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Evaluation on the Financial Performance of Technology Companies in Malaysia with Zmijewski Model

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ABSTRACT

In the era of Industrial Revolution 4.0 (IR 4.0), Information and Communications Technology (ICT) sector provides cost effective solution to improve overall organizational performance as well as support sustainable national economic growth of emerging economies like Malaysia. On top of it, local ICT related companies, especially those are listed in Bursa

Malaysia, are expected to work and contribute toward the accomplishment of vision 2050 in transforming Malaysian into smart communities. At the same time, the performance of these companies has to be evaluated as they will become financially distressed if they are not financially stable. The objective of this paper is to evaluate the financial performance of technology companies in Malaysia using Zmijewski model. The model uses financial ratio analysis that measures the performance, leverage and liquidity of these companies. The data of this study comprises technology-based companies that are listed in Malaysia's stock market. The period of this study is from year 2013 to 2017. The results indicate the financial condition of these companies based on the Zmijewski value computed. This study is significant because it assesses the financial condition of the technology companies in Malaysia. As a result of it, stakeholders will initiate proactive and preventive measures to promote the economic growth of technology sector in Malaysia.

Keywords: Zmijewski model, Financial performance, Technology companies.

1. Introduction

Nowadays, Information and Communications Technology (ICT) plays a significant role in accelerating and sustaining economic growth of developing, emerging and developed economies worldwide, see Majeed and Ayub (2018) and Niebel (2018). Due to exponential advancement in the era of fourth Industrial Revolution (IR 4.0), ICT has been leveraged to enhance productivity and efficiency of manufacturing industries particularly and service industries generally in order to achieve economy of scale and scope in the borderless and competitive market, see Yao and Lin (2016). As a result, research and development (R&D) investments and diffusions in ICT provide an impetus to spur up national economic growth in the globe (Das et al., 2018). In line with this development, Malaysian government has initiated Vision 2050 to transform the country into the top 20 nations and its citizens into smart communities who are to be equipped with creativity, innovation and knowledge to leverage ICT for sustainable economic development (Academy of Sciences Malaysia, 2017).

Since Malaysia has been focusing on ICT with the aim to build sustainable ICT industry that shapes the country's future, much concern has been expressed regarding the need for an efficient and effective financial planning in running the business of the technology companies in order to reduce the company's risk of insolvency and mitigate bankruptcy risk. Before being able

to take proactive steps to reduce prospective impact of the risks, potential reasons and factors of deterioration of a company's financial position must be identified first. There has been a surge in bankruptcy filings by companies. These corporate bankruptcies could have devastating effects on the country's economy growth. As a result, a stream of literature related to the new means and models of bankruptcy prediction has emerged where they serve as proxies for financial distress. Many stakeholders such as shareholders, creditors, and suppliers are particularly interested in the financial performance of a company. The predictive power of the bankruptcy prediction models becomes an enormous source of added value for these parties of concern as the ability of these models to evaluate financial health drives their decision making.

Many bankruptcy prediction tools have been proposed by a great number of authors in literature. Bankruptcy prediction was initiated in 1930s where formulation of the model is drawn on the basis of ratio analysis (Ali and Abdulhassan Abbas, 2015). A few of the most commonly cited models are Altman, Springate and Zmijewski model. Zmijewski model was estimated by a probit model that consists of three financial ratios that measure liquidity, leverage, and performance of a company. The advantage of using this model is its generalizability for emerging market economies as it is a non-industry specific model (Oz and Simga-Mugan, 2018). This bankruptcy prediction model is appropriate to predict bankruptcy of both financial and non-financial industries. The model was established based on a sample of 40 bankruptcy firms and 800 non-bankrupt firms with 98% correct predictions (Zmijewski, 1984).

The main focus of this paper is to analyze the financial performance of the companies from the technology sector listed in Bursa Malaysia with Zmijewski model. The rest of the paper is structured as follows. Section II reviews the literature related to the application of Zmijewski model on the evaluation of a company's financial performance. Section III describes the data and model studied in this paper. It is followed by results and conclusion.

2. Literature Review

In the era of fourth Industrial Revolution (IR 4.0), the increased labour productivity and revenue growth of manufacturing and servicing industries in both public and private sectors in the globe have been enabled by Information and Communications Technology (ICT), see Yao and Lin (2016), Ridgway et al. (2013), Rüßmann et al. (2015), Atzori et al. (2010), Khaitan and McCalley (2014), Siemieniuch et al. (2015), Kang et al. (2016), and Schwab (2017). ICT investments and diffusions have contributed significantly toward national

economic growth by enhancing productivity growth as well as improving organizational effectiveness and efficiency in developing, emerging and developed economies in the world, see Majeed and Ayub (2018), Niebel (2018), Hofman et al. (2016), Hausmann et al. (2014), Hwang and Shin (2017), and Sağlam (2018). In line with this recent development, Malaysia's technology-based companies, especially those listed in Bursa Malaysia, are expected to contribute and strive toward the accomplishment of Vision 2050 to transform Malaysian into smart communities with sustainable national economic growth (Academy of Sciences Malaysia, 2017).

The first study in the context of bankruptcy prediction was carried out by Thomas Woodlock on the railroad industry in 1900 (Kasgari et al., 2013). A variety of estimation methods have been proposed since then to address the issue of bankruptcy prediction as it provides an early warning sign of potential collapse of a business entity, such as multi-discriminant method (Altman, 1968), logistic regression method (Ohlson, 1980), linear discriminant method (Taffler, 1983), probit regression method (Zmijewski, 1984), and hazard modeling (Shumway, 2001). Zmijewski model is one of the most well-known bankruptcy prediction models as it is a good proxy for default prediction. Many researchers have applied this model to evaluate the financial performance of corporates in different sectors.

Pavlović et al. (2012) predicted the risk of failure of Serbian companies by utilizing Zmijewski model and it has been proven that the model is able to provide highly accurate results in the study. The accuracy rate for non-distressed companies is 95.2% on average. Meanwhile, the distressed companies obtained an average accuracy of 84.4%. The average accuracy of the total sample is as high as 94.15%.

In addition to that, Zmijewski model has also sparked interest in the field of coal mining industry where the researchers have tested its applicability on coal mining listed firms in Indonesian Stock Exchange (Salim and Sudiano, 2017). 19 companies have been examined from year 2011 to 2014. The main finding of this study emphasized that Zmijewski model is the predictive model that provides highest predictive accuracy. Besides, Zmijewski model has been applied to measure the performance of small enterprises (Dolejšová, 2015), pharmaceutical and textile firms (Imanzadeh et al., 2011) and manufacturing companies, see Sembiring and Sinarti (2015) and Kumar and Kumar (2012).

3. Methodology

A total of 31 technology companies that are listed in Bursa Malaysia Stock Market are analyzed in this study where their financial performance is evaluated with Zmijewski model. The financial data of the selected companies are extracted from the financial statement and the period of study covers over the period of 2013 to 2017 (Bursa Malaysia).

The formulation of Zmijewski model is represented as such:

$$Z = -4.3 - 4.5x_1 + 5.7x_2 - 0.004x_3 \tag{1}$$

$$x_1 = \frac{\text{Net Profit}}{\text{Total Assets}} \tag{2}$$

$$x_2 = \frac{\text{Total Liabilities}}{\text{Total Assets}} \tag{3}$$

$$x_3 = \frac{\text{Current Assets}}{\text{Current Liabilities}}. \tag{4}$$

Zmijewski model is developed as shown in Equation (1) where it calculates the Zmijewski score for each related company. x_1 in Equation (2) measures the performance of a firm. x_2 is an indicator of financial leverage where it explains how much of the company assets are financed by debt. The measure of company liquidity is represented by x_3. This ratio expresses the company's ability to pay its short term obligations. Zmijewski model classifies the financial condition of the examined companies based on the Zmijewski score obtained. A negative Zmijewski score indicates that the company is financially healthy and not experiencing financial distress. However, if the company obtains a positive Zmijewski score, it implies that the company has a higher tendency to file for bankruptcy and will be categorized as a bankrupt-prone company.

The Zmijewski's probit model computes the probability of distress of a company. The probit function is presented as follows,

$$P(X_0 = 1) = \frac{1}{-4.3 - 4.5x_1 + 5.7x_2 - 0.004x_3}. \tag{5}$$

According to Equation (5), the probit function estimates the probability of distress of the companies. A company with probability greater than or equal to 0.5 is categorized as bankrupt whereas a firm with probability less than 0.5 is classified as a non-bankrupt firm.

4. Results

Table 1 depicts the Zmijewski score of the 31 technology companies computed based on three financial ratios, x_1, x_2 and x_3, where the financial data are extracted based on the year of 2017. Also, the probability of distress of the technology companies in year 2017 is shown in Table 1. The Zmijewski score and the probability of distress indicate that 29 companies are financially sound in year 2017 where two of the examined companies experienced financial distress, which are CUSCAPI and DIGISTA. Table 2 shows the prediction of financial soundness of the firms listed in the technology sector. Over the entire five-year study period, except for CUSCAPI and DIGISTA, all the companies obtained a negative Zmijewski score. CUSCAPI obtained a positive Zmijewski Score in 2016 and 2017, which are 1.74 and 1.45 respectively. As for DIGISTA, it obtained positive Zmijewski score throughout the entire period of study. On average, the Zmijewski score of the technology companies ranges between -4.87 and 0.48. The prediction obtained from the Zmijewski model indicates that other than CUSCAPI and DIGISTA, the rest of the listed companies surveyed from year 2013 to 2017 have been performing well and are experiencing good financial condition. ELSOFT is found to be the company with the smallest Zmijewski score of -4.87. That being said, ELSOFT is the most financially sound company and has outperformed the rest of the companies. DIGISTA has the largest Zmijewski score which is 0.48, which explained why it is classified as a financially distressed firm as its corresponding score is greater than 0.

Table 3 shows the percentage of financial distress of the technology companies from year 2013 to 2017. Based on the results obtained, the percentage of distress for majority of the companies from year 2013 to 2017 is less than 50%. These companies are classified as non-bankrupt companies. Consider CUSCAPI, its percentage of distress in 2016 and 2017 are 85.12% and 81.07% respectively which indicate that CUSCAPI is likely to experience financial distress. As for DIGISTA, it exhibited a percentage of financial distress of more than 50% over the five-year study period. Both the Zmijewski model and Zmijewski's probit model provide consistent results as the results obtained revealed that except for CUSCAPI and DIGISTA, the rest of the studied companies from the technology sector are in good financial health where their businesses are not in financial distress. Therefore, all the studied technology companies listed in Bursa Malaysia Stock Market are in a healthy financial position.

Table 1: Zmijewski score calculations on the technology companies for year 2017.

Company	x_1	x_2	x_3	Z	Percentage (%)
CUSCAPI	-0.47	0.64	1.38	1.45	81.07
D&O	9.9999	9.4404	9.3719	10.7938	9.3715
DATAPRP	5.6287	5.4967	5.4824	6.0026	5.5079
DIGISTA	3.2876	3.2648	3.2391	3.2594	3.2686
DNEX	1.6709	2.0400	2.0219	2.0386	2.0527
EDARAN	0.6767	1.4613	1.4307	1.4443	1.4466
EFORCE	0.4072	1.1860	1.1753	1.1712	1.1729
ELSOFT	0.25	0.10	7.20	-4.89	0.75
FRONTKN	0.08	0.29	2.22	-3.03	4.59
GHLSYS	0.05	0.36	1.84	-2.49	7.67
GRANFLO	0.08	0.16	5.05	-3.73	2.34
GTRONIC	0.13	0.29	2.65	-3.23	3.81
HTPADU	-0.04	0.64	1.29	-0.49	37.99
INARI	0.19	0,27	2.87	-3.60	2.65
ITRONIC	-0.23	0.40	1.17	-1.00	26.81
JCY	0.03	0.22	3.16	-3.17	4.03
KESM	0.09	0.31	2.18	-2.96	4.91
MMSV	0.30	0.18	4.91	-4.60	0.99
MPI	0.13	0.19	3.42	-3.86	2.06
MSNIAGA	0.08	0.37	2.08	-2.55	7.26
MYEG	0.23	0.36	2.30	-3.29	3.58
NOTION	0.03	0.15	4.19	-3.58	2.72
OMESTI	-0.03	0.43	1.19	-1.74	14.87
PENTA	0.11	0.44	2.02	-2.31	9.04
PRESBHD	0.10	0.33	2.02	-2.85	5.47
THETA	0.02	0.24	3.75	-3.04	4.56
TURIYA	-0.01	0.29	0.64	-2.63	6.73
UNISEM	0.09	0.21	2.26	-3.52	2.87
VITROX	0.17	0.32	3.61	-3.23	3.79
VSTECS	0.06	0.42	2.28	-2.15	10.45
WILLOW	0.10	0.17	4.75	-3.82	2.16

Table 2: Computed Zmijewski Score (Z).

Company	2013	2014	2015	2016	2017	Average
CUSCAPI	-3.50	-3.19	-2.07	1.74	1.45	-1.11
D&O	-1.26	-1.46	-2.20	-2.33	-2.65	-1.98
DATAPRP	-2.27	-2.04	-1.57	-2.19	-1.97	-2.01
DIGISTA	0.33	0.47	0.92	0.45	0.22	0.48
DNEX	-1.48	-2.66	-2.32	-4.92	-3.92	-3.06
EDARAN	-2.17	-1.72	-1.81	-1.15	-0.33	-1.44
EFORCE	-4.47	-3.86	-3.85	-3.97	-4.03	-4.04
ELSOFT	-4.71	-4.90	-4.98	-4.89	-4.89	-4.87
FRONTKN	-2.66	-2.74	-2.69	-3.04	-3.03	-2.83
GHLSYS	-3.19	-2.68	-2.41	-2.53	-2.49	-2.66
GRANFLO	-3.01	-2.35	-2.66	-2.70	-3.73	-2.89
GTRONIC	-3.93	-3.95	-4.30	-3.85	-3.23	-3.85
HTPADU	-0.43	-0.34	-0.72	-0.89	-0.49	-0.57
INARI	-1.51	-2.48	-3.06	-3.80	-3.60	-2.89
ITRONIC	-2.81	-1.78	-2.00	-0.99	-1.00	-1.72
JCY	-2.74	-3.12	-3.22	-3.03	-3.17	-3.06
KESM	-2.88	-2.95	-2.92	-3.38	-2.96	-3.02
MMSV	-4.27	-4.21	-4.36	-4.31	-4.60	-4.35
MPI	-2.71	-3.41	-3.23	-4.12	-3.86	-3.41
MSNIAGA	-2.76	-1.71	-2.24	-2.31	-2.55	-2.31
MYEG	-3.84	-3.83	-2.78	-2.64	-3.29	-3.28
NOTION	-2.57	-2.48	-2.71	-3.48	-3.58	-2.96
OMESTI	-0.68	-2.22	-1.76	-1.43	-1.74	-1.57
PENTA	-2.59	-2.90	-3.78	-4.00	-2.31	-3.12
PRESBHD	-4.94	-4.53	-3.73	-3.47	-2.85	-3.90
THETA	-2.91	-2.66	-1.43	-2.62	-3.04	-2.53
TURIYA	-2.11	-1.63	-2.56	-2.61	-2.63	-2.31
UNISEM	-1.80	-2.77	-3.60	-3.55	-3.52	-3.05
VITROX	-3.74	-3.96	-4.06	-3.36	-3.23	-3.67
VSTECS	-2.30	-2.03	-2.09	-1.81	-2.15	-2.08
WILLOW	-4.15	-4.08	-4.17	-4.08	-3.82	-4.06

Table 3: Percentage of financial distress.

Company	2013	2014	2015	2016	2017
CUSCAPI	2.94	3.96	11.17	85.12	81.07
D&O	22.16	18.78	9.93	8.89	6.57
DATAPRP	9.38	11.56	17.21	10.08	12.24
DIGISTA	58.14	61.58	71.48	61.17	55.49
DNEX	18.52	6.56	8.98	0.73	1.95
EDARAN	10.25	15.22	14.05	23.99	41.74
EFORCE	1.13	2.07	2.09	1.85	1.74
ELSOFT	0.90	0.74	0.68	0.74	0.75
FRONTKN	6.56	6.09	6.38	4.56	4.59
GHLSYS	3.97	6.40	8.23	7.36	7.67
GRANFLO	4.71	8.71	6.54	6.27	2.34
GTRONIC	1.92	1.89	1.35	2.09	3.81
HTPADU	-0.04	0.64	1.29	-0.49	37.99
INARI	18.08	7.72	4.46	2.19	2.65
ITRONIC	5.70	14.49	11.91	27.00	26.81
JCY	6.04	4.24	3.85	4.60	4.03
KESM	5.32	4.97	5.13	3.30	4.91
MMSV	1.37	1.46	1.26	1.33	0.99
MPI	6.25	4.14	3.80	1.59	2.06
MSNIAGA	5.94	15.29	9.66	9.07	7.26
MYEG	2.10	2.12	5.85	6.65	3.58
NOTION	7.09	7.75	6.26	2.99	2.72
OMESTI	33.67	9.78	14.72	19.35	14.87
PENTA	7.00	5.20	2.23	1.80	9.04
PRESBHD	0.71	1.06	2.35	3.03	5.47
THETA	5.19	6.53	19.33	6.82	4.56
TURIYA	10.78	16.41	7.18	6.84	6.73
UNISEM	14.19	5.88	2.67	2.80	2.87
VITROX	2.32	1.87	1.69	3.37	3.79
VSTECS	9.11	11.59	11.04	14.08	10.45
WILLOW	1.55	1.67	1.52	1.66	2.16

5. Conclusion

This study attempts to predict the bankruptcy of the listed companies in the technology sector with Zmijewski model that measures the financial soundness of these companies. The importance of the adoption of ICT has been emphasized in Malaysia as the country aims to be at the forefront of this industry and be a leader in ICT. Therefore, having a fairly thorough understanding of the financial position of these companies is essential. Zmijewski model is employed in this study to provide an overview of a company's financial condition. The main finding of this study revealed that 29 out of 31 of the technology companies studied are performing well over the period of 2013 to 2017. The bankruptcy prediction model helps lighten the burden of decision makers to ensure the viability as well as to identify financial mismanagement if any in the listed technology based companies. This research could be further extended to identify other financial ratios and their dominant effects on predicting financial distress among business entities in technology-related sector locally and internationally.

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