Fraudulent Financial Statement Detection Using Statistical Techniques: The Case Of Small Medium Automotive Enterprise

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ABSTRACT

Fraudulent financial statements (FFS) are now placed under greater public scrutiny following an increase in the number of collapses among companies due to management fraud with losses on average at 5% of revenue (ACFE, 2014). There is consensus that management fraud is an on-going reality and no single organization is immune from the damage caused by the fraudsters (KPMG Malaysia, 2009). Small and medium sized businesses are also threatened by fraudulent activities and statistics showed organizations with fewer than 100 employees experienced more fraud cases than larger corporations (ACFE, 2008). Most of the companies in the automotive industry in Malaysia are small and medium scaled; hence these companies bear a greater burden and face higher risks of fraud. Precautionary measures in preventing fraud are crucial; however, with limited resources, effective detection may be severely curtailed. This paper assesses the possibility of FFS in a small medium automotive company in Malaysia using three statistical analyses namely the Beneish model, Altman Z-Score and Financial Ratio. The findings show that there are riskier zones that need to be further investigated by the management. It is suggested for the company to establish an internal audit unit to provide assurance on the company's operations, financial reporting accuracy and adherence to the regulations.

Keywords: Fraud Detection; Statistical Techniques; Small Medium Entity; Automotive

1. INTRODUCTION

Fraud from the accounting perspective is regarded as an intentional act that results in a material misrepresentation in financial statements that become the focus of an audit. The Report to the Nations on Occupational Fraud and Abuse by the ACFE (2014) highlighted that fraudulent financial statement (FFS) cases recorded an alarming median loss of $1 million. FFS involves misrepresentations of financial or non-financial details to mislead individuals who rely on the statements to make economic decisions (Isa, 2011; Kighir, Omar, & Mohamed, 2014). Generally, FFS were perpetrated by management or with conducted their consent or knowledge and therefore are commonly known as management fraud. FFS have received greater public scrutiny following an increase in the number of collapsed companies due to management fraud. It was estimated that the typical business will lose on average 5% of revenue to fraud, which contributes to a potential projected annual fraud loss of more than $3.7 trillion using the 2013 Gross World Product (ACFE, 2014). Among companies in Malaysia, there is across-the-board agreement that corporate or management fraud is an on-going reality and no organization is free from the destruction caused by the fraudsters (KPMG Malaysia, 2009).

The United States National Procurement Fraud Task Force reported automotive as the fourth most prevalent industry to have committed procurement fraud (PwC, 2009). Procurement fraud is a form of occupational fraud committed by the employees. Since fraud does not discriminate, the tendency towards such unethical behaviour will depend on the availability of three elements namely perceived financial need, opportunity and rationalization. Unfortunately, research has suggested that the perceived pressure felt by both small business owners

and employees is often sufficient motivation for many individuals to indulge in unethical acts (Jackson, Holland, Albrecht, & Woolstenhulme, 2010).

The automotive industry involves the processes of designing, manufacturing, and selling motor vehicles. In addition, the value-added services like accessories, services and maintenance, and repairs are equally important. Car makers such as General Motors, Ford, and Chrysler in the US have been fronting headlines in the past few years over disappointing demands and sales results, forcing them to cut costs and restructure their strategies (Franchise Help, 2014). In view of reducing costs, the large car makers will need to depend on smaller scale automotive companies. The operation of these small medium automotive companies is focused on producing a range of relatively low-technology accessories and peripheral items such as plastic injection moulded parts, wire harnesses, wipers, lamps, radio cassettes, air conditioners, and metal stamped and pressed parts (UNDP, 2006). The dependency towards the small medium enterprises (SMEs) assists the car makers in terms of saving to its operational costs.

The automotive industry scenario in Malaysia is similar. The commencement of the National Car projects, Proton, in 1984 and later Perodua in 1992 has created opportunities for the local automotive suppliers which are mostly small and medium scaled. This is evident in a study by Meyathanaha (1994) who found that domestic supply in electrical machinery and electronics production had increased since the 1980s. The development of Malaysia's automotive industry has elevated the country to a production centre for major automotive component manufacturers with more than 690 automotive component manufacturers producing a wide range of components, such as body panels, and parts for brakes, engines, transmissions and steering, rubber components and electrical and electronic (MIDA, 2010). Some of the global automotive companies like Toyota, Honda, Nissan, Mercedes Benz, Volvo, BMW and Peugeot have also set up operations in Malaysia to take advantage of such developments. The Malaysian Automotive Association (MAA) reported that the total local production of vehicles for the first six months of 2013 was 293,511 units. Comparing the local production with the Total Industry Volume (TIV) of new vehicles sold in Malaysia during the period, this would mean 93.6% of the vehicles sold in Malaysia were assembled locally (Motor Trader, 2013).

The local automotive suppliers, being small medium enterprises (SMEs), therefore bear greater burdens and are at greater risks of fraud occurrence as compared to larger competitors (Laufer, 2011). Most of the companies have limited resources, thus forcing the management to focus mostly on operational matters rather than other added value activities like the internal audit. However, these SMEs should prudently start expanding their sphere of concern because statistically, organizations with fewer than 100 employees are experiencing more fraud cases than larger corporations, where the median loss per fraud case to these small businesses was $200,000 in 2008 (ACFE, 2008).

Improper management of financial statements may lead to FFS. FFS not only bring harm to many parties involved directly but indirectly also to the nation as a whole. Thus, any activities that prove susceptible to fraud must be identified and further seek effective ways to assess the fraud risks. The management of fraud risks and misconduct has taken centre stage with business leaders recognizing the potential for significant reputational harm from public scandals, economic costs in the form of investigations, fines and penalties, and individual costs in the form of criminal prosecution. Many Malaysian companies are now beginning to focus on assessing the risks to which they may be exposed and developing appropriate anti-fraud, bribery and corruption compliance initiatives (KPMG Malaysia, 2013). For this reason, various fraud detection techniques have been created and adopted to identify and assess the extent of the deception. The techniques adopted by companies will depend on the magnitude and nature of the fraud (Linville, 2011). Statistical techniques and data mining like Beneish model, Benford Law, financial ratios, Altman Z-score, horizontal and vertical analyses were among the techniques used. These tools, if use properly can provide clear information about the company's condition. However, any findings as a result of these analyses do not necessarily mean that frauds occur in the company but nevertheless it serves as an indicator or a red flag to detect that something is wrong.

This study therefore aims to assess the possibility of FFS in a small medium automotive enterprise by looking at their audited annual reports. Three statistical techniques – Beneish model in identifying possibility of earnings manipulation, Altman Z-score to determine the bankruptcy level and the easiest form of analysis that is the

financial ratios in assessing the company's overall performance were adopted. The findings show that there are areas that need further investigations as they exceeded the benchmarks outlined.

2. Case Study – A Small Medium Automotive Company

The first automotive project in Malaysia was initiated in 1981 with the formation of the Heavy Industry Corporation of Malaysia (HICOM). Soon after, Proton, the first national car manufacturer rolled out its first car named Saga in 1985. Proton's development was also assisted by the introduction of the vendor development program in the late 1980s by the government. Various stimulatory and protective measures were also offered to the local suppliers to protect them from excessive exposure to external competition. Local suppliers were also allowed to supply foreign assemblers operating in the country, while the introduction of the country's second national car, Perodua in 1992 as well as other local companies helped boost domestic demand for further expansions of local suppliers (Rosli & Kari, 2008).

The company in this study, a small medium automotive company, was founded in 1986 and established in Kedah, Malaysia. It had small origins with the aim of helping sister companies with small parts and components. Over the years, the company has successfully developed and diversified it business. The company's corporate office is now located in Kuala Lumpur with other subsidiaries operating in Selangor, Kedah and Terengganu. The main focus of the group is manufacturing and supplying automobile plastic parts with the mission of becoming the preferred automotive solutions provider in the ASEAN region automotive industry. Their activities include mechanical servicing, automotive components and equipment, injection moulding services, motor vehicle accessories/components or spare parts (import or export) and repair, plastic machinery, plastic moulding machinery and plastic processing. The company's performance over the past years has been very impressive especially with the increasing local car manufacturing in the country. Among the clients of the company are Perodua, Proton, Volvo and Honda.

The company structure is simple and straight forward. The company is being headed by an Executive Chairman who is being supported by a Managing Director and an Advisor. The operation is divided into five departments namely Business Development, Corporate Services, Technical, Engineering and Finance.

In recognition of the quality of products manufactured, the company has been awarded the ISO/TS 16949:2009 which defines the quality management system requirements for the design and development, production and, when relevant, installation and service of automotive-related products. The company was also presented with the ISO 14001: 2004 which provide assurance to management and employees as well as external stakeholders that environmental impact is being measured and improved. The benefit of obtaining the standard include reduced cost of waste management, savings in consumption of energy and materials, lower distribution costs and improved corporate image among regulators, customers and the public. From the clients' perspective, quality and environmental are two important issues other than costs. The company was given an Excellent Cost Reduction Contribution Vendor 2013 by Perodua Manufacturing Sdn Bhd and Cost Appreciation Awards 2012 and Quality Appreciation Award 2013, both from Honda Malaysia Sdn Bhd.

SMEs in Malaysia are regarded as one of the key pillars of growth in attaining a high income nation status by 2020 (SME Corp, 2014). The SME Masterplan 2012-2020 aspires to raise the contribution of SMEs to the economy in terms of GDP (41% by 2020), employment and exports. In achieving the target, innovation, productivity and knowledge enhancement has been identified as the main focus. Rapid changes in the Malaysian economy since 2005 have pushed the National SME Development Council (NSDC) in endorsing a new definition of SME for manufacturing companies in 2013 which took effect on 1 January 2014, simplified as follows: "Sales turnover not exceeding RM50 million (previously: less than RM25 million) or full-time employees not exceeding 200 workers (previously: less than 150 workers)." The SME Corp in 1996 introduced the Enterprise 50, an annual award program to celebrate and highlight the achievements of SMEs that are well positioned for the future. This award is organized together with Deloitte Malaysia and supported by RHB Bank Berhad and Telekom Malaysia Berhad. 50 winners are selected yearly from amongst the nominations received and the evaluation is based on key financial and non-financial factors. To date, a total of 1,726 companies have participated and 550 companies have come out as winners. From this pool of winners, 46 have been listed on the Bursa Malaysia and 14 on the ACE Market. In recognizing its achievement, SME Corp conferred the Enterprise 50 Awards to the company in 2012.

3. Analysis AND Discussion

Precautionary measures in preventing fraud are crucial especially for the SMEs owners. Auditing and statistical methods are reported as the best strategies for detecting fraud (Abdul Aris, Othman, Mohd Arif, Abdul Malek, & Omar, 2013). With the increasing number of companies that have resorted to these unfair practices, auditors have become overburdened with the task of detection of fraud. In assisting audit professionals in risk analysis and fraud detection, statistics methods and data mining serve as popular tools used by businesses, organizations and governments. Data mining techniques when properly applied are able to identify trends that indicate suspicious or fraudulent activities, casting light on transactions hidden among the crowd (Balaniuk, Bessiere, Mazer, & Cobbe, 2013). Well prepared knowledge and understanding of the accounting system is essential to determine the accurate strategies that can be adopted in fraud detection. Statistical fraud detection strategy relies on analytical methods and is seen to be more efficient than other strategies (Ortega, Ruz, & Figueroa, 2006; Perols, 2011).

This study adopted three types of statistical techniques namely Beneish M-Score, Altman Z-Score and Financial Ratios. The Beneish M-Score is a mathematical model consists of eight variables to identify financial fraud existence or tendency to engage in earning manipulation. Altman Z-Score is calculated to predict the possibility that the company runs into bankruptcy. The financial ratios focusing on profitability, liquidity, efficiency and safety is the preferred analysis in measuring company's performance. The findings will serve as an aid in identifying the areas of manipulation based on the variables included in the analysis. However, this serves only as the starting point of the investigation. Further investigation is needed to detect fraudulent activity happening in the company. It may also used in improving the operations of the company.

3.1 Input Variables

Our analysis and discussion include two years period covering year 2011 and 2012. As such, three years audited financial statements (2010 to 2012) were needed and obtained from the company. The details are shown in Table 1 below.

Table 1. Input Variables

Year (MYR)	2012	2011	2010
Net Sales	142,071,708	134,793,221	147,716,000
Cost of Goods Sold	125,266,321	118,696,106	126,042,366
Net Receivables	42,707,421	36,788,794	24,437,401
Current Assets	49,376,042	55,106,437	63,977,088
PPE	44,544,983	40,487,780	33,449,446
Total Assets	103,852,915	102,381,447	104,748,887
SGA Expense	5,095,453	5,658,495	7,777,720
Net Profit	12,555,675	9,146,906	12,395,746
Cash Flow from Operations	25,357,907	10,893,306	4,743,470
Current Liabilities	41,229,554	43,695,677	39,349,837
Long-term Debt	2,657,638	9,348,731	22,818,572

Beneish Model

Beneish M-Score is a mathematical model created by Professor Messod Daniel Beneish. The model consists of eight variables to identify the occurrence of financial fraud or tendency to engage in earning manipulation (Jones, Krishnan, & Melendrez, 2008). The variables are constructed from the data in the organization's financial statements and once computed, create the M-Score to show the degree in which the earnings have been manipulated (Wiedman, 1999). An M-Score of less than -2.22 suggests the company will not be a manipulator. An M-Score of greater than -2.22 signals that the company is likely to be a manipulator. The outcome of this model is helpful in identifying the manipulators and areas of manipulation based on the variables included in the model. The eight variables used for developing the M-Score are expressed in an equation as follows:

$$M \text{ score} = -4.84 + 0.92 \text{ DSRI} + 0.528 \text{ GMI} + 0.404 \text{ AQI} + 0.892 \text{ SGI} + 0.115 \text{ DEPI} - 0.172 \text{ SGAI} + 4.679 \text{ TATA} - 0.327 \text{ LVGI}$$

Based on the mathematical formulae, the study managed to calculate the M-Score for the company as shown in Table 2. The M-score for the company is larger than -2.22 in 2012 and lower than -2.22 in 2011. Thus, there is a possibility of earnings manipulation in 2012. AQI (1.443 > 1.254) and DEPI (1.48 > 1.0) may be the areas being manipulated in 2012 since they exceeded the benchmark.

Table 2. Derived Variables of M-Score

	Benchmark	**2012**	**2011**
SGI (Sales Growth Index)	>1.607	1.054	0.913
GMI (Gross Margin Index)	>1.193	1.010	**1.229**
AQI (Assets Quality Index)	>1.254	**1.443**	0.948
DSRI (Days' Sales in Receivables Index)	>1.165	1.101	**1.650**
SGAI (Sales, General & Administrative Expenses Index)	>1.041	0.854	0.797
DEPI (Depreciation Index)	>1.000	**1.480**	0.959
LVGI (Leverage Index)	>1.000	0.816	0.873
TATA (Total Accrual to Total Assets)	>0.018	-0.123	-0.017
M-SCORE	**> -2.2**	**-2.59**	**-1.87**

2011 showed an acceptable score. However, based on the individual scores, GMI and DSRI posed threats as there is a possibility of manipulation. The lower score of SGI and the higher score of GMI are inconsistent as an increase in gross margin is supposedly generated by higher sales. Thus further investigation should be conducted especially in the areas of sales, gross profit and trade receivables.

Altman Z-Score

The Z-score formula was introduced by Edward I. Altman in 1968 in predicting bankruptcy for companies. The score outline five financial ratios, with all data obtainable from the company's financial statement. A score below 1.8 means the company is probably headed for bankruptcy, while companies with scores above 3.0 are not likely to go bankrupt. In a nutshell, the lower the score, the higher chances of bankruptcy. The formula may be used to predict the probability that a firm will become insolvent within two years. Z-scores are used to predict corporate defaults and an easy-to-calculate control measure for the financial distress status of companies in academic studies. The Z-score uses multiple corporate income and balance sheet values to measure the financial health of a company. The Altman Z-score is calculated as follows:

$$Z\text{-Score} = 1.2X1 + 1.4X2 + 3.3X3 + 0.6X4 + 0.999X5$$

In its initial test, the Altman Z-Score was found to be 72% accurate in predicting bankruptcy two years before the event, with a Type II error (false negatives) of 6% (Altman, 1968). In a series of subsequent tests covering three periods over the next 31 years (up until 1999), the model was found to be approximately 80%–90% accurate in predicting bankruptcy one year before the event, with a Type II error (classifying the firm as bankrupt when it does not go bankrupt) of approximately 15%–20% (Altman, 2000). Based on the formulae and available data, the results have been calculated as per Table 3 below.

Table 3. Derived Variables of Z-Score

	2012	**2011**
X_1 (Working Capital/Total Assets)	1.60	1.57
X_2 (Retained Earnings/Total Assets)	0.54	0.44
X_3 (EBIT/Total Assets)	0.11	0.09
X_4 (Market Value of Equity/Total Liabilities)	1.37	0.93
X_5 (Sales/Total Assets)	1.37	1.32
Z-SCORE	5.229	4.691

The results show that the company is in a healthy position as it scores well above 3.0 for both years. Individually, all scores provide a positive growth with market values of equity over total liabilities score the highest increment of 47% from the previous year. The overall score may attract investor as it signal growth.

Financial Ratio

Financial ratio is a valuable and easy way to interpret the numbers found in financial statements. They can help to answer critical questions such as whether the business is carrying excess debt or inventory, whether customers are paying according to terms, whether the operating expenses are too high, and whether the company assets are being used properly to generate income (Ravisankar, Ravi, Raghava Rao, & Bose, 2011). Previous studies have employed financial ratios in comparing the strengths and weaknesses of businesses between different regimes; Chinese firms and Japanese companies (Liu, O'Farrell, Wei, & Yao, 2013) and US and Chinese firms (Asheghian, 2012).

The ratio analysis normally used in assessing company's performance is observed in four main areas of profitability, efficiency, liquidity and safety. Profitability ratios (gross profit margin, net profit margin, return on assets and return on equity) measure the company's ability to generate a return on its resources. Liquidity is represented by current ratio and acid test ratio measures a company's capacity to pay its liabilities in the short term. The higher the ratios the stronger is the company's ability to pay its liabilities as they become due, and the lower is the risk of default. Efficiency evaluates how well the company manages its assets using four ratios; accounts receivable turnover, accounts payable turnover, inventory turnover and sales to total assets. Safety indicates a company's vulnerability to the risk of debt and is measured using debt to equity, EBIT over interest and cash flow to current maturity of long-term debt.

FFS may be perpetrated to increase stock prices, avoid payment of taxes or to get loans from banks by distributing lesser dividends to shareholders. Nowadays an increasing number of companies are making use of FFS in order to cover up their true financial status and make selfish gains at the expense of stockholders (Ravisankar et al., 2011). Using the company's audited financial statement, the calculated results is displayed in Table 4 below.

Table 4. Results of financial ratios for year 2012 and 2011

Indicator	Formula	2012	2011
1. Profitability ratio			
Gross Profit Margin	Gross profit / Total sales	12%	12%
Net Profit Margin	Net profit / Total sales	9%	7%
2. Liquidity ratio			
Current Ratio	Current asset / Current liabilities	1.2	1.3
Quick test Ratio	Cash + AR / Current liabilities	0.7	0.9
3. Efficiency ratio			
Accounts Receivable Turnover	Credit sales / Average Accounts Receivable	5.5	6.5
Days in Sales Receivable	Account Receivables * 360 / Sales	66.1 days	69.3 days
Accounts Payable Turnover	Credit purchases / Average Accounts Payable	4.5	5.1
Days in Payables	Accounts Payable * 360 / Sales	81.6 days	84.3 days
Inventory Turnover Ratio	COGS / Average Inventory	30.4	42.3
Days in Sales Inventory	Inventory * 360 / Sales	11.9 days	8.5 days
Cost of Goods Percentage	COGS / Sales	88%	88%
PPE Turnover	Sales / Average PPE	3.3 (43%)	3.6 (40%)
4. Safety			
Debt to Equity	TL / Equity	0.7 (42%)	1.1 (52%)
Earnings Per Share	Net income /No. of Shares	2.98	2.17

The results show that the company managed to maintain and improve its profitability in 2012 as compared to 2011. The ROA and ROE were not shown as it has been covered in Altman Z-Score. The liquidity position of the company's caused for concern as it indicates the company's ability to repay its obligation is minimal. Both current and quick test ratios had been deteriorating. This could be explained by looking at the efficiency ratios. The company's credit term stood beyond 60 days that is two months after the sales. Whereas the payables are more than 80 days which indicate that the company may have to wait for its receivables before paying the suppliers. The reason behind the longer credit terms are normally poor collection effort, delay in customer payments or customer is in financial distress position. Looking into the company's client, it is likely that the payment will be delayed. Clearly, the lagging strategy for small medium enterprise may not be good in the long run as cash is crucial in any

business. Inventory turnover had been improved from 42 days to 30 days which reduces warehouse and administration costs and the PPE position is at satisfactory level. The debt to equity ratio signal that the company is trying to utilize its internal financing rather than borrowing from the bank. This is being reflected in EPS, where 2012 recorded a higher value compared to 2011. In conclusion, the company will need to improve its liquidity and efficiency position.

4. CONCLUSION AND RECOMMENDATION

Fraudulent financial statements (FFS) cause the biggest losses although the numbers of cases reported are low (ACFE, 2012). More alarming is the smallest organizations tend to suffer unreasonably large losses due to occupational fraud (ACFE, 2014). Small businesses encountered specific fraud risks which differ from those faced by larger businesses. Hence, these small and medium-sized businesses should be more concerned since statistically, organizations with fewer than 100 employees are experiencing more fraud cases than larger corporations.

We firstly identified the possibility of the company being an earnings manipulator by conducting the Beneish M-score. The M-score for 2011 is higher than the benchmark of -2.22, thus indicating a possibility of earnings manipulation activity. The areas for further investigation will be GMI and DSRI. Although the result for 2012 is acceptable, the individual score can be used in assessing the risk of fraud. AQI and DEPI should be investigated to ensure the manipulation is not prolonged. Altman Z-Score was then calculated to test the risk of bankruptcy. The results show that the company is secure and is not at all facing the risk of being insolvent. Lastly, ratio analysis was conducted covering four main financial areas - profitability, efficiency, liquidity and coverage and funding. The results indicate that liquidity and efficiency are the two riskier areas that need to be further investigated.

Based on the three statistical analyses conducted for 2011 and 2012, it can be concluded that there are areas that need further investigation. The outcomes of these analyses are helpful in identifying the manipulators and areas of manipulation based on the variables included in the model. However, it is only the starting point of the investigation. It is basically the management role in ensuring the company's operation and performance meets the company's objective. Given the fact that management time and resources are limited, there is a real need for the company in establishing an internal control department. Internal control as a process is designed to provide assurance regarding three important issues; effectiveness and efficiency of company's operation, reliability of financial reporting and compliance with applicable rules and laws. It is believed that internal control could add value to the company if properly applied.

The shortfall identified from the findings shows the importance of establishing strong internal control in the financial statement preparation which will allow the company to identify manipulation at an earlier stage. Improvement in internal control is essential in the highlighted areas. Therefore, an internal auditor should look into the whole procedure related to the targeted area to identify possible reasons affecting the current situation. In an increasingly complex world, fraud perpetrators often develop new tools and opportunities to scheme and lie and cheat for gains. However, researchers and business leaders have the opportunity to also use new technology and knowledge to develop tools and processes that will assist in the fight against the debilitating effects of fraud.

ACKNOWLEDGEMENT

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