

An Evaluation of Corporate Strategic Health Using Altman's Model: A Sample from Jordanian Shareholding Industrial Companies

*Ahmed A. Al-Qatamin **

ABSTRACT

This study aimed at evaluating strategic health of a sample of Jordanian Industrial shareholding companies. To achieve this objective, Altman Z-Factor formula model was used to calculate the Z-Score values which indicate the level of strategic health of the companies included in the sample.

Results indicated that only 10 percent of the sampled companies have enjoyed strong strategic health. Results indicated also that, 40 percent of the sample has been classified into normal strategic health category, and 50 percent of the sample was correctly classified in the category of alarming strategic health category.

Keywords: Altman's Z-Value, Strategic Performance, Strategic Management, Strategic Health.

INTRODUCTION

The purpose of this article is to provide an assessment of corporate strategic health of Jordanian publicly held industrial companies utilizing Altman Z-Factor formula.

Corporate strategic health is defined as a set of strategic factors that contribute significantly to a firm's creative performance capability. It allows the corporation to create and maintain favorable future conditions that guarantee continuity and survival. This means that a healthy-performing corporation that enjoys high levels of strategic performance is characterized of being able to create and maintain a set of strategic performance capabilities that distinguish it from unhealthy corporation, (Chennerley and Neel, 2002).

Recently, the subject of corporate strategic health has been at the center of interests of both academic and professional corporate circles, (Hui et al., 2009).

The goal of this emphasis was to improve strategic health management of corporations so that future options can be managed adequately. Many research articles were published during the last decade with a focus on the development of proper measurements of strategic performance (Vital et al., 2002; Kaplan and Norton, 2001).

The main theme, of these articles, was that strategic

health is a difficult and complicated phenomenon for measurement and conventional accounting-based measurements cannot successfully capture the magnitude of the phenomena. Therefore, multi-dimensional and multi-factor measurements just as Altman's formula should be utilized, (Bourne et al., 2000).

Traditional measures for the evaluation of corporate strategic health are unable to depict the nature and orientation of this phenomenon simply because they measure past performance while strategic health requires a forward-looking measure, (Sim and Koh, 2001). Alternative approaches were developed in order to assess the firm strategic posture which involves a firm's ability to create and successfully maintain certain capabilities that help moving it forward, (Chenhall, 2005). This measurement system is going to be represented by Altman's Z-Factor and will be used to evaluate strategic health in the sample for this study.

The Z-Factor is a very popular, empirically tested indicator of strategic health or strategic physical-fitness of an organization. Originally Altman's model is a multiple discriminate analysis based method of testing for potential corporate failure (Altman, 1986). Altman utilized data from a sample of weak, unhealthy and low-performing American industrial corporations and another sample of healthy high-performing corporations to reach at a formula called Z-Factor. His investigations aimed at the determination of whether failed corporations had significantly different performance levels than did

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successful ones. When his statistical tests showed high degree of consistency in his subsequent investigations, he reached at a classification scheme to predict potential corporate failure (Altman, 1968 and 2000).

Altman initial study included 33 American manufacturing corporations encountered massive performance problems and ultimately went bankrupt during the time period 1964-1965 (Altman, 1968). These 33 failed corporations were paired with 33 non-bankrupt successful corporations on the basis of similar industry and asset size. Then, data on 22 variables were collected on the basis of their frequency of usage in literature and their relevance to his study. Several performance indicators were then calculated and results were classified into five performance categories. These categories are: Liquidity, profitability, leverage, solvency, and activity. One indicator from each category was selected for inclusion in the model. Following is a description of each of these indicators of performance: (Wheelen and Hunger, 2010):

The ratio of working capital to total assets

This ratio is one of the liquidity ratios that measure the company ability to meet its short-term obligations.

The ratio of retained earnings to total assets

This ratio is one of the solvency ratios that measure how much each Dinar of assets is able to generate in terms of reinvested money into the company's operations.

The ratio of net sales to total assets

The ratio is one of the activity ratios that measure the corporate efficiency in the utilization of its assets. It measures how much sales are generated by each Dinar of corporate assets.

The ratio of earnings before interest and tax to total assets

This ratio is one of the profitability factors that measure the rate of return on total assets utilized by the company. It is usually used as a measure of management efficiency. It shows the return on all assets under management control regardless of sources of financing. It is also considered as an indicator of how worthy the company is for investment purposes.

The ratio of market value of total debt to book value of equity

This ratio is one of the leverage indicators that

measure the percentage of borrowed money to owner's equity. It provides a measure of the balance that should exist between debt financing and internal financing (Wheelen and Hunger, 2010).

Altman's model consisted of a system of discriminant analysis procedures utilizing five variables as shown in the following formula:

$$Z = 1.2X_1 + 1.4X_2 + 3.3X_3 + 0.06X_4 + 1.0X_5$$

Where,

X_1 = Working Capital divided by Total Assets

$X_1 = WC/TA$

X_2 = Retained Earnings divided by Total Assets

$X_2 = RE/TA$

X_3 = Earnings before Interest and Tax divided by Total Assets

$X_3 = EBIT/TA$

X_4 = Market Value of Total Debt / Book Value of Equity

$X_4 = MVTD/BVE$

X_5 = Net Sales divided by Total Assets

$X_5 = NS / TA$

Where the numbers in the equation are constant values for the multiple discriminate analysis coefficients associated with each variables. After calculating these variables, Altman used the multiple discriminant analysis statistical method to obtain the Z-Factor scores.

Altman's has produced several industry specific Z-Factor scores. The generic version which is suitable for industrial organizations is used for the purpose of this study.

After finishing the calculation, Altman has made the following criteria:

- *Healthy corporation have Z-Factor score above 2.99*
- *Unhealthy corporations have Z-Factor score below 1.80, and therefore has an alarming health*
- *Corporations having Z-Factor scores between 1.80 and 2.99 having normal but not satisfactory health.*

THEORETICAL BACKGROUND

As discussed in the preceding sections, Altman's Z-Factor formula has combined five important performance variables by weighing them according to their significance as related to corporate health.

To make his selection, Altman used multiple discriminant analysis (MDA) as a statistical technique. (MDA) shows which characteristics in which proportions can best be used for determining to which of several

categories a subject belongs: bankrupt versus non-bankrupt, strong performer versus weak performer and strategically healthy versus non-strategically healthy, and so on.

The most advantage of (MDA) is that many characteristics can be combined into a single score. A low score implies membership in one group, while a high score implies membership in another group.

Altman found that about 95% of the weak bankrupt firms were correctly classified as bankrupt. And roughly 80% of the sick, non-bankrupt firms were correctly classified as non-bankrupt. (Calandro, 2007).

Altman's Z-Factor formula has been acknowledged as the first and most important multi-dimensional performance measure for a comprehensive evaluation of corporate strategic health and long-term performance. Since published in 1968 and re-examined in many subsequent studies it was used to predict corporation likelihood of failure and as a strategic assessment and performance tool. (Calandro, 2007).

It was also used by investors as a strategic predictor to evaluate corporate strategic condition to determine whether it provides a good investment opportunity or not (Altman, 2002). It has also been used as a primary and most reliable means of classifying companies as likely bankrupt candidates for merger and acquisition purposes, (Shrieves and Stevens, 1979). It has also been used by managers and corporate analysts to reach at an index that indicates the financial strategic health for their corporations and consequently formulate policy guidelines to improve their strategic posture. Researchers and top management teams used Altman's Z-Factor formula to examine the relative strategic positions of competitors in their industries (Chacravarthi, 1986).

A strategic position of any corporation is defined as the sum total of resources, managerial capabilities that can be efficiently utilized to secure corporate success in the long run (Verweire and Berghe, 2007). Research in strategic management has revealed that, strategic position of an organization should be measured by such multi-dimensional multi-factor measurements as Altman's Z-Factor formula (Shacravarathy, 1986).

Others argued that strategic phenomenon are multi-factor in nature; therefore it requires multi-measurement in order to be able to capture it (Ramanjan et al., 1993).

For the purpose of this study, the corporate strategic health is defined as the total performance level of the Jordanian industrial shareholding companies included in

the study sample that emulate the factors included in Altman's Z-Factor formula. As mentioned earlier, Altman's model combines five performance indicators and weighing them up so that a fair and comprehensive measure of corporate strategic health is insured (Dimitras, Zanakis and Zopounidis, 1996).

OBJECTIVE OF THE STUDY

This study aims at evaluating corporate strategic health in a sample of Jordanian Industrial shareholding companies. It specifically aims at determining whether industrial corporations in Jordan are strategically positioned well (strong strategic health) to be able to face current as well as future challenges in face of the consequences of global economic environment. It also aims to discover the true corporate performance levels in order to help these corporations to formulate adequate policy actions to increase their immunities against external environmental potential problems.

METHODOLOGY

A sample of 39 industrial shareholding companies listed in Amman Stock Exchange was selected for the inclusion in this study. An industrial company was included in the sample if it has positive values for retained earnings, working capital and net income for the period from 2005 to 2007, and the average Z-scores was used for the analysis. This period of three years was used because data was available in a most reliable manner.

Data on the variables were obtained from Public Shareholding Companies' Guide (2008), which is available at www.ase.jo. But when any problem related to data was encountered, respective company was contacted for explanation.

Expected Sample Disposition

For the purpose of this study it is expected that, sampled companies are going to be fell in one of the following three categories based on Altman's model:

High strategic health Category: is expected to include companies having Z-Factor scores above 2.9, thus enjoying high level of strategic health.

Normal strategic health category: is expected to include companies having Z-Factor scores between 1.80 and 2.9, thus having normal strategic health.

Alarming strategic health category: is expected to

include companies having Z-Factor scores below 1.80, thus suffering weak and alarming strategic health.

Table 1: The Study Sample

Name	TA	WC	RE	EBT	MVTD	BE	SALES
THE ARAB POTASH	543,224,000	189,325,000	115,796,750	167,644,000	154,263,000	2,906,965,020	291,436,000
Middle east complex	366,730,792	137,110,279	25,791,078	11,441,933	161,714,970	100,000,000	112,309,695
JORDAN PHOSPHATE MINES	318,294,601	101,878,523	28,111,478	47,214,727	124,763,687	75,000,000	354,828,055
THE JORDAN CEMENT FACTORIES	268,720,583	24,754,474	34,174,898	57,948,096	95,412,686	60,444,460	258,097,086
THE JORDAN WORSTED MILLS	104,437,234	9,371,276	8,884,690	6,486,787	1,543,137	12,500,000	8,690,449
JORDAN NEW CABLE	91,940,785	10,602,895	12,064,593	9,530,528	59,632,634	13,500,000	95,555,206
NATIONAL POULTRY	73,013,124	7,312,167	22,371,148	6,485,845	19,962,932	30,000,000	46,117,708
UNION TOBACCO & CIGARETTE INDUSTRIES	67,217,208	13,851,713	985,902	4,760,631	26,797,720	15,000,000	52,509,226
DARAL DAWA DEVELOPMENT & INVESTMENT	64,031,290	30,835,918	152,331	3,917,845	11,741,879	20,000,000	34,075,747
JORDAN STEEL	58,856,953	22,790,881	80,231	6,296,482	11,576,363	23,075,000	72,932,076
THE JORDANIAN PHARMACEUTICAL MANUFAC	54,531,097	18,595,359	5,243,451	1,753,212	20,264,607	20,000,000	21,117,056
JORDAN DAIRY	33,479,544	76,974	1,006,311	1,306,170	256,768	252,000,000	1,444,835
THE ARAB INTERNATIONAL FOOD FACTORIES	33,479,544	76,474	1,006,311	1,306,170	256,768	10,500,000	1,444,835
GENERAL INVESTMENT	29,944,692	4,788,247	2,010,460	2,392,804	2,810,983	10,000,000	9,364,881
NATIONAL CABLE & WIRE MANUFACTURING	28,400,784	10,889,114	1,173,862	2,268,963	8,056,947	12,500,000	29,109,515
MIDDLE EAST PHARMA	23,056,264	1,469,674	293,225	771,061	10,193,402	9,869,583	9,045,956
JORDAN INDUSTRIAL RESOURCES	21,548,528	2,101,937	1,173,223	63,277	2,234,854	13,250,000	8,442,461
ARAB ALUMINIUM INDUSTRY/ARAL	19,297,230	5,546,368	329,997	483,259	6,293,214	6,750,000	13,308,387
ARABIAN STEEL PIPES MANUFACTURING	18,823,343	9,446,265	874,551	1,370,679	3,463,524	9,000,000	10,655,132
NATIONAL ALUMINIUM INDUSTRIAL	18,736,861	6,184,774	725,477	1,036,937	6,182,734	9,000,000	12,911,818
JORDAN VEGETABLE OIL INDUSTRIES	15,973,680	2,534,454	99,983	458,301	10,776,710	3,000,000	20,348,665
AL-QARIA FOOD & VEGETABLE OIL INDUSTRIES	13,122,029	1,613,939	92,243	737,616	8,000,137	4,500,000	9,471,643
HAYAT PHARMACEUTICAL INDUSTRIES CO.	13,001,882	5,079,477	748,885	802,164	1,867,467	9,500,000	3,801,910
NATIONAL CHLORINE INDUSTRIES	11,970,342	3,032,041	560,094	716,429	1,105,387	9,000,000	6,288,605
UNION ADVANCED INDUSTRIES	11,371,270	2,023,411	99,822	1,708,488	4,329,023	3,000,000	7,559,518
JORDAN WOOD INDUSTRIES/ JMWCO	10,922,453	3,178,369	1,561,119	2,162,642	3,240,261	3,500,000	12,155,802
ARAB ELECTRICAL INDUSTRIES	10,646,893	3,406,198	474,233	526,355	3,471,849	6,000,000	7,677,776
UNIVERSAL MODERN INDUSTRIES	10,543,645	6,532,356	166,412	833,204	2,044,308	6,000,000	12,629,583
THE JORDAN PIPES MANUFACTURING	9,565,462	5,459,040	87,350	126,064	2,282,823	3,575,000	6,135,234
CENTURY INVESTMENT GROUP	9,220,062	466,509	159,122	647,690	2,887,851	5,191,560	607,142
INTERNATIONAL CERAMIC INDUSTRIES	8,713,851	3,436,913	357,929	54,905	2,137,405	6,000,000	4,348,689
AL-BKAL PRINTING AND PACKAGING	8,698,011	3,146,521	216,774	308,453	8,698,011	5,000,000	5,314,857
ARAB CENTER FOR PHARM. & CHEMICALS	8,267,285	3,007,377	253,731	91,487	570,317	5,000,000	1,370,971
TRAVERTINE COMPANY LTD	5,838,220	2,119,688	439,057	307,352	725,882	4,600,000	1,258,138
JORDAN CHEMICAL INDUSTRIES	5,093,124	1,578,800	119,436	603,892	1,666,258	1,799,624	3,685,440
PEARL- SANITARY PAPER CONVERTING	3,888,866	1,810,363	417,217	178,444	583,236	2,500,000	4,251,139
AL-JANUCB FILTERS MANUFACTURING	3,266,906	856,179	231,227	260,780	1,018,881	2,000,000	1,246,461
UNIVERSAL CHEMICAL INDUSTRIES	3,239,961	2,574,058	19,692	32,372	351,666	1,500,000	3,286,091
THE PUBLIC MINING	2,883,362	1,851,493	267,646	447,238	433,983	1,500,000	1,264,916

Sample Characteristics

Table (1) shows the study sample sorted out by size as measured by total assets. As shown in the table the size is varying between JD 543.2 million for the Arab Potash and JD 2.9 million for the public mining. This indicates that all companies included in the study sample have sizes beyond JD 2.9 million. In the meantime, the Retained Earning value was varying between JD 189.3 million for The Arab Potash to JD 0.019692 for Universal Chemical Industries which indicates a lot of variety between companies. Net sales were ranging from JD 354.8 million for The Arab Potash to JD 0.607 million for Century Investment Group which has also high degree of variance in the sample.

FINDINGS OF THE STUDY

Altman's Z-FACTOR formula was calculated for each of the 39 companies in the study sample, and Table (2) shows the study sample sorted out by the value of Z-

Factor scores.

The results of the study based on Altman's Z-Factor specifications as shown in table (2) can be summarized as follows:

- 1- Values of the Z-Factor scores for the study sample ranged between 4.3 for Jordan New Cable as the highest value and 0.21 for Jordan Dairy as the lowest one.
- 2- A total of four Jordanian industrial shareholding companies were managed to be on the top of the list falling into the strong strategic health category (Z-Factor score beyond 2.9).
- 3- A total of fifteen companies were classified into a normal strategic health category based on Altman's model specifications (Z-FACTOR scores between 1.8 and 2.9).
- 4- A total of twenty companies were classified into the category of alarming strategic health category (Z-Factor scores below 1.80).

Table 2: The Z-Factor Scores for the Study Sample

Name	Z-Factor Score
JORDAN NEW CABLE	4.353825425
JORDAN VEGETABLE OIL INDUSTRIES	3.723069618
JORDAN PHOSPHATE MINES	3.110136998
THE JORDAN CEMENT FACTORIES	2.907794536
JORDAN WOOD INDUSTRIES / JWICO	2.871082271
UNIVERSAL MODERN INDUSTRIES	2.428610408
JORDAN STEEL	2.35976214
UNION TOBACCO & CIGARETTE INDUSTRIES	2.35464025
THE ARAB POTASH	2.303401375
UNION ADVANCED INDUSTRIES	2.252226029
AL-EKBAL PRINTING AND PACKAGING	2.240823579
NATIONAL CABLE & WIRE MANUFACTURING	2.193283462
UNIVERSAL CHEMICAL INDUSTRIES	2.149751386
AL-QARIA FOOD & VEGETABLE OIL INDUSTRIES	2.13143207
PEARL- SANITARY PAPER CONVERTING	2.093385063
JORDAN CHEMICAL INDUSTRIES	2.075241948
THE PUBLIC MINING	2.0246606
Middle east complex	1.926598713
NATIONAL POULTRY	1.873174536
THE JORDAN PIPES MANUFACTURING	1.765644931
NATIONAL ALUMINIUM INDUSTRIAL	1.734234381
ARABIAN STEEL PIPES MANUFACTURING	1.704511367
ARAB ALUMINIUM INDUSTRY /ARAL	1.70053359
ARAB ELECTRICAL INDUSTRIES	1.677724363
DAR AL DAWA DEVELOPMENT & INVESTMENT	1.667566439
THE JORDANIAN PHARMACEUTICAL MANUFAC	1.645106375
AL-JANUOB FILTERS MANUFACTURING	1.36420948
INTERNATIONAL CERAMIC INDUSTRIES	1.264397861
MIDDLE EAST PHARMA.	1.216685508
NATIONAL CHLORINE INDUSTRIES	1.166008918
HAYAT PHARMACEUTICAL INDUSTRIES CO.	1.16339875
GENERAL INVESTMENT	1.030971226
TRAVERTINE COMPANY LTD	1.02487902
ARAB CENTER FOR PHARM.& CHEMICALS	0.750276624
CENTURY INVESTMENT GROUP	0.716301587
JORDAN INDUSTRIAL RESOURCES	0.695956721
THE JORDAN WORSTED MILLS	0.589030052
THE ARAB INTERNATIONAL FOOD FACTORIES	0.231395845
JORDAN DAIRY	0.217352662

Results Pertaining to Strong Strategic Health Group

Results pertaining to Strong Strategic Health Group are included in the first four rows in Table (2). Jordan New Cable (JNC) has got the highest Z-Factor score (4.35) among all Jordanian industrial companies. This indicates that Jordan New Cable has strongest level of strategic health in Jordan industrial shareholding sector. The company has JD 91.9 million total assets and JD 12.9 net income before interest and tax for the year 2007. JNC has a profit margin (PM) of 9.31 and a Return on Investment (ROI) of 13.4 and Return on Equity (ROE) of 27.53 for the year 2007. Its performance in the stock exchange market was very impressive; it has Earnings per Share ratio of 0.66 and a Price Earnings Ratio of 10.84. All these indicators show the strong profile of JNC which naturally lead to this level of strong strategic health. The next high strategic health in the sample was Jordan Vegetable Oil Industries with total Assets of around JD15.9 million, total sales of JD 20.3 million, ROI of 6.10 and ROE of 6.54.

Jordan Phosphate Mines scored a Z-Factor score of 3.1 which made it number three in the category of companies having high strategic health posture, slightly above the Jordan Cement Factory which has obtained a score of 2.9 and classified as number four in this category.

Results Pertaining to Normal Strategic Health Group

Results pertaining to normal strategic health group are presented in Table (2).

A total of fifteen companies were classified into the normal strategic health category (Z-Factor scores between 1.80 and 2.90), where, according to Altman, performance is at modest level and future is not really certain.

Jordan Wood Industries /JWICO came number one in this category with a Z-Factor score of 2.87, followed by Universal Modern Industries with a Z-Factor score of 2.42.

A total of thirteen companies in this category scored Z-Factor scores between 2.02 and 2.36; Jordan Steel scored 2.36 followed by Union Tobacco with a score of 2.35 followed by The Arab Potash with a Z-Factor score of 2.30.

Lastly, a total of two companies scored Z-Factor scores below 2, but above 1.80 which made it possible for both of them to stay in this category. National Poultry came last in this category with a score of 1.87 preceded

by Middle East Complex which obtained a Z-Factor score of 1.92.

Results Pertaining to Alarming Strategic Health Group

Twenty companies fell into the category of alarming strategic health (Z-Factor Scores below 1.80), Table (2) shows these companies along with their respective Z-Factor scores.

At the top of this list of alarming strategic health according to Altman's specifications, came The Jordan Pipes Manufacturing Company with a Z-Factor score of 1.76 followed by National Aluminum Industrial with a score of 1.73. Next to them came Arabian Steel Pipes and Arab Aluminum Industry/ ARAL, with Z-Factor scores of 1.704 and 1.700 respectively.

At the end of this list came The Arab International Food Factories and Jordan Dairy, with a Z-Factor Scores of 0.23 and 0.21 respectively.

CONCLUSIONS AND DISCUSSIONS

Results of employing Altman's Z-Factor score on a sample of 39 industrial shareholding companies revealed that only 10 percent of the companies included in this study sample was classified into the strong strategic health category. A total of four companies from three different industries were classified into this category. Jordan New Cable belongs to electrical industry, Jordan Vegetable Oil belongs to food industry and both Jordan Phosphate Mines and Jordan Cement belong to the mining industry. This result indicates that industry characteristics may have no impact on these results. In the other hand, 40 percent of the sample fell into normal strategic health category. Companies in this category are distributed all over different industries which confirm the fact that companies internal environment is the reason behind the company's level of performance.

The alarming health group of companies has serious problems as far as their posture of strategic health is concerned. Let us take Jordan Dairy which obtained the lowest score in this category, as an example to illustrate the reasons behind this low performance in various aspects of its operations.

- The net income of Jordan Dairy has experienced a crash decline from JD 641,800 in 2005 to JD 230,545 in 2007.
- The profit margin has continuously deteriorating

from 10.22 in 2005 to 2.74 in 2007.

- The return on Assets (ROA) has fallen from 12.06 in 2005 to 4.75 in 2007.
- The Return on Equity (ROE) has fallen sharply from 16.10 in 2005 to 2.23 in 2007.

All these indicators of the company performance show how bad the situation is and how important it is for the management to undertake certain managerial actions to stop the decline and start the rebuilding process.

Based on the above conclusion, another important conclusion can be drawn here, that is 50 percent of companies in the study sample were classified in the alarming strategic health category. Tracing back the industrial environment of companies in this category

revealed that there is no evidence of industry characteristics impact on being classified in this low performing category as discussed in the preceding paragraphs. This means that the lack of high level of performance in these companies is related directly to the internal environment rather than to the external one.

As policy implications of these results, companies in the alarming strategic health category must set up a systematic approach to enhance their managerial capabilities in order to be able to turnaround these companies and enhance future posture.

Future studies may concentrate on other sector of the Jordanian economy, such as financial sector, insurance sector or service sector.

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