Bankruptcy Prediction Using the Altman Z-score Model in Oman: A Case Study of Raysut Cement Company SAOG and its subsidiaries

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Abstract:

Financial health is of great concern for a business firm. For measuring the financial health of a business firm, there are lots of techniques available. However, Altman's Z-score has been proven to be a reliable tool. This model envisages predicting the possibilities of bankruptcy of manufacturing organization. Multiple discriminate analyses (MDA) are useful tools in such situations. The use of MDA helps to consolidate the effect of all ratios. Keeping the above view in mind, the "Z score" analysis has been adopted to monitor the financial health of the company. The current study has been conducted to assess the financial health of a firm namely Raysut Cement Company SAOG and its subsidiaries in Oman. This study was based on the secondary data which was obtained from the published sources i.e. Annual report for the period of 8 years (2007 to 2014). The study revealed that the Company Raysut Cement Company SAOG and its subsidiaries are financially sound as they have higher Z score than the benchmark (2.99) except in some years of study. The findings of the study may be useful for the managers to take financial decision, the stockholders to choose investment options and others to look after their interest in the concerned cement manufacturers of the country.

Keywords: Financial health, Altman's Z-score, Raysut cement company

JEL Classification: C39, M41

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1. Introduction

Financial health is a great concern for a business firm. The profit and loss account provides data about the operating activities whereas balance sheet tells about the assets and liabilities of the business at a particular point of time. There are basically two concerned parties in knowing the financial health of any firm. They are classified into internal and external users of accounting information. The parties which are interested in the performance of an organization are shareholders, officers, managers, employees and internal auditors. There are external parties namely Banks, Customers, Creditors and suppliers.

Shareholders /Investors (owners) use accounting information to make, buy, sell or keep decisions related to shares, bonds, etc. They are concerned whether the firm can pay off their required rate of return or not. Creditors (suppliers, banks) utilize accounting information to make lending decisions and are interested to know the payment capacity of the firm for pricing and collection of credits. So, judging the financial capacity of businesses carries enormous information for the institutions and people around it. The measurement of financial soundness shapes their decisions.

For measuring the financial health of a business firm, there are lots of techniques available. But the Altman's Z-score has been proven to be a reliable tool across the globe. This model devotes to predict possibilities of bankruptcy of manufacturing concerns. There is evidence that it has 76.9% accuracy in predicting the bankruptcy of the underlying sample (Begley et al. 1996). Altman (1968) defines five predicted factors that can be used to test the validity of Multivariate model. The model is based on financial ratios. Using financial ratios to predict bankruptcy can be accurate up to 90% (Chen & Shemerda, 1981).

Problem Under Study:

Financial health depends on the solvency of the firm which must be managed in the most efficient manner as to guaranty the systematic growth and continued existence of the organization. The firm's liquidity is the most important factor in an organization for the financial health of an organization. There is a need of a proactive tools rather than a reactive tool in the general approach towards the detection and remediation of the potential problem.

The Financial health can change into financial distress when the companies operating cash flows are insufficient to meet the current obligation. A firm in financial distress may also face bankruptcy or liquidation to meet its obligation. In this paper we are going to look at the model i.e. Z score with a view to assess the financial health of the firm. This paper is divided into five parts; following the introduction is the review of relevant literature. The third part presents the methodology that is used in gathering data and how the data were analyzed. Part 4 presents the data and discusses the result of the analysis while last part contains the conclusion and recommendation.

2. Literature review:

Sanesh (2016) tried to assess the Altman Z-score of NIFTY 50 companies excluding banks and financial companies. The score tries to predict probability of default by the companies due to the financial distress based on the current financial statistics of the company. Kumari's (2013) paper tried to predict bankruptcy for MMTC based on Altman's model of the Z score. She concluded that the overall financial health of MMTC is good, and it can be quoted as an investor friendly company. Ramana Reddy and Hari Prasad Reddy (2013) is also relevant. In this article, the Z score analysis shows the poor financial performance leading to bankruptcy of Chittoor co-operative sugars Ltd. Comparatively the financial performance of Sri Venkateswara Sugars Factory Ltd. was good.

Vikas Tyagi (2014) in his paper investigated the financial health of logistic industry in India based on Z score analysis. It reveals that Indian logistic industry was healthy industry .It is good that average Z score value increases from 2006 to 2010 (2.54 to 3.01) when Indian economy was hit by global recession. This indicates the overall performance of Indian logistic industry was good. Al-Rawi, Kiani and Vedd (2008) used the Altman z-score analysis to predict a firm's insolvency. They have remarked that the firm has increased its debt and will be facing bankruptcy in the near future.

Gerantonis Vergos and Christopoulos (2009) investigated whether Z-score models can predict bankruptcies for a period up to three years earlier. Results showed that Altman model performed well in predicting failures. They concluded that the results can be used by company management for financing decisions, by regulatory authorities and by portfolio managers in stock selection.

Chowdhury and Barua (2009) applied Z score model to the Z category shares traded in DSE to judge financial distress risk of each share. They used 53 companies' data of the years 2000-2005 to calculate Z-score. They argued that the Altman's Z score model, though may not be fully applicable for companies in Bangladesh, yet proves its strong validity and correctness in predicting distressful status of the Z category companies. Ramaratnam and Jayaraman (2010) measured financial soundness of Indian steel industry by using Z score model. The study was based on five years' data (2006-2010) of five firms of the steel industry. Their study revealed that all the selected companies are financially sound during the study period.

Alkhatib and Al Bzour (2011) conducted a study to report the effect of financial ratios in bankruptcy prediction in Jordanian listed companies through the use of Altman and Kida models. They suggested that the Jordanian listed companies should at least apply one of these models with high credibility for predicting corporate bankruptcy. Among others, corporate bankruptcy prediction model developed by Altman in 1968 is the most accepted and widely used tool (Mizan, Amin and Rahman 2011).The Altman Z score model is used in different countries for predicting bankruptcy.

Mizan, Amin, and Rahman (2011) conducted a study for the prediction of bankruptcy of the pharmaceutical industry in Bangladesh. They used the Altman Z-score Model for this purpose where sample size was six leading companies of this industry. Their study reveals some valuable findings like, two firms are found financially sound having no bankruptcy possibility in the near future and other companies are found to be unsatisfactory and they have a significant likelihood of facing financial crisis in the near future. They also stated that market value of equity of most of the firms is not reflecting the fundamentals of the respective companies. Altman and Beaver showed that a financial statement as sufficient information for a highly discriminate function of large businesses (Kim-Soon et al., 2013)

Mizan and Hossain's (2014) study has been conducted to assess the financial health of cement industry of Bangladesh. The study revealed that among the five firms, two firms are financially sound as they have higher Z score than the benchmark (2.99). Another firm is in the grey area that is the firm is financially sound, but the management requires special attention to improve the financial health of the organization. The other two firms are at serious risk of financial crisis.

3. Research methodology:

This study is Case study of Raysut cement company SAOG and its subsidiaries. A brief overview of the company is given as follows. The Raysut Cement Company SAOG ("the Parent Company" or "Company") was formed in Mar 15, 1981 by Ministerial Decision No. 7/81 and is registered in the Sultanate of Oman as a joint stock company. The parent Company is engaged in the production and sale of ordinary portland cement, sulphur resistant cement, oil well class 'G' cement and pozzolana well cement. All the financial statements are presented in Omani Rial ("RO") since that is the currency of the country in which the majority of the Company's transactions are denominated. In the Annexure the main points of the financial statement are presented. The principal activities of the subsidiary companies are set out below:

Subsidiary companies	Country of incorporation	Shareholding percentage (2014)	Shareholding percentage (2013)	Principal activities
Pioneer Cement Industries LLC United Arab	Emirates	100%	100%	Production and sale of cement
Raysea Navigation SA	Panama	100%	100%	Shipping transport company
Raybulk Navigation SA	Marshall Islands	100%	100%	Shipping transport company
Pioneer Cement Industries Georgia Limited*	Georgia	100%	100%	Production and sale of cement

(*Pioneer Cement Industries Georgia Limited is a subsidiary of Pioneer Cement Industries LLC)
Source: Annual reports of Raysut cement company SAOG and its subsidiaries Year 2014-2015)

This case study was based on the secondary data which was obtained from the published sources i.e. Annual report for the period of 8 years (2007 to 2014). The absolute figures reported in the financial statements do not serve the purpose of measuring the financial health of the companies. Hence, the financial analyst has to analyse the financial data in order to ascertain the strengths and weaknesses of the companies. Despite the financial analyst had many analytical tools, ratio analysis is most powerful tool to ascertain the financial health of the companies. Alone a single ratio does not serve the purpose.

The collected data was analysed with the help of ratio analysis. The accounting ratios used to predict the financial performance of the company, gives a warning only when it is too late to take corrective action. Therefore, it is necessary to combine the different ratios into a single measure of the probability of sickness or failure. Multiple discriminate analysis is a useful tool in such situations. The use of MDA helps to consolidate the effect of all ratios. Keeping the above view in mind, the "Z score" analysis has been adopted to monitor the financial health of the company.

Objectives:

The objectives of this study are as follows:
1) To assess the overall financial performance of the company
2) To know the efficiency in financial operations
3) To predict the financial health and viability of the company

Z score Analysis:

Altman's Bankruptcy Prediction Model: This Model was initially developed in 1968 by Edward I. Altman where he utilized data drawn from large US companies. He developed a model for predicting the likelihood that a company would go bankrupt. This model uses five financial ratios that combine in a specific way to produce a single number. This number is called the Z score. It is a general measure of corporate financial health. This value is to represent overall index of corporate financial health.

$$\sum_{i=1}^{n} Zi = 1.2\, x_{1i} + 1.4\, x_{2i} + 3.3\, x_{3i} + 0.6\, x_{4i} + 1\, x_{5i} \qquad \text{Eq. (1.1)}$$

where i = year 1 to n

x_{1i} = Networking capital to total assets ratio

x_{2i} = Retained Earnings to total assets ratio

x_{3i} = Profit Before interest & Tax (PBIT) to total assets ratio

x_{4i} = Capital funds to total liabilities ratio

x_{5i} = net sales to total assets ratio

x1i = Networking capital to total assets ratio. The net Working capital is the difference between current assets and current liabilities and the Total assets is the total of current assets and fixed assets.

$x2i$ = Retained Earnings to total assets ratio : It indicates the amount reinvested, the earnings or losses, which reflects the extents of company's leverage. In other words, the extent to which assets have been paid for by company profits. Those firms with high RE relative to TA have financed their assets through retention of profits and have not utilized as much debt. It also highlights either the use of internally generated funds for growth (low risk capital) Vs OPM (other people's money) – high risk capital. This is measure of cumulative profitability overtime and leverage as well.

$x3i$ = Profit Before interest & Tax (PBIT) to total assets ratio: It is the measure of the company's operating performance and also it indicates the earning power of the company. In addition, this is a measure of the productivity of the firm's assets, independent of any tax or leverage factors. Since a firm's ultimate existence is based on the earning power of its assets, this ratio appears to be particularly appropriate for studies dealing with credit risk.

$x4i$ = Capital funds to total liabilities ratio: It is the measure of the long-term solvency of a company. It is reciprocal of the familiar debt-equity ratio. Equity is measured by the combined market value of all shares. While debt includes both current and long term liabilities. This measure shows how much assets of an enterprise can decline in value before the liabilities exceed the assets and the concern becomes insolvent.

$x5i$ = net sales to total assets ratio: This is a standard turnover measure. Unfortunately, it varies greatly from one industry to another. In addition to this, it will reveal the sales generating capacity of the company's assets and also measure of management's capacity to deal with competitive conditions.

Test Results
If the Z score is less than 1.21 then it indicates bad financial performance which may lead to bankruptcy. It indicates a poor financial performance if the Z Score is ≥ 1.21 and $Z \leq 2.9$.
Lastly If the Z score value is greater than 2.9 then it indicates good financial performance.

4. Analysis and results.

Table 1: Showing Net Working Capital to Total Assets Ratio for Raysut cement company SAOG and its subsidiaries (all Figures in Omani Rial)

YEARS	2007	2008	2009	2010	2011	2012	2013	2014
NWV	24004961	28275340	33970938	17747689	3538168	33395085	45466732	43964430
TA	113029502	117644321	123337156	191572303	189074376	195292881	205106210	204174931
X_1	0.2124	0.2403	0.2754	0.0926	0.0187	0.1710	0.2217	0.2153

Source: X_1 computed by researcher's based on values extracted from audited financial statements 2007- 2014

NWV =Net Working Capital, TA= Total Assets, X_1=Net Working Capital/ Total Assets
Inferences:

It may be observed from the table I that the working capital to total assets ratio of Raysut cement had been around 0.0187 to 0.27. This ratio of company is very fluctuating. The total assets increased year by year except in the year 2010 & 2011 which shows the company had more concentration on the investments in fixed assets. The efficiency of this company in the matter of management of working capital helps the company to maintain the good financial health. The working capital is showing an increasing trend which is satisfactory. This analysis will help Raysut cement in maintaining the appropriate working capital i.e. neither low nor high level of investments in current assets without disturbing the basic liquidity position of the companies.

Table 2: Showing Retained Earnings to Total Assets Ratio for Raysut cement company SAOG and its subsidiaries (all Figures in Omani Rial)

YEARS	2007	2008	2009	2010	2011	2012	2013	2014
RE	40822882	47930345	56612832	57335204	52284187	66987600	79513513	91939680
TA	113029502	117644321	123337156	191572303	189074376	195292881	205106210	204174931
X_2	0.3611701 5	0.4074174 1	0.4590087 4	0.2992875 4	0.2765270 9	0.3430109 7	0.3876699 4	0.4502985 7

Source: X_2 computed by researcher's based on values extracted from audited financial statements 2007- 2014
RE = Retained Earnings, TA= Total Assets, X2=Net Working Capital/ Total Assets

Inferences: In Table 2 we can see the trends of retained earnings to total assets of the Raysut cement company. The ratio of retained earnings to total assets indicates that how much portion of total assets has been financed by retained earnings. Higher the ratio greater the financial stability of the company at times of low profitability periods. And also it depicts that the company is utilizing its own earnings as cheaper source of finance rather than debt finance.

It is observed that Raysut cement has good retained earnings in year 2007 to 2014. It shows the profitability of company. This study shows that Raysut cement have been utilizing retained earnings for financing its operations then debt. The increasing trends of retained earnings during the study period indicate that there is a growth of the Raysut cement.

Table 3: Showing EBIT (earnings before interest & taxes) to Total Assets Ratio for Raysut cement company SAOG and its subsidiaries (all Figures in Omani Rial)

YEARS	2007	2008	2009	2010	2011	2012	2013	2014
EBIT	33305006	30968463	32029487	23533372	17041743	26996815	30621367	30388253
TA	113029502	117644321	123337156	191572303	189074376	195292881	205106210	204174931
X_3	0.2947	0.2632	0.2597	0.1228	0.0901	0.1382	0.1493	0.1488

Source: X_3 computed by researcher's based on values extracted from audited financial statements 2007- 2014
EBIT = earnings before interest & taxes, TA= Total Assets, X3= EBIT / Total Assets

Inferences: The operational performance and earning power could be accessed through EBIT to Total assets which lead the business success or failure (Table 3). The profitability of the company has an increasing trend. From year 2007 to 2014 company's profit was increasing except in the year 2010 and 2011 but compared to profit there was more increase in total assets. In short, this ratio indicates that the overall profitability of the company was increasing but few instances where it has decreased.

Table 4: Showing Market Value of Equity to Total Liabilities Ratio for Raysut cement company SAOG and its subsidiaries (all Figures in Omani Rial)

YEARS	2007	2008	2009	2010	2011	2012	2013	2014
MVE	90946422	98053885	106736372	107458744	102407727	117111140	129637053	142063220
TL	22083080	19589827	16600784	84113559	86666649	78181741	75469157	62111711
X_4	4.1184	5.0053	6.4296	1.2775	1.1816	1.4979	1.7177	2.2872

Source: X_4 computed by researcher's based on values extracted from audited financial statements 2007- 2014
MVE = Market Value of Equity, TL= Total Liabilities, X3= MVE / TL

Inferences: table 4 shows that, the market value of equity and total liabilities increased every year but not in the same proportion. There has been a decrease in the year 2011 & 2012 in the market value of equity. Equity to debt ratio indicates the proportion of owner's fund to the long term debt. Where debt is more, the company has an obligation to pay interest to the creditors and thereby the shareholders risk may be increased. This ratio has a decreasing trend which is not good for Raysut cement.

Table 5: Showing Sales to Total assets Ratio for Raysut cement company SAOG and its subsidiaries (all Figures in Omani Rial)

YEARS	2007	2008	2009	2010	2011	2012	2013	2014
Sales	63013288	89080899	89346036	64978403	83813141	92802705	93290315	94292989
TA	113029502	117644321	123337156	191572303	189074376	195292881	205106210	204174931
X_5	0.55749	0.75721	0.72440	0.33918	0.44328	0.47520	0.45484	0.46182

Source: X_5 computed by researcher's based on values extracted from audited financial statements 2007- 2014)

Sales = Sales, TA= Total Assets, X5= Sales / TA

Inferences: In table 5, we have sales to the total assets. The Sales revenue plays a pivotal role in overall performance of the companies because all the operations are more or less depending on the sales revenue. Sales to total assets ratio measure the power of the asset in generating the sales. Higher ratio indicates the better performance and while poor ratio indicates the poor financial management of the companies in the optimum utilization of its assets in generating the sales revenue. We can observe from the trend that the sales revenue is showing an increasing trend except in the year 2010 where there was a drop. This has a positive impact on the performance.

Table 6: Showing the "Z Scores" of Raysut cement company SAOG and its subsidiaries from 2007-2014

	YEARS	2007	2008	2009	2010	2011	2012	2013	2014
X1	NWV/ TA	0.21238	0.24035	0.27543	0.09264	0.01871	0.17100	0.22167	0.21533
X2	RE/TA	0.36117	0.40742	0.45901	0.29929	0.27653	0.34301	0.38767	0.45030
X3	EBIT/ TA	0.29466	0.26324	0.25969	0.12284	0.09013	0.13824	0.14930	0.14883
X4	MVeq. /TL	6.45508	5.00535	6.42960	1.27754	1.18163	1.49793	1.71775	2.28722
X5	Sales/ TA	0.55749	0.75721	0.72440	0.33918	0.44328	0.47520	0.45484	0.46182
	Z score	4.761	5.488	6.412	2.041	1.859	2.516	2.787	3.214

Source: Researcher's Computation based on values extracted from audited financial statements 2007- 2014

Inferences: For determining the financial health of this company, this study used Z score model, which provides the financial soundness of a business. The table VI shows the Z score values of the company. The Z score value throughout has remained above 2.9 in all years except in the year 2010,2011& 2012 which was 2.041 ,1.859 & 2.516 respectively which showed a poor financial performance but it was above 2.9 in all the other years which showed a good performance of the company. As per the Altman's guidelines, the company financial position is healthy if the Z score value is greater than 2.9. In the year 2014 the Z score increased to 3.214 which shows that the health of the firm is good. Ramana Reddy and Hari Prasad Reddy (2013) concluded that the financial performance may lead to bankruptcy of Chittoor co-operative sugars Ltd. whereas the financial performance of Sri Venkateswara Sugars Factory Ltd. was good. Nilanjana Kumari (2013) concluded that the overall financial health of MMTC is good, and it can be quoted as an investor friendly company. Vikas Tyagi (2014) investigated the financial health of logistic industry in India based on Z score which revealed that Indian logistic industry was healthy industry. The Z score value increases from 2006 to 2010 (2.54 to 3.01) when the Indian economy was hit by a global recession.

Al-Rawi, Kiani and Vedd (2008) used the Altman z-score analysis to predict a firm's insolvency. They have made a comment that the firm has increased its debt and will be facing bankruptcy in the near future. In the same way we can say that the financial health of Raysut cement is good.

5. Conclusion

It is clear from the above case study that the financial position of the subject company is good. It never fell to less than 1.8 according to the Z score analysis it has a small probability of the firm facing financial distress in the near future. Investment in current assets are appropriate neither they are too high for they are too less. They have an optimum level of investment in the current assets as this is a cement manufacturing company.

The subject company has been utilizing its retained earnings for its investments therefore there would be less burden of interest on the company. EBIT to Total Assets ratio indicates that the overall profitability of the company has an increasing trend. The market value of equity and total liabilities increased every year but not in the same proportion. There has been a decrease in the year 2011 & 2012 in the market value of equity. This ratio has a decreasing trend which is not good for Raysut Cement. The Company has a good opportunity to improve its sales capacity but had been totally failure to utilize their assets optimally in generating the sales revenue. This has a positive impact on the performance

The fundamental financial health of a business firm is the main concern for the stakeholders. On the basis of the financial soundness, they take a decision regarding their possible involvement with a particular firm. The Altman Z score is the best measurement that can shape the decision of the stakeholders. The current study has been conducted to assess the financial health of a firms namely Raysut Cement Company SAOG and its subsidiaries in Oman. The study revealed that Raysut Cement Company SAOG and its subsidiaries is financially sound as they have higher Z score than the benchmark (2.99) except in some years of study So, the findings of the study can be useful for the managers to take financial decision, the stockholders to choose investment options and others to look after their interest in the concern cement manufacturers of the country.

6. Limitations of the Study and Suggestions for Future Research

This study is based on a case study of a single company of the cement industry of Oman. It is to be mentioned that only two cement companies are operating in Oman. This study covers a period of 2007-2014. The collected data for the present study is secondary data which is based on the published data of financial statements of the company.This study was based on a case study of a single company operating in Oman. We have a scope of further study on this topic by studying all companies which operate in Oman.

The cement industry is the backbone of industrial development; therefore it has further scope of study on the Gulf Cooperation Council (GCC countries). We can study for the member countries of GCC for wider results on Z scores.

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Appendix:

Financial data of Raysut cement company SAOG and its subsidiaries (all Figures in Omani Rial)

YEARS	2007	2008	2009	2010	2011	2012	2013	2014	Average
TOTAL CURRENT ASSETS	38094093	42234960	45779049	44403702	39854104	50386280	63647889	61985045	48298140.25
TOTAL CURRENT LIABILITIES	14089132	13959620	11808111	26656013	36315936	16991195	18181157	18020615	19502722.38
NET WORKING CAPITAL	**24004961**	**28275340**	**33970938**	**17747689**	**3538168**	**33395085**	**45466732**	**43964430**	28795417.88
TOTAL NON CURRENT ASSETS	74935409	75409361	77558107	147168601	149220272	144906601	141458321	142189886	119105819.8
TOTAL ASSETS	**113029502**	**117644321**	**123337156**	**191572303**	**189074376**	**195292881**	**205106210**	**204174931**	167403960
Retained Earnings	40822882	47930345	56612832	57335204	52284187	66987600	79513513	91939680	61678280.38
TOTAL LIABILITIES= total current liabliities+total non current liablities	**22083080**	**19589827**	**16600784**	**84113559**	**86666649**	**78181741**	**75469157**	**62111711**	55602063.5
Revenue (sales)	63013288	89080899	89346036	64978403	83813141	92802705	93290315	94292989	83827222
Profit Before interest & Tax	33305006	30968463	32029487	23533372	17041743	26996815	30621367	30388253	28110563.25
Market value of Equity	90946422	98053885	106736372	107458744	102407727	117111140	129637053	142063220	111801820.4
TOTAL NON CURRENT LIABILITIES	7993948	5630207	4792673	57457546	50350713	61190546	57288000	44091096	36099341.13
TOTAL CURRENT LIABILITIES	14089132	13959620	11808111	26656013	36315936	16991195	18181157	18020615	19502722.38
total liabilities = total current liabilities + total noncurrent liabilities	**22083080**	**19589827**	**16600784**	**84113559**	**86666649**	**78181741**	**75469157**	**62111711**	**55602063.5**

(Source: Annual reports of Raysut cement company SAOG and its subsidiaries Year 2007 -2014)