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## MANAGEMENT

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### THE INDICATIONS LEVEL OF BANKRUPTCY BY ALTMAN Z-SCORE CALCULATION METHOD (CASE STUDY ON SUBSIDIARIES OF PT KERETA API INDONESIA PERSERO)

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**Abstract.** This study aims to observe the condition of several companies that are affiliated as subsidiaries of PT Kereta Api using the Altman Z-Score to predict the indication of bankruptcy. The indication of bankruptcy is a way to the company to make a decision regarding the strategy that needs to be taken. In this research, the indication of bankruptcy commonly used the category that is included in the Altman Z score model. This includes quantitative research with a goal to detect and analyze the object of the research which is based on the secondary subject of Financial Reporting about the sign of bankruptcy of the company by using Altman Z-Score model. This research method used descriptive and quantitative approach. The research results show that from six Subsidiaries Companies of PT Kereta Api Indonesia (Indonesian railway companies) that are analyzed as the sample in this research, there are 3 companies that are regarded as "healthy companies" (companies that has a stable condition), a company that is included in grey area (predicted to experience a bankruptcy) and two companies that are included in more dangerous area or indicated as companies that have almost experienced a bankruptcy.

**Keywords:** Altman Z-score, bankruptcy, financial reporting.

**JEL Classification:** C63, D59, G33.

## INTRODUCTION

Developing companies and Developed companies often did not realize how the condition of company sustainability especially in long-term plan that should be owned by every company and used as a basis for further progress and growth, especially in order to be able to fairly compete in the future global markets era (Marsden and Wilkinson, 2018).

Company that consider as large at the opening could not be escaped in the term bankruptcy if they did not able to adapt to the demands of existing market situation or within the poor management on the aspect of company management itself (Teece, 2010). An obvious example can be used as a lesson related to the case of bankruptcy inside the air transportation service company, which the main point is that there is a mismanagement of the company or human error that occurs inside the management system of company, and it caused a large amount of debt, Thus, an

unfortunate incident happen and the company should be closed permanently. Based on the described condition, it is necessary to know the indications and information regarding predictions that could lead to the company bankruptcy (Karas and Režňáková, 2018). Information about bankruptcy predictions is important for several involved parties (Munawir, 2010) as for investor, it can lead to the information on prediction of potential bankruptcy that provides input for investors in investing their capital gains, whether they will still continue to invest or decided to stop/cancel their investment to a company, however investors certainly did not want any losses due to their mistakes on investing any capital. For the Government, prediction of bankruptcy is used by government to determine the policies in field of taxation and other policies related to the relationship between government and companies. For Banks and Credit Institutions, information regarding the possibility of bankruptcy faced by their customer companies and their prospective customers is needed to determine the determination of whether a loan submission should be granted or not, further negotiation of loan repayment need to be regenerated and other policies related to loan or credit approval.

Adnan and Eha (2000) inside their analysis regarding the Stability conditions of Companies to Predict Potential Bankruptcy by Altman Approach which was taken from ten companies in Indonesia, more likely explained regarding the relationship between company stability condition and the potential for bankruptcy by comparing the banking and non-banking companies. The obtained result concluded that the bankruptcy level of company can be decided two years before it happen.

Another study was done by Ayu (Chairunisa, 2017) inside the analysis of Analysis on Bankruptcy Rate of Coal Mining Companies that Listed on Indonesia Stock Exchange, using 2 models of Altman Z-Score and Zmijewski in predicting indications of bankruptcy in coal mining companies. This research focuses more to find out the indication of bankruptcy in a subsidiary of PT Kereta Api Indonesia (Persero) which is mainly engaged in rail-based transportation services. It is resulted that the method can be used to predict whether the condition of company is stable or not. The use of Altman model to predict the condition of a company and the financial health of a company, and it needs to be carefully used (Marcelinda, Paramu and Puspitasari, 2014)

Based on the explanation above, this research focuses on sixth subsidiaries company of PT Kereta Api Indonesia (Persero) which consist of: PT Reska Multi Usaha, PT Railink, PT Kereta Commuter Indonesia, PT Kereta Api Logistik, PT KA Properti Manajemen and PT Kereta Api Pariwisata, to observe if there are indications that will lead into bankruptcy or not.

In short, the purpose of this study is to determine the indication of bankruptcy in company by using the Altman Z score calculation method and to find out whether the use of Altman Z score calculation method can be effectively used in companies as the indications of bankruptcy.

## LITERATURE REVIEW

### **Bankruptcy**

The definition of Bankruptcy (Brigham, F and Houston, 2011) is a failure that occurs in a company which can be interpreted as below:

- *Economic Distressed*, which is a condition where the company loses money or where the company's revenue is unable to cover its own costs, in other word, the rate of return is less than the cost of capital gains or the present value of company's cash flows is less than the liabilities. Failure occurs when the actual cash flow of company is far below the expected cash flow.

- *Financial Distressed* is a company condition where the difficulty occur either in condition of funds, cash or in sense of capital gains. As the part of asset liability, management took a significant role in the arrangement to prevent financial failure. Financial failure can also be defined as insolvency that distinguishes between cash flows and stock policies.

According to Lesmana and Surjanto (2004) a company that will experience bankruptcy or

financial difficulties in the future has following signs as below:

1. There was a significant decrease in sales number and revenue
2. Profit or cash flow from operations has decreased
3. Decrease in total assets
4. There was a significant decrease in close price
5. High probability of industrial failure, or a high risk industry
6. There was a large dividend cut
7. Young company

### **Financial Reporting**

Financial Reporting or often called as Financial Statement, is a report that states the company's current financial condition and in a future period (Kasmir, 2014). Other definition was stated by (Riyanto, 2010) which stated that provide business regarding financial condition of a company, there are two components consist of *Neraca (Balance Sheets)* defined the asset value, debt and own capital gain at certain times and *income statement* states the results that have been achieved during specified period, generally covering a period of a year.

### **PAPER OBJECTIVE**

This research has an aim to observe the condition of several companies. The chosen several companies is the companies that affiliated as subsidiaries of PT Kereta Api within the indication of bankruptcy that applied through Altman Z-Score in order to predict the indication of bankruptcy that could happen to the future condition of the company.

It is important to know the indication of bankruptcy as anticipation for future condition. This bankruptcy could be seen through condition within a company. The using of Altman-Z Score to calculate the indication of bankruptcy might be effective and easy for company.

### **METHODOLOGY**

The research method used in this research is descriptive method within the quantitative approach by supporting data in form of financial reports. Descriptive research is a research method that is aimed to describe the present or past phenomenon. Descriptive Quantitative aimed to describe the phenomenon within the number (Sugiyono, 2016). In this case, the number included from financial reports.

#### **Data Sources**

Types and sources of data used in this study was secondary data of financial reports that have been audited by independent accountant in order to obtain accurate and reliable figures, which consist of:

- a) Income Statement from 2017 to 2018
- b) Balance Sheet Statement from 2017 to 2018

#### **Data Collection Technique**

As supporting material of case studies, data collection techniques are carried out in several ways:

1. Documentation Technique

This technique is the retrieval of data obtained through documents (Akbar and Usman, 2011). This documentation technique is used because the data source in this study is company financial reports that have been audited by an independent accountant

2. Literature Study

Conduct an in-depth analysis using existing theories to be applied in this research

### **Data Analysis Technique**

The analysis technique used in this research includes:

1. Calculate the company ratios based on the variables in Altman model (Z-Score)
2. Calculate the company's Z-Score by Altman model equation (Z-Score)
3. Calculate the condition of company based on predetermined cut off point
4. Compare the results of Altman (Z-Score) application model in listing companies and the application of delisting companies as research sample
5. Provide the conclusions regarding company's financial performance and bankruptcy predictions based on the analysis of existing data

## **RESULT AND DISCUSSION**

### **Altman Z score Analysis**

Hanafi (2008) defines the Altman Z score as multivariate formula that has functions to measure the financial stability of company and a powerful diagnostic tool to predict the possibility of a company bankruptcy. Altman initially entered 22 financial ratios into his research model, Altman focused on 5 categories representing 4 financial ratios including liquidity, profitability, leverage / solvency, and performance. Hereby the formula of Altman model (Z-Score):

$$Z = 1,2X1 + 1,4X2 + 3,3X3 + 0,6X4 + 1,0X5$$

*Source : After Gilrita, 2015.*

By the information as below:

Z	= bankruptcy index
X1	= capital gain/total assets
X2	= retained earnings / total assets
X3	= Earnings before Interest and Tax
X4	= total equity / total liabilities
X5	= revenue / total assets

And the results will be divided into 3 groups as following below:

1. Z-Score > 2,99 categorized as a very healthy company therefore it can be categorized as a non-bankrupt company
2.  $1,81 < Z\text{-Score} < 2,99$  is in a vulnerable area where the company cannot be determined whether it is a bankrupt company or not
3. Z-Score < 1,81 categorized as a company that has enormous financial difficulties and is at risk of bankruptcy.

There are 5 categories of Altman Z score model that was used to indicate bankruptcy in a company as following below:

1. Working capital to total assets → (X1)

$$X1 = \frac{\text{Current asset} - \text{current liabilities}}{\text{Total assets}}$$

This variable is used to measure the company's ability to fulfill its short-term liabilities and measure the level of liquidity of company's assets. The difference between current assets and current liabilities represents working capital

2. Retained earnings to total assets → (X2)

$$X2 = \frac{\text{retained earnings}}{\text{Total assets}}$$

This variable is a measurement of company's cumulative profitability or retained earnings that reflects to the company's age and company's earnings strength.

3. Earnings before interest and taxes/EBIT to total assets) → (X3)

$$X3 = \frac{\text{EBIT}}{\text{Total assets}}$$

The variables included in this profitability ratio have a function to Measure Company's ability to generate the profits from the assets or it can be said as a measure of company's assets productivity.

4. Market value of equity to book value of total liabilities → (X4)

$$X4 = \frac{\text{Total equity}}{\text{Total liability}}$$

This variable is used to describe the solvency (leverage) in form of company's long-term financial capability and to find out the amount of company capital used to the debt burden.

5. Sales to total assets → (X5)

$$X5 = \frac{\text{Incomes}}{\text{Total assets}}$$

This variable has a function to measure management's ability to use assets, generate sales and describes the turnover rate of every company assets.

Based on the discussion above, the results of calculation by Altman Z score method for each company in 2017-2018 are explained as following below:

*Table 1  
Altman Z Score test result*

Company Subsidiary	2017	2018
PT RMU	3,75	3,60
PT RAILINK	0,66	0,89
PT KCI	4,79	3,92
PT KALOG	2,14	2,63
PT KAPM	2,10	1,75
PT KAWISTA	3,13	4,04

*Source: Excel processed data.*

Categories:

- > 2,99 = stable
- < 2,99 = vulnerable
- < 1,81 = unstable/ bankrupt

#### **Classification of Company Condition**

Based on the results of calculations in table 1, the company's stability condition can be classified as follows:

*Table 2  
Details of the company's stability condition in 2017-2018*

Company Subsidiary	2017	2018
PT RMU	stable	stable
PT RAILINK	unstable	unstable
PT KCI	stable	stable
PT KALOG	vulnerable	vulnerable
PT KAPM	vulnerable	unstable
PT KAWISTA	stable	stable

*Source: Excel processed data.*

Rizkiansyah, A. and Falikhatun (2021), "The indications level of bankruptcy by Altman Z-Score calculation method (case study on subsidiaries of PT Kereta Api Indonesia Persero)", *Management and entrepreneurship: trends of development*, 1(15), pp. 89-97. Available at: <https://doi.org/10.26661/2522-1566/2021-1/15-06>

Based on the table above, it can be seen that PT RMU with an acquisition of more than 2,99, which is 3,75 in 2017 and 3,60 in 2018, is categorized as a stable company. For PT RAILINK, because the Altman Z Score is less than 1,81, the company's condition which categorized as unstable or almost experience a bankruptcy. PT KCI within the high value of 4,79 and 3,92 is categorized as a stable company, PT KALOG experienced a vulnerable condition because it obtain value below 2.99 but still above 1,81. In 2017, PT KAPM was categorized as vulnerable, but in the following year the decline became unstable or bankrupt. And the last one is PT KAWIST which obtain 3,13 and 4,04 included as stable.

## CONCLUSION

Based on the results and discussion above, it is obtained the conclusion as below:

PT Railink has been in unstable condition category for 2 consecutive years which means it has enormous financial difficulties and is at risk of bankruptcy. Meanwhile, PT KAPM in 2017 was in vulnerable condition, even in 2018 it was in an unstable condition. Moreover, For PT Kalog still in the vulnerable category, there is no indication of bankruptcy yet. However, if there is a slight mismanagement or other mismanagement, it can be fatal. Subsidiaries other than PT Railink, PT KAPM and PT Kalog are classified as stable; therefore it is still safe for company sustainability conditions.

It can be concluded that not every companies can apply the Altman Z score calculation method to indicated the indication of bankruptcy due to the type and scope of business that have different characters from one another.

## SUGGESTION

Based on the results, discussion and conclusions, there are several suggested point as below:

1. For companies that currently indicated to be bankrupt, it should immediately determine further steps and carry out more innovative strategies. Therefore; they can improve existing financial ratios, conduct studies in terms of mergers or acquisitions for the sake of business continuity.

2. For companies that currently in vulnerable category, it needs to pay more attention to the ratios that can help to improve the future conditions of company, therefore on its implementation of company stability; the company can continue to be stable.

3. For companies that currently indicated as stable, it should not consider as an excuse to be relaxed, the companies should always build the new creativity and other innovative finding, because it is easy for a company to slip into a bad category, especially if the management progress is not good.

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**РІВЕНЬ ПОКАЗНИКІВ БАНКРУТСТВА МЕТОДОМ ОБЧИСЛЕННЯ  
ОЦІНКИ АЛЬТМАНА Z (НА ПРИКЛАДІ ОЦІНКИ ДОЧІРНІХ ПІДПРИЄМСТВ  
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Дане дослідження спрямоване на спостереження за станом декількох компаній, які є дочірніми підприємствами PT Kereta Api, з використанням Z-оцінки Альтмана для прогнозування ознак банкрутства. Ознака банкрутства – це спосіб компанії прийняти рішення щодо стратегії, яку необхідно прийняти. У цьому дослідженні для позначення банкрутства зазвичай використовується категорія, включена в модель Z-оцінки Альтмана. Даний метод включає кількісне дослідження з метою виявлення і аналізу об'єкта дослідження, заснованого на вторинному предмет фінансової звітності про ознаку банкрутства компанії з використанням моделі Z-оцінки Альтмана. У цьому методі дослідження використовувався описовий та кількісний підхід. Результати дослідження показують, що з шести дочірніх компаній PT Kereta Api Indonesia (індонезійські залізничні

компанії), які аналізуються в якості вибірки в цьому дослідженні, є 3 компанії, які розглядаються як «здорові компанії» (компанії зі стабільним станом); компанія, яка включена в сіру зону (прогнозується банкрутство), і дві компанії, які включені в більш небезпечну зону або вказані як компанії, які майже пережили банкрутство.

**Ключові слова:** Z-оцінка Альтмана, банкрутство, фінансова звітність.

## **УРОВЕНЬ ПРИЗНАКОВ БАНКРОТСТВА ПО МЕТОДУ РАСЧЕТА Z-ОЦЕНКИ АЛЬТМАНА (НА ПРИМЕРЕ ДОЧЕРНИХ КОМПАНИЙ PT KERETA API INDONESIA PERSERO)**

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Данное исследование направлено на наблюдение за состоянием нескольких компаний, которые являются дочерними предприятиями PT Kereta Api, с использованием Z-оценки Альтмана для прогнозирования признаков банкротства. Признак банкротства – это способ компаний принять решение относительно стратегии, которую необходимо принять. В этом исследовании для обозначения банкротства обычно используется категория, введенная в модель Z-оценки Альтмана. Данный метод включает количественное исследование с целью выявления и анализа объекта исследования, основанного на вторичном предмете финансовой отчетности о признаке банкротства компании с использованием модели Z-оценки Альтмана. В этом методе исследования использовался описательный и количественный подход. Результаты исследования показывают, что из шести дочерних компаний PT Kereta Api Indonesia (индонезийские железнодорожные компании), которые анализируются в качестве выборки в этом исследовании, есть 3 компании, которые рассматриваются как «здоровые компании» (компании со стабильным состоянием); компания, которая включена в серую зону (прогнозируется банкротство), и две компании, которые включены в более опасную зону или указаны как компании, которые почти пережили банкротство.

**Ключевые слова:** Z-оценка Альтмана, банкрутство, фінансовая отчетность.