**THE APPLICATION OF ALTMAN’S Z-SCORE MODEL IN PREDICTING THE BANKRUPTCY POTENTIAL**

**(Case study: Telecommunication Companies on the IDX 2013-2017)**

*PENERAPAN MODEL Z-SCORE ALTMAN DALAM MEMPREDIKSI POTENSI KEBANGKRUTAN*

*(Studi kasus: Perusahaan-perusahaan Telekomunikasi di BEI 2013-2017)*

by

**Herald Evaristo Dadung1**

**Joy Elly Tulung2**

12Faculty of Economics and Business, International Business Administration, Management Program

Sam Ratulangi University

E-mail:

1Heraldevaristodadung@yahoo.com

2Joy.tulung@unsrat.ac.id

**Abstract**: Financial problem in a company is one of the factors that have an impact on bankruptcy potential. This study is aimed to estimate the likelihood of bankruptcy of Telecommunication companies listed on the Indonesia Stock Exchange for the period of 2013-2017. This study used quantitative descriptive research method where this research describes and measures the financial condition of telecommunication companies without seeking a relationship or influence of one company to another. The results show that there are three out of four telecommunication companies on the IDX are predicted to be in the Distress Zone or in other words potentially bankrupt. The three companies are PT. XL Axiata, Tbk in 2015 to 2017; PT. Indosat, Tbk from 2013 to 2016; and PT. Smartfren Telecom, Tbk from 2013 to 2017. Recommendation which can be given for those telecommunication companies that get Z-Score results in the distress zone or even in the gray zone is they can make this research result as an early warning so that they can take precautions before the occurrence of financial difficulties in the future that potentially lead to bankruptcy.

**Keywords:** *bankruptcy, altman’s z-score, financial distress, telecommunication companies.*

***Abstrak****: Masalah keuangan dalam suatu perusahaan merupakan salah satu faktor yang berdampak pada potensi kebangkrutan. Penelitian ini bertujuan untuk memperkirakan kemungkinan kebangkrutan perusahaan Telekomunikasi yang terdaftar di Bursa Efek Indonesia untuk periode 2013-2017. Penelitian ini menggunakan metode penelitian kuantitatif deskriptif dimana penelitian ini menggambarkan dan mengukur kondisi keuangan perusahaan telekomunikasi tanpa mencari hubungan atau pengaruh dari satu perusahaan ke perusahaan lain. Hasilnya menunjukkan bahwa ada tiga dari empat perusahaan telekomunikasi di BEI yang diprediksi berada di zona bahaya atau dengan kata lain berpotensi bangkrut. Ketiga perusahaan tersebut adalah PT. XL Axiata, Tbk dari tahun 2015 sampai 2017; PT. Indosat, Tbk dari tahun 2013 sampai 2016; dan PT. Smartfren Telecom, Tbk dari tahun 2013 sampai 2017. Rekomendasi yang dapat diberikan untuk perusahaan-perusahaan telekomunikasi yang mendapatkan hasil z-score berada di zona bahaya atau bahkan di zona rawan, yakni perusahaan-perusahaan tersebut dapat menjadikan hasil ini sebagai peringatan dini sehingga dapat mengambil tindakan pencegahan sebelum terjadinya kesulitan keuangan di masa depan yang berpotensi menyebabkan kebangkrutan.*

***Kata Kunci****: kebangkrutan, z-score altman, kesulitan keungan, perusahaan telekomunikasi.*

**INTRODUCTION**

**Research Background**

Nowadays, the online market is becoming one of the very popular business opportunities. The trade sector, manufacturing, small and medium business sector, and many others are using telecommunication services for business operations. In line with the current digitalization trend, the number of internet user in Indonesia is increasing. A survey of The Indonesia Internet Service Providers Association (APJII) stated that the number of internet users in 2016 reached 132.7 million users or 51.7% of the total population. This fact is certainly a great opportunity for the telecommunication service providers in Indonesia. But, the ability of a company to compete is determined by the performance of the company itself. Not all telecommunication companies generate profits. Some companies actually experience a decrease in profits and even a loss.

There are some factors a business could come to an end, which are when the company’s revenue cannot cover their cost, when they are unable to meet the current obligations though their asset is more than the total liability or when the total liability exceeds their total assets. A managerial incompetence is the most pervasive reason of all of this, there are many reasons of company’s bankruptcy but this one tends to become the major problem.

A company generally aims to gain profit from the production, both in the form of goods or services so they will be able to develop and maintain the continuity of the company in the long term. The companies that are not able to manage and maintain good performance will get into a recession or even loss. In this situation, the company usually faces difficulties in generating profits. Financial distress occurs before the bankruptcy. Bankruptcy does not happen all of a sudden. It is a mismanagement accumulation of a company within a certain period of time. Therefore, a tool is needed to analyze the company's financial distress. Bankruptcy potential analysis can show the condition of a company, whether the company is in a distress zone or not, so that the analysis can become an early warning for the company to anticipate a bankruptcy.

Basically, there are number of approaches to assess company's health, such as ratio analysis, capital structure analysis, work capital valuation and bankruptcy potential analysis. The model used in this study is Z-score model proposed by Edward I Altman. Z-score model is a combination of several financial ratios, such as Liquidity Ratio (used to measure the company’s ability to meet its short-term obligations), Profitability Ratio (used to measure the company’s ability to earn an adequate return), Market Value Ratio (used to evaluate the current share price of a publicly-held company's stock) and Activity Ratio (used to measure how efficient a company utilizes its assets). The Liquidity Ratio consists of Working Capital to Total Assets, the Profitability Ratio consists of Retained Earning to Total Assets and Earnings Before Interest and Taxes to Total Assets, the Market Value Ratio consists of Book Value Equity to Book Value of Total Debt, and Activity Ratio consists of Sales to Total Assets.

**Research Objective**

Based on the research background, this study is aimed to estimate the likelihood of bankruptcy of Telecommunication companies listed on the Indonesia Stock Exchange by applying Altman’s Z-Score Model.

**THEORETICAL REVIEW**

**Financial Management**

Financial Management is the study of how people and businesses evaluate investment and raise funds to finance them (Petty, et al, 2012). According to Fabozzi and Peterson (2003), Financial Management Sometimes called Corporate Finance is concerned primarily with financialdecision-making within a business entity. Financial management includes how to raise the capital, and how to allocate it. Not only about long term budgeting but also how to allocate the short term resources like current liabilities. It also deals with dividend policies of the share holders.

**Financial Statement**

The Financial statement summarizing a firm’s performance over a period of times (Ross, Westerfield, and Jordan, 2010). According to Penman (2013), The Financial statement is the primary information that firms publish about themselves, and investors are the primary users of the financial statement. Financial statements are summaries of the operating, financing, and investment activities of a business. Financial statements provide the information needed to assess a company’s future earnings and therefore the cash flows expected to result from those earnings. Financial statement is different from financial reporting. Financial reporting conveys past and current financial information, whereas financial analysis is forward-looking (Fabozzi and Peterson, 2003).

**Financial Statement Analysis**

Fabozzi and Peterson (2003) stated that financial statement analysis is the selection, evaluation, and interpretation of financial data and other pertinent information to assist in evaluating the operating performance and financial condition of a company. Within the firm, financial analysis may be used not only to evaluate the performance of the firm, but also its divisions or departments and its product lines. According to Fridson and Alvarez (2002), financial statement analysis is an essential skill in a variety of occupations including investment management, corporate finance, commercial lending, and the extension of credit.

**Financial Ratio**

Financial Ratio describes the significant relationship which exists between various items of a balance sheet and a statement of profit and loss of a firm. The financial ratio is a comparison between one bit of financial information and another. When studying financial statements, it cannot be separated from the variables called Ratio. Financial Ratio is used in order to evaluate financial condition and company performance. Ratios made simple by Leach (2010). Leach argued that a ratio is simply one number divided by another. Ratios provide an extremely effective method of understanding company accounts. Each ratio is intended to assist the process of identifying some aspect of a company, such as its profitability, efficiency or liquidity.

**Financial Distress**

A firm that does not generate enough the cash flow to make a contractually required payment, such as an interest payment, will experience financial distress. The first sign of bankruptcy is financial distress. According to Wruck (1990) in Tesfamariam (2014) assumed that Financial distress is a situation where a firm’s operating cash flows are not sufficient to satisfy current obligations (such as trade credits or interest expenses), and the firm is forced to take corrective action. Financial distress refers to the inability of a company to pay its financial obligations as they mature (Beaver, Correia, and McNichols, 2010).

**Bankruptcy**

According to Harnanto in Aprilaningsih (2015), bankruptcy is a situation or condition where the company is experiencing shortages and insufficient funds to run or continue its business. Bankruptcy is also defined as a condition in which a company fails or is unable to fulfil its obligations to the creditor.

**Previous Research**

Samanhyia, Oware, and Yaansah (2016), this research examined the financial distress of five companies listed in the stock exchange of a developing West African country, Ghana. Research models used in this study were Z-Score and Boone Indicator. Samanhyia found that one company was in the Financial Distress. The study concluded that the firms were less likely to be financially distressed in its highly competitive industry because the firms became more efficient and the performance enhanced, but poor corporate governance contributed to financial distress and that smaller board size negatively affected corporate performance.

Sajjan (2016), this research studied the likelihood of Bankruptcy of 3 manufacturing companies and 3 non-manufacturing companies. The research used data from financial reports which listed in Bombay Stock Exchange & National Stock Exchange of India for the period of 5 years (2011-2015). The research revealed that there were only 2 companies in the Safe Zone for the period of 2011-2015, namely ACC Cement Ltd in 2011 and SKS Micro Finance Company in 2011 and 2015. Most of the firms were in the Distress Zone which clearly indicated that these firms went Bankrupt.

Aloy and Pratheepan (2015), this research examined the likelihood of bankruptcy of the firms in the Trade Sector in Sri Lanka by applying the Altman’s Z-Score model. The research used data from the financial reports of seven trading companies for a period of the last five years from 2010 to 2014. The study found that 71% of companies in the Trade Sector were in the Distress Zone and the rest of the whole 29% were in the Grey Zone. None of the companies in this sector were in the Safe Zone. Overall this sector was in a difficult period.

**Conceptual Framework**



**Figure 1. Conceptual Framework**

**RESEARCH METHOD**

**Type of Research**

The type of this research is Quantitative Research. Quantitative Research refers to all numeric data or data based on meanings derived from numbers (Aliaga and Gunderson in [Muijs](https://www.google.co.id/search?hl=id&tbo=p&tbm=bks&q=inauthor:%22Daniel+Muijs%22), 2004). According to Saunders*,* Lewis, and Thornhill, (2009), Quantitative Research is predominantly used as a synonym for any data collection technique (such as a questionnaire) or data analysis procedure (such as graphs or statistics) that generates or uses numerical data.

**Population, Sample and Sampling Technique**

According to Quinn and Keough (2002), population is defined as the collection of all the possible observations of interest. The populations in this study are the telecommunication companies (Go public) listed on the Indonesia Stock Exchange. A sample is a subgroup of a population (Frey, Botan, and Kreps, 2000). The samples used in this research are 4 of 5 companies (Go public) in the telecommunication sector which listed on the IDX for the period of five years (2013-2017). Sampling method used in this research is Purposive Sampling. According to Saunders*,* Lewis, and Thornhill, (2009), Purposive or judgemental sampling enables the researcher to use their judgment to select cases that will best enable the researcher to answer their research question(s) and to meet their objectives.

**Data Collection Method**

This research is used secondary data. According to [Wren](https://www.google.co.id/search?hl=id&tbo=p&tbm=bks&q=inauthor:%22Bruce+Wrenn%22), Stevens, and Loudon (2002), secondary data is data previously gathered for some other purpose. The data is obtained from the company's annual report for the period of five years (2013-2017) which has been published on the Indonesia Stock Exchange website.

**Operational Definition and Measurement of Research Variables**

There are four variables used in the Z”-Score model.

(Z = 6.56X1 + 3.26X2 + 6.72X3 + 1.05X4)

Working Capital to Total Assets (X1), working capital is defined as the difference between current assets and current liabilities. Liquidity and size characteristics are explicitly considered. Ordinarily, a firm experiencing consistent operating losses will have shrinking current assets in relation to total assets. This ratio indicates the percentage of total assets that can be converted into cash within a short time after it is used to pay off its short-term liabilities. This ratio shows the comparison between current assets minus current liabilities and total assets.

Retained Earnings to Total Assets (X2), this measure indicates the earnings power of a company. It is also considered as a leverage ratio, meaning that the age of a firm is implicitly considered in this ratio. This variable is used to measure cumulative profitability. This ratio shows the comparison between retained earnings and total assets.

Earnings Before Interest and Taxes to Total Assets (X3), this ratio measures the ability of a company's assets to gain profit from its operations. This ratio is calculated by dividing the total assets of a firm into its earnings before interest and tax reductions. In essence, it is a measure of a company’s profitability of its assets, excluding statutory obligations in the form of tax and interest charges.

Book Value of Equity to Book Value of Total Debt (X4), the ratio shows how much the firm's assets can decline in value before the liabilities exceed the assets and the firm becomes insolvent or it can be said the ratio shows an indication of how the total assets of a company can cover its liabilities. Equity is measured by the combined market value of all shares of stock, preferred and common, while debt includes both current and long-term.

**Data Analysis Method**

The Z-score Analysis model was adapted to predict corporate failures for developing countries firms, emerging market companies and for non-manufacturers.

(Z” = 6.56X1 + 3.26X2 + 6.72X3 + 1.05X4), where: X1= Working Capital/Total Assets; X2= Retained Earnings/Total Assets; X3= EBIT/Total Assets; X4= Book Value of Equity/Book Value of Total Debt.

**RESULT AND DISCUSSION**

**Results**

Z-score is a formula that sums the value of a certain weight from several financial ratios. These results indicate the condition of the company whether in the Distress Zone, Grey Zone or in the Safe Zone. The Altman's discriminant cut-off used to determine company's condition, companies with Z-score more than 2.6 are classified as healthy companies or in the Safe Zone, while companies with Z-score less than 1.1 are classified as potentially bankrupt or in the Distress Zone. Furthermore, Z-scores between 1.1 and 2.6 are classified as in the prone position or Grey Zone.

(Z” = 6.56X1 + 3.26X2 + 6.72X3 + 1.05X4)

**Table 1. Z-Score Result of PT. Indosat, Tbk (*In Billion Rupiah*)**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Year | X1 | X2 | X3 | X4 | Z-Score | Zone of Discriminant |
| 2013 | -0.761 | 0.779 | 0.188 | 0.611 | 0.817 | Distress Zone |
| 2014 | -1.548 | 0.675 | 0.081 | 0.593 | -0.199 | Distress Zone |
| 2015 | -1.200 | 0.574 | 0.289 | 0.744 | 0.407 | Distress Zone |
| 2016 | -1.423 | 0.694 | 0.517 | 1.004 | 0.792 | Distress Zone |
| 2017 | -0.872 | 0.747 | 0.538 | 0.764 | 1.177 | Grey Zone |

*Source: Data Processed, 2018*

Table 1 shows the Z-Score calculation results of PT. Indosat, Tbk from 2013-2017. In 2013, the Z-Score is 0.817 and categorized as potentially bankrupt or the company was in the Distress Zone. In 2014, the company's Z-Score decreased significantly and only produced a negative value of -0.199 and was in the Distress Zone. In 2015, the company's Z-Score increased to 0.407 but still in a Distress Zone. In 2016, the company's Z-Score increased to 0.792 but was also still in the Distress Zone. In 2017, the company's Z-Score increased to 1.177 and was in the Grey zone.

**Table 2. Z-Score Result of PT. XL Axiata, Tbk (*In Billion Rupiah*)**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Year | X1 | X2 | X3 | X4 | Z-Score | Zone of Discriminant |
| 2013 | -0.334 | 0.726 | 0.437 | 1.866 | 2.731 | Safe Zone |
| 2014 | -0.216 | 0.388 | 0.168 | 0.879 | 1.219 | Grey Zone |
| 2015 | -0.623 | 0.421 | 0.356 | 0.732 | 0.886 | Distress Zone |
| 2016 | -0.918 | 0.476 | 0.208 | 0.770 | 0.536 | Distress Zone |
| 2017 | -0.938 | 0.486 | 0.195 | 0.958 | 0.701 | Distress Zone |

*Source: Data Processed, 2018*

Table 2 shows the Z-Score calculation results of PT. XL Axiata, Tbk from 2013-2017. The company’s Z-Score has decreased from 2013-2016 and has increased again in 2017. In 2013, the value of the company's Z-Score amounted to 2.731 and was in the Safe Zone. In 2014, the company's Z-Score decreased to 1.219 and was in the Grey Zone. In 2015, the company's Z-Score value decreased to 0.886 and was in the Distress Zone. The Z-Score value of the company decreased again in 2016 and was in the Distress Zone. In 2017, the company's Z-Score increased to 0.701 but still in the Distress Zone.

**Table 3. Z-Score Result of PT. Telekomunikasi Indonesia, Tbk (*In Billion Rupiah*)**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Year | X1 | X2 | X3 | X4 | Z-Score | Zone of Discriminant |
| 2013 | 0.236 | 1.467 | 1.458 | 4.390 | 7.551 | Safe Zone |
| 2014 | 0.092 | 1.454 | 1.384 | 5.431 | 8.361 | Safe Zone |
| 2015 | 0.492 | 1.382 | 1.310 | 4.517 | 7.701 | Safe Zone |
| 2016 | 0.289 | 1.389 | 1.465 | 5.687 | 8.83 | Safe Zone |
| 2017 | 0.072 | 1.395 | 1.485 | 5.442 | 8.394 | Safe Zone |

*Source: Data Processed, 2018*

Table 3 shows the Z-Score calculation results of PT. Telekomunikasi Indonesia, Tbk from 2013-2017. Telkom is the only telecommunications company listed on the IDX which has a positive Z-Score in the last five years (2013-2017). In 2013, the company's Z-Score was 7.551 and was in the Safe Zone position. In the following year, 2014, the company's z-score increased to 8.361 and was staying in the Safe Zone. In 2015, the company's Z-Score decreased to 7.701 but remained in the Safe Zone. In 2016, the company's Z-Score increased to 8.83 and was obviously stay in the Safe Zone. In 2017, the company's Z-Score once again decreased to 8.394 but remained in the Safe Zone.

**Table 4. Z-Score Result of PT. Smartfren Telecom, Tbk (*In Billion Rupiah*)**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Year | X1 | X2 | X3 | X4 | Z-Score | Zone of Discriminant |
| 2013 | -1.456 | -2.266 | -0.685 | 0.123 | -4.284 | Distress Zone |
| 2014 | -1.660 | -2.174 | -0.370 | 0.124 | -4.08 | Distress Zone |
| 2015 | -0.617 | -2.109 | -0.430 | 0.397 | -2.759 | Distress Zone |
| 2016 | -0.807 | -2.197 | -0.585 | 0.253 | -3.336 | Distress Zone |
| 2017 | -1.043 | -2.487 | -0.625 | 0.226 | -3.929 | Distress Zone |

*Source: Data Processed, 2018*

Table 4 shows the Z-Score calculation results of PT. Smartfren Telecom, Tbk from 2013-2017. Unlike the previous companies, PT. Smartfren Telecom, Tbk is the only telecommunication company listed on the IDX that has a negative Z-Score in the last five years. The company's Z-Score value increased from -4.284 in 2013 to -2.759 in 2015. However, it decreased again in 2016 amounting to -3.336 and -3.929 in 2017. With negative results obtained each year, this company is classified as in the Distress Zone in 2013-2017.

**Discussion**

In terms of achieving goals, the company must carry out its functions properly. All of the company’s activities related to how to obtain funds, and manage assets must be effective and efficient. This is related to the performance of a company. The better the financial performance of the company is, the smaller the possibility of the company experiencing bankruptcy. The risk of bankruptcy associated with the uncertainty of a company’s ability to continue its operations if its financial condition has decreased. Bankruptcy analysis is an analysis to get early signs of bankruptcy. Generally, bankruptcy is interpreted as a failure of the company to run the company's operations to generate profits.

The calculation results show that almost all telecommunications companies have a tendency to bankruptcy in 2013-2017. Out of four companies that become the object of research, there is only PT. Telekomunikasi Indonesia, Tbk that is not categorized as potentially bankrupt (Distress Zone) or stay in the Safe Zone and three other companies, namely PT. Indosat, Tbk., PT. XL Axiata, Tbk., and PT. Smartfren Telecom, Tbk are fluctuated in the grey zone and distress zone for the period of 2013-2017. In general, the entire company has fluctuation Z-Score results in the last five years.

**Implications of Research Result**

**Figure 2. Z-Score Trend at PT. Indosat, Tbk**

*Source: Data Processed, 2018*

In figure 2 shows the Z-Score trend at PT. Indosat, Tbk in 2013-2017. This trend shows the Z-Score decreased significantly in 2014. This is due to a decrease in the ratio values of X1, X2, X3, and X4 in that year. The ratio values of X1, X3, and X4 in 2014 also became the lowest ratio values obtained by the company in the last five years (2013-2017). Furthermore, the value of the ratio has increased again in the following year. This means that, PT. Indosat, Tbk showed improvements from 2015 to 2017. Overall, from 2013 to 2016, the value of the company's Z-Score was less than 1.1, which means the company was in the Distress Zone, and in 2017, the company's Z-Score increased to 1.177, although still in the prone area / Grey Zone, but the company continues to show progress in each year. Negative working capital (X1) becomes one of the factors of the company's Z-Score significantly decreases in 2014. According to Sharan Vyuptakesh (2015), negative net working capital means that the company's current liabilities excess over the current assets.

**Figure 3. Z-Score Trend at PT. XL Axiata, Tbk**

*Source: Data Processed, 2018*

Figure 3 shows the Z-Score trend at PT. XL Axiata, Tbk in 2013-2017. The Z-score trend shows a decrease in the Z-Score that decreases from the Safe Zone to the Distress Zone. In 2013, the Z-Score was more than 2.6, which means the company was in the Safe Zone. But then the value of the Z-Score decreased to the prone area or Grey Zone in 2014 and decreased again in 2015 to 2016 to the Distress Zone. In 2017, the value of Z-Score increased again but was still in the Distress Zone, which means the company does not show significant progress. This decrease was due to negative values at Working Capital to Total Assets (X1) and Earnings Before Interest and Tax to Total Assets (X3) which continued to decrease significantly in the last five years. Sharan (2015) argued that negative working capital (X1) and EBIT (X3) means that the company's current liabilities excess over the current assets and the company's assets were unable to gain profit from its operations.

**Figure 4. Z-Score Trend at PT. Telekomunikasi Indonesia, Tbk**

*Source: Data Processed, 2018*

Figure 4 shows the Z-Score trend at PT. Telekomunikasi Indonesia, Tbk in 2013-2017. The trend shows the Z-Score that fluctuates every year. However, the value of Z-Score in 2013 to 2017 was classified as a healthy company and was in the Safe Zone with values above the Altman's discriminant cut-off, namely the Distress Zone (1.1) and Grey Zone (2.6). That’s because of the ratio value of X1, X2, X3, and X4 that the company obtained are positive in every year so that the Z-Score results were positive. The lowest Z-Score is 7.551 in 2013 and the highest is 8.83 in 2016.

**Figure 5. Z-Score Trend at PT. Smartfren Telecom, Tbk**

*Source: Data Processed, 2018*

Figure 5 shows the Z-Score trend at PT. Smartfren Telecom, Tbk in 2013-2017. This trend shows the negative Z-Score obtained by the company each year. The value of Z-Score moves up and down or fluctuates in the Distress Zone. This is due to the negative results obtained by the company at the Working Capital to Total Asset (X1) ratio, negative value of Retained Earnings to Total Assets (X2), and negative ratio of Earnings Before Interest and Tax to Total Assets (X3). According to Altman and Hotchkiss (2006), negative working capital to total asset (X1) shows that the company's assets are unable to cover their short-term liabilities, negative retained earnings to total asset (X2) means that the company is not profitable, and negative earnings before interest and tax to total asset (X3) ratio obtained by company due to the company's operating expenses were higher than their operating profits.

**Research Limitation**

1. This research is only limited to the telecommunication sector on the IDX.

2. This study is only used data for the period of 5 years (2013-2017).

3. The sample size is very small considering researcher only took four companies to study.

**CONCLUSION AND RECOMMENDATION**

**Conclusion**

The purpose of this research is to estimate the likelihood of bankruptcy of Telecommunication companies listed on the IDX by applying Altman’s Z-Score Model. Based on the results of the analysis of telecommunication companies on the Indonesia Stock Exchange in 2013-2017 using the third model of Altman's Z-Score formula (Z"-Score), the obtained conclusions are as follows:

1. The value of the X1-X4 ratio of telecommunication companies in Indonesia fluctuates each year. In this case, PT. Telekomunikasi Indonesia, Tbk is the only company that has positive X1-X4 ratio value for the period of 2013-2017 while PT. XL Axiata, Tbk and PT. Indosat, Tbk have a negative X1 value for five consecutive years. Furthermore, PT. Smartfren Telecom, Tbk only has a positive X4 value, which means that it is the only company that has three negative ratios (X1, X2, and X3) for the last five years. So, three out of four telecommunication companies on the IDX have negative working capital problem or liquidity problem while for PT. Smartfren Telecom, Tbk besides having working capital problem, it also has a negative value of X2 and X3 which is related to the profitability problem.

2. Furthermore, based on the calculation of the X1-X4 ratio using the Altman’s Z-Score formula, there are three out of four telecommunication companies on the IDX that are predicted to be in the Distress Zone or in other words the companies have the potential to go bankrupt due to financial difficulties within them.

a. PT. XL Axiata, Tbk was in a distress zone with a period of three years (2015-2017)

b. PT. Indosat, Tbk was in a distress zone with a period of four years (2013-2016)

 c. PT. Smartfren Telecom, Tbk was in a distress zone with a period of five years (2013-2017)

3. Furthermore, the Z-Score trend describes the company’s condition over the period of five years. Generally, companies fluctuate each year. There is a company that fluctuates in the Safe Zone such as PT. Telekomunikasi Indonesia, Tbk., there is a company that experiences a decline from the Safe Zone down to the Distress Zone such as PT. XL Axiata, Tbk., there is a company that continues showing progress in each year such as PT. Indosat, Tbk., but there is also a company that continues to be in the Distress Zone or does not have a significant improvement over the period of five years.

**Recommendation**

Based on the conclusions above, here are the list of recommendations which can be given to the telecommunication companies on the Indonesia Stock Exchange and related parties:

1. For the telecommunication companies on the IDX in 2013-2017:

The companies that get Z-Score results in the Distress Zone or even in the Gray Zone can make this research as an early warning so that they can take precautions before the occurrence of financial difficulties in the future that potentially lead to bankruptcy.

2. For investors and creditors:

a. For investors, this research can be used as information and reference whenever they make a consideration in making investments.

b. For creditors, this research can be used as information whenever they make a decision in providing loans.

3. For further research:

a. This research can be useful as a reference, where liquidity problem becomes one of the problems that can have an impact on financial problem and even potential bankruptcy.

b. The third model of Altman’s Z-Score formula can be used in other non-manufacturing companies.

**REFERENCES**

Altman, E. I., andHotchkiss E. 2006. *Corporate Financial Distress and Bankruptcy: Predict and Avoid Bankruptcy, Analyses and Invest in Distress Debt*. Third Edition. John Wiley and Sons, New York.

APJII, 2016. *Buletin APJII Edisi November 2016*. from: <https://apjii.or.id/downfile/file/BULETINAPJIIEDISI05November2016.pdf>. Retrieved March 12th 2018.

Aloy, N. J., and Pratheepan, T. 2015. The Application of Altman’s Z-Score Model in Predicting Bankruptcy: Evidence from the Trading Sector in Sri Lanka. *International Journal of Business and Management. Volume 10. No. 12. ISSN 1833-3850*. Canadian Center of Science and Education. from: <http://www.ccsenet.org/journal/index.php/ijbm/article/viewFile/54096/29331>. Retrieved March 12th 2018.

Aprilaningsih, W. 2015. Analisis Prediksi Kebangkrutan Perusahaan Dengan Menggunakan Metode Altman Z-Score Model Pada Perusahaan Telekomunikasi Indonesia. *Journal of Management*. Muhammadiyah University, Surakarta. From: <http://eprints.ums.ac.id/39934/1/NASKAH%20PUBLIKASI.pdf>. Retrieved february 15th 2018.

Beaver, W. H., Correia M., and McNichols M. F. 2010. *Financial Statement Analysis and the Prediction of Financial Distress*. *Volume 5, Issue 2*. now Publishers Inc, USA.

Fabozzi, F. J., and Peterson. P. P. 2003. *Financial Management and Analysis.* Second Edition. John Wiley & Sons, New Jersey.

Fridson, M. S., and Alvarez. F. 2002. *Financial Statement Analysis: A Practitioner's Guide*. Third Edition. John Wiley & Sons, United States.

Frey, L. R., Botan. C. H., and Kreps. G. L. 2000. *Investigating Communication: An Introduction to Research Methods*. Second Edition. Allyn and Bacon, Boston.

Leach, R. 2010. *Ratios Made Simple: A Beginner's Guide to the Key Financial Ratios*. Harriman House, London. From: <https://www.harriman-house.com/samples/9780857190826_sample.pdf>. Retrieved March 25th 2018.

Muijs, D. 2004. *Doing Quantitative Research in Education With SPSS*. First edition. SAGE Publications, London.

Penman, S. H. 2013. *Financial Statement Analysis and Security Valuation*. Fifth Edition. McGraw-Hill Companies, New York.

Petty, [J. W.](https://www.google.co.id/search?hl=id&tbo=p&tbm=bks&q=inauthor:%22J+William+Petty%22), Titman. S., Keown, [A. J.](https://www.google.co.id/search?hl=id&tbo=p&tbm=bks&q=inauthor:%22Arthur+J+Keown%22), Martin. [P.](https://www.google.co.id/search?hl=id&tbo=p&tbm=bks&q=inauthor:%22Peter+Martin%22), Martin. [J. D.](https://www.google.co.id/search?hl=id&tbo=p&tbm=bks&q=inauthor:%22John+D+Martin%22), and Burrow. [M](https://www.google.co.id/search?hl=id&tbo=p&tbm=bks&q=inauthor:%22Michael+Burrow%22). 2012. *Financial Management: Principles and Applications.* Sixth Adaptation Edition. Pearson Australia Group, Australia.

Quinn, G., and Keough. M. 2002. *Experimental Design and Data Analysis for Biologists*. Cambridge University Press, New York.

Ross, S., Westerfield. R., and Jordan, B. 2010. *Fundamentals of Corporate Finance*. Ninth edition. McGraw-Hill Companies, New York.

Samanhyia, S., Oware. K. M., and Yaansah. F.A. 2016. Financial Distress and Bankruptcy Prediction: Evidence from Ghana. *Expert Journal of Finance.* Volume 4, pp.52-65*.* From: <https://pdfs.semanticscholar.org/ea99/fb399db2da10c82e1938d77743162aaa71b5.pdf>. Retrieved March 25th 2018.

Sajjan, R. 2016. Predicting Bankruptcy of selected firms by applying Altman’s Z-Score model. *International Journal of Research – Granthaalayah.* Volume 4, No. 4: 152-158*.* from: <http://granthaalayah.com/Articles/Vol4Iss4/20_IJRG16_B04_67.pdf>. Retrieved February 21st 2018.

Saunders, M., Lewis, P., and Thornhill, A. 2009. *Research Methods for Business Students*. Fifth Edition. Pearson Education Limited, London.

# Sharan, Vyuptakesh. 2015. *Fundamentals of Financial Management*. Fifth Edition. Pearson Education, India.

Tesfamariam, Y. 2014. The Determinants of Financial Distress in the Case of Manufacturing Share Companies in Addis Ababa-Ethiopia. *Journal of Accounting and Finance*. From: <http://etd.aau.edu.et/bitstream/123456789/5235/1/YohannesTesfamariam.pdf>. Retrieved February 28th 2018.

Wren, [B](https://www.google.co.id/search?hl=id&tbo=p&tbm=bks&q=inauthor:%22Bruce+Wrenn%22)., Stevens, [R. E.,](https://www.google.co.id/search?hl=id&tbo=p&tbm=bks&q=inauthor:%22Robert+E.+Stevens%22) and Loudon, [D. L.](https://www.google.co.id/search?hl=id&tbo=p&tbm=bks&q=inauthor:%22David+L.+Loudon%22) 2002. *Marketing Research: Text and Cases*. The Haworth Press Inc, New York.