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BANKRUPTCY PREDICTION OF LISTED CEMENT COMPANY IN INDONESIAN STOCK EXCHANGES USING ALTMAN Z-SCORE MODEL

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ABSTRACT

Ratio analysis is one of the most competent tools to predict the bankruptcy of a company. In this paper the bankruptcy prediction of listed cement company in Indonesian Stock Exchanges has been evaluated using Altman Z-score. This study aims to determine the level of the bankruptcy of the listed cement companies in the Indonesian Stock Exchange during 2013 to 2017. There are four listed cement companies, namely PT Semen A, PT Semen B, PT Semen C and PT Semen D. Based on the results of the research, it shows that PT Semen A, PT Semen B and PT Semen C are in the safe zone with the highest Z value which is 15,822 and the lowest Z value which is 3,542. PT Semen D is in the bankrupt zone because it has a Z value below 1.8. For that reason, all companies need to improve the performance immediately to avoid the bankruptcy happening. There are many ways to avoid the bankruptcy such as improving the sales revenue, improving operational cost and waste reduction in operation.

INTRODUCTIONS

A. Background Of The Study

Predicting the financial health or corporate bankruptcy can be done by various methods. Ratio analysis is one of the most competent tools to predict the bankruptcy of a company, but the best method in predicting corporate bankruptcy is the Altman Z score method. The study conducted by Altman (2006) used financial ratios predicting corporate health with a 94% accuracy rate for one year before bankruptcy occurs; and 72% two years before the actual incident, while in a series of tests that have been conducted the next Altman was covering three different time periods, until 1999, accuracy in predicting bankruptcy one year ahead, ranging between 80-90% (Altman, 2006).

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One of the industries that is good enough to be examined is the cement subsector. The cement industry plays a role as one of the main components in the development of the country's infrastructure and buildings. The condition of a good cement company, does not experience liquidity problems or solvency difficulties will sustain the availability of cement to meet the needs of the development sector (Halkadri, 2014). Interest in investment in the cement industry in Indonesia is very high following the continued growth in demand for cement in the country due to increased construction activities, especially the housing sector on Java, toll road development programs, and other programs that require cement supply (Eddy, 2010). But in reality, in 2015 the cement company experienced a decline in cement sales. The total ability of the sluggish cement company sales is not in line with the total national cement demand and the increasing cement production capacity. This causes an over supply of cement, where cement production capacity is higher than the total cement that can be sold. Besides the increasingly fierce competition in the cement industry is also an obstacle for the cement company in improving its performance (Fataya, Alamsyah & Iwan, 2017).

In 2012, the number of cement producers in Indonesia was only nine companies, but until 2018 the number of cement companies has reached 19 companies. A large number of newcomers has impacted the increasing of national cement production capacity. Throughout 2016, the production capacity of cement has penetrated 95.5 million tons, while domestic and export demand is only 63.5 million tons. When comparing 2014 data, the capacity of the cement plant is still 69.5 million tons; there is an increase of 26 million tons or an increase of 38%. Based on data from the Indonesian Cement Association (ASI), domestic cement sales in October 2017 reached 6.8 million tons, up only 11.4% from the same period last year. Cumulatively, the total national cement sales during January-October 2017 reached 54.19 million tons, an increase of only 7.3% compared to the same period last year (Indonesian Cement Association).

In general, the performance of cement companies' revenue in the period of January-September 2017 is still sluggish. Only Cement Indonesia posted a 7.69% increase from the previous year, while Semen Baturaja, Semen Indocement Tunggal Prakarsa, and Semen Holcim still have not published the latest financial report (Indonesian Cement Association). As of September 30, 2017, the biggest contributor to Semen Indonesia's revenue is still dominated by cement sales, worth Rp17.55 trillion, or 85% of total revenue. The revenue increase was not driven by cement sales, as cement sales from Semen Indonesia dropped 2% from the same period last year valued at Rp17.86 trillion. When income rose, the company's net profit decreased only Rp1.45 trillion, down by 50%. The decline in net income was due to a 26% increase in operating expenses to Rp14.5 trillion (Indonesian Cement Association). If left unchecked, it could endanger the company's survival.

The size of the growth of cement companies from 2012 which only 9 companies became 19 companies in 2018 impacted the emergence of increasingly fierce cement sales competition. Cement production capacity continues to increase every year due to the large number of cement companies that have emerged, while the demand for cement in Indonesia tends to be stable. This has the potential indirectly to the financial health of cement companies due to decreased cement sales due to high competition and the large amount of cement circulating in the market.

Futkhatul & Pandi (2012) conducted a study to find out the performance and financial health of a publicly listed company specializing in cement companies that were accepted on the IDX, namely PT Indocement Tunggal Perkasa, Tbk, PT Holcim Indonesia, Tbk and PT Semen Gresik (Persero), Tbk using Altman Z score of 2006. However, this study uses a different decrimination zone, namely Z-Score> 2.90 categorized as a very healthy company, 1.20 <Z-Score <2.90 is in the gray area (gray area) and Z-Score <1.20 is categorized as a company that has a very large financial problem and high risk and very large bankruptcy. Based on Z-score calculation results, the last year of PT Holcim Indonesia. Tbk has the highest bankruptcy potential with the lowest Z-score of 1.25, then PT Indocement Tunggal Perkasa. Tbk with score 2.69 and PT Semen Gresik (Persero) Tbk. with a score of 2.81.

Fataya, Alamsyah & Iwan (2017), find out the financial distress potential of manufacturing companies basic industry and chemicals sector, cement subsector listed on Indonesia Stock Exchange period of 2011-2015 by using Altman Z-Score Modification model. The data used is cement companies listed on Indonesia Stock Exchange period of 2011-2015, that is financial statement of PT. Indocement Tunggal Prakarsa Tbk, PT. Holcim Indonesia Tbk, and PT. Semen Indonesia Tbk. Data analysis technique by using Altman Z-Score Modification analysis in Altman 1995 which use $Z = 6{,}56\,X1 + 3{,}26\,X2 + 6{,}72\,X3 + 1{,}05\,X4$ that only use X1 (working capital/total asset), X2 (retained earnings/total asset), X3 (earning before interest and taxes/total asset), and X4 (book value of equity/total liabilities). In Altman Z-Score 1995 sales is does not exist. The final results of this research show that cement companies listed on Indonesia Stock Exchange period of 2011-2015 are classified into three categories of companies i.e the companies that fall into the category of distress area, grey area, and non distress area. The analysis results show that PT. Indocement Tunggal Prakarsa Tbk and PT. Semen Indonesia Tbk. are consistently included in non distress area category period of 2011-2015, both of the companies fall into health categories and not potentially to bankruptcy. Other than that there is one company that went financial distress in 2013-2015 and potentially to bankruptcy in the future i.e PT. Holcim Indonesia Tbk. At 2013 PT. Holcim Indonesia Tbk fall into grey area category. PT. Holcim Indonesia Tbk. Fall into distress area in 2014 and 2015.

Therefore, researchers are interested in analyzing the bankruptcy projection of cement companies in Indonesia. For the sake of ease and uniformity of data sources, this research is only limited to companies listed on the Indonesia stock exchange. Until 2018, there were only 4 cement companies listed on the Indonesia Stock Exchange. The four listed cement companies, consisting of two government companies and two private companies. The government companies, namely PT Semen A and PT Semen B. The private companies are PT Semen C and PT Semen D (Indonesia Stock Exchange). For that writer feel the need to research to know the health of a cement company which goes public in Bursa Efek Indonesia to avoid the situation that endangersthe company. By evaluating the health of the company, the manager can take action to avoid corporate bankruptcy. In addition, by knowing the health of the company investors can find out which companies are worth investing in and get investment. A good investment must go through an analysis of the decision to find out whether the business will benefit or not. To avoid losses received by investors, investors must know their investment proposals with long-term risks that will be accepted (Ananda, Risa & Andika, 2018).

B. Research Questions and Objective of The Study

Based on previous research, researchers wanted to find out the health analysis of cement companies listed on the Indonesian stock exchange using the latest Altman Z-score model that uses 5 variables, with research question is to understand the level of the bankruptcy of listed cement companies in Indonesian Stock Exchange and the goal to be achieved is to understand the level of the bankruptcy of the listed cement companies in Indonesia Stock Exchange.

RESEARCH METHOD

The sample in this study is the company in the cement sector which listed on the Indonesia Stock Exchange. There are four listed cement companies, from government and private. PT Semen A and PT Semen B are they belong to the government and the private companies are PT Semen C and PT Semen D. This study uses secondary data obtained from Indonesian Capital Market Directory (ICMD) and the annual report of the company (financial statements).

The data had been analyzed through Altman's Z score model, for which a few ratios have been calculated through ratio analysis and collected data is analyzed by using Excel. The ratios are the widely used tool to measure the financial performance of a company. There are four major ratios which define the complete financial position of a company, which is a liquidity ratio, profitability ratio, solvency ratio,and activity ratio. The liquidity ratio helps to measure the company's ability to meet the short-term obligations. The profitability ratio measures the profit-bearing capacity of a company. The solvency ratio measures the debt service capacity in the

long run and the activity ratio determines the company's ability to utilize the assets efficiently. In the above formula, X1 gives the liquidity position to the total capitalization, X2 measures the cumulative profitability overtime and leverages, X3 measures the operating performance and productivity of assets, X4 gives the long-term solvency position and X5 gives the sales generating capacity of the assets.

$X1$ = Working Capital / Total Asset
$X2$ = Retained Earnings / Total Assets
$X3$ = Earnings Before Interest and Taxes / Total Assets
$X4$ = Market Value Of Equity / Book Value Of Liabilities
$X5$ = Sales / Total Assets

For example (PT Semen A):
$X1$ 2013 = Working Capital / Total Assets
       = 4674479 / 30792884
       = 0.152
$X2$ 2013 = Retained Earnings / Total Assets
       = 19752566 / 30792884
       = 0.641
$X3$ 2013 = EBIT / Total Assets
       = 6920400 / 30792884
       Z= 0.225
$X4$ 2013 = Book Value of Equity / Book Value of Debt
       = 83931008 / 9081621
       = 9.242
$X5$ 2013 = Net Sales / Total Assets
       = 24501241 / 30792884
       = 0.796

RESULTS AND DISCUSSION

Altman Z score consists of 5 variables, the five variables obtained from the PT Semen A financial statements from 2013 to 2017. The values for the variable company Z score can be seen in table 1.

Table 1. Value of PT Semen A Z Score Indicators

	PT Semen A				
	2013	**2014**	**2015**	**2016**	**2017**
Working capital	4674479	6376615	3939514	2221486	4998242
Total assets	30792884	34331675	38153119	44226896	48963503
X1	**0.152**	**0.186**	**0.103**	**0.050**	**0.102**
Retained earnings	19752566	22953520	25389389	26527985	26733361
Total assets	30792884	34331675	38153119	44226896	48963503
X2	**0.641**	**0.669**	**0.665**	**0.600**	**0.546**
EBIT	6920400	7077276	5850923	5084622	2746546
Total assets	30792884	34331675	38153119	44226896	48963503
X3	**0.225**	**0.206**	**0.153**	**0.115**	**0.056**
Book value of equity	83931008	96090624	67619328	54421696	58722048
Book value of debt	9081621	9326745	10712321	13652504	18524451
X4	**9.242**	**10.303**	**6.312**	**3.986**	**3.170**
Net sales	24501241	26987035	26948004	26134306	27813664
Total assets	30792884	34331675	38153119	44226896	48963503
X5	**0.796**	**0.786**	**0.706**	**0.591**	**0.568**

The ratio of net working capital to total assets depicts the liquidity position of the company. The ratio of working capital to the total assets of the firm varies from 0.050 to 0.186 during the study period; there is no upward or downward tendency based on X1 value. It shows that inefficient working capital mobilization seen from fluctuating X1 value. The ratio of retained earnings to total assets is varied from 0,546 to 0,669 during the study period, it indicating that the retained earnings mobilization is low. The ratio of EBIT to total assets is positive and low and varied from 0,056 to 0,225 shows that the earnings of the company are low. The book value of equity to debt is a common indicator of bankruptcy. It is a measure which indicates how much the company's assets can decline in value before the liabilities exceed the assets and the company becomes insolvent. From the analysis, it can be concluded that PT Semen A is relying more on equity rather than debt. The sales to total assets ratio are varied from 0,591 to 0,796 during the study period indicating that the sales of the company are low compared to the total assets invested by the company. Overall, the solvency position of the company is good enough, but the company must be able to make decisions wisely so that the company's financial performance does not continue to decline every year.

Table 2. Value of PT Semen B Z Score Indicators

	PT Semen B				
	2013	**2014**	**2015**	**2016**	**2017**
Working capital	1913010	2156020	1703873	545994	454774
Total assets	2711416	2928480	3268668	4368877	5060337
X1	**0.706**	**0.736**	**0.521**	**0.125**	**0.090**
Retained earnings	449157	665292	931553	1135543	1217417
Total assets	2711416	2928480	3268668	4368877	5060337
X2	**0.166**	**0.227**	**0.285**	**0.260**	**0.241**
EBIT	400402	404810	443414	349281	208947
Total assets	2711416	2928480	3268668	4368877	5060337
X3	**0.148**	**0.138**	**0.136**	**0.080**	**0.041**
Book value of equity	3246434	3748156	2862764	27447123	32976000
Book value of debt	244459	245389	319315	1248119	1647477
X4	**13.280**	**15.274**	**8.965**	**21.991**	**20.016**
Net sales	1168608	1214915	1461248	1522808	1551525
Total assets	2711416	2928480	3268668	4368877	5060337
X5	**0.431**	**0.415**	**0.447**	**0.349**	**0.307**

The ratio of working capital to total company assets varies from 0.090 to 0.736 during the study period. High level of fluctuation indicates that PT Semen B has a good level of investment in current assets. The ratio of retained earnings to total assets is varied from 0.166 to 0.285 during the study period, indicating that the mobilization of retained earnings is good because the trend of retained earnings rises every year. The ratio of EBIT to total assets is positive and low and varied from 0.041 to 0.148 shows that the earnings of the company are low. The ratio of book value of equity and book value of debt ratio ranges from 8,965 to 21,991. From the analysis, it can be concluded that PT Semen B is relying more on equity rather than debt. The sales to total asset ratio is varied from 0.307 to 0.447 during the study period indicating that the sales of the company is low compared to total assets invested by the company. Overall, the solvency position of the company is not poor.

Table 3. Value of PT Semen C Z Score Indicators

	PT Semen C				
	2013	2014	2015	2016	2017
Working capital	14106159	12826811	10446111	11237000	9404000
Total assets	26607241	28884635	27638360	30151000	28864000
X1	**0.530**	**0.444**	**0.378**	**0.373**	**0.326**
Retained earnings	18438208	20037534	19326471	21883459	20323413
Total assets	26607241	28884635	27638360	30151000	28864000
X2	**0.693**	**0.694**	**0.699**	**0.726**	**0.704**
EBIT	6595154	6815478	5645111	4146379	2287989
Total assets	26607241	28884635	27638360	30151000	28864000
X3	**0.248**	**0.236**	**0.204**	**0.138**	**0.079**
Book value of equity	73624634	92030792	82183498	56691000	80803040
Book value of debt	3629554	4307622	3772410	4012000	4307000
X4	**20.285**	**21.365**	**21.785**	**14.130**	**18.761**
Net sales	18691286	19996264	17798055	15362000	14431000
Total assets	26607241	28884635	27638360	30151000	28864000
X5	**0.702**	**0.692**	**0.644**	**0.510**	**0.500**

The ratio of working capital to the total assets of the firm varied from 0.326 to 0.530 during the study period. It indicates that PT Semen B has a good level of investment in current assets. The ratio of retained earnings to total assets is varied from 0.693 to 0.726 during the study period, indicating that the mobilization of the retained earnings is good because of the tendency of retained earnings that tend to rise. The ratio of EBIT to total assets is positive and always decreases annually and varied from 0.079 to 0.248 shows that the earnings of the company are low. The ratio of book value of equity and book value of debt ratio ranges from 14,130 to 21,785. From the analysis, it can be concluded that PT Semen C is relying more on equity rather than debt. The sales to total assets ratio are varied from 0,500 to 0.702 indicating that every year the company's sales continue to decline so that the company must make efforts to resell the sales increase. Overall, the solvency position of the company is not poor.

Table 4. Value of Z PT Semen D Score Indicators

	PT Semen D				
	2013	2014	2015	2016	2017
Working capital	-1176999	-1541356	-1375667	-2844408	-2457792
Total assets	14894990	17195352	17321565	19763133	19626403
X1	**-0.079**	**-0.090**	**-0.079**	**-0.144**	**-0.125**
Retained earnings	2469116	2278138	2031098	1829331	1071286
Total assets	14894990	17195352	17321565	19763133	19626403
X2	**0.166**	**0.132**	**0.117**	**0.093**	**0.055**
EBIT	1336548	928746	350418	172032	690455
Total assets	14894990	17195352	17321565	19763133	19626403
X3	**0.090**	**0.054**	**0.020**	**0.009**	**0.035**
Book value of equity	17433098	16743437	7624586	6897000	6399000
Book value of debt	6122043	8617335	8871708	11702538	12429452
X4	**2.848**	**1.943**	**0.859**	**0.589**	**0.515**
Net sales	9686262	9483612	9239022	9458403	9382120
Total assets	14894990	17195352	17321565	19763133	19626403
X5	**0.650**	**0.552**	**0.533**	**0.479**	**0.478**

The ratio of working capital to total assets has a negative value during the study period. It indicates that PT Semen D has a bad level of investment in current assets. The ratio of retained earnings to total assets is varied from 0.055 to 0.166 during the study period, indicating that the retained earnings are not poor. The ratio of EBIT to total assets is positive and low and varied from 0.009 to 0.090 shows that the earnings of the company are low. The ratio of book value of equity and book value of debt ratio ranges from 0,515 to 2,858. It shows the interest of shareholders is low due to the ill financial health of the company. The sales to total assets ratio are varied from 0.478 to 0.650 during the study period indicating that the sales of the company are low compared to the total assets invested by the company. Overall, the solvency position of the company is not good.

Table 5. Value of Coefficients and Z Score

Z-score of PT Semen A					
Year	1,2X1	1,4X2	3,3X3	0,6X4	1,0X5	Z
2013	0.182	0.898	0.742	5.545	0.796	**8.163**
2014	0.223	0.936	0.680	6.182	0.786	**8.807**
2015	0.124	0.932	0.506	3.787	0.706	**6.055**
2016	0.060	0.840	0.379	2.392	0.591	**4.262**
2017	0.122	0.764	0.185	1.902	0.568	**3.542**

Z-score of PT Semen B					
Year	1,2X1	1,4X2	3,3X3	0,6X4	1,0X5	Z
2013	0.847	0.232	0.487	7.968	0.431	**9.965**
2014	0.883	0.318	0.456	9.165	0.415	**11.237**
2015	0.626	0.399	0.448	5.379	0.447	**7.298**
2016	0.150	0.364	0.264	13.194	0.349	**14.321**
2017	0.108	0.337	0.136	12.010	0.307	**12.897**

Z-score of PT Semen C					
Year	1,2X1	1,4X2	3,3X3	0,6X4	1,0X5	Z
2013	0.636	0.970	0.818	12.171	0.702	**15.298**
2014	0.533	0.971	0.779	12.819	0.692	**15.794**
2015	0.454	0.979	0.674	13.071	0.644	**15.822**
2016	0.447	1.016	0.454	8.478	0.510	**10.905**
2017	0.391	0.986	0.262	11.257	0.500	**13.395**

Z-score of PT Semen D					
Year	1,2X1	1,4X2	3,3X3	0,6X4	1,0X5	Z
2013	-0.095	0.232	0.296	1.709	0.650	**2.792**
2014	-0.108	0.185	0.178	1.166	0.552	**1.973**
2015	-0.095	0.164	0.067	0.516	0.533	**1.185**
2016	-0.173	0.130	0.029	0.354	0.479	**0.818**
2017	-0.150	0.076	0.116	0.309	0.478	**0.829**

Table 6. Z Value and Firm's Classification

Company	Year	Z Value	Zone
PT Semen A	2013	8.163	Safe zone
	2014	8.807	Safe zone
	2015	6.055	Safe zone
	2016	4.262	Safe zone
	2017	3.542	Safe zone
PT Semen B	2013	9.965	Safe zone
	2014	11.237	Safe zone
	2015	7.298	Safe zone
	2016	14.321	Safe zone
	2017	12.897	Safe zone
PT Semen C	2013	15.298	Safe zone
	2014	15.794	Safe zone
	2015	15.822	Safe zone
	2016	10.905	Safe zone
	2017	13.395	Safe zone
PT Semen D	2013	2.792	Grey zone
	2014	1.973	Distress zone
	2015	1.185	Distress zone
	2016	0.818	Distress zone
	2017	0.829	Distress zone

Based on table 6, PT Semen A in 2013-2017 has a financial performance is in a safe area. This can be seen from the value of Z which is above 3 or Z> 3.0. Although the value of Z PT Semen A are in safe areas, but companies must remain cautious because every year the financial performance of the company continues to decline. It can be seen from the value of Z which tends to decrease every year.

PT Semen B in the year 2013-2017 also has financial performance in the safe area. This can be seen from the Z value greater than three. PT Semen B. has a fluctuating financial performance, as seen from the declining Z value in 2015, rising in 2016 and back down in 2017. Therefore, the company must take policy for the company's financial performance does not decrease again in the next year.

PT Semen C in the year 2013-2017 also has financial performance in the safe area. This can be seen from the value of Z which is above three. Until 2015, the financial performance of PT Semen C continues to increase, but in 2016 the value of Z companies decreased until finally rose again in 2017. Therefore the company should strive to improve its performance so that the company Z value does not decrease again in the next year.

PT Semen D in 2014-2017 has a financial performance that is in the area of bankruptcy and located in the gray area only in 2013. Based on the score Z, the performance of PT Semen D continues to decline. It must be addressed by the company so that PT Semen D can improve its performance so the company does not go bankrupt in the next year.
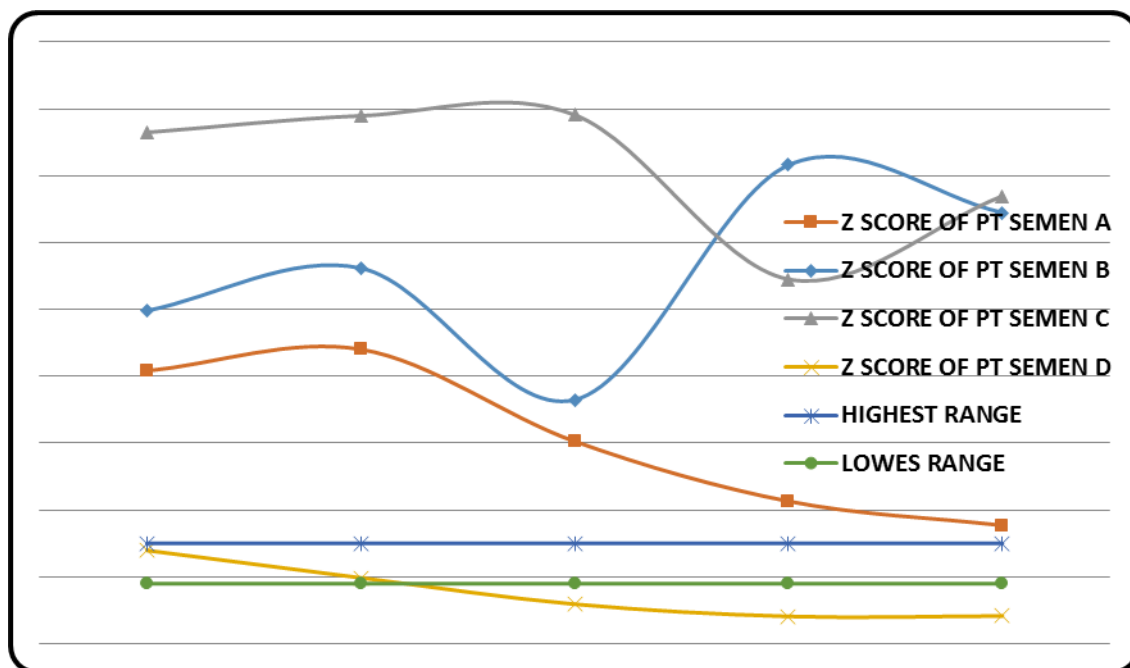
Figure 1. Graphical Presentation of Z Scores

Based on Figure 1, PT Semen C is seen as the healthiest company compared to other cement companies listed on the Indonesia Stock Exchange. This can be seen from the graph that PT Semen C has the highest Z score of 15,822. PT Semen C companies are quite stable in dealing with corporate finances that can be seen from the low fluctuations in the company's finances. PT Semen B is a company that is also categorized as healthy because it is in a safe zone or a safe zone. This is because all of the company's Z scores are above 3.0. From the table above it can be estimated that in 2015 there was a decline in the financial condition of the PT Semen B company, but the management of the PT Semen B company acted quickly in the following year. The financial of the PT Semen B company rose significantly again. company finances can continue to increase every year. PT Semen A companies are categorized as healthy because they are in a safe zone or a safe zone. However, the PT Semen A company must continue to improve its strategy because the Z score of the PT Semen A company score continues to improve each year. The company must immediately improve the strategy that has been implemented so that the company will immediately rise and no longer increase its finances in the following years. Based on the table above, it can be seen that PT Semen D is categorized as unhealthy because during the study period the results of the Z score of the PT Semen D company were in the bankrupt or stressed zone, only in 2013 the company was in the gray area. This is because almost all of the company's Z score is below 1.8. If the Z value is less than 1.8, then it is a bankrupt company (depressed zone). Based on the graph above, the PT Semen D company is a company that has the finance that most need greater improvement because all of these company variables are in the insecure category. The company must overhaul its financial strategy so that it is not in the bankrupt zone again the following year and is detrimental to the company.

In general, figure 1 represents the Z score of PT Semen A, PT Semen B, PT Semen C,and PT Semen D (from table 7) is compared to the lowest range (1.8) and the highest range (3) of Altman's Z,score model. It can be seen that PT Semen A, PT Semen B, PT Semen C has a viable financial position, but the management of the company must be careful and remains in a safe zone. Based on figure 1, it can also be seen that PT Semen D is in a bankrupt zone. The company must immediately take quick actions avoiding the and having experienced for the bankruptcy in the future.

There are many ways to avoid a company from bankruptcy, such as:

1. Applying The Quality Function Deployment (QFD) Method to Improve The Company's Competitiveness

The QFD method is to increase product reliability, improve product quality, increase customer satisfaction, shorten time to market, reduce design costs, improve communication, increase productivity and increase company profits. Besides that, QFD also aims to develop products that can satisfy consumers by translating consumer desires into technical characteristics that are the target of design and quality control elements for use throughout the production process. The ability to produce products in accordance with the needs and desires of consumers is a key factor that must be owned by the company to be able to produce products that are highly competitive (Trenggonowati, 2017).

2. Applying Lean Manufacturing Approaches in Reducing Waste

According to Gaspersz (2007) lean manufacturing is a production system that uses very little energy and waste to fulfill what consumers want precisely. The purpose of lean manufacturing is to eliminate waste (non value adding activity) from a process so that activities along the value stream are able to produce value adding. There are seven waste in the production process, namely overproduction, waiting, transportation, processing, inventory, motion and defects. By implementing a lean manufacturing approach, it is hoped that companies will be able to eliminate waste and increase profits, so that the company will avoid bankruptcy (Akhmad, Wahyu & Ilyas, 2015.)

3. Implement a Quality Management Model in Improving Product Competitiveness

In order for a cement company to be able to compete in the cement industry and avoid bankruptcy, the company must have very high quality that makes the company able to meet customer satisfaction, make products sold out, be able to compete with competitors, and increase market share. Some things that affect product competitiveness are leadership, strategic planning, measurement analysis and knowledge management, human resource focus, and process management (Billy & Wiwik, 2018).

4. Improve The Company's Supply Chain Management

There are many things companies must do to avoid bankruptcy, one of which is to improve the supply chain system. Supply Chain Risk Management is a risk that occurs in the flow of products, information, raw materials to the delivery of the final product that threatens the entire supply chain from the initial supplier to the consumer. Whereas supply chain disruptions are unplanned events that occur in the supply chain that can affect the flow of materials and components. Some of the risks that often occur are demand risk, delays in raw materials, natural disasters (discruption), while other risks are, supplier quality, product quality, information systems, prices, supply, warehouse damaged products, financial, supplier dependency, delays, production capacity , inventories, shortages of raw materials, stock differences and politics. There are 9 strategies to mitigate supply chain disruptions, namely: postponement, stock strategy, flexible supply base. make and buy, economic supply incentives, flexible transportation. revenue management via dynamic pricing and promotion, planning planning. silent product rollover (Handayani, 2016).

5. Implement a Six-Sigma Approach in Improving Product Quality

The profits obtained by the company, is a combination of all aspects that exist in the company. Six Sigma is a method used to make efforts to repair and improve processes that are continuous or continuous (Tannady, 2015). To achieve quality products, companies must always control and improve the quality of their products, so that perfect results will be obtained (Kartini, 2019). The Six Sigma approach with the Define, Measure, Analyze, Improve, and Control (DMAIC) methods can help identify problems that occur in the company, measure process performance and product performance, then analyze these problem factors in order to provide solutions and proposals for improvements to company performance so that the company can avoid bankruptcy projections going forward. (Hartono et al. 2010).

CONCLUSION

The bankruptcy level of the listed cement company in Indonesian stock exchange show that PT Semen A financial performance level is in the safe zone with Z value more than 3, 3.542 to 8.807. PT Semen B financial performance level is the safe zone with Z value in between 7.233 to 14.321, PT Semen C. This cement company is also having the financial performance in the safe zone, with Z value 10.905 to 15.882. Compared to other cement companies, Indocementhas the highest Z value. It means this company is the best among the others. PT Semen D. It is showing that during the 2014 – 2017, the financial performance in the area of bankruptcy, and on the verge of bankruptcy in 2013. Z value is in between 0.818 – 2,792 which is very low compared to others. This company needs to improve the performance immediately to avoid the bankruptcy happening.

There are many ways to avoid bankruptcy such as improving the sales revenue with the stronger sales team, improving operational cost by improving productivity and waste reduction in operation. Lastly, the most important thing is the leadership team have to come out with clear objectives and strategic action of how to get out from the bankruptcy zone.

All the companies need the elemental improvement on company performance and financial management. It will help company fitness level in stock exchange to avoid the indication of bankruptcy which will impact and share the value in the stock list of Indonesian exchange.

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