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Analysis on the Performance of Technology Companies with Z-score Model

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Article Info

ABSTRACT

Local technology sector plays a significant role in information and communication technology (ICT) based innovations and applications which enhance organizational performance as well as national economic growth and labor productivity. In this paper, financial performance of the listed Malaysia companies in technology sector is analyzed and evaluated. Altman's Z-score model is proposed due to its robustness in determining companies' financial distress level using five financial ratios as variables. The computed Z-score values classify the financial status of the companies into distress, grey and safe zones. This study investigates the financial data of 23 listed technology-based companies in the Main Market of Bursa Malaysia over the period of 2013 to 2017. The findings reveal that the percentage of safe zone companies increase throughout the five years whereas distress zone companies decline. It is concluded that financial ratio for market value of equity to total liabilities is the dominant factor that directly influences the level of financial distress among these technology-based companies in Malaysia. These research outcomes provide an insight to investors or policy makers to develop future planning in order to avoid financial failure in local technology sector.

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1. INTRODUCTION

The leverage of Information Communication Technology (ICT) is an enabler for the acceleration of economic growth, structural reform and labor productivity in developed and developing countries as well as emerging and newly industrializing economics in the globe [1-11]. It facilitates agile and fast access to new market worldwide for the products or services provided, achievement of economies of scale, enhancement on competitiveness and sustainable economic growth for countries pursuing open market economy [12-15]. In line with this effort, Malaysian government has initiated National E-Commerce Strategic Plan that is facilitated by local technology sector to speed up e-commerce growth rate from 10.8% in 2016 to 20.8% by 2020. This growth rate is expected to contribute more than RM211 billion to Malaysia's GDP compared to RM114 billion target set under 11th Malaysia Plan [16]. As a main driver in national economic growth, small and medium enterprises (SMEs) in the technology sector have taken the initiatives to acquire technological

capabilities via active involvement in globalized research and development (R&D) efforts, technology transfers and collaborations [15,17,18]. At the same time, it is vital to evaluate financial health of these technology-based companies so that steps can be taken to avoid them from encountering financial failure and bankruptcy.

Bankruptcy or failure of any institution is always an interesting issue to investigate because investors refuse to risk themselves in a poor financial performance company. Altman [19] attempted to assess the ratio analysis as an analytic technique based on Multiple Discriminant Analysis (MDA). The initial investigation examined 66 manufacturing corporations that were discriminated into bankruptcy and non-bankruptcy. Five financial ratios were used to form the finalized Z-score model [19,20]. The variables covered different categories such as liquidity, profitability, leverage, solvency and activity ratios. The findings proved to have a high accuracy in predicting the bankruptcy and hence have a high percentage in the classification of the corporations. Later on, Z-score model has been utilized by other researchers in different fields. Li, et al. [21] applied Z-score model in modern enterprise financial management. The model was used to construct a financial early-warning system to hedge against potential financial risk. Next, the model was used to predict financial distress of listed companies in Tehran Stock Exchange (TES) in Iran [22]. The study investigated 30 companies with financial distress problem and 30 companies without financial distress problem. Similar financial ratios such as liquidity and profitability were tested to predict the company's financial distress problem. The model was once again proved to have a high accuracy in predicting company's bankruptcy. In India, Z-score model was studied by Pardeshi, et al. [23] to examine the financial performance as well as solvency of three listed airline operators. Due to funding problem, the aviation industry aimed to lower the rate of bankruptcy through identification of influential variables using this model. Meanwhile, similar researches had been carried out such as pharmaceutical companies [24], Italian manufacturing companies [25] and Spanish financial sector [26] to predict the companies' failure.

2.   RESEARCH METHOD

In this paper, the financial performance of listed technology-related companies is analyzed and categorized using Altman's Z-score Model. Besides, the dominant financial ratios that directly affect financial performance of the technology company over the period of 2013 to 2017 are identified using multiple regression analysis.

A total of 23 technology companies which are listed in the Main Market of Bursa Malaysia are examined to determine their financial performance based on Altman's Z-score model. This study is conducted using their latest five years of financial data from 2013 until 2017. The related companies excluded in the research are mainly due to unavailability of financial data over the period of the study.

2.1. Altman's Z-score Model

The following model indicates Z-score model to distinguish the financial distress level of selected companies [19,22,23,24].

$$Z = 1.2x_1 + 1.4x_2 + 3.3x_3 + 0.6x_4 + x_5,$$

where x_1 = working capital to total assets (WC/TA)
x_2 = retained earnings to total assets (RE/TA)
x_3 = earnings before interest and taxes to total assets (EBIT/TA)
x_4 = market value of equity to total liabilities (MVE/TL)
x_5 = sales to total assets (S/TA)

x_1 is defined as the liquidity ratio where working capital refers to deduction of current assets over current liabilities. This ratio expresses the liquidity of the current assets with respect to total assets. x_2 calculates the cumulative profit of the company over time in which the retained earnings refer to the profits that are paying out to equity investors as dividends or retaining as business operation. x_3 measures the effectiveness of a company in generating earnings using its assets. x_4 defines the market view or market value of the company in relation to the stock price and number of outstanding shares. x_5 measures the sales generating capacity regarding the total assets of the company.

The results of the Z-score model are separated into three ranges. For the first range, Z<1.81 is defined as distress zone where the company is indicated as failed company that undergoes financial distress. Z value between 1.81 and 2.99 is defined as grey zone where uncertainty happens in the company. This kind of company has to be monitored intently because it involves characteristic of distress and non-distress level. Lastly, Z>2.99 denotes safe zone where the company denotes as financially stable and safe from bankruptcy.

2.2. Multiple Regression Analysis

Multiple regression analysis is a statistical tool that widely used to identify linear relationship between dependent variable and a set of independent variables based on financial data of the public listed companies [27,28]. On top of it, the independent variables which have significant influence on the dependent variable are determined [29,30]. In this research, it is used to determine the significant financial ratios that have impact on the Z-scores of selected technology companies in Malaysia. The forward multiple linear regression procedure is implemented using IBM SPSS V22. The regression model of the research is shown as follows by adopting the Z-score model and its financial ratios.

$$Z = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_4 + \beta_5 x_5$$

where   Z=Z-scores of the selected technology company

x_1 =WC/TA

x_2 =RE/TA

x_3 =EBIT/TA

x_4 =MVE/TL

x_5 =S/TA

and β_0, β_1, β_2, β_3, β_4 and β_5 are the regression coefficients of the model.

3. RESULTS AND DISCUSSION

The listed companies in technology sector are examined using Z-score model. Table 1 shows the values for the five variables as well as the model values. Financial distress levels of the companies are determined through Z-score values. Table 1 indicates the values of five variables and Z-score of technology companies in 2017. According to the findings, 17 companies (73.91%) are financially stable while 4 companies (17.39%) and 2 companies (8.70%) are under grey zone and distress level respectively. Z-score values of DIGISTA and OMESTI are below 1.81, hence these two companies are under the distress level. Next, AMTEL, CUSCAPI, MSNIAGA and THETA are the companies under the grey zone.

Table 1. Variables and Z-score for 2017

No	Company Name	Abbreviation	X1	X2	X3	X4	X5	Z
1	AMTEL HOLDINGS BERHAD	AMTEL	0.64	0.19	-0.05	1.82	0.55	2.51
2	CUSCAPI BERHAD	CUSCAPI	0.18	-1.48	-0.48	7.83	0.64	1.91
3	D&O GREEN TECHNOLOGIES BERHAD	D&O	0.25	0.12	0.09	4.37	0.95	4.35
4	DATAPREP HOLDINGS BHD	DATAPRP	0.62	0.01	-0.06	6.69	0.89	5.45
5	DIGISTAR CORPORATION BERHAD	DIGISTA	0.25	0.00	0.02	0.22	0.16	0.64
6	ECS ICT BERHAD	ECS	0.54	0.39	0.08	1.10	3.93	6.03
7	EXCEL FORCE MSC BERHAD	EFORCE	0.66	0.48	0.15	84.07	0.42	52.82
8	ELSOFT RESEARCH BERHAD	ELSOFT	0.59	0.57	0.25	62.15	0.54	40.18
9	FRONTKEN CORPORATION BERHAD	FRONTKN	0.31	0.30	0.11	3.85	0.69	4.14
10	GHL SYSTEMS BERHAD	GHLSYS	0.26	0.16	0.06	6.55	0.59	5.26
11	GRAND-FLO BERHAD	GRANFLO	0.62	0.29	0.08	3.66	0.54	4.15
12	GLOBETRONICS TECHNOLOGY BERHAD	GTRONIC	0.35	0.24	0.14	6.94	0.77	6.16
13	INARI AMERTRON BERHAD	INARI	0.46	0.33	0.20	13.40	0.98	10.69
14	KESM INDUSTRIES BERHAD	KESM	0.26	0.56	0.10	5.70	0.71	5.56
15	MMS VENTURES BERHAD	MMSV	0.69	0.54	0.30	21.46	1.06	16.51
16	MALAYSIAN PACIFIC INDUSTRIES BERHAD	MPI	0.40	0.53	0.15	7.95	0.95	7.45
17	MESINIAGA BERHAD	MSNIAGA	0.40	0.29	0.07	0.92	1.04	2.69
18	NOTION VTEC BERHAD	NOTION	0.37	0.34	0.03	2.90	0.65	3.42
19	OMESTI BERHAD	OMESTI	0.08	0.02	-0.02	0.89	0.73	1.31
20	PENTAMASTER CORPORATION BERHAD	PENTA	0.43	0.28	0.12	6.15	0.80	5.81
21	THETA EDGE BERHAD	THETA	0.62	-0.42	0.02	2.31	1.00	2.60
22	UNISEM (M) BERHAD	UNISEM	0.22	0.36	0.10	7.01	0.79	6.09
23	VITROX CORPORATION BERHAD	VITROX	0.52	0.57	0.18	18.46	0.67	13.76

A total of 23 listed companies in the technology sector in Malaysia are investigated in this study. The data is extracted from their respective annual reports over the period of 2013 to 2017. The five variables are used to obtain the Z-score values as shown in Table 2. According to the results, DIGISTA and OMESTI undergo distress level throughout the five years because the Z-score values are below 1.81. According to

Altman et al. [25], the companies went bankrupt if the Z-score values fell into the distress zone. Meanwhile, there are companies that are always in a safe zone such as ECS, EFORCE, ELSOFT, GHLSYS, GTRONIC, MMSV and VITROX. These companies have lower tendency in the risk of bankruptcy as the findings show that the values are far apart from the defined value of 2.99. The companies that fall into the grey zone are the companies that need to be monitored as these companies are in between the risk of distress and non-distress zones. Among the technology companies, AMTEL, D&O, MSNIAGA and THETA stand in the grey zone for 4 out of 5 years. Hence, the four companies should be observed properly. Besides, 69.57% of the selected listed technology-based companies have improved Z-scores from year 2014 to 2015. On top of it, 86.96% of them show upward Z-scores' trend from year 2016 to 2017. This indicates that there is an improvement on these technology-based companies' financial strength over the period of 2014 to 2017.

Table 2. Z-score Values

No	Company Name	Abbreviation	2013	2014	2015	2016	2017
1	AMTEL HOLDINGS BERHAD	AMTEL	2.29	4.75	2.73	2.06	2.51
2	CUSCAPI BERHAD	CUSCAPI	9.38	3.97	3.28	-1.44	1.91
3	D&O GREEN TECHNOLOGIES BERHAD	D&O	2.09	2.32	2.62	2.49	4.35
4	DATAPREP HOLDINGS BHD	DATAPRP	3.90	2.47	2.37	2.27	5.45
5	DIGISTAR CORPORATION BERHAD	DIGISTA	1.54	1.37	1.20	1.02	0.64
6	ECS ICT BERHAD	ECS	6.16	5.95	6.75	5.61	6.03
7	EXCEL FORCE MSC BERHAD	EFORCE	10.27	4.90	7.11	11.72	52.82
8	ELSOFT RESEARCH BERHAD	ELSOFT	13.99	15.63	16.70	20.25	40.18
9	FRONTKEN CORPORATION BERHAD	FRONTKN	1.80	2.50	2.57	2.61	4.14
10	GHL SYSTEMS BERHAD	GHLSYS	4.23	3.46	3.98	3.86	5.26
11	GRAND-FLO BERHAD	GRANFLO	3.08	2.29	2.48	2.37	4.15
12	GLOBETRONICS TECHNOLOGY BERHAD	GTRONIC	6.15	7.02	11.03	7.60	6.16
13	INARI AMERTRON BERHAD	INARI	1.97	3.85	4.21	5.97	10.69
14	KESM INDUSTRIES BERHAD	KESM	2.57	2.62	3.31	5.34	5.56
15	MMS VENTURES BERHAD	MMSV	7.11	8.57	12.23	9.54	16.51
16	MALAYSIAN PACIFIC INDUSTRIES BERHAD	MPI	2.59	3.84	5.16	6.88	7.45
17	MESINIAGA BERHAD	MSNIAGA	3.63	2.41	2.61	2.56	2.69
18	NOTION VTEC BERHAD	NOTION	2.12	1.66	2.00	3.12	3.42
19	OMESTI BERHAD	OMESTI	1.21	1.73	1.57	1.15	1.31
20	PENTAMASTER CORPORATION BERHAD	PENTA	1.15	1.81	3.18	4.27	5.81
21	THETA EDGE BERHAD	THETA	2.62	2.05	1.42	2.12	2.60
22	UNISEM (M) BERHAD	UNISEM	1.39	2.86	4.68	4.61	6.09
23	VITROX CORPORATION BERHAD	VITROX	5.13	6.10	8.30	4.91	13.76

Table 3 shows the total number of companies while Table 4 indicates the percentage of companies that are under three different zone in respective year. The percentage for the safe zone companies are the highest throughout the five years which is approximately 48% until 74% whereas distress zone companies has the lowest percentage among the technology companies. It is seen also the percentage for the distressed companies declines consistently from 21.74% to 8.70% from 2013 until 2017. Apart from that, the grey zone level increases slightly in 2014 and decreases to 17.39% in 2017. For the non-financial distress companies, the number of companies increases continuously from 47.83% to 73.91% which reveals that more companies in technology sector are getting financially stable and safe from bankruptcy. It indicates also financial performance of Malaysia companies is getting stronger throughout the five years. Figure 1 illustrates the trend of the companies in five years.

Table 3. Number of Companies in Different Zone Level

Zone	Year				
	2013	2014	2015	2016	2017
<1.81	5	4	3	3	2
1.81 to 2.99	7	8	7	7	4
>2.99	11	11	13	13	17
Total	23	23	23	23	23

Table 4. Percentage of Companies in Different Zone Level

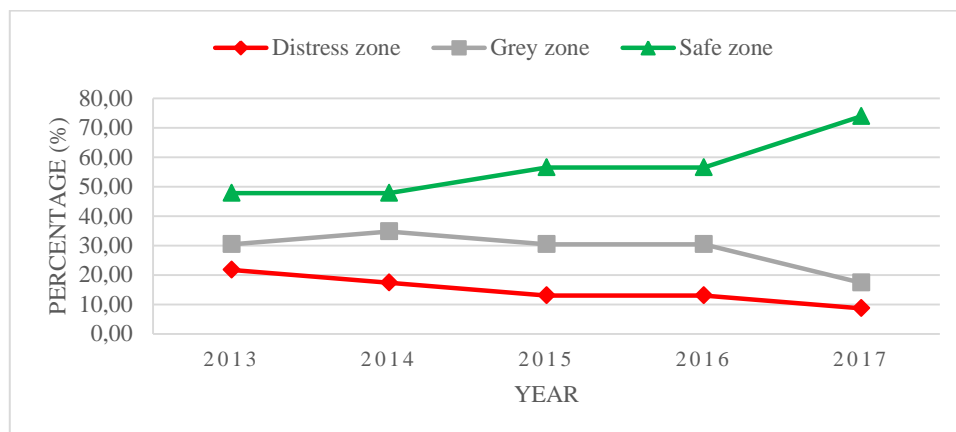| Zone	Year				
	2013	2014	2015	2016	2017
<1.81	21.74	17.39	13.04	13.04	8.70
1.81 to 2.99	30.43	34.78	30.43	30.43	17.39
>2.99	47.83	47.83	56.52	56.52	73.91

Figure 1. Percentage of companies illustrated in line graph

From the summarized results for multiple regression analysis in Table 5, the financial ratio of market value of equity to total liabilities (x_4) is a dominant factor that influences technology-based companies' level of financial distress in Malaysia. Besides that, the ratio of working capital to total assets (x_1) and sales to total assets (x_5) are concluded as the factors that have impact on financial health of technology companies in Malaysia.

Table 5. Summary of Multiple Regression Analysis

No.	Name of company	Significant variable / variables	Significance level/levels
1	AMTEL HOLDINGS BERHAD	X4	0.001
2	CUSCAPI BERHAD	X3	0.045
3	D&O GREEN TECHNOLOGIES BERHAD	X4	0.002
4	DATAPREP HOLDINGS BHD	X4	0.011
5	DIGISTAR CORPORATION BERHAD	X1	0.022
6	ECS ICT BERHAD	X4,X5	0.012,0.035
7	EXCEL FORCE MSC BERHAD	X1,X4	0.049,0.000
8	ELSOFT RESEARCH BERHAD	X1,X3,X4	0.043,0.008,0.000
9	FRONTKEN CORPORATION BERHAD	X4	0.003
10	GHL SYSTEMS BERHAD	X2, X4	0.014, 0.003
11	GRAND-FLO BERHAD	X4	0.001
12	GLOBETRONICS TECHNOLOGY BERHAD	X1, X4, X5	0.034, 0.002, 0.010
14	KESM INDUSTRIES BERHAD	X4	0.000
15	MMS VENTURES BERHAD	X4	0.000
16	MALAYSIAN PACIFIC INDUSTRIES BERHAD	X1, X4, X5	0.020, 0.002, 0.005
17	MESINIAGA BERHAD	X1	0.009
18	NOTION VTEC BERHAD	X1	0.004
19	OMESTI BERHAD	X3, X5	0.002,0.016
20	PENTAMASTER CORPORATION BERHAD	X2	0.002
21	THETA EDGE BERHAD	X4	0.035
22	UNISEM (M) BERHAD	X4	0.000
23	VITROX CORPORATION BERHAD	X4	0.000

Among companies which are financially stable, the ratio of market value of equity to total liabilities is the sole significant factor that directly influences the financial health of D&O, DATAPREP, FRONTKEN, GRAND-FLO, KESM, MMSV, UNISEM and VITROX over the period of 2013 to 2017. For ECS and INARI, their Z-scores are significantly caused by their ratio of sales to total assets besides ratio of market value of equity to total liabilities. Both GTRONIC and MPI's Z-scores are significantly contributed by ratios of working capital to total assets, sales to total assets and market value of equity to total liabilities. For PENTA, its increasing Z-scores are merely due to higher ratio of retained earnings to total assets whereas GHLSYS's Z-score depends on the ratios of retained earnings to total assets as well as market value of equity to total liabilities. On the other hand, NOTION's Z-score is only significantly influenced by its ratio of working capital to total assets. Besides that, Z-score of EFORCE is significantly contributed by ratio of market value of equity to total liabilities on top of ratio of working capital to total assets. ELSOFT has high and continuously increasing Z-scores from 2013 to 2017 which are due to its ratio of EBIT to total assets besides the ratios of market value of equity to total liabilities and working capital to total assets.

Among potential financially distressed companies, Z-scores of AMTEL and THETA are merely affected by its ratio of market value of equity to total liabilities over the period of 2013 to 2017. On the other hand, CUSCAPI's and MSNIAGA's poor Z-scores are mainly influenced by its ratios of EBIT to total assets and working capital to total assets respectively. For the financially distressed DIGISTA, its low and decreasing Z-scores are mainly due to ratio of its working capital to total assets over the period of 2013 to 2017. Similarly, low Z-scores of OMESTI are due to its ratios of both EBIT to total assets and sales to total assets.

4.   CONCLUSION

Overall, the Altman's Z-score model with financial ratios as variables can be used to estimate the companies' financial performance and potential distress. The objective of this study in identifying the financial distress level of the listed companies in Malaysia technology sector has been achieved through the proposed Z-score model. The model examined the companies' financial performance from 2013 until 2017 based on the financial ratios as variables. Throughout the five-year performance, 7 companies are always in the safe zone whereas 2 companies are in the distress zone. Besides that, the percentage of the safe zone companies shows an increasing trend while distress companies show decreasing trend indicating the economic growth of the financial performance in the companies in technology sector. According to the multiple regression analysis, market value of equity to total liabilities is the most dominant financial ratio while working capital to total assets and sales to total assets are considered as important financial ratios that affect level of financial distress among listed technology-based companies in Malaysia. The identification of companies' financial performance provides insight to investors or policy makers to develop future planning in order to avoid any financial failure.

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