIS OF FINANCIAL DIFFICULTIES IN FINANCIAL MANAGEMENT WITH ALTMAN Z-SCORE, ZMIJEWSKI, AND SPRINGATE MODELS IN SMALL TEXTILE AND APPAREL COMPANIES. LISTED ON THE INDONESIA STOCK EXCHANGE

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Abstract: *Financial difficulties are the first step experienced by a company in the bankruptcy process. If the company fails, many parties are harmed. Therefore, it is necessary to conduct an analysis of financial problems or difficulties that can provide early warning for the company. The purpose of this study is to find out and analyze financial difficulties in financial management with the ALTMAN Z-SCORE, ZMIJEWSKI, and SPRINGATE models in small textile and apparel companies listed on the Indonesia Stock Exchange (IDX) using the calculation of the Altman Z-Score, Zmijewski, and Springate models. The research method used is quantitative descriptive research. The research population is all textile and garment subsector companies listed on the IDX as many as 25 companies. The samples were selected using a purposive sampling technique and were obtained by 6 companies over a six-year period. The data analysis models used are the Altman Original Z-Score, Zmijewski, and Springate models. This research was conducted by taking secondary data from the Indonesia Stock Exchange website. The results of the study show that there are companies in the textile and garment subsector that are experiencing financial difficulties and financial management with the model used. Zmijewski's model is the most accurate in predicting financial difficulties with the highest accuracy of fifty percent.*

Keywords: *Altman Z-Score, Financial distress, Financial Management, Springate, Zimjewski.*

INTRODUCTION

The manufacturing sector plays an important role in Indonesia's economic growth, and one of its contributors is the textile and apparel industry. The textile and apparel industry has an important role in meeting the needs of the domestic market, providing wide employment opportunities, and becoming a source of the country's foreign exchange through oil and air imports. Thus, the textile industry not only meets domestic needs but also strengthens Indonesia's position in international trade and creates many jobs for the community.

The development of this industry reached its peak in the 1980s when foreign goods were the driver of its growth. Indonesia's achievements in this sector are very encouraging, as evidenced by India's entry into the world's thirteen largest textile and clothing exporters in 1993. This achievement reflects India's strategic position in the textile and apparel trade and the importance of the sector to the national economy.

. However, the era of prosperity for textile companies did not last long as the conditions began to deteriorate. This occurs due to production inefficiencies caused by 70% of raw materials still imported and obsolete production equipment. In addition, several regulations must be complied with both domestically and internationally, as well

as increasing competition in the international market.

At the end of 2019, the situation of the textile and apparel industry was severely affected by the Covid-19 pandemic. Based on the 2021 report of the Ministry of Industry of the Republic of Indonesia, the textile and clothing industry recorded a decline of 10.49% in the fourth quarter of 2020. This number is lower than the same period the previous year. which is 7.17%. The decline was caused by the implementation of the massive social bond policy (PSBB) which had an impact on the decline in people's purchasing power. As a result, production capacity has decreased, it is difficult to obtain raw materials from within the country, the labor force has decreased, and foreign exchange receipts have decreased.

According to Suharno Lusdi, Chairman of IKATSI (Indonesia Textile Experts Association), currently, the unsold goods amount to 970 million meters of cloth and 1.5 million bales of cotton. Due to the large number of fabrics and yarns imported at low prices (Kontan.co.id, 2019). The sustainability of the company's activities has become unstable due to high imports of seed products.

The textile and apparel industry is facing a serious financial crisis. In 2020, the pandemic put millions of workers at risk of becoming unemployed, and up to 80% of workers in the sector were laid off. Around 2.1 million workers in the seed and seed products (TPT) industry have been laid off, according to the President of the Indonesia Seed Company (API). This failure occurred because seed production services decreased by 90% and production decreased by 85%. apparel products are expected to fall by 50%. This situation is further exacerbated by the cancellation of export orders and the plunge in domestic demand. domestic textile factories supply almost 70% of the total products produced for export. However, the pandemic has hampered exports and forced companies to restructure their operations to meet domestic demand. However, the increase in real estate prices cannot be stopped because domestic demand for it has dropped significantly (Tobing, 2022).

The researchers chose companies in the textile and apparel sector as their research project because these subsectors have faced many challenges in recent years, including financial and managerial issues. Particular attention is paid to the decline in the financial performance of some companies of this subsector which is characterized by a decline in profits and losses over several years.

Based on financial statements published by six companies in the textile and garment sub-sector, all of these companies experienced losses and decreased profits. In 2018, the company with the highest profit was TRIS with 289,419 million, while the highest loss was experienced by HDTX with 229,988 million. In 2019, TRIS still recorded the highest profit despite decreasing from the previous year to 23,236 million, while the largest loss was experienced by MYTX of 241,027 million. In 2020, all issuers suffered losses, with MYTX recording the highest loss of 114,827 million. In 2021, SSTM recorded the highest profit of 56,749 million, while MYTX again recorded the largest loss of 139,616 million. In 2022, the

company with the highest profit was TRIS with IDR 64,521 million, and the highest loss was experienced by RICY with IDR 69,375 million. In 2023, TRIS again recorded the highest profit of 68,176 million, with the largest loss experienced by MYTX of 352,071 million. Profit is a crucial element that is the main focus of stakeholders because it can provide a comprehensive picture of the company's performance through financial statements. Companies that experience a downward trend in profits or even losses for several consecutive years will be at risk of facing financial distress.

With these conditions, companies must be aware of financial difficulties, because when a company is declared bankrupt, it has experienced bankruptcy. analysis financial statements to monitor financial performance is one of the company's efforts to identify and reduce financial problems. Financial statement analysis is one of the tools that can be used to assess the condition and progress of a business, as well as ensure its continuity. In addition, companies can use the analysis of financial statements to identify shortcomings and potential bankruptcy, as well as possible financial problems that may affect the company, so that it can be used as a reference for strategizing and improving future performance (Surya Wardani, 2015).

Financial distress is the initial phase of a decline in a company's financial condition before bankruptcy. Therefore, it is very important to recognize the symptoms of financial distress as early as possible. Early symptoms of financial distress can be identified using an early warning system model. This model serves as a tool to detect early signs of financial difficulties, thus allowing companies to take corrective action before the situation deteriorates into crisis or bankruptcy.

For a long time, researchers have developed various prediction models to help potential investors and creditors in choosing the right company to invest avoid the risk of being trapped in financial distress. Of the models that have been developed, the three most recognizable are the Altman, Zmijewski, and Springate models. Each of these models offers a different approach to analysis and predicting a company's potential financial difficulties.

Edward I. Altman created the Altman Model (1968) using multivariate analysis. Altman's model is a mathematical equation that is accurate enough to predict bankruptcy by using a linear combination of 5 (five) financial ratios. Working Capital to Total Assets, Retained Earnings to Total Assets, Earnings Before Interest and Taxes to Total Assets, Market Value Equity to Book Value of Total Debt, and Sales to Total Assets are the 5 (five) ratios.

The Zmijewski model (1984) has been in development for two decades. This model combines three financial ratios, namely Return on Assets, Leverage and Liquidity. The Springate model (1978) was the next model that used the same methodology and sampling techniques used by Altman (1968), but with a

different sample. There are 4 (four) financial ratios used in this model, namely Working Capital to Total Assets, Earnings Before Interest and Taxes to Total Assets, Earnings Before Taxes to Current Liabilities and Sales to Total Assets.

Research conducted by Widenda in 2016 showed that the three models can predict financial distress with the same degree of accuracy for the Altman Z-Score and Springate S-Score models, which is 87.5%, as well as 75% for the Zmijewski X-Score model. Meanwhile, research conducted by Ritonga (2021) shows that by using the Altman model as many as 4 companies have the potential to experience bankruptcy, by using the Springate model as many as 15 companies have the potential to experience bankruptcy, and by using the Zmijewski model as many as 4 companies have the potential to experience bankruptcy. The accuracy level obtained by the Altman model is 81.25%, the Springate model is 62.5%, and the Zmijewski model is 91.67%. Thus the best model is the one that has the highest level of accuracy, namely the Zmijewski model.

LITERATURE REVIEW

1. Management

Management comes from the United Kingdom"management" whose verb "to manage" In general, it means managing. Specifically, management is used to refer to leadership and leadership, namely individuals who carry out leading activities. Therefore, a manager is a person who leads or is a leader.

Management is a discipline and art that involves planning, organizing, directing, and controlling all organizational resources to achieve various goals set effectively and efficiently (Siswanto, 2021:1).

Thus, it can be concluded that management is a management process that involves leadership and leadership. A manager is a leader who manages an organization's resources through planning, organizing, directing, and controlling to achieve goals effectively and efficiently.

2. Financial Management

Irfani (2020:11) defines financial management as a company's financial management activities that aim to find and use funds to achieve the company's goals effectively and efficiently. Siswanto (2021:4) defines financial management as the activity of planning, organizing, controlling, and supervising organizational resources in the form of money to achieve company goals. It can be concluded that financial management is an activity that involves managing, planning, organizing, controlling, and supervising the financial resources of a company or organization to achieve the goals that have been set effectively and efficiently. According to Purnamasari and Djuniardi (2021:1), financial management usually refers to the procurement, placement, and control of financial resources.

3. Signal Theory

Signal theory or signaling theory is a theory developed by Ross in 1977. Signal theory in Firmansyah & Ferry (2017) explains information asymmetry. This theory is based on the assumption that managers and shareholders do not have access to the same company information. Certain information is known only to the manager and is not disclosed to shareholders. As a result, there is an information imbalance between management and shareholders. So, when there is a change in the company's capital structure, it can provide information to

shareholders which results in the company's value changing. This is called a sign or signal.

4. Financial Ratio Analysis

Financial statement analysis according to (Henry, 2018) is the act of breaking down financial statements into their components and examining each component carefully to obtain a thorough and accurate understanding of the financial statements as a whole. Financial statement analysis is a procedure for elaborating more broadly each heading presented in the financial statements to make it easier to understand. Ratio analysis is part of financial analysis. Ratio analysis is carried out by associating various headings in financial statements with financial ratios. This analysis of financial ratios can reveal important relationships between headings in financial statements and is used to evaluate the company's financial condition and performance (Hery, 2015:163).

5. Financial Distress

Financial distress according to (Brigham and Daves, 2003) is a situation where the company is no longer able to pay the liabilities at maturity. Another situation is when there are indications that the company will not be able to pay the liabilities, which is reflected in the projected cash flows it has. According to (Drescher, 2014) financial distress is the final stage of a liquidity crisis and potentially included in the bankruptcy stage. The benefits of financial distress information (Platt and Platt, 2002) are to accelerate management actions in preventing problems before bankruptcy such as mergers or takeovers so that the company can pay off debts and manage the company properly, as well as an early warning of bankruptcy in the coming period. Information on Proceedings of the 11th Annual International Conference on Industrial Engineering and Operations Management Singapore, March 7-11, 2021 © IEOM Society International 4250 Financial distress can also be useful for stakeholders such as investors, creditors, governments, and other parties who are useful in making decisions.

According to Salim and Sudiono (2017), financial difficulties are situations in which a company finds that its operating cash flow is insufficient to pay off its debts or loans (e.g. interest expense and commercial debt), which then encourages the company to make improvements. According to Sudrajat and Wijayanti (2019), financial distress is a condition in which companies face problems in fulfilling their financial obligations. This situation occurs when the company's cash flow is insufficient to pay the debts that are due, so it can be said that the company is experiencing a financial crisis.

Prediction Model Financial Distress

1. Model Altman Z-Score

Model Altman was the first researcher to use the Multiple Discriminant Analysis (MDA) technique in 1968. Research conducted by Altman gave the result a of formula known as the Altman Z-Score. This model classifies the possibility of distress, Gray areas, and health for the company (Altman, 1968). In the research (Türk and Kurklu, 2017) entitled "Financial Failure Estimate in Best Companies with Altman (ZScore) And Springate (S-Score) Models" The results show that the Altman model shows an accuracy rate of 69% compared to the Springate model only provides an accuracy rate of 57%. Altman's model develops over time by expanding the model that can predict all companies, whether go public, non-public, or non-manufacturing. The formula used in this study is the second revised Altman model in 1995. The formula for the revised model is:

Z = 6,56 X1+3,267X2+6,72X3+1,05X4

Information:

Z = Overall Index

X1 = Working Capital / Total Asset

X2 = Retained Earnings / Total Asset

X3 = Earnings Before Interest and Taxes / Total Asset

X4 = Book Value of Equity / Book Value of Total Debt The Z-Score index is the value of all the equation functions above. This model has a cutoff of Z to determine the firm's distress, Gray area, or healthy condition. This model categorizes the condition of the company as follows:

a. If the Z-Score Z<1.1 then the company is distressed.
b. If the Z-Score is between 1.1<Z<2.6 then the company is in a Gray area.
c. If the Z-Score Z>2.6 then the company is not distressed (healthy).

2. Springate S-Score Model

Gordon L. V Springate (1978) conducted research using the same method or technique as Altman's Multiple Discriminant Analysis (MDA). This model is known as the Springate model which uses four out of 19 financial ratios in the literature. In the study (Tahu, 2019) there were eight companies sampled in predicting financial distress. This study shows that the Springate model has an accuracy rate of 62.5% with a type error of 37.5% compared to the Altman model which has an accuracy rate of only 50% with a type error of 50%.

The 4 financial ratios formulated by Gordon L. V. Springate, can predict the condition of a company with two classifications, namely distress and non-distress (healthy).

The results of the 4 ratios are summarized in this model with the following formula:

S = 1,03A+3,07B+0,66C+0,4D

Information:

S = Overall Index

A = Working Capital / Total Asset

B = Earnings Before Interest and Taxes / Total Asset

C = Earnings Before Taxes / Current Liabilities

D = Sales / Total Asset

Based on the results of the S-Score of all the functional equations above. This model classifies the S-Score to determine the condition of the company as distressed and non-distress (healthy). The S-Score cutoff point is categorized as follows:

a. If S-Score S<0.862 the company is in a state of distress.
b. If S-Score S>0.862 then the company is not distressed (healthy).

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3. Zmijewski X-Score Model

The prediction model created by Zmijewski in 1983 was a repeating 20-year study. The financial ratios chosen by Zmijewski are ratios that have been done by previous researchers. This model uses ratio analysis that measures the company's performance, leverage, and liquidity (Zmijewski, 1984).

The result of the research entitled An Analysis of Bankruptcy Likelihood on Coal Mining Listed Firms in the Indonesian Stock Exchange: an Altman, Springate, and Zmijewski Approaches, showed that the Zmijewski model is the most accurate predictive model that can be applied to coal mining company listed on the Indonesia Stock Exchange (IDX). This model has the highest level of accuracy compared to another predictive model that is equal to 78.95% followed by the Springate model and the Altman Model. (Salim and Sudiono, 2017).

The financial ratios formulated by Zmijewski can predict the condition of a

company with two classifications, namely distress and non-distress (healthy). The ratios made are summarized in this model with the following formula:

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

Information:
X = Overall Index
X1 = Return on Asset (ROA)
X2 = Leverage (Debt Ratio)
X3 = Liquidity (Current Ratio)

The cut-off point of this model is 0. If the X-Score value is more than 0 (X> 0) then the company is predicted to be in financial distress, but if the X-Score is less than 0 (X <0) then the company is predicted not to experience financial distress (healthy).

4. Grover G-Score Model

This model was discovered by Jeffrey S. Grover in 2001. This Grover model is a model formed by redesigning and reassessing the Altman Z-Score model (Sari, 2013). Jeffrey S. Grover used the same sample as the Altman Z-Score model and added 13 new financial ratios.

The conclusion from the research conducted by (Verlekar and Kamat, 2019) entitled Recalibration and Application of Springate, Zmijewski, and Grover Bankruptcy Models in the Indian Banking Sector states that the Grover model.

better performance among other models such as Springate and Zmijewski.

G = 1,650 + 3,404ROA-0,016DER 0,057CR

Information:
G = Overall Index
X1 = Working Capital / Total Asset
X2 = Earnings Before Interest and Taxes / Total Asset
X3 = Net Income / Total Asset (ROA)

Based on the results of the G score from all the functional equations above. This model classifies the G-Score to determine the condition of the company as distress, gray area, and non-distress (healthy). The G-Score cutoff points are categorized as follows:

a. If the G-Score G<-0.02 then the company is in a state of distress.
b. If the G-Score is between -0.02<G<0.01 then the company is in a gray area.
c. If the G-Score G>0.01 then the company is not distressed (healthy)

RESEARCH METHODS

The methodology of this study is quantitative descriptive using secondary data with purposive sampling techniques and the analysis method is a quantitative analysis using Altman (Z-Score), Springate (S-Score), Zmijewski (X-Score), and Grover (G-Score). The object of this study is financial ratios, the unit of analysis used in this study is the organization located at the research location, namely the Textile and Garment Sub-Sector companies Listed on the Indonesia Stock Exchange (IDX) The data in this study is a financial report that according to the website www.idx.co.id

ANALYSIS AND DISCUSSION

The results of financial distress analysis using the Altman Z-Score, Springate, and Zmijewski models are summarized in the following table:Tabel dan gambar diberi nomor urut dan diberi judul. Contoh penyajian tabel dan gambar adalah sebagai berikut:

Table 4.1
Results of the Recapitulation of Three Models During the 2018-2023 Period

Company Code	Rata-rata Z-Score	Ket	Rata-rata X-Score	Ket	Rata-rata S-Score	Ket
BELL	3,457	ND	-1,487	ND	0,858	D
HDTX	-8,498	D	2,477	D	-1,527	D
MYTX	-1,011	D	1,65	D	-1,482	D
RICY	1,32	D	0,354	D	0,66	D
SSTM	2,092	GZ	-1,25	ND	0,396	D
TRIS	2,747	GZ	-1,744	ND	1,101	ND

Source: processed data (2024)

Information: ND = Non Distress
D = Distress
GZ = Grey Zone

The analysis of financial distress using the Altman Z-Score, Zmijewski, and Springate models on six textile and garment sub-sector companies listed on the Indonesia Stock Exchange (IDX) for the 2018-2023 period, based on the average value of the three models shows that the three companies show mixed results between models, indicating fluctuations in financial conditions during the research period. Meanwhile, three other companies have consistently been in distress for six consecutive years according to all prediction models.

Recapitulation of Financial Distress Analysis Results

The comparison of the summary of the results of the financial distress analysis is carried out by calculating the number of predictions from each model based on the categories that have been determined. These categories include distress (financial difficulties), Gray zone (Gray zone), and non-distress (not experiencing financial difficulties). The breakdown of each category will be outlined in the following table:

Table 4. 2
Comparison of Financial Distress *Recapitulation*

Analysis Model	Results of Analysis			Sum
	Distress	*Grey Zone*	*Non-Distress*	
Altman Z-*Score*	3	2	1	6
Zmijewski	3	-	3	6
Springate	5	-	1	6

Source: Data Processed (2024)

Analysis of the Accuracy Level of the Altman Z-Score, Zmijewski, and Springate Models

The accuracy level analysis aims to identify the most appropriate model in estimating *financial distress* in textile and garment sub-sector companies listed on the Indonesia Stock Exchange (IDX). The results of this analysis will show the percentage accuracy of each model in predicting *financial distress* based on the entire sample studied.

a. Model Altman Z-*Score*

$$Accuracy\ Level = \frac{Number\ of\ Correct\ Predictions}{Number\ of\ Samples} \times 100\%$$

$$Accuracy\ Level = \frac{1}{6} \times 100\% = 16,7\%$$

Table 4. 3
Calculation of the Accuracy Level of the Altman Z-Score Model

Recapitulation	Results of Analysis			Sum
	Distress	Grey Zone	Non-Distress	
Rill Not Broke	3	2	1	6
Sum	3	2	1	6
Accuracy Level	16,7%			

Source: Data Processed (2024)

Based on the analysis shown in the table, the Altman Z-*Score* shows an accuracy rate of 16.7%. Based on the average value of Z-*Score*, the classification results show that one company is in a healthy financial condition (*non-distress*), three companies are in an unhealthy financial condition (*distress*), and two companies are in a zone of uncertainty (*grey zone*).

a. Model Zmijewski

$$Tingkat\ Akurasi = \frac{Jumlah\ Prediksi\ Benar}{Jumlah\ Sampel} \times 100\%$$

$$Tingkat\ Akurasi = \frac{3}{6} \times 100\% = 50\%$$

Table 4. 4
Zmijewski Model Accuracy Rate Calculation

Recapitulation	Results of Analysis			Sum
	Distress	*Grey Zone*	*Non-Distress*	
Rill Not Broke	3	0	3	6
Sum	3	0	3	6
Accuracy Level	50%			

Source: Data Processed (2024)

Based on the analysis shown in the table, Zmijewski's model shows an accuracy rate of 50%. Based on the average value of X-*Score*,

the classification results show that half of the companies studied are in a financially healthy condition (*non-distress*), while the other half are in an unhealthy financial condition (*distress*).

Model Springate

$$Accuracy\ Level = (Number\ of\ Correct\ Predictions)$$

$$Accuracy\ Level = 1/6 \times 100\% = 16.7\%$$

Table 4. 5
Springate Model Accuracy Level Calculation

Recapitulation	Results of Analysis			Sum
	Distress	*Grey Zone*	*Non-Distress*	
Rill Not Broke	5	0	1	6
Sum	5	0	1	6
Accuracy Level	16,7%			

Source: Data Processed (2024)

Based on the analysis shown in the table, Springate's model shows an accuracy rate of 16.7%. Based on the average S-Score score, the classification results show that one company is in a healthy financial condition (*non-distress*) and five companies are in a financial condition (*distress*).

Financial Distress *Analysis* with Altman Z-Score Model

The results of the analysis with the Altman Z-model score show that there are three companies experiencing conditions distress or financial difficulties, namely PT (HDTX), PT (MYTX), and PT (RICY), there are two companies in the Gray category or grey zone namely PT (SSTM) and PT (TRIS), and there is one company in good health or non-distress namely PT (BELL). Therefore, it can be concluded that there are companies that have experienced financial distress based on the Altman Z-Score. These results are also in line with research conducted by Rahayu, et al. (2016), Cipta (2021), and Sinta (2022).

Financial Distress Analysis with the Zmijewski Model

The results of the analysis using the Zmijewski model show that there are three companies experiencing distress or financial difficulties, namely PT (HDTX), PT (MYTX), and PT (RICY) and there are three companies in non-distress conditions or healthy, namely PT (BELL), PT (SSTM), and PT (TRIS). Therefore, it is concluded that there are companies that experience financial distress based on the Zmijewski model. These results are also in line with research conducted by Cielo and Manda (2020), Putri (2020), and Armenda and Hertina (2023).

Financial *Distress Analysis* with the Springate Model

The results of the analysis using the Springate model show that there are five companies experiencing distress or financial difficulties, namely PT (BELL), PT (HDTX), PT (MYTX), PT (RICY), and PT (SSTM) and there is one company in a non-distress condition or healthy, namely PT (TRIS). Therefore, it is concluded that there are companies that experience financial distress based on the Springate model. These results are also in line with research conducted by Rahayu, et al. (2016), Armenda and Hertina (2023, and Sinta (2022).

Accuracy level analysis

The results of the accuracy level analysis showed that out of several models analyzed, one model performed the best with the highest level of accuracy. This model can be considered the most trusted tool for assessing the conditions of a financially distressed company. Based on the analysis of the accuracy level, the Zmijewski model proved to be the most superior to the

Altman Z-Score and Springate, with an accuracy rate of 50%. These results are also in line with research conducted by Damayanti, et al (2023). Listyarini (2020), and Apsari, et al (2024).

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