

Using the *Z-Score* As A Turnaround Tool

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The Z-Score has slowly gained acceptance as a financial predictive tool, but the model is useful beyond forecasting possible bankruptcy. The five underlying component formulas can assist management in devising a plan of action to bring about a successful turnaround.

The five-factor Z-Score model, which is used primarily in manufacturing scenarios, was developed by Dr. Edward I. Altman, a finance professor at New York University's Stern School of Business. The evolution in the use of the Z-Score predictor model by passive credit analysts, bankers, and those in academia to its utilization by operating management and turnaround professionals has happened overtly in some cases and as part of the turnaround methodology in others.

This article demonstrates the use of the Z-Score through Lisa's Clothing, a fictional company that serves as a case study for a TMA educational program. Lisa's Clothing grew rapidly through acquisition and internal expansion funded primarily by debt. Figure 1 provides a snapshot of its five-year operating results.

Converting unproductive assets into cash is critical for reducing debt and priming a successful turnaround, and the Z-Score model uses total assets as one of the denominators in four of the five formulas. Before looking at the Z-Score for Lisa's Clothing, it is important to take a quick look at some commonly used ratios.

Analysts, management, and turnaround professionals use liquidation ratios (Figure 2) as a tool to scrutinize companies. As Figure 2 illustrates, Lisa's Clothing's liquidity eroded substantially during the review period. Its huge buildup in fixed assets and inventory from 1995 to 1997 caused substantial strain on the company.

Another critical tool used by analysts, management,

and turnaround professionals in assessing companies is the working capital ratio (Figure 3). The mismanagement of Lisa's Clothing resulted in a \$16 million swing in working capital from 1996 to 1999. The operating ratios (Figure 4) reflect a 7 percent erosion in gross profit margin and a 17 percent erosion in profits from 1995 to 1999 as a result of management's failure to stock its stores with appropriate merchandise.

There is no doubt that Lisa's Clothing was in severe trouble. The company suffered its first operating loss in three years in 1997, although it still had working capital and a current ratio above 1 to 1. Revenue had grown by \$30 million, and the loss was only \$500,000.

The Z-Score, however, painted a more ominous picture at the end of the third year (Figure 5). The figure dropped sharply and suddenly to under 1.8, the danger zone for such calculations. A Z-Score of 1.6 is in the low gray area range for a privately owned business and indicates that a company may be headed for bankruptcy.

Z-Score Components

Understanding the Z-Score requires an appreciation of its components and the relevance of changes in them to the end result. The Z-Score is the sum of five weighted ratios:¹

$$Z = 1.2(X1) + 1.4(X2) + 3.3(X3) + 0.6(X4) + 1.0(X5)$$

where:

X1 = Working Capital/Total Assets

X2 = Retained Earnings/Total Assets

X3 = Earnings Before Interest and Taxes (EBIT)/Total Assets

X4 = Market Value of Equity/Book Value of Total Liabilities

X5 = Sales/Total Assets

"The evolution in the use of the Z-Score predictor model...has happened overtly in some cases and as part of the turnaround methodology in others."**"**

Figure 2: Liquidity Ratios

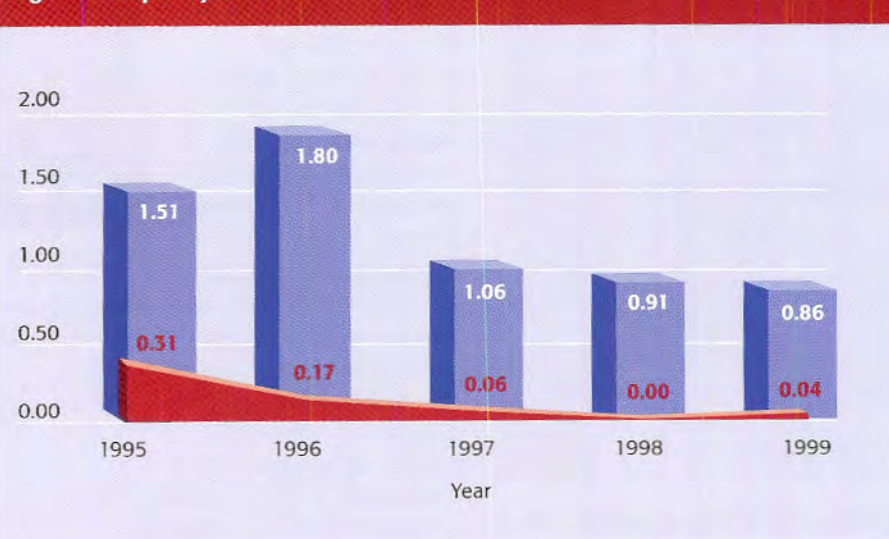


Figure 3: Working Capital

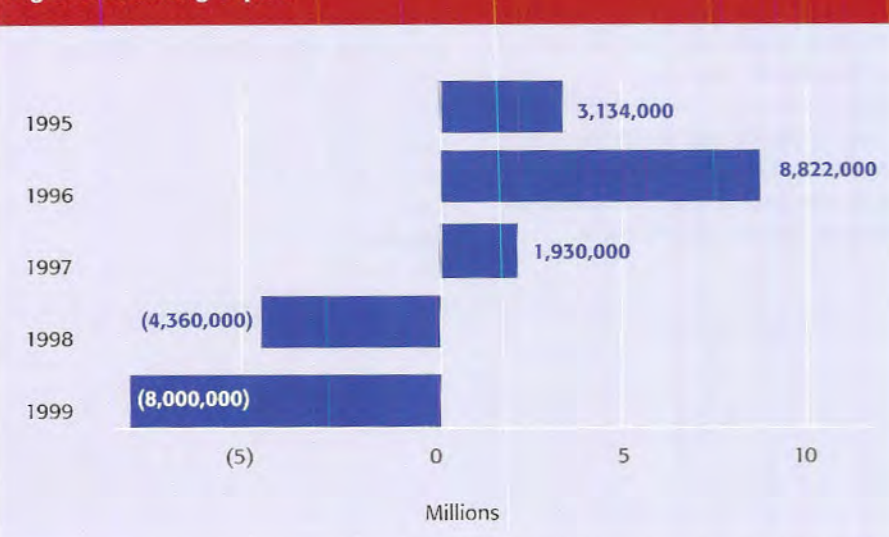
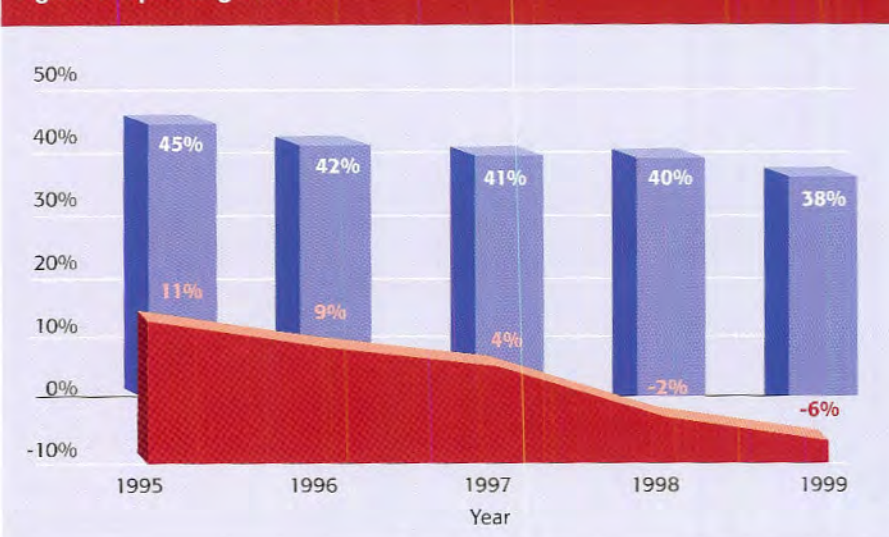


Figure 4: Operating Ratios



Z-SCORE

Some long-term assets have long-term debt attached. Although their sale might not improve the working capital ratio, it would decrease total debt and improve profitability by decreasing interest and depreciation costs. Responsible parties must focus on long-term assets that generate cash. (Selling off assets to reduce cash outflow and debt is part of a solution discussed later.)

X2. Retained earnings represent the accumulation of earnings that have remained within the entity. Retained earnings can be affected by quasi-reorganizations and stock dividend declarations. If so, consideration should be given to readjusting retained earnings. A young firm will be impaired by this ratio and this should be kept in mind.²

To increase retained earnings, a company must generate profits, either through operations or the profitable sell-off of assets or divisions or the forgiveness of debt.

X3. Dividing EBIT by total assets provides an indicator of the productivity of a company's assets and is important because a firm's long-term existence is based upon the earning power of its assets.³

Apart from reducing assets in an operating turnaround, it is usually vital that a company decrease costs and become a low-cost producer. As a company reduces its costs and starts to produce profits, its working capital should increase if cash is not spent on capital items or acquisitions. Retained earnings should also increase, assuming no dividends or unnecessary distributions are paid. As the business cycles evolve, cash should start to accumulate.

X4. Dividing the market value of equity by the book value of total liabilities shows how much a firm's assets can decline in value (measured by market value of equity plus debt) before its liabilities exceed its assets and the firm becomes insolvent.⁴

For privately held firms, this factor is calculated as net worth/total debt. This value will be smaller, and the overall Z-Score indicators are adjusted downward to reflect this lower number.

X5. The capital-turnover ratio indicates the sales-generating ability of the firm's assets. It is one measure of management's capacity in dealing with competitive conditions.⁵

In many operational turnarounds, sales fall in the short term as weak customers and product lines are eliminated. The assets should be deployed in sales and profit initiatives for long-term growth. The assets should be deployed in profit-generating activities for the company to segue into the future.

No model predicts precisely when failure will occur, but the Z-Score has indicated that failure is likely up to two years before a company declares bankruptcy. The Z-Score should be reviewed over time rather than at any one point in time. The trend is important. The most serious changes in the ratios occur between the third and second years prior to bankruptcy.⁶

The lower the Z-Score is, the greater the odds are of failure. For publicly owned companies, scores between 1.81 and 2.99 are in the gray area — a company may survive if corrective actions are taken — while scores of less than 1.81 indicate that failure is a real possibility.⁷ For privately owned companies, the range for the gray area is lower — 1.23 to 2.90 — to account for the differences between book value and market value.⁸

Return to Profitability

When Lisa's Clothing took on substantial debt to expand in 1997, its Z-Score decreased from 3.83 to 1.61. While the operating statement reflected only a small loss, the Z-Score indicated that the company had overexpanded and corrective action was needed. The situation took a turn for the worse because management failed to respond to this need.

It appears that management focused on building the revenue line while ignoring sound business practices regarding profitability and the impact on the balance sheet. Among its mistakes, management:

- Overleveraged the company and invested in fixed assets and inventory that failed to provide adequate returns.
- Opened additional stores that failed to provide adequate returns.
- Allowed gross profit to deteriorate because of a poor product mix and overzealous buying.

The company had excess assets in two major areas. First, the inventory grew from a low of 146 days to 252 days supply on hand (Figure 6). Second, the company expanded to 75 stores, expending large sums on leaseholds, inventory, and deposits. Because total assets are the denominator in four of the five Z-Score calculations, these actions caused Lisa's Clothing's Z-Score to plummet.

The Z-Score provides guidance on improving the company's performance. By decreasing total employed assets, the company will improve ratios X1, X2, X3, and X5. Generating cash from long-term assets and reducing inventory to historical norms increases working capital and impacts formulas X1 and X3 by lowering interest and depreciation costs. Operational improvements cannot be defined by the Z-Score, but increasing inventory turns and eliminating losing locations improves operating performance and impacts formula X3.

Using computer simulation models to depict how the turnaround strategy will impact these numbers and the Z-Score is a great way to communicate the action plan to interested parties. Performing a series of what-if analyses on a plan assists in determining what results are required from the asset sell-off to give a company a chance to survive.

Areas in Lisa's Clothing's financial structure that provide opportunities for improvement are:

- Inventory reduction. What impact will a sell-off at a loss have?
- Leases. Can the leases be sold? Can they be sold at a profit, or must the company absorb losses on the sales?
- Leasehold improvements. Can value be realized from leasehold improvements?

Management and the turnaround professional must determine what level of losses Lisa's can

Figure 5: Z-Score

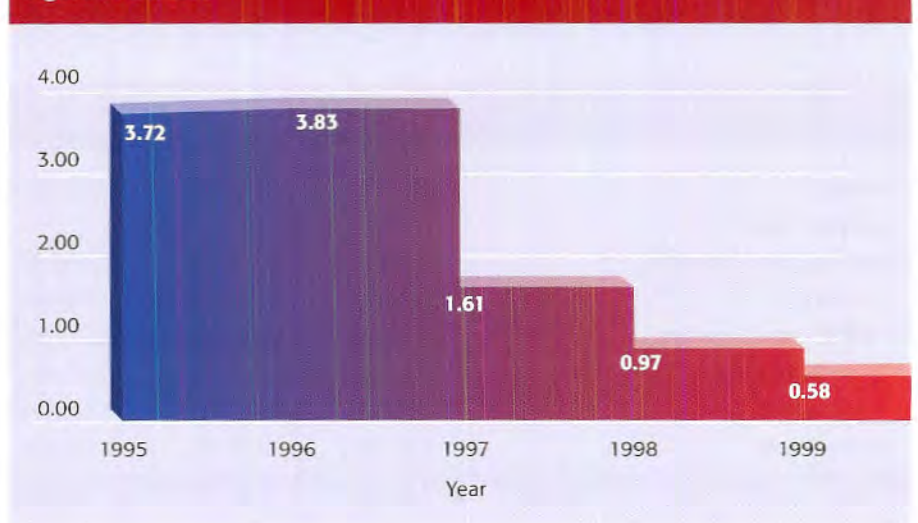


Figure 6: Days Inventory on Hand

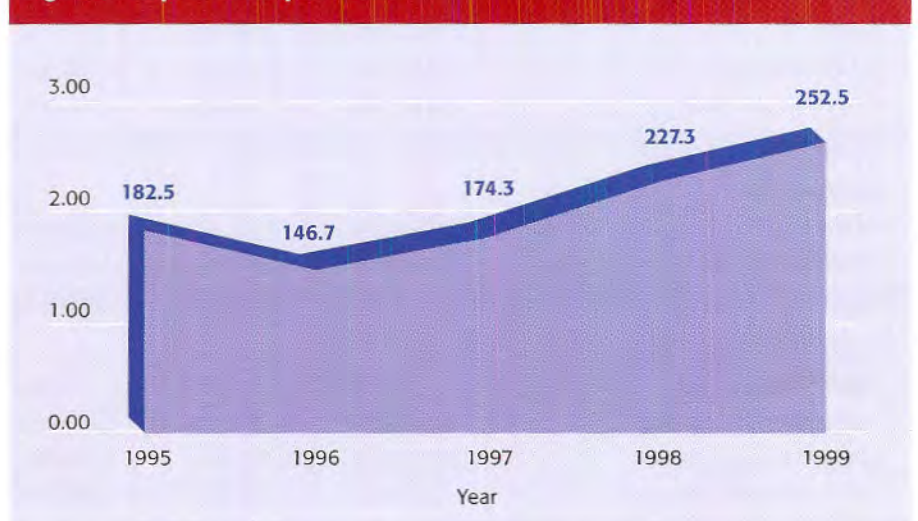


Figure 7: Operating Statement

Operating Statement	1995	1996	1997	1998	1999	Future One	Future Two
Revenue							
Total Revenue	25,000,000	51,000,000	82,500,000	93,000,000	96,000,000	76,800,000	78,000,000
Total Cost of Goods Sold	13,750,000	29,580,000	48,675,000	55,800,000	60,000,000	44,544,000	43,320,000
	55%	59%	61%	62%	65%	60%	57%
Gross Profit - Own	11,250,000	21,420,000	33,825,000	37,200,000	36,000,000	32,256,000	34,680,000
License Department Income			400,000	500,000	600,000	480,000	480,000
Gross Profit	11,250,000	21,420,000	34,225,000	37,700,000	36,600,000	32,736,000	35,160,000
Total Operating Costs	7,300,000	14,340,000	26,405,000	34,290,000	36,320,000	21,792,000	22,260,645
EBIT	3,950,000	7,080,000	7,820,000	3,410,000	280,000	10,944,000	12,899,355
Deduct Interest Costs	360,000	600,000	3,840,000	5,100,000	3,120,000	3,439,907	2,080,000
Other Costs	1,250,000	2,500,000	4,800,000	5,400,000	6,000,000	9,443,335	1,000,000
Net Profit before Taxes	2,340,000	3,980,000	(820,000)	(7,090,000)	(8,840,000)	(1,939,242)	9,819,355
Deduct Income Taxes (40%)	936,000	1,592,000	(328,000)	(2,200,000)	0	0	0
Net Profit After Taxes	1,404,000	2,388,000	(492,000)	(4,890,000)	(8,840,000)	(1,939,242)	9,819,355

Figure 8: Balance Sheet

Assets	1999	Future One	Future Two
Current Assets			
Cash & Cash Equivalents	2,500,000	1,884,593	1,573,984
Inventory	43,000,000	17,200,000	12,200,000
Total Prepaid Expenses	4,700,000	3,149,000	1,340,000
Total Current Assets	50,200,000	22,233,593	15,113,984
Fixed Assets, net	45,000,000	30,150,000	28,066,129
Other Assets	2,800,000	1,876,000	1,500,000
Liabilities and Stockholders Equity			
Current Liabilities			
Trade Accounts Payable	13,400,000	8,900,000	5,000,000
Factors	10,500,000	500,000	0
Accrued Expenses	8,500,000	2,500,000	4,000,000
Notes Payable - Bank	25,800,000	11,165,000	3,000,000
Long-Term Debt			
Term Debt	20,000,000	13,333,835	6,000,000
Other Liabilities and Sellers Notes	18,000,000	18,000,000	17,000,000
Stockholders Equity			
Common Stock	5,000	5,000	5,000
Additional Paid in Capital	10,000,000	10,000,000	10,000,000
Retained Earnings/Deficit	(8,205,000)	(10,144,242)	(324,887)
Total Shareholders Equity	1,800,000	(139,242)	9,680,113

sustain as part of its plan to generate cash through asset reduction. The simulation model and resulting Z-Score can assist in ascertaining those levels.

The most heavily weighted Z-Score factor is X3, at 3.3. Not surprisingly, returning the company to profitability will have the largest impact on the Z-Score and the company's short- and long-term viability.

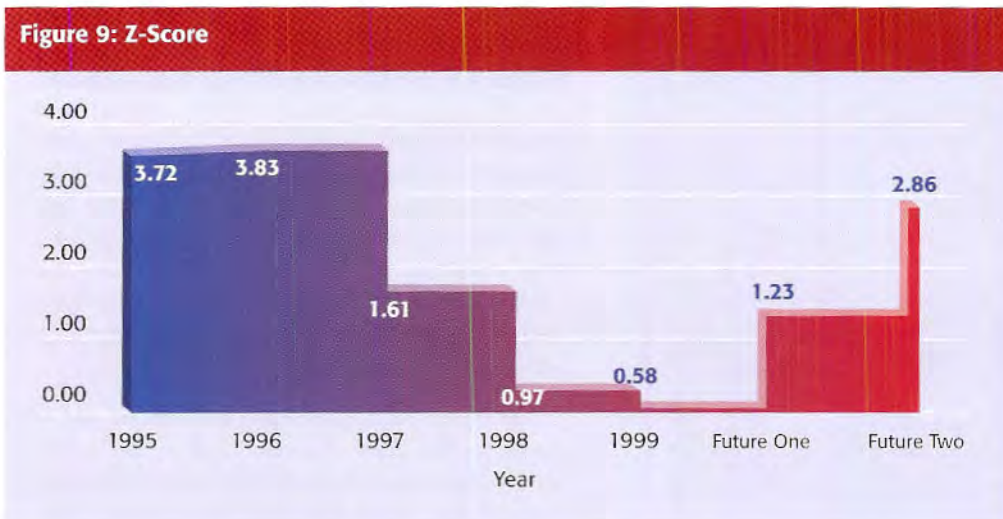
Because total assets serve as the denominator in four of the five factors, Lisa's Clothing's action plan should focus on reducing total assets. This should include:

- Closing losing stores.
- Reducing unnecessary general and administrative costs, inventory, and fixed assets.
- Increasing gross profit.

In addition to returning gross profit to historical norms, the goals and objectives in restructuring Lisa's Clothing might be:

- Stores to be closed 33%
- Decrease in Inventory 50%
- Initial decrease in volume 20%
- Decrease in store-level costs (total) 40%
- Loss on Inventory Sell-off 20%
- Loss on Fixed Asset Sell-off 33%
- Planned reduction in prepaid items 60%

Figure 9: Z-Score



If these changes were implemented successfully, the results would be those shown in **Figure 7**. The plan reflects expense reductions in payroll to historical norms as a percentage of sales and reductions in publicity and selling costs to more modest levels. Corporate costs are reduced to more reasonable levels, and decreases in depreciation and interest costs reflect the actions taken. Gross profit slowly moves back to earlier norms.

Selling off assets allowed the company to pay down debt, reduce assets, increase working capital, and make other improvements to the

company's long-term viability (**Figure 8**). These changes and execution of the action plan resulted in a Z-Score of 2.86 (**Figure 9**).

Lisa's Clothing's Z-Score remained in the gray area at the end of the first year of rehabilitation, but profitable operations in Year Two moved the company beyond the gray area.

Executing the strategy is more difficult than the theory behind the Z-Score. Following a plan that improves the Z-Score helps validate the turnaround plan by providing management with a tool it can understand, buy into, and follow. ■

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¹ Edward I. Altman, *Corporate Financial Distress and Bankruptcy: A Complete Guide to Predicting & Avoiding Distress and Profiting from Bankruptcy*, 2d Ed. (John Wiley & Sons, Inc., 1993), pp. 186-188.

² *Ibid.*

³ *Ibid.*

⁴ *Ibid.*

⁵ *Ibid.*

⁶ *Ibid.*, 199, 201.

⁷ *Ibid.*, 197-204.

⁸ *Ibid.*, 204.