FINANCIAL PERFORMANCE MEASUREMENT OF SOUTH AFRICA'S TOP COMPANIES: AN EXPLORATORY INVESTIGATION

Ву

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my departed wife Ntshadi,

and my departed parents Mosetsane and Letshalaphala

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My son Khumo, who understood why I was not spending more time with him,

IGBMOSALAKAE

PRETORIA

July 2007

DECLARATION

I declare that <u>FINANCIAL PERFORMANCE MEASUREMENT OF SOUTH</u>

<u>AFRICA'S TOP COMPANIES: AN EXPLORATORY INVESTIGATION</u> is my own

work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references.

DATE

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SUMMARY

This study explores the financial performance measurement of South Africa's Top Companies. It aims to find a conclusion on the research problem, that is 'Do South Africa's Top Companies use the available arsenal to measure their financial performance?'

Commerce and industry are the cornerstones of the economy of a country. This study purports to contribute to the ways and means of minimising the risk of business failures due to the resultant effects on the economy.

The sample comprises of sixty companies. The sampling frame is the first hundred companies of the Financial Mail 200 Top Performers for 2004.

The arsenal that is available to measure financial performance is researched in the financial literature. Mainly, this covers ratio analysis and interpretation, and the bankruptcy prediction models.

To arrive at a conclusion on the research problem, a research instrument is developed from the host of financial ratios in the literature, including the bankruptcy prediction models. The research instrument comprises of popular ratios that are also found to be 'logical', as well as the ratios that

make up the Z-Score bankruptcy prediction model. The instrument is called the Ratio Map and Z-Score and is applied to test the financial strengths/weaknesses of the Top Companies.

In addition to the Ratio Map and Z-Score, the measures applied by the Top Companies as 'highlights' are analysed. This is done to determine the extent at which the measures unearth the strengths/weaknesses of the Top Companies.

The conclusion drawn is that the Top Companies do not utilise the available arsenal to measure their financial performance. The supporting evidence is that the most frequently applied 'highlights' measures by the Top Companies cover only one area of the many financial fields of a company, that is, share performance. On the other hand, the analyses per Ratio Map and Z-Score have not revealed major material weaknesses in the financial position of the Top Companies.

It is proposed that:

- More information be given in the notes to the financial statements to facilitate meaningful analysis; and
- ♦ A follow-up research study be done to assess the trends of the Top Companies.

KEY TERMS

Financial performance measurement; Top Companies performance; Exploratory investigation; Financial Mail 2004 Top Performers; Risk of

business failure; Ratio analysis and interpretation; Bankruptcy prediction models; Top Companies' highlights measures; Ratio Map and Z-Score.

CHAPTER 1

INTRODUCTION

"The ultimate purpose for any profit-seeking organisation is to create wealth for its owners. It is the goal of a street vendor, as well as for a large listed company. The only difference is that the street vendor operates for the benefit of one person whereas a listed company operates for the benefit of a large number of shareholders".

de Wet and du Toit, 2007

1.0. Background to the Research

Commerce and industry are the cornerstones of a country's economy. The activities are conducted or driven through various forms of business enterprises. These may be sole proprietorships, partnerships, co operatives, close corporations, or companies (private and public).

What is commerce and what is industry? Commerce and industry fall under the broad field of business management. Commerce is defined as the organised economic activity embracing the purchase and sale of goods and services (Loriaux 1986:16). This includes wholesalers, retailers, financial services (banks, insurance etc.). Industry, on the other hand, is defined as the organised economic activity embracing the manufacture, extraction, and processing of raw materials (Loriaux 1986:15). This includes factories, mines, quarries etc.

Business management is an applied science that embraces the methods and tactics on how organisations are managed effectively and efficiently.

This applied science has sub-disciplines, i.e. finance, human resources etc.

The sub-discipline of interest in this research study is finance, which in turn has its own sub disciplines, i.e. investment management, financing etc. (Unisa 2005:41). These are dealt with more fully in Chapter 2.

With the importance of commerce and industry in mind, the drivers of these activities need to attract even more attention. A company is the ultimate form of business enterprise due to its legal personality (a close corporation has legal personality but does not have the regulatory framework similar to that of a company). The sample for this research study is drawn from public companies, due mainly, to their sound 'legal' foundation. The focus of this exploratory investigation is on investment management of top public companies, due to their importance as major players in commerce and industry. The specific focus of the investigation is on financial performance management.

1.0.1. Financial Performance Management and Performance Management Financial performance management, while a sub-discipline of Investment management, it is part of the total performance management of an organisation. Weldeghiorgis (2004:3) states that business leaders have begun to realise that both financial and non-financial indicators (sum of performance measures) should be considered in measuring performance. Weldeghiorgis (2004:1) also quotes Zairi (1996:31) that "performance measures are the life blood of organizations, since without them no decisions can be made" Al-Enizi, Innes, Kouhy & Al-Zufairi (2006:363) state that the recognition in the West, of the limitations of traditional financial performance

measurements (FPMs) has led to many studies that advocate the use of non-financial performance measurements (NFPMs). Regrettably, Al-Enizi *et al* (2006) do not define FPMs, neither do they come out clearly on the limitations of these measurements. El-Enizi *et al* (2006:365) state quality, customer satisfaction, delivery and other "critical success factors" as examples of NFPMs.

To be able to assess progress, performance has to be managed. Le Roux (2004:1) defines corporate performance management (CPM) as an approach that embraces processes that facilitate the assessment of the progress of an organisation. He cites processes such as strategy formulation by the transfer of the make a profit. Financial results summarise the results for a given period. Activities undertaken during such period involve many facets of a company. These include the management of sales, customer care, costs, and most important, the management of personnel. It is inconceivable that a company can only have financial performance measures. There are numerous measures that need to be applied and which should lead to the achievement of the objective: the posting of a profit (assuming that the company is doing well). Figure 1° is an elementary sketch which illustrates the process.

Schutte (1993:19) refers to key performance areas as managerial activities that are essential to the performance of an organisation. He further refers to Pareto's Law – "that a relatively small number of activities make a

disproportionately large contribution to the overall performance of the organisation". He illustrates his view

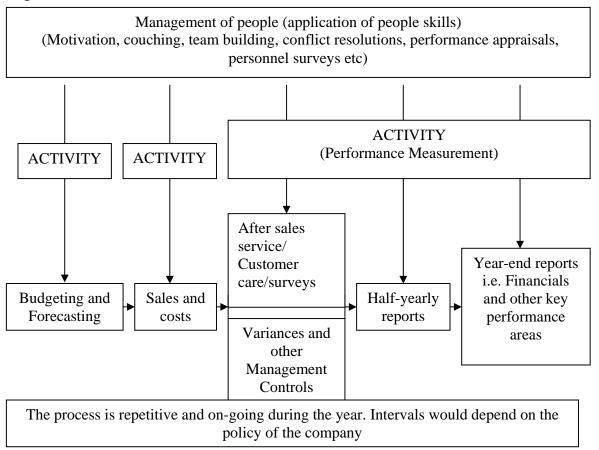


Figure 1°: Performance Management Process

Source: Designed for the research study

by means of a "Planning system flow chart" and refers to performance measurement points as 'review of gap analyses' (Schutte (1993:98).

Therefore, financial performance management is part of performance management or CPM.

1.0.2. Financial Performance Management

The focus of this research is on financial performance management because this is the core area and end-result of all the activities undertaken during a period. It gives a picture of the sustainability of an enterprise. In turn sustainability ensures, amongst other things, good employment levels, local and foreign trade, contributions to the coffers of the state, and wealth distribution to the shareholders. One writer puts it that "the financial stability of companies is of concern to employees, investors, bankers, government and regulatory authorities alike (Lin & Piesse 2004:73).

It is on the grounds of sustainability, that this exploratory investigation on the financial performance measurement of South Africa's Top Companies, is undertaken.

Companies measure their performance differently, with financial ratio analysis forming the basis of measurement. This aspect is briefly discussed under two headings: theory covering ratio analysis and studies on business failure (bankruptcy prediction); and practice covering the Media Top Companies surveys and the 'highlight' measures applied by the Top Companies.

1.0.2. (a) Ratio Analysis

Generally, for external reporting, companies include 'ratios' that they consider important – they refer to these as 'highlights'. Accounting data (financial statements) can, at best, only be read with meaning by means of ratios. It is, therefore, not surprising that ratio analysis and interpretation feature prominently in the literature on financial management. McLeary (1992:203) defines a financial ratio as "an expression of a relationship between any two figures or groups of figures in the financial statements of an undertaking".

Beaver (1966:71) traces the history of ratio analysis to the early 1900s when the analysis was confined to the current ratio for the evaluation of creditworthiness only. He notes further that the development of ratio analysis during the 1960s evolved into the use of several ratios by different users for different purposes – this included credit lenders, credit rating agencies, investors, and management. He notes that despite the wide use of ratio analyses, little had been done to test their practical and formal usefulness. Since then, attempts to improve on ratio analysis and interpretation gained momentum with studies on business failure. 1.0.2. (b) Studies on business failure

Studies on business failure or the development of the 'bankruptcy prediction models' were done with the view to improve on ratio analyses and interpretation. As early as the 1930s, studies on business failure were initiated, by amongst others, Smith and Winakor (1935), and Mervin (1942). Later studies were done by, to mention just a few, Beaver (1966), Altman (1967), Blum (1974), Edmister (1972), Deakin (1972, 1977), Wilcox (1971), Altman, Haldeman, & Narayanan (1977), Scott (1981), and Ohlson (1980).

The contribution by South Africa's researchers in this field includes models developed by Daya (1977); De la Rey (1981); Amiris, Ashton and Cohen (1978), Vietri (1979), Le Roux (1980), Immelman (1980), Hamman and Smit (1991), Garbers and Uliana (1994) (Truter 1996:14); Strebel and Andrews (1977), Court, Radloff and van der Walt (1999), Lukhwareni (2005) (Naidoo 2006:3); and Naidoo (2006).

Naidoo (2006) does not use the term 'bankruptcy prediction' but 'prediction of the states of financial health'. The word 'states' is applied in the sense of a category, i.e. 'severely distressed' or 'distressed' or 'healthy'.

There are also local dissertations that are briefly touched on under paragraph 2.2.3. (h) – Other independent research studies on Bankruptcy Prediction Modelling.

Altman (1968:590) defines a bankruptcy prediction model as a tool for assessing the bankruptcy potential of firms. Altman (1968:589) further defines bankruptcy as firms that are legally bankrupt and are either placed in receivership or have been granted the right to reorganise under the provisions of the National Bankruptcy Act. This definition is based on The Wording used in the Companies Act, no. 61 of 1973 (as amended by the Corporate Amendment Act, no. 24 of 2006) (section 1), relating to 'bankruptcy' is the 'winding-up' of a company. The 'winding-up' may either be by order of the court, or voluntary. In both instances, winding up would be the end result where a company is deemed to be unable to pay its debts in terms of section 345 of the Act. The section provides that

- if a company is served with a letter of demand and it neglects to pay or make reasonable arrangements with the creditor; OR
- If it is proved to the satisfaction of the Court that the company is unable to pay its debts.

In either case, the company would be deemed to be unable to pay its debts. In coming to such conclusion, the Court would also take into account the contingent and prospective liabilities of the company.

Defining bankruptcy, De la Rey (1981:1) uses the term "finansiële mislukking" (the English version is given as 'financial failure', but a more appropriate translation is deemed to be 'business failure'). De la Rey (1981:1;10) defines financial failure as the inability of a firm to meet its financial obligations, including the timeous payment of dividends. De la Rey (1981:1;10) further points out that, where the obligations to outsiders (liabilities) are greater than total assets, the firm would not be able to meet its financial obligations, and would, therefore, also be regarded as having failed. Therefore, a bankruptcy prediction model may be defined as a tool that may be used to assess whether or not a firm will still be able to continue with its operations.

In this research, the bankruptcy prediction models are accepted as part of the available arsenal for financial performance measurement. The purpose of financial performance management is to improve efficiency, that is, to be able to identify problems in good time so as to take appropriate action, to avoid bankruptcy, or to facilitate the application for winding-up in cases where chances of a turnaround are slim. This approach is supported by the following quotes: Naidoo (2006:2) quotes from Poston, Harmon and Gramlich (1994), that

"This artificial dichotomisation does not explicitly recognise that a failing firm may be able to remedy its weakened position before it reaches the final stage of collapse".

Naidoo (2006:2) further quotes from Honsberger (1979), that

"We tend to forget that bankruptcy does not strike like a bolt of lightning and that there are, in fact, many indicators or predictors of its approach".

1.0.2. (c) Ratio analysis and studies on business failure

The studies on business failure were based, mainly, on ratio analysis. Beaver (1966), attempted to determine the usefulness of ratio analysis. Altman (1968), aimed at bridging the gap between the 'traditional ratio analysis' and the technical techniques that became popular during those years. Ohlson (1980), aimed at improving the models that had already been developed. This research study focuses on ratio analysis as well as the bankruptcy prediction models - both as part of the arsenal of financial performance measurement tools that are available. Ratio analysis enjoys wide use. Besides being used by companies, there are various other users. Lenders use the analysis for credit and rating purposes. Rating agencies use the analysis for rating purposes as a service to their clients. The written media use the analysis to determine the well performing companies, and to reward them. Shareholders use the analysis to assess the soundness of their investments. (McCleary 1992:202.) Despite the popular use of ratios, there is a view that they tend to have results that are subject to the analyst's judgement, or, as suggested in the literature, "ratio analysis is no longer an important analytical technique ...

due to the relatively unsophisticated manner in which it has been presented" (Altman 1968:609). Altman (1968:609) suggests that ratios, if they were to be analysed within a multivariate framework, would take on greater significance than the approach of ratio comparison.

Despite this view, a well run company will periodically measure its performance against set targets. This is generally done in terms of sales targets, expense/cost targets, and selected ratios (Welsch 1976:6). The appropriate application of the bankruptcy prediction models as a means of financial performance measurement, in addition to ratio analysis, may, while revealing areas of success, also reveal areas that contribute to impending failure, thereby enabling corrective action to be taken in good time (Altman 1968:608). It is noteworthy that Altman (1968:608) made this statement even though he had failure prediction in mind when he developed his bankruptcy prediction model. The arsenal of financial performance measures is explored in more detail in Chapter 2.

1.0.3. The Media Surveys

As part of the performance measurement of South Africa's public companies, various publications survey South Africa's public companies annually to determine, in accordance with their specific criteria, Top Companies. The sample of this research study is drawn from South Africa's Top Companies. The population for the study is drawn from the surveys conducted by the *Sunday Times Business Times* (*Business Times*) and the *Financial Mail*.

1.0.3. (a) The Sunday Times Business Times Survey

The primary aim of the *Business Times* Top 100 Companies survey is an effort to "acknowledge those listed companies that have earned the most wealth for their shareholders" (Top 100 Companies, 2003).

The results of the survey list the Top 100 Companies over a five year growth period, based on compound growth, as well as over a one year growth. In addition, the survey results list the ranking by return on equity, profit after tax and turnover growth, as well as a ranking of top-performing property companies.

1.0.3. (b) Financial Mail Survey

The Top Performers are 200 companies that are ranked by IRR over a fiveyear period. Additional information given is EPS growth over 5 years, ROE over 5 years, Return on Assets (ROA) over 5 years, dividend yield over 5 years, and pre-tax profit over 5 years.

1.0.3. (c) Overview of the surveys and the research sample

The criteria applied in the surveys are centred mainly on ratios, which support their importance. The definitions of the ratios are given in Chapter While the *Financial Mail* survey of Top Performers is determined based on IRR (shareholder cash flows) over five years, the *Business Times* survey determines its Top 100 Companies based on compound growth (shareholder cash flows) over five years. The two approaches are similar except that the *Financial Mail* survey discounts the cash flows, while the *Business Times* survey does not have passed the test of the surveys 'should' be well run companies that have passed the test of the surveys 'should' be well run companies, even though the surveys by other publications are not discussed. The selection of the population for the research study is, therefore, drawn from the two surveys for the reason that these should be amongst the well-run and well-performing companies.

The approach by the *Financial Mail* is deemed superior (due to the discounted cash flow approach) and hence the sample for this research study is drawn from their survey of the 200 Top Performers for 2004. A similar approach of population selection was adopted by Mosalakae (1995), where the *Business Times* Top 100 Companies, which had achieved an annual simple return of 100% or more for the year 1994, was drawn as a sample. The surveys of both publications are discussed in more detail in Chapter 2.

1.0.4. Company Financial Performance Measurements

In general, companies use different approaches to measure financial performance. The financial measurements are usually centred on financial ratios, their analysis and interpretation. However, a random study of the accounting data of a pilot sample of ten *Financial Mail's* 200 Top Performers for 2002 shows the most commonly used ratio as 'headline earnings per share' (HEPS). In these instances, there is no reference in most of the reports, to the popular ratios such as solvency and liquidity. This does not imply though, that the ratios are not being used, they could be enjoying wide use for internal management reporting. Rating agencies also make use of ratio analysis to determine client ratings (CA Ratings). This research study is regarded as necessary for the following broad the importance of the sustainability of companies.

With the above background in mind, a graphic Conceptual framework (Figure 1) illustrates the core of the study - the factors and constructs, and the presumed relationship between them (Miles & Huberman1994:18;308).

1.1. The research problem and the research questions

The research problem is:

Do South Africa's Top Companies use the available arsenal to measure their financial performance?

A scan of the pilot sample has indicated that only one measure seems to be popular as a highlight measure in the accounting data of the Top Companies.

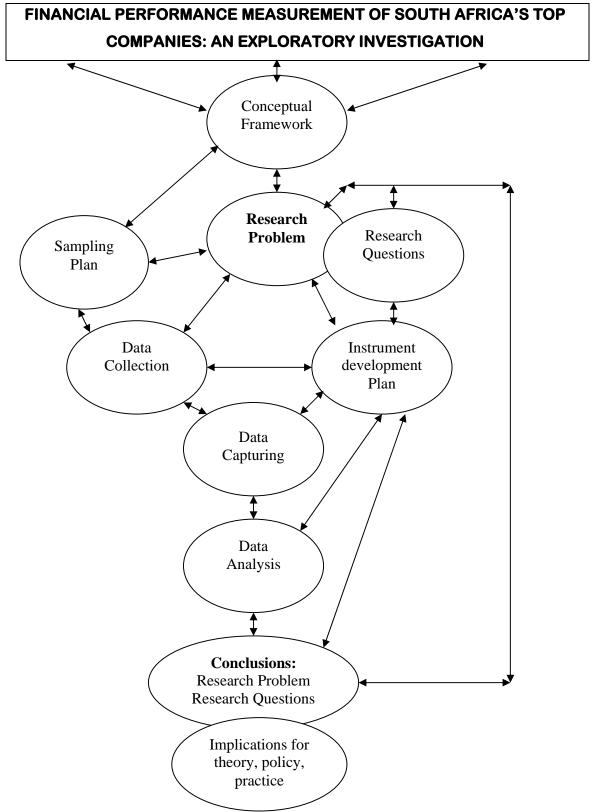


Figure 1: Research Study Conceptual Framework

Since the goal of a firm is to maximise shareholder wealth, gap analyses need to be done from time to time. This is done, from a financial point of view, by means of financial ratio analysis. The analysis assists in identifying, on the one hand, the major strengths and opportunities of a business enterprise, and, on the other hand, weaknesses of, and threats facing, a business enterprise. An analysis indicates the levels of efficiency, i.e. liquidity (cash holdings against obligations), debt management, and an adequate capital structure. (Moyer, Mcguigan & Kretlow 1984:152.)

While there may be no doubt about the importance of ratio analysis, different writers have different views on its usefulness and shortcomings. These are discussed in Chapter 2.

To be able to obtain information on the performance of their companies, shareholders rely on published annual reports that include accounting data. In most cases, the tools at their disposal that informs them on the financial soundness of their companies are the ratios, their analysis and interpretation. However, companies are known to have gone bankrupt even in the face of results that have been audited and found to be good.

The intended improvement on ratio analysis and interpretation has seen the emergence of the development of the bankruptcy prediction models. According to the accounting data of the pilot sample, these models do not seem to enjoy use in South Africa. Seven models developed locally are discussed in Chapter 2. Five of these relate to two models developed by other researchers. Three of the five models are based on the Z-Score model

developed by Altman (1968); one is based on Beaver's (1966) model; and the other is a comparative study of the models by Altman (1968) and Springate (1978). The other two studies are independent: one is an independent study and the other, also independent, is tailored along the lines of Altman's (1968) model.

Reference to any of the models could not be found while scanning the accounting data of the ten pilot study companies. The scanning will be extended to the sample of sixty companies in the research sample.

Eidleman (1995) wrote: "A decade ago, the use of Z scores was virtually unheard of among practising accountants. Today, they are used by auditors, management consultants, and courts of law, and as part of many data base systems used for loan evaluation." This statement was made in America twelve years ago, some twenty seven years after the initial Z score model was developed by Altman (1968).

Ratio analysis and interpretation, and the intended improvement by means of the bankruptcy prediction models, form the field of financial measures that are available. The bankruptcy prediction models are regarded, in this research study, as financial performance measurement tools, and not necessarily as bankruptcy prediction models.

This study, therefore, explores the arsenal that is available to measure financial performance, and attempts to find out whether or not the Top Companies use these measures. While shareholders and any other interested parties need to have tools at their disposal to do 'checks and

balances' on their companies, the companies need to provide the necessary information to make this task easier. This study attempts to determine the position.

In summary, the problem addressed in this research study is

Do South Africa's Top Companies use the available arsenal to measure their financial performance?

The conclusion is that ratio analysis and interpretation embody the arsenal to measure financial performance (the ratios may be from theory, practice, and by design). The use, however, needs to be coordinated in such a manner that the interpretation must emphasise the relationships between the various ratios. In this way, underlying strengths and weaknesses may become easily identifiable. The instrument developed for this research study, the Ratio Map and Z-Score (Figure 5a), is drawn from ratios, and is designed in such a manner that the link between the ratios is easily identifiable. Figure 5a includes the Z-Score model. The model is made up of a set of ratios that are not commonly found in literature and in practice (designed ratios), but whose variables are easily found in the accounting data. The Ratio Map and Z-Score (Figure 5a) therefore, extends the analysis for the identification of organisational strengths and weaknesses.

 Firstly, it is proposed that more information be given in the notes to the accounting data to include detailed information on loans/debt, inventory, debtors and all other creditors. This should minimise assumptions in the determination of the ratios; and Secondly, it is proposed that a follow-up research project be done, following on the results of the Ratio Map and Z-Score (Figure 5a) as applied in this research study.

The above conclusion and the proposals are the result of the following research questions dealt with in this report:

- Is ratio analysis and interpretation useful as a financial performance measure?
- Is the bankruptcy prediction model applied in this research study reliable as a financial performance measurement tool?
- Is the bankruptcy prediction model applied in this research study user-friendly as a financial performance measurement tool? and
- Is the information covered in the annual financial statements of the Top Companies adequate for a meaningful analysis to be done?

The available arsenal of financial performance measures (the development of the research problem) is discussed in Chapter 2. The background to the research questions is also developed in Chapter 2. The conclusions on the research questions and the research problem are drawn and discussed in

Chapter 5. 1.2. Justification for the Research

Commerce and industry create jobs for members of society, and produce goods and services which contribute to the gross domestic product of the country. The activities involve trade, which leads to exports and imports contributing to the foreign exchange holdings. The activities also culminate in the payment of taxes which assists in the governance of the country and promotes the ability to provide essential services for the citizens. For the

companies quoted on the Stock Exchange, investors trade on shares to create wealth for themselves as well as for the country.

Exploring the performance measures, identifying any gaps, and making recommendations, may assist in opening avenues for creativity towards maintaining and sustaining the activity of commerce and industry.

Commerce and industry operate within a legal framework. Companies, the drivers of commerce and industry, formulate their own policies (within the legal framework), to ensure their corporate success. Yet problems are experienced from time to time. Bankruptcies occur from time to time, and it may be a mystery why some of them are so sudden. Honsberger (1979), as quoted by Naidoo (2006:2) comes to mind: "We tend to forget that bankruptcy does not strike like a bolt of lightning and that there are, in fact, many indicators or predictors of its approach". Despite the legal framework, as well as the continuous steps that are taken

Despite the legal framework, as well as the continuous steps that are taken by the authorities to tighten the financial reporting mechanisms, the problems persist. The research is aimed at assessing the *status quo*, and to add to the arsenal of approaches applied to keep in check, the financial soundness of public companies, and possibly other investment entities.

The research is, therefore, justified on the grounds that it may strengthen the 'gate-keeping' efforts and contribute towards minimising the problems associated with the following:

• The Companies Act, no. 61,1973, (amended by the Corporate Amendment Act, no. 24, 2006, stipulates how companies should prepare their financial statements (amended Schedule 4). The Amendment Act

makes wide ranging amendments to the appointment of auditors and audit committees and their duties (amended sections 269; 270; 271; 273; 274; 275; 276; 280). The Amendment Act also establishes a Financial Reporting Standards Council (FRSC) (Section 440P) and a Financial Reporting Investigations Panel (FRIP) (Section 440W). The objective of the FRSC is to establish financial reporting standards which promote "sound and consistent accounting practices". The objective of the FRIP is to "contribute to the reliability of the financial report by investigating non-compliance with financial reporting standards and recommending appropriate measures".

In the past, the Generally Accepted Accounting Practice (GAAP) Monitoring Panel was established because the South African Institute of Chartered Accountants (Saica) and the Johannesburg Securities Exchange (JSE) believed that the Companies Act failed to ensure compliance with accounting standards (Temkin 2006:22). The JSE could refer any listed company to the panel in cases of non-compliance with statements of GAAP or the International Accounting Standards (IAS) (GAAP Monitoring Panel Charter) Since 2003, thirty listed companies were reported to the Panel for failing to meet financial reporting standards (Temkin 2006:22).

The FRIP replaces the GAAP Monitoring Panel. Part of the reason for this move was that the authority of the GAAP monitoring panel was sometimes undermined. It could, for instance, be threatened with litigation. There have also been "knee-jerk reactions by companies to query letters issued by the panel". (Temkin 2006:7).

It would appear, therefore, that the amendment to the Companies Act became necessary to strengthen the muscle of the Act. As this is still new, the effects can only become evident with the passage of time.

• The Corporate Amendment Act also deals with false or misleading financial reports (amended Section 287). The section states, in part, that a company that fails to comply with financial reporting standards when

- issuing its financial statements may be guilty of an offence, including every director or officer who is party to the issue of the statements.
- Attempts are continuously being made to close gaps in financial reporting by companies. Recently, it was reported that the auditing industry is being revamped to "weed out dodgy chartered accountants (CAs)" (Naidoo 2006:13). The changes are said to be part of a move to restore credibility to the auditing profession following local corporate disasters such as Regal Treasury Bank, MacMed, Leisurenet and Saambou and Enron in the USA (Naido 2006:13) into effect on 1 April 2006. The Act establishes the Independent Regulatory Board for Auditors (IRBA) and is the successor body to the Public Accountants'
- English (Bankfuptcies) of companies (public and private) in South Africa over a period of seven years (1999 to 2005) totalled 12 139 (Source: Statistics South Africa). Whenever adverse effects on the economy, no matter how trivial, are minimised, value is added (De la Rey 1981:1). The application of Figure 5a may assist in identifying imminent liquidations in good time, and prompt corrective action.
- Ratio analysis has been in use for many years. The ratios serve a useful purpose, but they need to be computed and analysed with care. The ability of the analyst goes a long way towards coming up with near accurate and reliable analyses. This report acknowledges the need for caution when applying ratio analysis for the benefit of the users. The instrument (Figure 5a), developed for this research study and based on ratio analysis and the Z-Score, may be a useful tool to the investing community and other interested parties as it may encourage the coordination of ratio analysis and interpretation.

It is clear from the above that the problems are serious. It is hoped that this research study may contribute to the validation of financial reports and also contribute towards minimising the problems discussed above.

1.3. Methodology

1.3.1. The research study

The research study is exploratory with a qualitative approach (Emory & Cooper 1991:144) on whether or not South Africa's Top Companies use the available arsenal to measure financial performance. The literature review, dealt with in Chapter 2, forms the basis for the research.

The research study is basic, that is, it seeks "an extension of knowledge", but it is not necessarily problem oriented (Unisa 1995). The study is also a documentary research study which, according to Lang & Heiss (5th Edition), "emphasises contemporary sources and present day issues". The study is specifically based on existing data.

The research questions are supported by means of a study of the literature on ratio analysis and interpretation, as well as a study of the literature on bankruptcy/failure prediction models. The surveys by the media to determine Top Companies are discussed, and a study of the accounting data is done as part of the support for the research questions.

The study is also empirical, where the financial performance of the Top Companies is explored by means of the instrument developed for this research study – Figure 5a. This embraces ratio computations, their analysis and interpretation, and the interpretation of the Z-Scores. To facilitate the analysis and interpretation, the Z-Scores of the sampled companies are conveniently used to classify the companies into three categories – high, medium and low. Further, the process of analysis and

interpretation includes a critical look at the financial performance measures

highlighted by the Top Companies in their accounting data.

1.3.2. The sample and the sources of data

The population selection is based on a pilot study conducted on the 2002

and 2003 Top 100 Companies as surveyed by the Business Times; and, the

200 Top Performers for 2002 and 2003, as surveyed by the Financial Mail. In

the end, the sample is drawn from the *Financial Mail* 200 Top Performers.

The main source of accounting data is the annual reports of the sample of

South Africa's Top Companies. The media are also scrutinised for any

current news on the sampled companies. The sampling is discussed in

Chapter 3. 1.4. Outline of this Research Report

The research report layout is as follows:

Chapter 1: Introduction

Chapter 2: Literature review

The broad field of study is discussed, that is, Business Management. This is

supported by a discussion of its sub-discipline, i.e. financial management,

and a discussion of the further sub-disciplines of investment management

and financial performance management.

The following aspects are reviewed:

⋄ ratio analysis and interpretation of accounting data;

bankruptcy prediction models;

♦ general comments on bankruptcy prediction models;

♦ other research studies on the bankruptcy prediction models;

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- ♦ South Africa's Top Companies surveys; and
- The 'highlight' measures used by the Top Companies in their accounting
 Chapter 3: Research methodology

The chapter discusses the following: the research problem and its relatedness to the literature review; the development of an instrument to assist in arriving at a conclusion on the research problem; the description of the unit of analysis; the sources of data; the data collection procedures; the administration of the data collection procedures; the limitations in the methodology; and ethical issues.

The unit of analysis is refined to minimise bias in the analysis. The units of analysis are grouped into three categories using the Z-Scores. An analysis of each group is summarised and supported by notes on the analysis of each individual unit. Conclusions are held over for discussion in Chapter 5.

Chapter 5: Conclusions and implications

The following are discussed: conclusions on the research questions and the research problem; implications for theory; implications for policy and practice; other research findings; and implications for further research.

1.5. Definitions

Definitions of terms are given as and when the terms are introduced in the research report.

1.6. Delimitations of scope and key assumptions

The following key issues are of note:

- Two publications have been handpicked for the selection of the population and sampling the *Business Times* and the *Financial Mail*. The *Business Times* is a weekly newspaper with the biggest readership in South Africa (Publicitas Promotion Network), while the Financial Mail is a weekly magazine with the highest circulation in South Africa (familymagazines). These publications have therefore, been hand-picked for their popularity and authority on financial matters. Needless to say, the identification of the Top Companies is a valuable tool in encouraging companies to do better every year. The sample for the research study is,
- therefore, drawn from amongst the 'best' companies. The Financial Mail 200 Top Performers category is the sub-population, and the sample is determined as follows: the first forty companies ranked, and the twenty companies ranked from eighty-one to one hundred. The study has, therefore, a sample of sixty companies. Since there are two hundred companies in the Top Performers category, the sample of sixty companies represents 30% of the sub-population.
- ♦ It is noteworthy that while the criteria used over the years to arrive at the Top Companies have not changed, the Top Companies do not keep their positions - they either fall out or take other positions down the line. This is an area that should be worrying to shareholders.
- In the determination of the Top Companies, the two publications use different approaches. The approaches are mainly based on financial performance. Since this research study is on financial performance measures, the criteria applied by the publications do not differ with the basis of this research study. Looking at it another way, financial performance measures are based mainly on accounting data. It is accepted that there are limitations in the approach performance cannot be measured in terms of monetary values only (Bernstein 1974:5). However, the zone of comfort is that this research study is
- focused on financial performance measures.
 The sampled companies are in different industries. Since effective performance management differs from one industry to another, and for

- the purpose of this research report, the standard financial performance measures are accepted as appropriate.
- ♦ It is also noteworthy that the financial years of the sampled companies end at different times. This implies that performance in this research report is not time-matched. Care has, however, been taken to use the latest accounting data within the year 2004. The differences in the financial years also mean that the accounting data used in this research report is not the same as that used by the media to identify the Top
- Companies of the accounting data of the sample differ. These have been re-arranged to have a uniform format, to facilitate modelling.
- ♦ The main source of data is the annual reports of the Top Companies. Owing to various reasons (given in Chapter 3, paragraph 3.2.1.) only forty-nine annual reports could be obtained. The original sample has therefore been adjusted and supplemented with eleven companies.

1.7. Conclusion

This chapter (the introduction), gave the background to the research study, which was followed by an exposition of the research problem as well as the research questions. The justification for the report was given, followed by a brief detail of the methodology. Finally, the delimitations of scope and key assumptions were given, setting the scene for the detailed process of the research.

CHAPTER 2

LITERATURE REVIEW

2.0. Introduction

Business Management is the broad field of this research study.

Business is the exchange of goods or services and money or, the exchange of money and goods or services, for mutual benefit (McNaughton, Hartley & Schwartz 1970:5). Business management is an applied science that emphasises the efficient and effective management of business organisations. It embraces a broad field of the management discipline. The field include finance, human resources (HR), marketing, production and pperations, purchasing, and risk. (Unisa 2007:41.) Figure 2 outlines the broad field of the study.

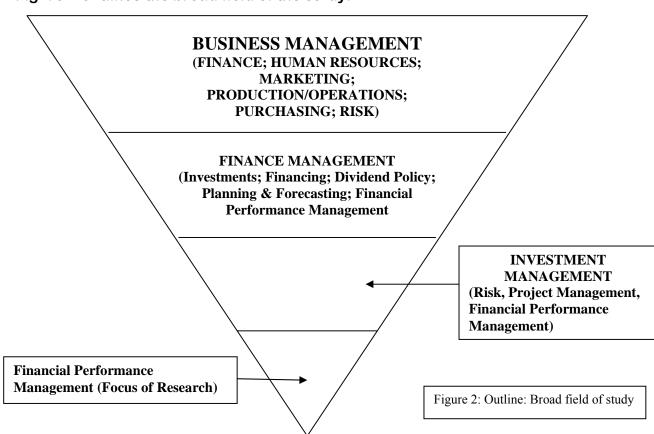


Figure 2 is derived from the following sources: Unisa (2007:41), Amling (1984), and Moyer, *et al* (1984:4). An untitled article provided the frame.

The focus of this study is on financial management, a sub-discipline of business management. Financial Management is the art and science of managing finance (Gitman: 2000:2). It comprises various fields, that is, investment management, financing, dividend policy, planning & forecasting, financial performance management etc. The specific field of this study is investment management, with sub-disciplines such as risk analysis, project management, investment/financial performance management etc. In this research study, the focus is on financial performance management – as a sub-discipline of investment management. More specifically, the focus is on the analyses of the financial position of firms. Figure 3 depicts the area of the research, starting with the parent discipline,

Figure 3 depicts the area of the research, starting with the parent discipline, moving to the immediate discipline of the research, the target population; research studies done previously; and the research questions not resolved from the to arrive at a conclusion on the research problem, this chapter reviews the relevant literature. This is necessary for the following reasons:

- ♦ To give background on the subject of the research study by reviewing the literature on the parent discipline (financial management) and its subdisciplines, with more depth on the sub-discipline of investment
- THE PRESENTE THE discussion on investment management and its performance management by exploring the arsenal of financial measures that is available in the literature. This covers a review of accounting data ratio analysis and the bankruptcy prediction models (defined in Chapter 1).

- ♦ To further explore the available arsenal of financial measures by reviewing the measures applied in the media surveys for the determination of the Top Companies.
- ♦ Lastly, the financial measures applied by the Top Companies as 'highlights' form part of the available arsenal. These are also reviewed in this chapter. The 'highlights' measures are also an important element towards finding a conclusion on the research problem.

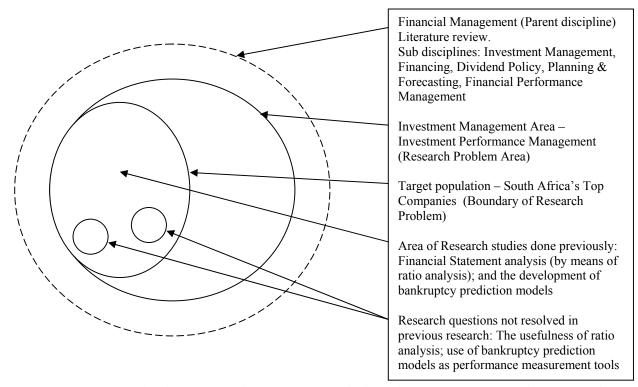


Figure 3: Pictorial: The parent discipline, its sub-discipline in relation to the research problem area, the target population, the research study area and the research Source: Designed from an untitled article

The chapter ends with a conclusion.

'Old' literature forms part of the review for two purposes: as historical background on the development of a specific subject, and where the statements made are still valid today. Old literature has also provided definitions that still hold today.

2.1. Financial Management

The word 'finance' is defined as the "art and science of managing money" (Gitman 2000:2). Any organisation, whether large or small, whether profit seeking or not, whether government or non-government, has finance as its driving force (Moyer, *et al.* 1984: 4). The success or failure of an organisation depends therefore, on how well its finances are managed. Individuals, like organisations, also earn or raise money on the one hand, and, on the other hand, spend or invest (shareholding) the money. (Gitman 2000:2.)

Financial management has various interdependent fields. Only two of the fields merit discussion. *Planning and Forecasting* may be seen as the initial field – where plans are drawn and financial requirements are determined (budgeting). The plan and forecasts spell out the source of funds (financing – this may include equity and loans), as well as how these funds are to be applied. The application of funds may have an allocation for investment (plant, machinery, cash holdings etc). The planning and forecasting may also provide for a dividend policy – a blueprint on dividends. The plan and forecasts form the basis of financial management, including, the interval of financial performance management reports. These activities, described as financial management, maximise the value of the firm. (Weston & Copeland 1986:3.)

Another field is *Investment Management*, which is the research problem area of this study.

2.2. Investment Management

Investment is the "purchase by an individual or institutional investor of a financial or real asset that produces a return proportional to the risk assumed over some future investment period" (Amling 1984: 3). In this research, the subject of investment is a public company. Both individuals and institutions may hold shares (invest) in public companies. As pointed out by de Wet and du Toit (2007), "a listed company operates for the benefit of a large number of shareholders". The law requires that every company (public or private, listed or not listed) must appoint external auditors [section 269 of the Companies Act, no. 61, 1973 (as amended by the Corporate Amendment Act, no. 24, 2006)]. Section 300 of the Act spells out the duties of the auditors. The section also deals with the auditors' duty of ensuring that the financial statements "fairly present the financial position of the company ..., in conformity with generally accepted accounting practice..." Shareholders and any interested party have other avenues that provide information on the financial state of public companies. There are rating agencies, which, from time to time, formulate opinions after conducting a "full investigation" with the co-operation of management (ca-ratings). Profile Media publishes 'Profile's Stock Exchange Handbook' (SE Handbook), biannually, incorporating 'The JSE Handbook'. The SE Handbook contains information on all JSE listed companies". I-Net Bridge also assists companies by delivering solutions tailored to meet a client's "specific business requirements". (Profile' Stock Exchange Handbook 2004.) Accounting data is the basis for financial performance measurement. However, monetary values are not the only measures of performance

(Bernstein (1974:5). The components of the parent discipline (Business Management), have their own performance measures (Le Roux 2004:1).

The literature review is discussed in five sections: investment management and its embedded problems; financial statements analysis and interpretation (ratios); bankruptcy prediction models; and the annual surveys on Top Companies done by the *Sunday Times Business Times* and the *Financial Mail*. Lastly, a discussion on the Top Companies' financial performance measures concludes the review. The last four sections cover an exploration of the arsenal of financial measures that is available and in use.

The literature review sets the scene and develops the research problem with the view to arrive at a conclusion.

2.2.1. Investment management and its 'embedded' problems

2.2.1. (a) Company 'governance' and 'management'

The 'governance' and 'management' of public companies poses investment management challenges to investors. Companies are 'governed' by a Board of Directors, which, in terms of its fiduciary duty, is responsible for the governance of the company, i.e. policy. The Board delegates the day-to-day running of the company to management. The latter becomes responsible for carrying out the policy as decided by the Board. Generally, the shareholders do not have an active part in the management of the company. The window of control available to the shareholders is limited to the exercise of their voting powers at annual general meetings. (Loriaux 1986:74.) However, directors

may also hold shares (become shareholders) in terms of sections 211 and 213 of the Companies Act as amended.

Obviously, the owners of a company (the shareholders) rely, largely, on the governance competency of the Board as well as the competency of management. Investment in shares (ordinary shares in particular) has, as one of its features – inconsistent earnings, lack of price stability, and variable returns. These features create substantial risk. (Amling 1984:174.) In addition to these features, the shareholder has to contend with agency problems – defined as "the divergence of interests that arises between principal and agent" (Weston & Copeland 1986:6). The principal would be the shareholders, and agent would be the management. The shareholders (be it an individual or an institution) are therefore, continuously at risk with their investment.

The agency problem, which attracts costs, places great importance on investment performance management. The agency costs may take different forms, i.e. costs towards systems intended to monitor managerial actions, re-structuring costs from time to time, auditing systems, lost opportunities because of limited managerial delegations etc. (Brigham & Capenski 1991:20; Weston & Copeland 1986:6.)

2.2.4 (b) Managarial Ability

2.2.1. (b) Managerial Ability

Managerial ability has a major effect on business failure. The underlying reasons may range from banks lending to projects that are not viable to inexperienced borrowers (Hemraj 2004:1).

Managerial incompetence is generally seen as the major cause of failure (Altman (1993:17). A turnaround consultant found that the quality of management was identified by 88% of the respondents as the major contributing factor to either success or failure (Altman (1993:17). There is obviously little that can be done about poor management except to take steps towards replacement as soon as the problem is identified, to save the firm (Altman (1993:17), who emphasises poor practices by lenders, proposes that lenders, who rely solely on guarantors rather than viable propositions, should be penalised.

2.2.1. (c) The reliability of financial reports

2.2.1. (c) (1) Accounting data

Accounting data is considered to be "central to the process of investment decision making" by many groups of market participants (Saville 2004:505). In the face of this importance, Saville (2004:504) points out that the exposure of accounting irregularities and frauds has been on the increase. He further states that evidence gathered internationally shows that the "number and size of companies restating financials to disclose accounting irregularities and frauds" has been increasing with the passage of time.

Saville (2004:510) suggests that as a first step, the management of companies must "set" a "tone of accurate, reliable and responsible reporting".

2.2.1. (c) (2) Interval of external audits

Generally, once a year, external audits are undertaken. Although interim financial statements are prepared half-yearly, it would appear that interim audit reviews are not necessary for all companies (Botha 2000:2). Although the current status is not clear, Botha 2000:2 points out that, in terms of requirements, if there is "a disclaimer of opinion or an adverse opinion" regarding the audit report of a listed company, the "subsequent un-audited interim report" should be reviewed by the company's auditors.

While the South African Shareholders Association has favoured a "review" of interim results by external auditors, some fund managers, on the other hand, have expressed doubts on whether or not an audit non-review of the interim results could influence investment decisions (Botha 2000:2).

Due to these conflicting views, research has questioned the effectiveness of communication to the users of the interim results on the external auditors' involvement (Botha 2000:2). One researcher found that auditors, company secretaries, accountants and shareholders are of the opinion that assurances given in a review report are of a lower level than those of an audit report (Botha 2000:4) concludes that "it is generally accepted" that company interim financial statements convey information that is useful to different stakeholders for decision-making. Botha (2000:8) proposes that future research in this regard is required in South Africa, and that studies on auditor reviews done in other countries could contribute to the "global perspective" on the subject.

2.2.1. (d) Business Failure

Despite the legal regulatory mechanisms. and business failures/bankruptcies continue to send shock waves through the business RWB9 Withg June 2001, that the Reserve Bank took over the management of Regal Treasury Private Bank (Regal) due to financial difficulties. At the end of April of that year, the company's results for 2001 were ready for publication. Two days before the Reserve Bank took-over, the auditors of Regal withdrew their consent for the publication of the results, based on "new information that has come to their attention". (Brand 2001.) Other cases are Masterbond (Masterbond saga 1983-2005), Leisurenet (Theobald 2002) and Saambou Bank (BankGate). The number of bankruptcies tabled in Chapter 1 illustrates the size of the problem. South Africa is not alone, similar occurrences have taken place in other parts of the world, i.e. the demise of Enron, Kmart and Global Crossing (Graczyk 2006; Theobald 2002.)

2.2.2. Financial Statements Analysis and interpretation

Cilliers (1967:14) points out that there are "inferences" that can be drawn from the financial statements. He points out that some measure of comparison with actual results is necessary to make inferences. Cilliers (1967:15) suggests that the simplest and feasible measure of comparison is ratio inferences because the relevant information is usually readily available. The ratios are computed from the financial statements (defined as a systematic synopsis of financial history) of an undertaking (Cilliers 1967:11).

Therefore, ratios facilitate the analysis and interpretation of financial statements.

The financial statements have value if the information they carry is useful to the intended reader. Such information would be on the financial performance of an organisation over an immediate past period. (Cilliers 1967:11.) There are a number of users of the information: the owners (who need to know how their investment is doing); management (as the drivers of the investment company, they should be on their toes at all times to ensure that matters are going well); the lenders (they need to satisfy themselves that the default risk is low); and the Receiver of Revenue (for tax assessment purposes). (Cilliers 1967:11.) However, the information covered in the financial statements has value and meaning if "a prudent analysis and interpretation of those statements" is possible (Cilliers 1967:12).

Ratio analysis and interpretation facilitate the identification of an organisation's major strengths and weaknesses. The ratios would depict important aspects such as to meet obligations:

- an accounts receivable collection period that is in line/not in line with the credit terms; and
- the efficiency level of the inventory management policy; and the capital adequacy relating to plant, property, equipment, and capital structure. These aspects are necessary if the firm is to achieve the goal of maximising shareholder wealth.

(Moyer *et al.* 1984:152.)

2.2.2. (a) Problems with Ratio analysis and Interpretation

The provision of the required information in the financial statements makes a prudent analysis possible (Cilliers 1967:12). Problems in this area relate to aspects such as the determination of 'cost of goods sold' where stock valuation may differ from one firm to another, and the different methods of calculating depreciation (Moyer *et al.* 1984:150). Unless information on these aspects is made available in the financial statements, the analysis may not be meaningful. Despite having all the information, ratio analysis still poses problems. Gitman (2000:128) contends that it is only when a group of ratios is assessed that reasonable judgement can be made on the performance of a firm. In other words, he is of the opinion that, generally, a single ratio does not give sufficient information to be able to make reasonable judgement on all aspects of a firm's financial position.

Other writers support this view, pointing out that the interpretation of results of ratios poses a problem, in that some ratios may look good while others may look bad (Brigham & Capenski (1991:908). Another view, in the same breath, is that traditional financial ratio analysis looks at only one ratio at a time and then relies on the analyst to form a judgement about the overall financial profile of the firm (Moyer *et al.* (1984:177).

The interpretation of a ratio such as return on equity (ROE) needs careful thought. This ratio is described by de Wet and du Toit (2007:59) as "one of the all-time favourites and perhaps most widely used overall measure" of the financial performance of corporate bodies. The appeal of ROE is that it links the income statement (earnings) to the balance sheet (equity) (de Wet & du

Toit 2007:60). Despite this appeal, de Wet and du Toit (2007:60) bring to light the following flaws of the ROE:

- ♦ Changes in accounting policy can lead to the manipulation of earnings under the guise of the framework of Generally Accepted Accounting Practice (GAAP).
- ♦ ROE is calculated after the debt costs, but before accounting for the cost of own capital or equity.

Another critical view is given by Eidleman (1995) who points out that those who advocate the use of statistical models argue that the 'failure prediction models' are "more precise and lead to clearer conclusions than a mass of TARTERISO PLISTIVE notes on ratio analysis and interpretation.

2.2.2. (b) Positive Notes on Ratio Analysis and Interpretation

Altman (1968:589) states, "Since attacks on the relevance of ratio analysis emanate from many esteemed members of the scholarly world, does this mean that ratio analysis is limited to the world of 'nut and bolts'?" He goes further to propose that, instead of severing the link between traditional ratio analysis and the statistical techniques, bridging the gap is the way to go.

On the usefulness of financial ratios, Moyer et al. (1984:153) propose that:

- Despite the ratios commonly found in literature, the scope for the development of many other ratios is wide.
- The interpretation of a ratio needs careful consideration for the determination of areas of strengths or weaknesses. The examination of other related information is crucial.

 Industry standards are important in the interpretation of ratios, i.e. for comparative purposes. Organisations may also formulate their own standards.

2.2.2. (c) Ratios, their Analysis and Interpretation

In addition to ratios commonly found in literature, there is wide scope for the development of various other ratios (Moyer *et al.* 1984:153). In this research, the discussion is on the more commonly used ratios (both theory and practice), but it is not in detail.

Over the decades, ratios were classified into four groups (Moyer *et al.* 1984:154). Further developments have resulted, amongst others, in the Du Pont System of Analysis (McLeary 1992:204).

2.2.2. (c) (1) Classification of Ratios

The commonly used ratios are set out in a matrix per Table 1. The matrix classifies the ratios into four categories per the source literature as shown at the foot of the table. The interpretation of ratios may not be as simple as it may appear per the formulae in Table 1. Gitman (2000:135) suggests that two firms may have a similar Current Ratio, but that a closer look at the composition of the 'Current Assets' may reveal a completely different picture. He compares the situation of two companies – One with only one current asset: Inventory;

♦ The other with a spread of four current assets: Cash, Receivables, Marketable Securities, and Inventory.

If, in the first case, the inventory has a slow turnover, the second company would have better liquidity because of its holdings of cash and marketable securities.

The quality and adequacy of information in the financial statements are important for good analyses. Adequacy of the information facilitates the verification of various items, such as the provision for bad debts (Cilliers (1967:16). The assessment of the quality of the financial statement items is important for near reliable analyses (Cilliers (1967:16; Gitman 2000:135).

The one ratio that has become prominent is Earnings per Share (EPS). Due to its wide use, its calculation is included in GAAP to ensure uniformity. (Everingham 2005:7:1.)

Other ratios, over and above those per Table 1 are suggested in the article '15 Suggested Ratios to regularly Monitor' (February 2006):

Sales	Monitoring sales from one period to the next	
Profitability:		
Operating expenses as a % of Sales	Calculated as: Operating expenses/Total Sales	
Personnel Productivity:		
Payroll as a % of Total sales or Gross Profit.	Salaries, Bonuses, Commissions paid/Total Sales	
Average Gross Profit per employee	Gross profit in Rand/Total full time employees	
Leverage:		
Total Assets to Equity	Total Assets/Total Equity	

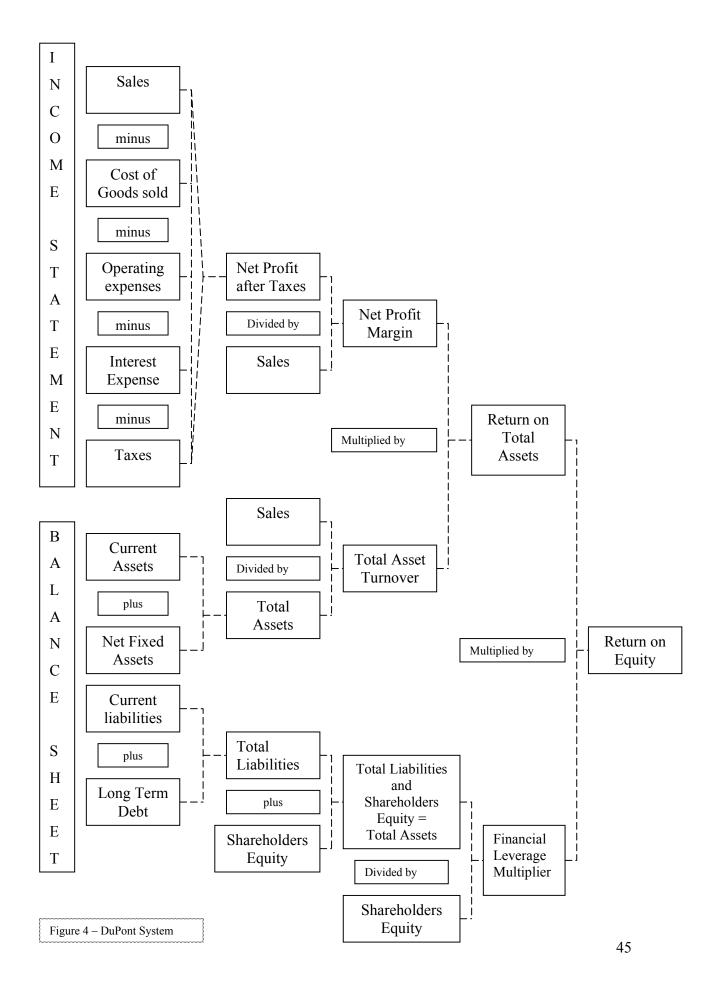
RATIOS AND THEIR CLASSIFICATION	EXPLANATORY NOTE	FORMULA
LIQUIDITY: Current Ratio Acid Test Ratio Defensive Interval Measure (not a common ratio)	The ability to meet short term obligations Measure of firm's ability to meet short term Shrigation Current Ratio but excludes Inventory Estimates the number of days the defensive assets could cover the projected daily operating expenditures	Current assets/Current Liabilities (Current assets – Inventory)/Current [Calsilities s short term marketable securities plus receivables)/(Projected daily operating expenditures less non-cash items).
LEVERAGE RATIOS/DEBT MANAGEMENT: Degree of debt - Total Debt/Total Assets Debt to Equity	The extent of debt in relation to total assets The extent of debt in relation to equity Proportion of Assets funded by debt Proportion of debt in relation to Equity	Total Liabilities/Total Assets Total Debt/Total Equity
Ability to service debt - Times Interest Earned Fixed Charge Coverage	Measure of ability to meet debt payments on due date Measure of ability to meet debt interest payments Measure of ability to meet fixed payment obligations	[Earnings before Interest & Taxes [EBIT]]/[ilistbeess] Payments]/[Interest plus Lease Payments plus (Principal Payments plus Pref Share Div) x [1/(1-T)]
Cash Flow Coverage	Measure of cash-inflows in relation to preferred outflows	[EBIT plus Lease Payments plus Depreciation]/[Fixed Charges plus (Pref share Div/(1-T)) plus (Debt repayment/(1-T))]
ACTIVITY RATIOS/ASSET MANAGEMENT	The measure of effective utilization of resources (Assets)	
Inventory Turnover Average Collection Period Fixed Asset Turnover Total Assets Turnover	The rate at which Inventory is converted into sales A measure of collection period in number of days A measure of efficiency of Fixed Assets to generate sales	Cost of goods sold/Inventory Accounts Receivable/Average credit Sales Bates/Allet Fixed Assets Sales/Total Assets
PROFITABILITY	A measure of how effective the firm is managed – a combined effect of the other three ratio classifications	
Gross Profit Margin on Sales Profit Margin on Sales Return on Total Assets Return on Net Worth Earnings per Share (EPS) Price/Earnings (P/E) ratio	A measure of gross profit in relation to sales A measure of profit after 'all expenses' on sales A measure of the return on Investment A measure of return on the owners' investment A measure of 'per share' profit available to owners An appraisal of share value for each R1 of earnings	Gross Profit/Sales Net Profit after Taxes/ Sales Net Profit after Taxes/Total Assets Net profit after tax/Shareholders' Equity Profit available to owners/No. of issued Market price per Ordinary share/EPS

Table 1 – Commonly used Ratios. Source: Brigham, et al. 1991:874; Gitman 2000:132; Moyer, et al. 1984:155; Weston, et al. 1986:178; Foster 1978:29.

2.2.2. (c) (2) The DuPont System of Analysis

The system dates back to the 1920s. Its premise is that each financial ratio is a combination of at least two other ratios. Today's system has significant improvements. (McLeary 1992:204,206). McLeary (1992:204) points out that the system is "simplistic and rather mechanical", and that even though it does not "always provide all the answers", it is the "most logical way of tackling an analysis" the income statement and balance sheet into two summarised measures of profitability. The measures are the return on total assets (ROA) (income statement), and total assets to shareholders' equity (balance sheet). The combination of the two measures gives rise to return on equity (ROE). (Gitman 2000:147.) The remarks on the flaws of ROE by de Wet and du Toit (2007:60) are borne in mind. The Du Pont system is best described by means of a diagram (Figure 4) adopted from Gitman (2000:148). As illustrated per Figure 4, the first step of the system is to compute, from the income statement, the net profit margin on sales (the profitability on sales). The total assets turnover (measure of efficiency in the use of the assets to generate sales) is then calculated. The multiplication of the two ratios gives rise to a return on total assets (ROA). (Gitman 2000:147.)

The second step is the computation of the financial leverage multiplier (FLM) - total assets divided by equity. The use of FLM is preferred to the use of the debt ratio purely for the convenience of computation, and is equivalent to 1/(1-debt ratio). The final ratio, i.e. return on equity, is ROA multiplied by FLM. (Gitman 2000:149.)



In summary, four writers, together with their co-writers (Brigham, et al. 1991:874; Gitman 2000:132; Moyer, et al. 1984:155; and Weston, et al. 1986:178) have a similar classification of ratios applied to analyse financial **Biaman**, tet al. (1991:888); Gitman (2000:147); McLeary (1992:204); Moyer, et al. (1984:171); and Weston, et al. (1986:228) recommend the DuPont System of Analysis as a useful tool.

2.2.2. (d) Ratio analysis and the first research question

The views expressed by the different writers on ratio analysis should form the basis for providing a conclusion on the research question: 'Is ratio analysis and interpretation useful as a financial performance measure?'

2.2.3. The Bankruptcy Prediction models

Having discussed, amongst other things, the shortcomings of financial ratio analysis, Shim (1992) suggests that to overcome the shortcomings, it is necessary to combine "mutually exclusive ratios into a group to develop a meaningful predictive model". Shim (1992) cites the regression analysis and the multiple discriminant analysis as the statistical techniques used so far. Shim (1992) is referring to the bankruptcy prediction models.

Altman (1993:4), in defining corporate distress, points out that there are governor terms that are commonly found in literature." These are failure, insolvency, default, and bankruptcy. He states that, though the terms are sometimes interchangeable, they differ distinctly in their formal usage. He

discusses the different uses of the terms, which embody the different stages of distress of a firm, with bankruptcy (defined as a state where the total liabilities exceed a fair valuation of total assets) being the end. The Dun & Bradstreet definition of failure, as given by Altman (1993:4) is, business failure relates to "businesses that cease operation following assignment or bankruptcy". The use of the term failure is frequent in this report. The intended meaning is the Dun & Bradstreet definition.

Predicting the future, or more specifically bankruptcy, may not be an easy task. Ohlson (1980:111), who has developed one of the prediction models, states: "However, one might ask a basic and possibly embarrassing question: why forecast bankruptcy? This is a difficult question, and no answer or justification is given here". Further, Ohlson (1980), attempting to justify how difficult this question is, states: "Existing empirical studies reflect this problem in that there is no consensus on what constitutes 'failure', with definitions varying significantly and arbitrarily across studies."

However, Foster (1978:460) notes that one of the compelling reasons for predicting "financial distress" is because of public policy issues. The regulatory bodies established to monitor organisations such as insurance companies, banks, pension funds etc, might find it worthwhile to make use of there are other distress aspects, which may individually or collectively, lead to bankruptcy, the proposed meanings of the terms (as above) are not relevant as these relate mainly to the usage in America.

The usefulness of the models depends largely on the availability of information, as well as the process of calculation. Today, with the availability of computers, computations are no longer a problem. (Bankruptcyaction.) The availability of information, per the requirements of the different models, still makes the use of the models cumbersome. The samples selected for the development of the models was public companies because accounting data in these instances was readily available. (Altman (1968:609.)

Some writers point out that the problem with the models emanates from the difficulty in calculating results. This, in turn, is the result of lack of appropriate and easily available data. These writers also point out: "Some Words of Caution! All developers of prediction models warn that the technique should be considered as just another tool of the analyst and that it is not intended to replace experienced and informed personal evaluation". The writers suggest that the use of the models require application as performance measures, where, the identification of problems in good time, could lead to the correction of the problems. In so doing, the company may continue as a going concern. (bankruptcyaction.) Altman (1993:179), explaining that the Z-Score model is easy to understand and to apply, states: "Analysts only need a recent balance sheet, income

Altman (1968:609) explains the combination of ratios as a multivariate framework, which brings about greater statistical significance than the common technique of sequential ratio comparisons.

statement, a stock price (for a publicly held firm), a hand-held calculator, a

piece of paper, and about 10 to 15 minutes to calculate a firm's Z-Score.

Studies on business failure date back to Smith and Winakor (1935) and Merwin (1942). Later studies were done by, to name just a few, Beaver (1966), Altman (1967), Blum (1974), Edmister (1972), Deakin (1972, 1977), Wilcox (1971), Altman, Haldeman, & Narayanan (1977), Scott (1981), and Phis Contribution by South Africa's researchers in this field includes models developed by Daya (1977); De la Rey (1981); Amiris, Ashton *et al* (1978), Vietri (1979), Le Roux (1980), Immelman (1980), Hamman and Smit (1991), Garbers and Uliana (1994) (Truter1996:14); Strebel and Andrews (1977), Court *et al* (1999), Lukhwareni (2005) (Naidoo 2006:3); and Naidoo (2006).

The literature review, therefore, covers a discussion of some of the 'popular' bankruptcy prediction models. This includes comments by various writers on the usefulness of the models, as well as comparative studies on the use of the models developed over the years fall under different approaches. Jones (2002) classifies the models as follows:

- Univariate a single factor (or ratio) was important in predicting failure. Beaver (1966), described as one of the earliest researchers used this approach.
- Matched-pair Multi-discriminate where a sample of bankrupt and non-bankrupt firms is used. Most of the traditional models used this approach. An example under this classification is Altman's Z-Score (1968).
- Logit where an estimate is made of the maximum likelihood of bankruptcy leading to a probabilistic prediction. One example of this approach is that used by Ohlson (1980).

- Gambler's Ruin The principle of the approach is that bankruptcy
 is probable when a company's net liquidation value
 (NLV) becomes negative. The contributor to the
 development of this type of model is Wilcox (1971).
- Artificial Neural Networks (ANN) the approach applies computers
 constructed to process information in almost the same
 way that the human brain processes information. The
 ANN, developed in 1990, has been in use ever since.

The classification facilitates the discussion of the models. The discussion of the Beaver, Altman, and Ohlson models is in some detail, while some of the other models are touched on briefly. Jones (2002), in his classification, does not cover the South African models. The Daya model is discussed briefly (univariate classification), while the De la Rey model is discussed in some detail under the Matched-pair Multi-discriminate classification. Amongst the South African models, this model is "notably the most comprehensive study" (Truter 1996), hence its discussion in some detail.

Recently, Naidoo (2006) developed a predictive model he termed the Financial Risk Analysis Model (FRAM). This is based to a large extent on the multi-state models of Lau (1987) and Ward (1994) (Naidoo 2006). FRAM is a four-state model, that is, it predicts the states of companies on four levels. A brief discussion of this model is included.

2.2.3. (a) The Univariate Models

Beaver (1966), developed a model of this type some forty years ago. The developer, nonetheless, makes valuable observations, which are still prevalent today. Secondly, the Beaver (1966) model serves as a milestone in the development of the bankruptcy prediction models. Daya (1977) developed a model similar to that of Beaver (1966), but this was intended for South African conditions. The discussion of the Daya (1977) model highlights the deviations from the Beaver (1966) approach.

2.2.3. (a) (1) Beaver Model

Beaver (1966:71) makes an interesting opening statement, that in the early 1900s, ratio analysis was still in an undeveloped stage. He traces the history, and notes that the analysis started with the current ratio, having been cited in the literature as early as 1908. This was a single ratio applied for a single purpose - the evaluation of credit-worthiness. He notes further that the development of ratio analysis during the 1960s involved the use of several ratios by different users for different purposes - including credit lenders, credit rating agencies, investors, and management. Despite the wide use of ratio analysis at the time, their practical and formal usefulness were not tested (Beaver 1966).

Beaver (1966:72) bases the objective of his study on the usefulness of ratio analysis. He sums this up as follows: "The ultimate motivation is to provide an empirical verification of the usefulness (i.e. predictive ability) of accounting data (i.e. financial statements)."

The population for the study was drawn from publicly owned corporations, both failed and non-failed. The sample consisted of 158 firms: 79 failed- and 79 non-failed firms. Even though both failed and non-failed firms were included in the sample, this was not for the purpose of paired analysis. It was for the purpose of a 'profile analysis' – this is defined as a comparison of the mean values of the two groups. Profile analysis is "not a predictive test", but "merely a convenient way of outlining the general relationships between the failed and the non-failed firms" (Beaver 1966:79).

Beaver (1966:71) defines failure as "the inability of a firm to pay its financial obligations as they mature. Operationally, a firm is said to have failed when any of the following events have occurred: bankruptcy, bond default, an overdrawn bank account, or non-payment of a preferred stock dividend." In the discussion on the Beaver (1966) model, failure means bankruptcy.

Thirty ratios are classified into six groups to test their usefulness. These are calculated for a five-year period (prior to failure) on the sample. The groups of ratios are made up of: Cash Flow (four ratios); Net Income (four ratios); Debt to Total Assets (four ratios); Liquid Asset to Total Assets (four ratios); Liquid Assets to Current Debt (three ratios); and Turnover (eleven ratios). The criteria selecting the thirty ratios are —

 Popularity based on frequent appearance in the literature. Beaver (1966:78) notes: "It will be interesting to see the extent to which popularity will be self-defeating – that is, the most popular ratios will become those most manipulated by management (an activity known as window dressing) in a manner that destroys their utility".

- Ratios that performed well in one of the previous studies based on consistency.
- Ratios defined in terms of a cash-flow concept because the ratios
 "offer much promise for providing ratio analysis with a unified
 Although 30 ratios are calculated, the focus for analysis is only one ratio
 from each group (a total of six ratios). The selection criterion is the lowest
 percentage error for their group over a five-year period. The six ratios are

Cash flow to total debt;

Net income to total assets;

Total debt to total assets;

Working capital to total assets;

Current ratio and

No credit interval [defensive assets (cash plus accounts receivable) minus current liabilities for funding operations expenditure].

The data analysis is on three levels: a comparison of mean values; a dichotomous classification test; and an analysis of likelihood ratios.

2.2.3. (a) (1) (i) Comparison of mean values

The calculation of the mean of the ratios covers the failed firms as well as non-failed firms. The comparison is on profile analysis – the outlining of the general relationships between the failed and the non-failed firms.

Beaver (1966:80) describes the firm as a reservoir of liquid assets, the inflows (increases) and the outflows (decreases). He proposes that the probability of success or failure of a firm is evident from the following:

• "The larger the reservoir, the smaller the probability of failure."

- "The larger the net liquid asset flow from operations (i.e. cash flow), the smaller the probability of failure."
- "The larger the amount of debt held, the greater the probability of failure."
- "The larger the fund expenditures for operations, the greater the probability of failure."

The observations are that the failed firms have lower cash flows and a smaller reservoir of liquid assets than non-failed firms. A further observation is that, even in the face of less ability to meet obligations, the failed firms tend to incur more debt than the non-failed firms. However, it is noteworthy that the difference in assets size between the failed and non-failed firms is not perfect for the purpose of mean comparisons.

As noted by Beaver (1966:83), the limitations of the profile analysis are that it "can demonstrate that a difference between failed and non-failed firms exists", but that "it cannot answer the crucial question: How large is the difference?" He states further: "The profile concentrates upon a single point on the ratio distribution – the mean. Without the additional knowledge of the dispersion about that point, no meaningful statement can be made regarding the predictive ability of a ratio." Beaver (1966:83) concludes that the discussion on profile analysis "suggests that some sort of predictive test is needed".

2.2.3. (a) (1) (ii) Dichotomous Classification Test

This test predicts the failure status of a firm, based mainly on the "knowledge of the financial ratios". The test is intuitive. The data of each ratio is arrayed, and each ratio is "visually" inspected to find an optimal cut-off point – a point

that will minimise the proportion of incorrect predictions. If a firm's ratio is below the cut-off point, the firm is classified as failed, or vice versa. The procedure is followed for each of the thirty ratios. The process of determining the cut-off point is one of trial and error, possibly a personal judgement based on what an individual (with the knowledge of ratios) would regard as reasonable or not reasonable. (Beaver1966:83-84.)

For this test, the sample is randomly divided into two sub-samples, with a cut-off point determined for each. The organisations in each of the sub-samples are then classified in terms of the cut-off points. The classifications are then compared to the actual status of the firms, i.e. failed or non-failed. The proportion of misclassifications to correct classifications is then taken as a "crude index of predictability" on the premise that, the smaller the error, the higher the degree of predictive ability in the test. (Beaver 1966:84).

In terms of the model, and based on the percentage error, the 'Cash-flow to Total debt' ratio has a smaller percentage error. Beaver (1966:85) observes that the expected percentage error would be approximately 50%. For this reason, he concludes that the 'Cash-flow to Total assets' ratio is the single most important factor to consider in predicting failure.

Beaver (1966:91) points out limitations of the classification test: if a ratio is far removed from the cut-off point, there would be more confidence in the prediction than if it were close. In other words, the size of the ratio can also provide important information regarding the probability of error.

The intuitive approach in determining the cut-off points is subjective and may result in different analysts coming up with different cut-off points.

2.2.3. (a) (1) (iii) Analyses of Likelihood Ratios

Beaver (1966:91) points out that, drawing from the model, financial ratios are tools for assessing the likelihood of failure. On the other hand, the problem of predicting failure is an approach for assessing the probability of failure, depending on the value of the ratio. The formula is given as P(F/R) (Beaver (1966:96), and is defined as the likelihood estimate (explained further below). Beaver (1966:91-98) illustrates the likelihood ratios by deriving them from financial ratios by means of histograms. The values of the financial ratios are depicted on the horizontal axis, while the vertical axis indicates the relative frequency of class intervals of financial ratios of failed or non-failed firms. The likelihood estimates, i.e. the frequency levels on the histogram, represent the distributions of the 'heights' of the failed firms [P(F/R)] and non-failed firms [P(F/R)] at a given value of a financial ratio. The likelihood ratio then becomes the ratio of the two heights. A brief example may illustrate the calculation. The cash flow/total debt ratio, which was more 'useful' in the other two data analyses, is used for the development of the histogram. For the first year before failure, the likelihood estimates for the ratio interval .0 to .1 are .18 (failed firms – P(F/R)) and .11 (non-failed firms - $P(F/\bar{R})$). To calculate the likelihood ratio, .18 is divided by .11, giving rise to 1.64. (Beaver 1966:98).

The relationship between the likelihood ratio and the financial ratio either increases or decreases in value consistently. That is, the higher the financial ratio, the lower the likelihood ratio. The interpretation is that, the higher the likelihood ratio, the stronger the likelihood that the firm will fail. Conversely, the lower the likelihood ratio, the more likely it is that the firm will not fail.

Beaver (1966:98) Beaver (1966:98) does not point out any shortcomings of this approach. Bearing in mind the shortcomings pointed out under the two other approaches, i.e. Comparison of mean values and the Dichotomous Classification Test, it would appear that he regards the Analysis of Likelihood Ratios as a predictive test.

2.2.3. (a) (1) (iv) Overview of the model

The literature says little about this model except that it set the scene for the development of multivariate analyses by Altman and others (Altman 1966; Jones 2002).

2.2.3. (a) (2) Daya Model

Daya (1977) conducted a study on Financial Ratios as Predictors of Corporate Failure. The study was based on the approach by Beaver (1966). The conclusion was that ratios need to be applied with discretion because "not all ratios predict equally well" and that "the ratios do not predict failed and non-failed firms with the same degree of success" (Daya 1977:106(b).

Daya (1977:6) also points out that the Z-Score model of Altman (1968), although an improvement on the model by Beaver (1968), is a poorer indicator of bankruptcy for a period of more than two years. This however, is

not a new observation since Altman (1968) in his tests, concluded that the predictive ability of the Z-Score model was weak for periods of two years and longer. For this reason, Altman, Haldeman and Narayanan (1977), undertook an improvement of the Z-Score model by developing the Zeta® model (also discussed in this chapter.

Daya (1977:7) further observes that the use of the Z-Score model by "companies in other economies is not likely to succeed". Daya (1977:7) gives part of the problem as the "American weighting factors" in the model, and the manner in which the factors were determined.

De la Rey (1981:26) suggests, as a solution, that the model should be adjusted to ensure the same success as in other countries. While it is not clear what the areas of adjustments should be, it would seem that the problem revolves around the presentation of financial statements, i.e. the omission of turnover, and other items in the financial statements of South Africa's companies at the time (De la Rey 1981:60).

2.2.3. (b) Matched-pair Multi-discriminate Models

Following on Beaver's model, Altman (1968) developed a model which he labelled the Z-Score. He intended to improve on the models that had previously been developed. He felt that the methodology of the models was 'essentially univariate in nature" with "emphasis placed on individual signals of impending problems". He chose the multiple discriminant analysis (MDA) as the appropriate statistical technique. (Altman 1968:591.) Although the Z-Score was developed during 1968, it has been kept alive with updates.

During 1977, a revised model was developed. Altman, Haldeman, and Narayanan and ZETA Services, Inc. (a private financial firm), teamed up to construct a second generation model with several enhancements to the original Z-Score model. Recently, Altman (2000) "revisited" both models.

Both models fall under MDA. Altman (1968:591) defines MDA as "a statistical technique used to classify an observation into one of several *a priori* groupings dependent upon the observation's individual characteristics. It is used primarily to classify and/or make predictions in problems where the dependent variable appears in qualitative form, i.e. male or female, bankrupt in non-bankrupt". The first step is to have explicit group classifications of two or more. The following step is to collect data for the objects in the groups, and then to derive a linear combination of the characteristics "which 'best' discriminates between the groups". (Altman 1968:592.) The process should become clearer in the discussion of the models.

The De la Rey model falls under the MDA umbrella and is also discussed.

2.2.3. (b) (1) The Z-Score Model

As this model has been up-dated, the original format is discussed as background, followed by a discussion of the model up-dates.

2.2.3. (b) (1) (i) The original model

The sample consist of two groups: thirty three bankrupt firms and thirty three

non-bankrupt firms. Both groups are manufacturers, with the bankrupt firms having filed a "bankruptcy petition under Chapter X of the (American) National Bankruptcy Act during the period 1946 to 1965". The non-bankrupt firms were still in existence in 1966. To make the derivation of a linear combination possible, the two groups fall within specified asset size ranges. The data are financial statements (Balance Sheet and Income Statement) of the companies in the sample. (Altman 1968:593.) Based on the indicators of corporate problems in previous studies, twenty-two ratios are evaluated. These are grouped into five categories, that is, liquidity, profitability, leverage, solvency and activity ratios. The selection of the ratios is based on popularity in the literature and potential relevancy to the study. In addition, "a few 'new' ratios are initiated". Drawing from the twenty-two ratios, five are selected based on 'suitability' to predict corporate bankruptcy. In determining the final profile of variables (ratios), the following tests were undertaken –

- the following tests were undertaken –
 "observation of the statistical significance of various alternative functions, including determination of the relative contributions of each independent variable;
 - "evaluation of inter-correlations among the relevant variables;
 - "Observation of the predictive accuracy of the various profiles; and
 - "judgement of the analyst".

(Altman 1968:594.)

The final discriminant function is derived as follows:

$$Z = 0.012X1 + 0.014X2 + 0.033X3 + 0.006X4 + 0.999X5$$

Where

Z = The discriminant function score of the company (%)

X1 = Net working capital/Total assets (%)

X2 = Retained earnings/Total assets (%)

X3 = Earnings before Interest & Tax (EBIT)/Total assets (%)

X4 = Market value of total equity (ordinary & Preference Shares)/Total debt (book value) (%)

X5 = Sales/Total assets (number of times)

Variables X1, X2, X3, and X4 need to be calculated as absolute percentage values, i.e. a ratio of 15% should be included in the model formula as 15.0% and not 0.15 (Altman 2000:12-13). To avoid confusion, Altman (1993:188, 1998:115) has re-stated the function as

$$Z = 1.2X1 + 1.4X2 + 3.3X3 + .6X4 + 0.999X5$$

In this paper, the original format of the function is maintained.

The definitions of the financial terms, as well as a brief exposition of the ratios are as follows (Altman 1968:594-595):

X1 = Working capital/Total assets (%):

Definitions	Working Capital:	Current Assets less Current liabilities	
_			

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	Total Assets:	Fixed Assets plus Long term Assets plus Current Assets
Exposition:	capitalization. Gen- operating losses wou to total capitalization including this one. The other two – current a	erally, a firm experiencing continuous ald have decreasing current assets in relation on. Three liquidity ratios were evaluated, his ratio proved to be most valuable while the nd quick ratios, were dropped as they proved d subject to perverse trends for some failing 10).

X2 = Retained earnings/Total assets (%):

Definition:	Retained Earnings:	Accumulated earnings after tax & dividends
Exposition:	This is an example of a "new" ratio developed. It is a measure of	
	cumulative profitability in relation to total capitalisation. The age of	
	the firm is a factor in this ratio. A firm in its infancy (say, one to five	
	years) would not have had time to build up its cumulative profits,	
	and would therefore have this ratio at a low level. Altman (1968:595,	
	2000:11) explains that the situation in the real world is that "the	
	incidence of failure is much higher in a firm's earlier years".	
	Altman (2000:10) notes that the "retained earnings account is	
	subject to 'manipu	lation' via quasi-reorganisations and stock
	dividend declaration	s". He proposes that, in case this is picked up
	in the financial state	ements, re-adjustments should be made. How
	this may be done is le Another aspect mea	eft to the analyst isured by this ratio is leverage. A high ratio
	indicates that the firm	n has financed its assets through the retention
	of profits with little us	se of debt.

X3 = Earnings before Interest & Tax (EBIT)/Total assets (%):

Definition:	EBIT:	Profit before leverage costs and tax
Exposition:	The ratio measures the true productivity of the firm's assets	
	before any non operations costs, i.e. tax and leverage costs. Since	
	the assets are held for	r the purpose of generating earnings, the
	ratio is relevant in measuring the extent of achieving the firm's	
	earnings objective. The prominence of the ratio also becomes	
	obvious where the firm	's value (or its assets value) is determined
	by the earning power o	f the assets. Altman (2000:11) asserts that
	this ratio outperforms of	other profitability measures including cash
	flow.	

X4 = Market value of total equity (ordinary & Preference Shares)/Total debt (book value) (%):

Definitions :	Total equity (market value):	The market value of all shares – common and preferred. Altman (2000:12) explains that the "equity market value serves as a proxy	
		for the firm's asset values".	
	Total Debt (book value):	Both long-term loans and current	
Exposition:	The ratio is an indicator of the gap at which assets can decline in		
	value before they are exceeded by liabilities. The greater the ratio,		
	the greater the extent at which assets would have to reduce to be		
	exceeded by liabilities. Put another way, the greater the ratio, the		
	more remote the chance that the assets would be exceeded by the		
	liabilities Altman (1968:595, 2000:12)	points out that the application of market	
		o yield a more effective prediction of	
	bankruptcy than the comm	only used ratio of 'net worth/total debt',	
	i.e. equity based on book va	alue.	

X5 = Sales/Total assets (number of times):

Definition:	Sales:	Net sales after accounting for returns
Exposition:	The ratio illustrates the ability of a firm's assets to generate sales.	
		k second in the contribution to the "overall the model" (Altman 1968:596, 2000:12.)

Altman (1968:597) points out that the greatest contributors to group separation are X3, X5 and X4. He argues that a company earning a profit is not likely to go bankrupt, hence the greater contribution by X3. The profit is fed by sales (X5), but a profit can only be achieved if the costs are well managed, hence the contribution by sales ranks second to profit.

Based on the variable means of one financial year before bankruptcy, an F-test is performed to test their individual discriminating ability (an F-test is a ratio that depicts a comparison of the means of the two samples). Since the main objective of the MDA is to identify and use the variables that best discriminate between groups, as well as those that are most similar within groups, the F-test is useful for this purpose. Variables X1, X2, X3, and X4 are found to be significant at the .0001 level, with the F-ratio ranging between 26.56 and 58.86. This shows a significant difference in the variables between the two samples. The F-ratio for variable X5 is found to be 2.84, which is not significant at the .001 level. Despite the insignificance, sales in element X5 form the basis of the life of a firm – they are the inflows which lead to EBIT. (Altman 1968:596-597.) The contributing ability of X5 has also been found to

rank second in its contribution to the overall discriminating ability of the model.

Looking at the variable means of the two samples (bankrupt and non-bankrupt firms), the conclusion drawn is that the lower the discriminant score, the greater the bankruptcy potential of a firm.

The model was tested by observing its accuracy in predicting bankruptcy. A series of six tests was performed. In addition to the initial sample, secondary samples were also used in these tests. In the main, the test involved classifying the bankrupt and non-bankrupt firms and testing these against the actual, positionary in the classifications ranged between 79% and 96%. The accuracy on the original sample was 95%. The results of the individual tests were as follows (Altman 1968:599-604):

Sample/Type of test	Accuracy
(a) Initial sample – one year before bankruptcy:	Accuracy of 95% was achieved
(b) Initial sample – two years before bankruptcy:	Accuracy of 83% was achieved
(c) Potential bias and validation techniques:	In the process of reducing the original twenty-two sets of variables to the five that were considered to be the best, a search bias is said to be inherent. The results of a t-test showed that a search bias does not appear to be significant. (continued on next page)

(d) Twenty-five bankrupt firms with the same asset size as the original sample:	Accuracy of 96% classification was achieved
(e) Sixty-six firms selected on the basis of net income or deficits (65% of these had reported losses in the three previous years):	Accuracy of 79% classification was achieved
(f) Long range predictive accuracy:	A five-year predictive accuracy test on the initial sample showed that accuracy is higher during the first two years (95% and 72% respectively), and declines progressively during the third, fourth and fifth years. This would indicate that prediction is near accurate during the first two years.

The results of the six tests are evidence of the reliability of the prediction conclusions drawn from the initial sample. It is important to note, though, that the Z-Score model, as a bankruptcy predictor, tends to be near accurate only at one year and/or two years prior to bankruptcy (Altman 1968:604).

The model is said to be easy to use with the 'Cooley-Lohnes MDA Program'. In the absence of this program, a cut-off point or an optimum Z value has to be determined. Such a cut-off point serves as a guide whether or not a firm is about to go bankrupt, depending on the value of the Z-Score (Altman 1968:606) concludes, deriving from the original sample,

- that a Z-Score greater than 2.99 falls into the category of non-bankrupt firms; and
- that firms with a Z-Score below 1.81 are bankrupt.

The firms with Z-scores falling between 1.82 and 2.98 were classified as the 'zone of ignorance'. Since the status of the firms falling within the zone of ignorance do not have a definite classification, a guideline had to be established for this purpose. In the final analysis, a midpoint within the zone of ignorance was determined as the cut-off point between bankrupt and non-bankrupt firms, which is 2.675. Altman (1968:607) emphasises that the "real test of this 'optimum' Z value is its discriminating power not only with the initial sample, but also with the secondary samples".

Even though Altman (1968:608) had prediction of bankruptcy in mind when he developed the model, he also notes that the model may be used as a performance management tool. Part of his concluding remark is that:

"An extremely important, but often very difficult task of corporate management is to periodically assess honestly the firm's present condition. By doing so, important strengths and weaknesses may be recognised and, in the latter case, changes in policies and actions will be in order. The suggestion here is that the discriminant model, if used correctly and periodically, has the ability to predict corporate problems early enough so as to enable management to realise the gravity of the situation in time to avoid failure."

2.2.3. (b) (1) (ii) Subsequent tests and Revisions of the Z-Score model Subsequent tests

The average Z-Scores over time were determined by means of the following tests: 86 companies that were distressed between 1969 and 1975;

110 firms that went bankrupt between 1976 and 1995; and

• 120 firms that defaulted on their publicly held debt between 1997 and Drawing 900 mm the three tests, the accuracy of the model, based on a cut-off score of 2.675, was found to be between 82% and 94%. The tests were based on data from one financial year before bankruptcy or default on bonds. However, it is noted that the Type II error (classifying a firm as distressed while it does not go bankrupt) increased by as much as 15% to 20% of all firms, with the largest firms having Z-Scores below 1.81. This led Altman (2000) to advocate the use of the lower cut-off point of 1.81 instead of 2.675.

In the case of the most recent test of 120 firms, the default prediction accuracy rate was 94% (113 out of 120) at the cut-off rate of 2.675. At the cut-off rate of 1.81, the accuracy rate was still high at 84%. It is noteworthy that Altman (1968:2000) has merely given a guide on the cut-off rate, and as implied, he has left the final decision to the analyst.

Revisions of the Z-Score Model

The original model was developed on a sample of publicly held manufacturing firms. A question that has arisen is whether or not the model may be applied to any type of firm. This is not possible because element X4 of the model requires market value of equity. The practice has been to substitute market value for book value. Another angle is that manufacturing firms may have a completely different make-up compared to non-manufacturing firms (Altman 2000:22). The following revisions have since been made.

> The Revised Z-Score Model for Non-listed firms

Altman (2000:25) advocated a complete review of the original model, which resulted in a change in the coefficients, as well as a change in the proposed cut-off point. The review, obviously, had to start by substituting market value for book value. Similar steps to those taken in the case of the original model were followed (the estimation of the values of the discriminant coefficients etc) and this resulted in a change in the coefficients.

The resultant model for non-listed firms is given as:

Z'= 0.00717X1+ 0.00847X2 + 0.03107X3 + 0.0042X4 + 0.999X5

The coefficients for X1, X2, and X4 have changed somewhat significantly, while there was a slight change in X3, with no change in X5 classification accuracy on the total sample is pegged at 94%, 1% lower when compared with the original sample model. This indicates that the accuracy of the revised model is slightly less impressive. This is also borne out by the lower cut-off point of 1.23 as against the 1.81 cut-off point of the original model. Since this model relates to private firms, secondary samples were not tested due to lack of readily available information (Altman 2000:25-26).

The adapted model for Non-manufacturers

This model was developed to analyse the characteristics and accuracy of a model without X5 – sales/total assets. Altman (2000:26) explains that the exclusion was done "in order to

minimize the potential industry effect which is likely to take place when such an industry-sensitive variable as asset turnover is included". Unlike manufacturing firms, non-manufacturing firms may not be as capital intensive as the former (i.e. non-manufacturing firms would generally use lease to finance its assets). The assumption inherent in this model is that the non-manufacturers are private firms, and therefore, the book value of equity is used.

The steps followed in the estimation of the values of the discriminant coefficients etc were the same as those followed in the case of the original model, as well as in the case of the model for Privates in the case of the model for privates in the case of the model for mon-manufacturing firms is given as:

The discussion of the revised models is merely to illustrate further the efforts made to keep the Z-Score updated.

2.2.3. (b) (2) The ZETA® Credit Risk Model

Altman (2000:31) states that "In 1977, Altman, Haldeman and Narayanan (1977) constructed a second generation model with several enhancements to the original Z-Score approach. The purpose of this study was to construct, analyse and test a new bankruptcy classification model which considers explicitly recent developments with respect to business failures."

The ZETA® model was constructed in partnership with ZETA Services, Inc. (a private financial firm), making it a proprietary model. Its details cannot, therefore, be fully disclosed. The model is, however, briefly discussed as part of the exploration of the models. This, it is hoped, will give an understanding of the basics of the model, and in so doing, leave it to the 'analyst' to decide whether or not it would be worthwhile to subscribe and obtain the parameters of the model. The process of developing the model is the same as that for the Z-Score, and only additions to the process and the end results are discussed. The following are briefly discussed:

- Reasons for constructing the model;
- Principal findings;
- Sample and data characteristics;
- Note on the variables analysed;
- Reported adjustments;
- The model variables;
- Accuracy testing;
- Comparison with the Z-Score model; and
- Concluding Comment on the model.

2.2.3. (b) (2) (i) Motivation for constructing the model

The development of the model was intended to improve on the statistical models that had been developed over the then past ten years. The improvements took the following into account (Altman 2000:32):

• The dramatic increase in the number of bankruptcies;

- Relevance at the time in terms of the growth in the size of firms the average asset size during two reporting periods before failure was \$100 million;
- Temporal nature of the data at the time;
- The inclusion of retailing firms;
- Scrutiny of financial statements including notes as well as any changes in the presentation of data; and
- The testing and assessment of advances and controversies of discriminant analysis.

2.2.3. (b) (2) (ii) Principal Findings

Successful classifications achieved were 90% of sample one year prior to failure, and 70% of sample five years prior to failure. The result does not differ markedly with the Z-Score results. (Altman 2000:32).

2.2.3. (b) (2) (iii) Sample and data characteristics

The sample consisted of 53 bankrupt firms and 58 non-bankrupt firms, and was made up of an equal number of manufacturers and retailers.

The bankrupt firms comprised 94% of firms that failed between 1969 and 1975. (Altman 2000:33).

2.2.3. (b) (2) (iv) Variables Analysed

The analysis covered a total of 27 variables. These were based on their common use in credit analysis (Altman 2000:35).

2.2.3. (b) (2) (v) Reported adjustments

The basic data were adjusted to account for some of the important accounting modifications. The following adjustments were made (Altman 2000:35) apitalisation of leases;

- Reserves of a contingency nature were included in equity with income accordingly adjusted; and
- Other adjustments related to minority interests, goodwill and intangibles, and capitalised research and development costs.

2.2.3. (b) (1) (vi) The Final variables

Seven variables were finally selected from the original twenty-seven. These are said to have proved reliable in various validation procedures. The variables are made up as follows (Altman 2000:37):

X1: Return on assets [EBIT/Total assets]

X2: Stability of earning ["measured by a normalised measure of the standard error of estimate around a five to ten year trend

X3: Debt service [Interest coverage ratio: EBIT/Total interest payments] (Interest payments include lease obligations).

X4: Cumulative profitability [Retained earnings/Total assets]

X5: Liquidity [Current ratio] (for this model, the ratio was found to be more informative than the other liquidity ratios)

X6: Capitalisation [Common equity/Total Capital] (in both the numerator and the denominator, common equity is determined by a five year average of the total market value. The denominator includes preferred stock at liquidating value, long-term debt and capitalised leases).

X7: Size [Total assets including capitalisation of leases]

2.2.3. (b) (2) (vii) Accuracy Tests

The average accuracy based on one year's data prior to bankruptcy was found to be 92.8% on the original sample. On "holdout" samples, the accuracy ranged between 89% (two years prior) and 77% (five years prior).

(Altman 2000:42.) Comparison with the Z-Score Model

Based on the accuracy tests, both models show similar results one year prior to bankruptcy. As the periods extend to five years, the Z-Score model accuracy drops dramatically to below 40%, while the Zeta® model accuracy drops to 76%. It may, therefore, be concluded that the Z-Score model may prove to be reliable one year prior to bankruptcy, but that the further the period is from bankruptcy, the more dramatically the accuracy decreases. On the other hand, the decreases in accuracy of the Zeta® model are more gradual, the further the period is from bankruptcy. (Altman 2000:41.)

2.2.3. (b) (2) (viii) Overview of the Zeta® Credit Risk Model

Unlike in the case of the Z-Score model, no revisions of the Zeta® model have been found. Part of the material used to give an exposition of these models was written as recently as 2000. This would indicate that the Zeta® model, as an improvement on the Z-Score, has stood the test of time in that no revisions have been found to be necessary. The Z-Score itself, has seen minor

revisions, which related mainly to the inclusion of types of firms that were not included in the original sample.

Even though the Zeta® model has not been fully discussed due to its proprietary nature, it appears to be useful. Altman (1993:218) points out that since 1977, 80 institutions (mainly financial) have subscribed to Zeta Services, Inc., Hoboken, for the use of the Zeta® Model.

2.2.3. (b) (3) Business Failure Forecasting Model – the K-Model (Finansiële Mislukkingsvoorspellingsmodel)

The model was developed during 1981 under the auspices of the Bureau of Financial Research at the University of Pretoria. The 'project' was led by J.H. De la Rey, a senior researcher at the Bureau.

De la Rey (1981:10) points out that a large amount of money is lost in the country as a result of "financial failure of industrial businesses". The purpose of the study is given as the development of a model that can measure the risk of financial failure by means of a number of financial ratios. De la Rey (1981:26) argues that even though the failure of a business may be due to a variety of reasons, it is normally found that certain financial ratios serve as indicators of problem areas. He acknowledges the availability of models developed elsewhere, but adds that these need to be adjusted for use in the Republic of South Africa.

2.2.3. (b) (3) (i) Criteria for financially failed firms

De la Rey (1981:11) adopted the matched pair multi-discriminate approach in developing the model. He adopted the following criteria to classify a firm as "financially failed":

- A company where equity has become negative. Equity is defined as the difference between tangible assets and total external financing.
- A company that has become unable to continue with its operations and is placed under judicial management, or is suspended by the Johannesburg Stock Exchange (JSE), or is declared insolvent.
- A company that has not posted profits for any of the following periods:
 - Two successive years or
 - Two out of three successive years.
- A company where preference shares' dividends have not been paid on time (possible reasons for this are given as low levels of retained earnings, poor liquidity, or an attempt to maintain a reasonable debt-
- Postilization ere ordinary shares' dividends have not been declared during the forth year since commencement of business. If dividends are not declared during the first three years, this may not necessarily be a sign of problems in that the company may still be growing. A company that has recently decreased its ordinary share dividend, is
- Also of party that "failed" defaulted and is still defaulting on loan
- Acronitparrytswhere the nominal value of share capital has been reduced to bring it in line with the value of assets.
 - This excludes capital intensive companies where the exploration stage may be uncertain, requiring large capital. In such cases, as soon as operations start, any excess capital found to be unnecessary would usually be paid back to the investors.
- Companies taken over by 'capital giants' due to poor performance for a period of a year or two.

2.2.3. (b) (3) (ii) The sample

Industrial firms listed on the JSE between 1970 and 1979 were analysed with the view to determining those that failed and those that did not. A list of

failed firms was then compiled based on the criteria discussed above. For firms that had not failed, the selection was made from 1974 until 1979. The information was sourced from The JSE monthly bulletin and numerous copies of the *Financial Mail*.

The study was based on 32 firms that failed, and 32 financially healthy firms. The number was later reduced to 26 firms on both sides. The next step in the process was to identify ratios that may be included in the model. The considerations for identification of the ratios were (De la Rey 1981:27):

- ♦ Popularity in the literature and ratios whose application was successful in previous studies [both adopted from Beaver (1966)];
- availability of information (elements of the ratios) in the financial statements of sample companies for the computation of the ratios; and
- ♦ any other ratios that have weight and that may add value to the model.

2.2.3. (b) (3) (iii) The selection of ratios

Ratios that were used by other researchers and that had proved to be useful were considered. More specifically, the ratios used by Beaver (1966) and Daya (1977) were used. Secondly, the ratios on the database of the Bureau for Financial Research at the University of Pretoria were screened to determine whether or not they could have prediction qualities. Thirdly, other ratios not covered in the two other groups were considered to determine whether they could be used as good predictors.

Sixty eight ratios were identified and tested on the sample of 32 failed and 32 non-failed companies (later reduced to 26 on both sides). Owing to lack

of data on some of the accounting data, i.e. elements such as turnover, the ratios that required such data were dropped. Other ratios dropped were those where the result of the ratio was negative, zero, or too small. As a result, 28 ratios were dropped, leaving 40 ratios for further testing. The ratios were further reduced to 25 as some of the ratios were not suited to forecasting. The other problem encountered was the use of financial leases by some companies in relation to total assets. The value of the leased assets was not easy to determine since only the rental amounts appeared in the financial statements.

Note AA at the end of this chapter lists the ratios excluded because of elements that were not readily obtainable (i.e. turnover, total assets, market capitalisation). These ratios are tabled to indicate the vast number of ratios that are available or that may be developed.

The tested ratios were classified into five groups: Profitability, Cash/Funds Flow, Financing, Liquidity, and Other.

Profitability

- Normal* Earnings before Interest & Tax/Average Total assets
- Earnings before Interest & Tax/ Average Total assets
- Earnings before Interest & Tax/ Average Actual Total Assets (per
- **Ivafluation**n)Adjusted Earnings before Interest & Tax/Inflation Adjusted Average Actual Total Assets
- Inflation Adjusted Earnings after tax/ Inflation Adjusted Actual Total
- **Baseis**gs after Tax/Average Total Assets at book value
- Earnings after Tax/Average Total External Financing
 - * Normal earnings exclude profit on sale of investments, and non-trade assets

Cash flow

- Cash Flow Earnings** before Interest and Tax/Total External Financing
- Cash Flow Earnings after Tax/Average External Financing
- Cash Flow Earnings after Tax/Inflation Adjusted Actual total Assets
- Cash Flow Earnings after Tax/Total External Financing
- Cash Flow Earnings after Tax/Current Liabilities
- Cash Flow Earnings after Tax/Average Total Assets
- Retained Net Cash Flow/Total External Financing
- Retained Net Cash Flow/Current Liabilities
- ** Earnings before Interest and Tax plus non cash flow items

Financing

- Total Current Assets/Total Financing
- Total Current Liabilities/Total Financing
- Total External Financing/Total Assets
- Inflation Adjusted Actual Equity/Inflation Adjusted Total Actual Assets
- Long Terms Loans/Inflation Adjusted Total Assets
- Current Liabilities/Inflation Adjusted Total Assets
- Total External Financing/Inflation Adjusted Actual Total Assets

Liquidity

- Total Current Assets/Total Current Liabilities
- Total Quick Current Assets***/Total Current Liabilities
- Total Current Assets plus Listed Investments/Total Current Liabilities
- Total Quick Current Assets plus Listed Investments/Total Current
- **Stabilities**ation Adjusted Total Actual Assets
- Debtors/Inflation Adjusted Total Actual Assets
- Total Current Assets/Inflation Adjusted Total Actual Assets
- Total Quick Current Assets/Inflation Adjusted Total Actual Assets
- Quick Assets plus Listed Investments/Inflation Adjusted Total Actual
- Nesetarrent assets/Inflation Adjusted Total Actual Assets

Realistic Net Current Assets/Inflation Adjusted Total Actual Assets
 *** Total Current Assets less Stock

Other

Total Net Reserves/Total Actual Inflation Adjusted Assets

2.2.3. (b) (3) (iv) The Development of the Model

The ratios selection procedure and their combination, included the following:

- Wilk's Lambda step-by-step process of discriminatory analysis to test the ratios for different combinations. The interpretation of the Lambda is that the smaller it is, the greater the mean difference, i.e. the greater the measure of discrimination would be;
- Standard deviations were used to identify ratios that showed a distinct difference between the failed and non-failed firms;
- Factor analysis was used as this enables the grouping together of ratios with a high correlation;
- Tests on ratio combinations recommended by other researchers were done; and
- Some combinations were developed on intuition and tested.

Because of this process, 194 combinations were tested. Owing to further testing of the accuracy of the combinations (including a test on a secondary sample of 255 sound firms and 138 failed firms), the number was reduced from 194 to 7. After more tests, the model that produced the best results was $\frac{1}{100} = \frac{1}{100} = \frac{1}$

Where

a = (Total Outside Financing/Total Assets) * 100%

b = (Profit before Interest and Tax/Average Total Assets) * 100%

c = (Total Current Assets plus listed Investments/Total Current Liabilities) * 109% (Profit After Tax/Average Total Assets at book value) * 100%

e = (Cash Flow Profit after Tax/Average Total Assets) * 100%

f = (Total Inventories/ Inflation Adjusted Total Assets) * 100%

The accuracy classification of the model was 94,5% for financially sound firms and 98,6% for failed firms. The interpretation of the model is that a 'zero' or 'a minus' result indicates failure, while 'one plus' indicates soundness. A further interpretation is that the nearer the result is to one (or zero) the stronger the possibility that the firm is likely to fail. Conversely, the greater the result from one is, the greater the possibility that the firm is strong and would continue with operations. The following are some of the disadvantages" of the model, as well as some of the problems encountered during the development of the model as noted by De la Rey (1981:15,169):

- The model requires complicated calculations that need to be carried out using a computer.
- The model is "not suitable to classify businesses according to a failure risk as it is inclined to give the same value to financially sound businesses as well as to all the financially failed businesses".
- The number of failed firms was not high enough to be representative for accurate results.
- Due to the limited number of listed companies, the model was developed for the JSE industry sector as a whole, while a model per production sector would have yielded better results.
- Some of the firms do not include, in their annual reports, information that an analyst may need. This limited the choice of elements for the ratios.

- In South Africa, there are no guidelines on how a firm that employs leased assets may be compared with a firm that owns the assets. As a result, the element of total assets created a problem in the instances
- Substances of holding companies were not easy to classify owing to the support given by the parent company.

2.2.3. (b) (3) (v) Overview of the Business Failure Forecasting Model

The elements of the model are easily obtainable, except for adjusting for inflation since De la Rey (1981) has not indicated the inflation figure relative to time, which must be used. However, De la Rey (1981:146) admits that for practical reasons, an attempt was made to develop a reasonably reliable model, which can give an indication to an investor of the risk profile involved, while bearing in mind that reliability may not be placed on statistical purity.

2.2.3. (c) Logit Model

Ohlson (1980) developed a model under this umbrella.

2.2.3. (c) (1) Ohlson Model

The methodology used in the development of the model is one of "maximum likelihood estimation of the so-called conditional logit model." Ohlson (1980:109) does not define 'conditional logit', but implies that the model "logically and systematically develops probabilistic estimates of failure". 'Logit conditional analysis' is dealt with by McFadden (1973) in his paper – 'Conditional logit analysis of qualitative choice behaviour'. This discussion does not cover McFadden (1973), but a brief description of the relevant

model is given below, under the discussion on the Probabilistic Prediction of Bankruptcy model.

Ohlson (1980:111) explains that he chose the conditional logit analysis to avoid some fairly well known problems associated with Mutivariate Discriminant Analysis (MDA). Ohlson (1980:112) discusses some of these problems, but these are not relevant in the current study. In support of the conditional logit analysis, Ohlson (1980:112) states: "the fundamental estimation problem can be reduced simply to the following statement: given that a firm belongs to some pre-specified population, what is the probability that the firm fails within some pre-specified time period?" The logit model attempts to answer this question. The attributes of the population (Ohlson 1980:114) are the following:

- Failed firms which filed for bankruptcy in terms of Chapters X and XI of the American National Bankruptcy Act or some other notification indicating bankruptcy proceedings (the Act was "reformed" during 1978 – Ohlson's population for the study was confined to firms that failed between 1970 and 1976);
- The stock (shares) of the firms must have been traded on "some" stock exchange or over-the-counter market; and
- Industrial firms (the term "industrial" is not defined, but excludes utilities, transportation firms and financial services firms).

The final sample consisted of 105 failed firms, and 2058 non-bankrupt firms.

2.2.3. (c) (1) (i) Composition of the ratios or predictors

Ohlson (1980:118) selected the variables or predictors for their simplicity as well as their frequent mention in the literature. Three models (1, 2, and 3)

were estimated and comprised an intercept (cut-off) as well as nine independent variables –

- SIZE: calculated as log(total assets)/GNP price level index.
 The index year is the year preceding the balance sheet year with an assumption of a base value of 100 for 1968.
- TLTA: calculated as total liabilities divided by total assets.
- WCTA: calculated by dividing working capital by total assets.
- CLCA: calculated by dividing current liabilities by current assets.
- OENEG: determined as '1' (one) if total liabilities exceed total assets, or '0' (zero) if the reverse is the case.
- NITA: calculated by dividing net income by total assets.
- FUTL: calculated by dividing 'funds provided by operations' by total liabilities.
- INTWO: determined as '1' (one) if a net loss was posted for the last two years, or '0' if a net income was posted during that
- CHIN: Φ righted as $(NI_t NI_{t-1})/(|NI| + |NI_{t-1}|)$ where NI_t is net income for the most recent period.

These predictors form the basis for the probabilistic model of bankruptcy. (Ohlson 1980:118)

2.2.3. (c) (1) (ii) The Probabilistic Model of Bankruptcy

The definition of the model (Ohlson (1980:117), described as "The logarithm of the likelihood of any specific outcomes as reflected by the binary sample space of bankruptcy versus non-bankruptcy," is:

$$l\beta \equiv \sum_{i \in S_1} \log P(X, \beta) + \sum_{i \in S_2} \log(1 - P(X, \beta))$$

where

denotes a vector of predictors for the *i*-th observation. The vector would be the family of predictors (ratios) for the units in the sample.

 \square is the vector of unknown parameters

P is some probability function where $0 \le P \ge 1$

 $P(\Box, \Box)$ denotes the probability of bankruptcy for any given \Box and \Box

 S_1 is the (index) set of bankrupt firms, and

 S_2 is the set of non-bankrupt firms.

Ohlson (1980:118) explains that since a positive theory of bankruptcy does not seem to exist, "there is no easy solution to the problem of selecting an appropriate class of functions" for P. He goes on to point out that "As a practical matter, all one can do is to choose on the basis of computational and interpretative simplicity". 2.2.3. (c) (1) (iii) The Prediction of bankruptcy

Ohlson (1980: 121) computed three sets of estimates for the logit model. He labeled these (i) Model 1 – prediction of bankruptcy within one year; (ii) Model 2 - prediction of bankruptcy within two years; and (iii) Model 3 - prediction of bankruptcy within one or two years. The results were evaluated in terms of the following (Ohlson 1980: 120-121):

- *t*-statistics where more than half of the coefficients were found to be "statistically significant at respectable levels".
- A measure of goodness-of-fit given by the likelihood ratio index (the
 index would equal one (1) where there is a perfect fit, or zero (0) where
 there is no fit). The ratio indices were .84, .80, and .72 for the three
 computations respectively. These indicate a near perfect fit due to the
 proximity to one.

• A measure of the accuracy of prediction of bankruptcy prior to the three periods of computations. This was based on a cut-off point of .5 on the premise that classification is done if $P(X, \beta) > .5$. The results were .96, .96, and .93 for the three computations.

The three models are described as follows:

```
Model 1: O = -1.32 - 0.407(SIZE) + 6.03(TLTA) - 1.430(WCTA) + 0.076(CLCA) - 1.72(OENEG) - 1.72(OENEG) - 2.370(NITA) - 1.83(FUTL) + 0.285(INTWO) - 0.521(CHIN)
```

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Model 2: O = 1.84 - 0.519(SIZE) + 4.76(TLTA) - 1.71(WCTA) - 0.297(CLCA) - 1.98(OENEG) - 2.74(NITA) - 2.18(FUTL) - 0.780(INTWO) + 0.4218(CHIN)
```

Model 3:
$$O = 1.13 - 0.478(SIZE) + 5.29(TLTA) - 0.990(WCTA) + 0.062(CLCA) - 1.91(OENEG) - 4.62(NITA) - 2.25(FUTL) - 0.521(INTWO) + 0.212(CHIN)$$

The risk of bankruptcy is determined on the basis of 'the greater the *O*, the greater the risk of bankruptcy'. The most important 'predictor' is said to be SIZE. Ohlson (1980:124) makes an interesting statement, that: "There is no way one can completely order the predictive power of a set of models used for predictive (decisions) purposes. As a minimum, this requires a complete specification of the decision problem, including a preference structure defined over the appropriate state-space". It is not clear what Ohlson (1980) means by 'state-space', but it would appear that he is of the opinion that models intended to predict the direction of an organization can seldom be accurate for decision-making purposes. Ohlson (1980:127) also notes that studies have differed in their selection of 'predictors', but that this cannot be of great significance as long as "a fair number of ratios and predictors" are taken into account. He cites the example that, in the case of his model, he has not made use of "non accounting-based data such as market price data".

2.2.3. (c) (1) (iv) Overview of Ohlson's logit model

The model is easier to understand if one has a good understanding of McFadden (1973). However, the description of Models 1, 2, and 3 helps one to understand the model. As pointed out in the introduction, some writers argued that the use of models is sometimes cumbersome as information is not readily available, and that the computations are sometimes difficult to carry out. (Bankruptcyaction.) Except for SIZE, all other variables may be obtained from the annual financial statements. However, the cash flow statement would need to show clearly, the item - 'funds provided by operations' to enable the determination of the variable 'FUTL'.

2.2.3. (d) Gambler's Ruin

One of the developers of this model, Wilcox (Altman 1993:232), sees bankruptcy as probable when a company's net liquid value (NVL) becomes negative. NVL is defined as total assets liquid value less total liabilities. For a financial period, NVL is increased by cash inflows and decreased by cash outflows. Wilcox combined the inflows and outflows and termed them 'adjusted cash flow'. The smaller the company's beginning NVL (all things being equal), the more probable that the company's failure is increasing. This would also have the effect that the company's 'adjusted net cash flow' would be getting smaller while there would be a larger variation of the company's adjusted cash flow over time.

The researchers of the gambler's ruin are said to have "made a substantial contribution to business failure prediction", but this contribution is said to have not reached the aspirations of Wilcox, who wished for a generally accepted conceptual framework of business failure. (Jones 2002.)

2.2.3. (e) Artificial Neural Networks

This approach to bankruptcy prediction evolved since the 1990s. The Artificial Neural Networks (ANNs) are computer programmes constructed to process information. The process of the ANNs stores information in the form of patterns. New information that is processed is tied to a specific pattern, i.e. either financially sound or facing bankruptcy. Unlike other models, ANNs imposes less restrictive data requirements and is useful in recognising and learning complex data relationships. The accuracy classification of the ANNs is comparable to logit and MDA models. (Jones 2002.)

2.2.3. (f) The Four-state Model – Financial Risk Analysis Model (FRAM)

Naidoo (2006) developed the model. The model determines the 'states of health' of South African companies (Naidoo 2006:2). The development of the model is done in two stages for purposes of comparison.

The first stage, the identification of the states of health, classifies companies on a three-state model, that is, Healthy, Intermittent or Distressed (Naidoo 2006:64). The states of health are identified by means of three statistical methods. These affedel using the Shareholder Value Added (SVA) ratio;

- the Multiple Discriminant Analysis (MDA) that classifies an observation into one of several groups; and
- the Chi-squared Automatic Interaction Detection (CHAID) that gives a decision or classification tree.

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(Naidoo 2006:59,60,62.)
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In the analysis of the first stage, the **Na**ïve and CHAD models were tested and found to be superior to the De la Rey model. This discussion concentrates on the second stage.

The second stage, the analysis of the states of health, is the main development of FRAM. The model classifies companies on four-states, that is,

```
Healthy (state 0);
Intermittent (state -1);

Distressed (state -2 & SHE>0); and
Severely distressed (state -2 & SHE≤0)

Naidoo (2006:187.)
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The sample consisted of forty-two companies. The studies done by Daya (1977), De la Rey (1981) and Court *et al* (1999) provided the sample. The sample for the first stage was the same. The variables were categorised into the following groups (Naidoo 2006:187):

- Growth the model included real earnings growth (REG) and real sales growth (RSG);
- Performance Analysis an analysis of selected profitability, net working capital, and the asset turnover ratios ['selected profitability' does not seem to be defined];
- Investment analysis comparison of profitability with the funds provided by shareholders;
- Financial status analysis of solvency and liquidity.

Due to the observations in the first stage, the Naïve, CHAD and De la Rey models formed part of FRAM (Naidoo:2006:187).

Naidoo (2006:188) noted that the FRAM model yielded results that were in some cases different to the results of the first stage. In addition, some of the 'non-failed' companies had negative RSG and REG, as well as poor working capital.

2.2.3. (g) Opinions/writings on the Bankruptcy Prediction Models

Articles by academics and financial practitioners have provided the opinions. Comments dating back to the 1980s are ignored in favour of comments made since the 1990s.

Lin and Piesse (2004:73) contend that the problem with the study by Beaver (1968) is the reliance on a single ratio rather than considering the numerous possible factors that may, collectively, give indications of future corporate failure*****

On multivariate discriminant analysis (MDA), Lin and Piesse (2004:74 point out that there are demanding assumptions that are difficult to satisfy in practise. Examples given are that "these models all suffer biased inferences at different levels subject to the variable and model selection process, as well as the distributional characteristics of the sample data".

The article 'The best analysis tool to predict corporate financial trouble" (2003) describes the Z-score as "the best analysis tool to predict corporate financial trouble". The publication advises: "During shaky times, it's crucial to keep on top of your company's financial strength". The article states that the Z-score model, which has an accuracy rate of up to 90%, is a technique that can foresee financial trouble. The model is recommended for both internal use and external use on business-associated companies.

Jones (2002) states that Ohlson's model is applied frequently in academic research as an indicator of financial distress. For this reason, he suggests that its strong performance supports its use as a preferred model (Jones 2002)

Auchterlonie (1997) points out that bankruptcy prediction analyses is most efficiently handled through the Z-Score model: "a powerful diagnostic tool that along with other diagnostic procedures is used by turnaround professionals to develop an effective turnaround strategy for their clients."

Shim (1992) states that while the Z-Score model is an excellent measure for predicting insolvency, it should not be used as the only evaluation tool. In the same vein, Eidleman (1995) asserts that the Z-Score model "is the tried and tested formula for bankruptcy prediction. It has been demonstrated to be

quite reliable in a variety of contexts and countries". Eidleman (1995) points out that some of the users of ratio information have different needs to satisfy:

- Lenders would want to know if the money they lent out will be repaid;
- Auditors would be interested to determine the 'going concern' status of financially troubled companies; and
- Management of companies would want to know of any problems they are likely to face to be able to take corrective action in good time.

Eidleman (1995) concludes that the Z-Score model and the rest of the models "are a valuable, cost effective weapon to be added to the arsenal, and that as long as they are used to "complement our existing knowledge and we are not fooled by their apparent exactness, they can only improve the quality of our work."

A criticism of the Z-Score model is that the selection of ratios appears to have been arbitrary, but that this was corrected in the development of the Zeta® model (McLeary (1992:250). A similar model developed by De Ia Rey (1981) is said to have achieved a high rate of success when used by one of the leading commercial banks, but that not much information is available on the results (McLeary (1992:250).

2.2.4. (h) Other Independent research studies on the Bankruptcy Prediction

Mod stallowing are some of other researcher's findings on the bankruptcy prediction models.

Grice & Ingram (2001) tested the Altman (1968) Z-Score model on the following research questions:

 "Is Altman's original model as useful for predicting bankruptcy in recent periods as it was for the periods in which it was developed and tested by Altman?"

The results returned a negative response to the question. It is noteworthy though, that Altman revised the original model during

2000.
 "Is the model as useful for predicting bankruptcy of non-manufacturing firms as it is for manufacturing firms?"

The results returned a negative response to the question. It is also noteworthy that Altman (2000) also revised the model to provide for non-manufacturing firms.

 "Is the model as useful for predicting financial stress conditions other than bankruptcy as it is for predicting bankruptcy?"

The results returned a positive response. Altman (1968:609) has pointed out that the use of the model may assist to detect signs of deterioration early enough to take "profitable action".

Chen & Merville (1999) undertook a study on the indirect costs of financial distress. On-going firms, totalling 1041, were examined between 1982 and 1992. They used quarterly data for the detection and measurement of the

magnitude of the indirect costs on financial distress. They came up with three 'important' explanatory factors:

- that financial distress has a distinct pattern of increasing over time; and
- that two aspects have a bearing on financial distress: the degree of financial leverage in the capital structure, and the size of the firm.

The study found that the average annual losses as a percentage of market value are a minimum of -10.3% and a maximum of -76%, and that, even if the firm continues to operate, its market value may be significantly affected by the presence of the indirect costs of bankruptcy over a period. This justifies the inclusion of market value of equity in Altman's model. The study found a significant and positive relationship between Altman's Z-Score and the growth rate of the firm's capital investment. In other words, if the firm does not grow its investment, the lack of such growth contributes to the total indirect costs of financial distress.

Truter (1996) developed a Z-Score model (not identical to that of Altman) using a sample of 30 failed and 30 non-failed, non-listed companies. An accuracy classification of 90% was achieved.

Levy (1996) researched the potential utility of the Z-score model as a means in the formulation of a turnaround strategy. Levy (1996) mentions that despite the general view on the "emphasis on the importance of retrenchment activities in turnaround processes", recent literature suggests

otherwise, that retrenchment is not adequate, as a stand-alone, to fulfil the complex demands of turnaround processes. He therefore, studied the potential of the Z-Score model as a proposed tool for the formulation of a successful turnaround strategy. The results of the study suggest some support for noting the application of the model in its "passive predictive capacity".

Viljoen (1990) studied the performance of various risk measures during and after the stock market crash of 1987. He emphasised the effectiveness of beta and the Z-Score. Beta is defined as a measure of the volatility of a security's returns when compared to the returns of a broad-based market portfolio of securities. The results were not conclusive, but Viljoen (1990) surmised that, in the place of beta, the Z-Score would appear to be more usable.

El-Temtamy (1995) conducted a study to compare the logit model to the neural networks. The same variables were used on each of the two approaches. Six sets of data from the oil and gas industry were used. The finding of the study is that results with the use of neural networks outperformed those with the use of the logit model. The reason given for this outcome is that neural networks have the ability to generalise and to exercise freedom from the data characteristics that the other model does not

have.

Hillegeist, Keating, Cram & Lundstedt (2004) conducted a study to compare the reliability of models that use accounting-based measures to a model that uses a market-based measure. The models that use accounting-based measures chosen for the study are the Z-Score of Altman (1968) and the O-Score of Ohlson (1980). The model that uses the market-based measures is derived from the Black-Scholes-Merton (BSM) option-pricing model, and is termed Black-Scholes-Merton Probability of Bankruptcy (BSM-Prob). The latter model is based on the approach developed by Black and Scholes (1973) and Merton (1974), which likens the firm's equity to a call option on the value of the firm's assets. When the firm becomes insolvent, i.e. the value of the assets drops below the book value of liabilities (likened to a strike price), the call option is not exercised and what is left of the insolvent firm would be turned over to its debt-holders. The primary variables for estimating the BSM-Prob are market value of equity, the standard deviation of equity returns, and total liabilities.

Hillegeist et al (2004) point out the following shortcomings of the model:

- The model relies on its simplifying assumptions, i.e. the estimation of probability of bankruptcy over the following year assumes that all of the firm's liabilities will mature in one year. This is very seldom the
- PREP-stock market may not efficiently have all publicly available information concerning the probability of bankruptcy. This is supported by the generally held view that the market does not accurately reflect all of the information in the financial statements of a company.

In view of these shortcomings, Hillegeist *et al* (2004) contend that it is "ultimately an empirical question" whether or not an accounting-based measure performs better than a market-based one.

The conclusion, based on the study, is that BSM-Prob provides significantly more information on the probability of bankruptcy than the Z-Score and the O-Score models.

Lin and Piesse (2004) undertook a study to distinguish between distressed and non-distressed industrial companies in the United Kingdom. The sample consisted of 32 failed and 45 non-failed firms between the years 1985 and 1994. The conditional probability analysis (CPA) model was applied. This approach falls under the classification of logit models as in the case of the Chisan (1980) model (2004:75) modified the basic logit model to include proportions sampled from failed and non-failed firms, symbolised by *Pi* and *P2* respectively. A number of models were estimated and four models "performed particularly well" (Lin & Piesse 2004:78) with accuracy levels ranging between 81%

Laitinen and Kankaanpää (1999) undertook a study to compare six failure prediction methods. These were linear discriminant analysis, logit analysis, recursive partitioning, survival analysis, neural networks, and human information processing. The following discussion is on three of the models, the other three models are already discussed.

♦ Recursive partitioning (RPA)

This is similar to the construction of a decision tree. An original sample, assumed to be at the top of the tree, is split into two subsamples (to land on the left and the right of the lower part of the tree) based on the appropriate splitting rule. The process is repeated for each sub-sample until further splitting does not decrease the impurity of the tree. In this way, the sample is classified to *a proiri* selected groups, i.e. failed or non-failed.

♦ Survival Analysis

The model examines the time interval during a period before an event occurs within the determined observation period. In other words, the method attempts to observe how many months/years does the number of sampled companies fail/survive within the observation period. The aim is to measure the relationship between the months/years and the variables that can be explained, for example, reasons for the failure/survival. The model assumes that the failed and non-failed firms are from the same population by treating the non-failed firms as censored observations. Censored observations roughly mean that it is assumed that the non-failed firms will survive during the observation period.

Human information processing

This approach studies the behaviour of decision-makers. Criteria are determined, i.e. ratios that are to facilitate decision-making. The

behaviour of the decision maker (on the ratios) is then studied. The method represents the relationship between the decision-maker's judgement and the criteria.

The results of the study showed that no one method was superior to the others even though the prediction accuracies varied, but not to a statistically significant degree.

Kidane (2004) undertook a study to test the predictive ability of failure of the Altman (1968) and Springate (1978) models. The models tested were those designed for manufacturing companies. The study was on South African IT and services companies listed on the JSE. The final sample consisted of 24 failed and 62 non-failed companies.

The study observation was that both models are not appropriate for predicting bankruptcy in the South African services and information telephology to provide for non-manufacturers as well as non-listed companies.

2.2.3. (i) The Bankruptcy Prediction Models and the second and third research questions

The literature review on the bankruptcy prediction models provides material on the different models as well as pointers for the selection of an appropriate model for application in this research study. In turn, the application of the selected model should provide a basis for a conclusion on the reliability of

the model. Further, the application should either prove to be cumbersome or easy to carry out.

2.2.4. South Africa's Top Companies Surveys

Each year, some of the local newspapers conduct surveys to identify South Africa's Top Companies. Specifically, the surveys by the *Sunday Times Business Times* and the *Financial Mail* form part of the focus of this research. The discussion of the surveys serve a useful purpose in that the criteria applied in the surveys are on the financial performance of public companies. Secondly, the population for this research study is drawn from the winners of the *Financial Mail* survey of South Africa's Top Companies. Thirdly, the public companies strive hard to achieve the Top Companies awards. They are, therefore, suited to be role models in financial performance management Times is the biggest weekly newspaper in South Africa in terms of circulation (Publicitas Promotion Network). On the other hand, the *Financial Mail*, being a weekly magazine, has the highest circulation in South Africa (familymagazines). The two publications are chosen, therefore, for their high circulation figures. The two publications run the annual Top Companies surveys independently.

The tools applied by the two publications to identify the Top Companies are discussed below.

2.2.4. (a) The *Sunday Times Business Times* Survey

The survey is conducted annually with the aim of identifying the *Sunday*Times

Business Times Top 100 Companies. The source of the synopsis below is the Sunday Times Business Times Top 100 Companies 2003, and 2004.

The primary aim of the survey is to "acknowledge those listed companies that have earned the most wealth for their shareholders". The earned wealth is determined by measuring the movement of the share prices of every company listed on the JSE Securities Exchange. The returns are calculated on R10 000 invested over a five year period. Share price growth determines the earned wealth, taking into account normal and special dividends as well as bonus shares. The *Sunday Times Business Times* (*Business Times*) argues that this approach is "one of the indicators of how sound a company's operations are". The *Business Times* further argues that while the market may get it wrong, the "share price performance is generally an accurate barometer of value".

I-Net Bridge (a financial services information company) does the calculations based on each company's financial reports. Companies in the survey include those that are foreign based, but with a secondary listing on the JSE, such as SABMiller, Anglo American, BHP Billiton and Old Mutual.

Companies excluded from the survey are

- those that have, any time during the five-year period, traded in the property sector;
- those that did not meet the minimum value traded of R10 000 000 a
- **year**performing pyramids; and
- those found guilty under insider trading regulations (discretion is used in the case of companies that are under investigation for similar infringements).

Investment instruments such as preference shares, debentures, and warrants are excluded in the computations.

Different 'tables' of Top Companies are generated for the benefit of investors. Among these are Top 100 Companies over one year and five years on the criterion of compound growth (as explained already); Top 50 Companies ranked separately on the criteria of return on equity (ROE), profit after tax, and turnover growth. Other "tables" are for the 30 Worst performers over one year and five years on compound growth; Top 20 Properties Companies over one year on compound growth; and previous winners over the previous twenty-eight years. The Business Times defines ROE as a quick reference guide on the profit a company is able to generate out of the capital provided by its shareholders. Profit after tax and turnover growth are not defined.

2.2.4. (b) The *Financial Mail* Survey

The *Financial Mail* conducts the survey annually with the aim of identifying Top Companies. The source of the synopsis below is Theobald (2002, 2003, \$49.4) Foreword to the 2002 Top Companies Supplement suggests that company reporting has come under the spotlight owing to the collapse of Enron, Global Crossing and Kmart in the United States of America. The foreword goes further to point out that reporting has become an issue locally with the collapse of Regal Treasury Bank and LeisureNet.

The Top Companies survey is not "just about winners, but also about how South Africa's companies rank against each other on a wide range of

factors" – from turnover to debt levels. Since 2003, the Top Companies surveys broke away from a 36-year-old formula, and took into account comments by readers. The survey concentrates on three categories: SA's Top 20 Companies, the SA Giants, and the 200 Top Performers. The University of Pretoria's Bureau of Financial Analysis (BFA) conducts the research independently. The annual reports of the 400-odd listed companies on the JSE are analysed (April is the cut-off date for the receipt of annual reports).

Prior to 2003, measures were purely quantitative based on the historical financial and share price performance of the companies. The measures now include qualitative measures. These are corporate governance, investor communication, strength of management, 'investability' ("volumes traded and value-buy at current prices"), industry profit prospects, and individual formany profit prospects. The approach for the selection of SA's Top 20 Companies is by means of a quantitative measure of three ratios, and a qualitative measure of the six elements given above. The three ratios are internal rate of return (IRR) of the share price, earnings per share (EPS) (5 year compounded growth), and return on equity (ROE) for the latest year. The weights of the three ratios are 40%, 40% and 20% respectively. Excluded are companies with a market capitalisation of below R1bn. The IRR is a market related return taking into account, by way of a discounted cash flow calculation, both share price movements and dividends paid". The share price five years ago is a cash outflow and all annual dividends during the five years (both cash dividends and dividends in

kind) as well as the share price at the end of the five years are cash inflows. The discounting rate applied (also the IRR) is the rate that equates the present value of cash-inflows with the cash-outflow at the beginning of the five year period.

EPS is used in the sense of "headline earnings per share as published by the companies" (the word 'headline' is not defined). The last ratio, ROE, is net profit expressed as a percentage of equity. In turn, net profit is after tax profit attributable to ordinary shareholders, but excluding extra-ordinary and exceptional items, deferred tax and amounts transferred to reserves. Finally, equity consists of ordinary share capital, all capital reserves and distributable reserves, including asset revaluations.

The finalists are determined by quantitative measures who are then assessed on the qualitative measures to determine the 20 Top Companies.

The SA Giants are the biggest 200 companies in South Africa. The companies are ranked by turnover, with the following additional information-total assets, market capitalisation, equity funds, and net profit. "Turnover would be as published by the company". The SE Handbook defines turnover as "total revenue excluding VAT". Total assets are fixed assets and current assets. Investments are valued at market value or at director's valuation, and land and buildings are valued at book value. Market capitalisation is the market value of all fully paid and issued ordinary shares at the closing price of the last trading day of April. The definition of the term 'equity funds' is similar to the equity definition given above.

The 200 Top Performers are ranked by IRR over a five-year period. Additional information given is EPS growth over 5 years, ROE over 5 years, Return on Assets (ROA) over 5 years, Dividend yield over 5 years, and pretax profit growth over 5 years. The IRR, EPS, and ROE are defined above. ROA is profit before interest, but after tax, divided by total assets.

In summary, the two surveys use different approaches to identify Top Companies. The *Financial Mail* 200 Top Performers criteria are almost similar to the *Business Times* criteria for identifying the Top 100 companies. However, the overall approach by the *Financial Mail* tends to go deeper, i.e. the use of the qualitative measures in the case of the Top 20 Companies, as well as the discounted cash flows in the case of the 200 Top Performers.

2.2.5. Financial Performance Measures as highlighted by South Africa's Top Companies

relies financial statements An external analyst on the an organisation/company as the most important source of information (De la Rey 1981:31). The financial statements of a public company are easily obtainable, since such companies are obliged by law to lay their financial statements before the annual general meeting (Section 286 of the Companies Act, as amended) for the benefit of shareholders being the most important source, the information they cover has shortcomings (De la Rey 1981:341:64h formation given, and given as audited, implies that everything is in order when, in fact, this is not always the case.

- The information is not always complete to allow a proper analysis. For instance, the values of assets (buildings, debtors etc.) are not always accurate. The notes do not always enable the determination, for instance, of the quality of debtors, particularly in those companies where sales are conducted on credit.
- Companies use different approaches to value stock, to calculate depreciation etc.
- Different companies use different approaches of presentation.
- De la Rey (1981:34-35) also raises the problem of the difference between economic profit and financial profit, and concludes that since there is no easy and practical way of determining economic profit, the corporate world has to make-do with the financial profit.

Bearing these shortcomings in mind, the exploration done in this study, of the financial performance measures highlighted by the companies, is confined to the information obtainable in the annual reports, that is, it does not include financial performance measures that could be internally applied by the companies and their definitions are summarized per Table 2. The definitions are confined to those given in the source documents, as well as the SE Handbook.

Table 2: Definitions of ratios tabled per Appendix E

DESCRIPTION	DEFINITION/FORMULA
Acid test ratio	Current Assets less stock/Current Liabilities
Assets turnover	Turnover/Average Net Assets
Cash to Equity	Net Cash/Equity
	Net cash defined as net cash inflow or outflow per cash flow statement Equity defined as Total Shareholders' Interest

Average number of days it takes to pay creditors
Current Assets/Current Liabilities
Debtors payment period in days
(Long-term Debt plus Short-Debt less Interest free Debt)/Total Shareholders' Interest
Total Debt/Total Assets
Usually referred to a Dividend per Share. In some cases this is referred to as 'distributions' – defined as including cash dividends and the cash equivalent of capitalization dividends. In the case of property companies, distributions include 'linked' debenture interest paid (Table continued on next page)

DESCRIPTION	DEFINITION/FORMULA
Dividend Cover	Headline Earnings Per Share/Ordinary Dividend per
EBITDA margin	Share EBITDA/Turnover
	EBITDA – Earnings Before Interest, Tax,
	Depreciation, and Amortisation
Headline Earnings Per Share	Ordinary earnings with exceptional items and their
(HEPS)	tax effects stripped out
Interest Cover	Profit Before Interest and Tax but after exceptional
	Items/Net Interest Paid
Net Assets per Share	Ordinary Shareholders' Interest/Number of Ordinary
	Shares in Issue
Net Profit margin (NP Margin)	Profit After Interest and Tax/Turnover
Net Working Capital/Revenue	Net Working Capital/Turnover
Operations Margin	Net operating Income/Turnover
Price received	US\$/ZAR price received per ounce/kg of metal sold
	as reported by company. Due to hedging programs,

	the price may not be in relation to the spot price
Production	Metals produced per kg (ZAR) or per ounce (US\$). In some cases more than one metal is produced. In such cases, if average figure/basket figure is not given, only the figure for the major metal is given
Return on Equity (Return on Shareholders' Funds)	(Attributable Income after extraordinary items plus Outside Shareholders Interest)/Total Shareholders Interest
Return on Total Assets	(Profit before exceptional items less Interest paid (Received) plus Income from Associates)/Total Tangible Assets

(Table continued on next page)

DESCRIPTION	DEFINITION/FORMULA
Share price	The ruling JSE price at the close of business on the last day of a company's financial year end
Stock/Inventory turnover	Number of days stock/inventory is held. Also referred to as 'stock days'
Total cash costs	Costs per kg (ZAR) or once (US\$) of metal produced
Vacancy factor	Average vacancy factor based on lettable space

Source: Top Companies Annual Reports

There are unique measures that are applied by some of the specialist companies (i.e. insurance, property, mining etc). These measures are not covered in Appendix E, but are given below together with their definitions (where these are available). Some of the ratios/measures are not defined either in SE Handbook or in the relevant annual reports. While some of these ratios/measures are self-explanatory, their definitions are not assumed.

2.2.5. (a) Unique performance measures as highlighted by the companies (Source: Top Companies Annual Reports)

• The ratios/measures of mining companies

Yield in grams per ton	Gold output by smelters in grams, divided
	into the number of tons milled

• The ratios/measures by property companies

Measure/Ratio	Definition/Formula
Administration and collection fees to turnover	Not defined
Distribution per linked unit	Dividends including capitalization dividends
Operating cost to turnover	Not defined
Operations Return on Investment	(Net Rental Income plus Dividend Income)/Fixed Assets plus Investments
Net assets value per linked unit	Linked unitholders' Interest/Number of linked Units in Issue
Shareholders Return on	[(Number of Units in Issue*Distributions per
Investment/ Return on linked	Share)/Total Shareholders' Interest]/1000
unitholders' funds Operating Income : Turnover	Net rental Income/Turnover

• The ratios/measures by Insurance companies

Management expense ratio	Not defined
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Operating ratio	Not defined
Underwriting result as a % of earned premiums	Not defined
General Insurance result as a % of earned premiums	Not defined
Claims ratio	Not defined

2.2.5. (b) Overview of the Financial Performance Measures highlighted by the Top Companies

The literature on ratio analysis, on both the positive and negative aspects, has been discussed earlier in the chapter. The financial performance measures highlighted by the Top Companies have brought to light financial measures that are not covered in the rest of the literature review. The more prominent measures that have come to light relate to 'earnings', and 'dividends'. These elements are important in any business. Hence, there are critical questions raised on them in the literature - not as performance measures, but as crucial financial management areas.
The payment of dividends is highlighted by the Top Companies as a performance measure. The grey area is that dividends are the basis for the cost of equity. The payment of dividends is also a criterion in the surveys by the media in the determination of Top Companies. The cost of equity contributes to the weighted average cost of capital (WACC) of an enterprise. The literature cites two techniques for measuring the cost of equity, i.e. the constant-growth model and the capital asset pricing model (CAPM). (Gitman 2000:460.) The constant-growth model (also referred to as the Gordon model), is based on the premise that the value of a share is equal to the present value of all

future dividends. The dividends are assumed to grow at a constant rate over an infinite time frame. Since the dividends represent returns on shares or equity, the dividends represent the cost of the shares or equity. The expression for the cost of equity is

$$Ks = \frac{D}{Po} + g$$

Where

Ks is the required rate of return on equity

D/ is the per share dividend expected per year

Po is the value of equity per share

g is the constant rate of growth in dividends

(Gitman 2000:460.)

Since dividends on ordinary shares are paid from after-tax profits, no tax adjustment is required (Gitman 2000:460). In the ordinary cause of matters, dividends do not grow at a constant rate. The calculation of the growth rate may, therefore, be determined by means of the present value interest factor (PVIF) table, or by means of a financial calculator (Gitman 2000:460).

The CAPM links together the non-diversifiable risk and the return on assets. The non-diversifiable risk, or systematic risk, cannot be eliminated or diluted by means of diversification. This type of risk would arise from factors such as war, inflation etc. (Gitman 2000:256). Since the data required to apply the CAPM are not covered in the data collected for this research study, no further discussion is necessary in organisation is a very important part of the total structure of the organisation. A consideration of costs, therefore, would

usually start with the costs of capital, which would then determine what the best capital structure (a mix of any of equity, preference shares, and debt) should be. This is referred to as the optimum capital structure - defined as a point where the WACC is the lowest. Debt is negotiated with lenders, and an organisation does not have control over this instrument. On the other hand, the dividend policy of an organisation is an important financial management tool that guides the providers of equity on the level of returns. (Gitman 2000:464.)

Therefore, the management of an optimum capital structure may be achieved by means of a reasonable level of debt; reasonable payment of dividends; the maintenance of adequate levels of retained earnings and reserves; and overall, the full utilisation of the tax shelter available (Weston & Fne use of earnings and dividends as performance measures, therefore, needs to be analysed critically, bearing in mind the cost of equity/retained earnings in relation to the optimum capital structure (Weston & Copeland 1986:601).

1986:601). 2.2.5. (c) Adequacy of the information covered in the annual reports and the fourth research question

Cilliers (1967:12) has pointed out that a prudent analysis of the financial position of an organisation can only be done if the required information in the financial statements is adequate. In other words, the analyst should have little or no room for making assumptions. Therefore, any gaps in the computation of the financial measures per Figure 5a (research instrument), seen together with the importance of any gaps in the ratio analysis per

Figure 5a, should provide a conclusion on the adequacy of the information carried in the annual reports of the Top Companies.

2.3. Conclusion

In this chapter, the broad field of business management and its disciplines were discussed. The discussion was narrowed to the specific sub-discipline of financial performance management as a sub-discipline of investment management. The tools that are available to measure the performance were also discussed. The tools covered are financial statement ratio analysis and interpretation, and the bankruptcy prediction models.

Measurements used by the media to identify Top Companies were also discussed. These have been included because the measures form part of the arsenal of measures that are available. It is also possible that the companies may be adopting these measures to keep ahead in the race.

Finally, the performance measurements highlighted by the Top Companies were discussed. The purpose was to unearth any financial measures not discovered in the literature review, and to strengthen the arsenal of massures that are available. The exploration covered both theory and practice.

NOTE AA

RATIOS DROPPED BY DE LA REY DUE TO VARIABLES NOT READILY AVAILABLE

- Inflation adjusted Income Before Interest, Tax, and Investment Income / Turnover
- o Income after Tax / Turnover
- Turnover / Average Cash and Bank
- o Gross Cash Flow / Turnover
- o Turnover / Debtors
- o Turnover / Stock
- o Turnover / 'Quick' Current Assets (as in the case of the Quick/Acid
- o Tash)over / Current Assets
- o Net Current Assets / Turnover

- o Realisable Net Quick Assets / Turnover (Current Assets excluding
- o Turnover / Inflation adjusted Actual O™ Equity
- Turnover / Inflation adjusted Actual Total Assets
- o Turnover / Inflation adjusted Fixed Assets
- o Market Capitalisation / Inflation adjusted Actual Owner's Equity
- o Market Capitalisation / External Financing

CHAPTER 3

METHODOLOGY

3.0. Introduction

This chapter spells out the process followed to be able to arrive at a conclusion on the research questions and the research problem. Since this research study is exploratory, the methodology is qualitative. Qualitative research is loosely defined as an approach that investigates the participant's opinions and experiences from the informant's point of view – the approach focuses on subjective data rather than numbers. Although numbers feature prominently in this research study, they are merely a means of communicating the arsenal applied to measure financial performance. The research takes a detailed look at the subject matter under investigation without a "prior commitment" to any "theoretical model" (Yin 1989:25).

The chapter starts by setting out the justification for the methodology by taking a closer look at the research problem, in relation to the information gathered from the literature review. This is followed by an exposition of the unit of analysis, the subject matter and the sources of data. The discussion proceeds to explain the data collection approach, as well as any shortcomings in the administration of collecting the data. Methodological limitations are discussed, as well as any adjustments to the data. A brief note is given on any software requirements. The last section deals with ethical issues.

The chapter is concluded with an overview of the methodology.

3.1. Justification for the methodology

The methodology is justified on the following grounds.

3.1.1. The research problem and the literature review

The research problem 'Do South Africa's Top Companies use the available arsenal to measure their financial performance?' can best be assessed by means of performance measures that are available in both theory and in practice. Further, the measures need to be well-grounded for use as reliable financial performance measures.

The best source of theory is literature, while various sources are available for the measures used in practice. The host of measures available in theory, as well as those used in practice, were sourced from the following: the literature dealing with the interpretation and analysis of financial statements, the literature dealing with the development of the bankruptcy prediction models, the surveys done by the media to identify Top Companies, the finance periodicals, the rating agencies, the annual reports of the Top Companies, and the SE Handbook.

These sources provide good information on the arsenal of financial performance that is available. As part of the methodology, the most important area of the research problem is the identification of the highlight measures applied by the Top Companies. This is done by studying the annual reports of the Top Companies.

3.1.2. The research instrument

The research instrument is designed and developed after a critical analysis of the usefulness of ratio analysis and interpretation as well as the bankruptcy prediction models. These measures are the subject of discussion in Chapter 2. While ratio analysis and interpretation enjoy popular use, the bankruptcy prediction models do not seem to enjoy popular use. For this reason, one of the models was tested as part of the pilot study to determine whether or not the model could serve a purpose in this research study. The result of the pilot study made it necessary to effect minor adjustments on the model for use as part of the instrument.

Most of the available arsenal of financial performance measures is discussed in Chapter 2. These measures are critically analysed to test their usefulness as well as their inter-relatedness. Those found to be useful in conveying an inter-related flow of analyses are included in the development of the instrument for this research study (Figure 5a).

3.1.3. Unit of analysis and sources of data

The sample for the research study is selected from the *Financial Mail* 200 Top Performers for 2004. Since the criteria for determining the Top Companies are based on financial performance, these companies must be experts on financial performance. The companies must also be role models in the corporate world.

The sources of data are, mainly, the annual reports of the Top Companies. An annual report carries a host of information on a company. The accounting data (including all relevant information) are the important area. The SE Handbook is also a data source and carries information such as share prices at year-end, dividends declared and paid during a financial year, and company sectors.

Since the Top Companies are public companies, their accounting data are easier to obtain. Also, the regulatory framework applicable to public companies validates, in some way, the "truth value" of the accounting data of the companies.

3.1.4. The data collection procedures

The annual reports (the source of accounting data) are usually available in libraries and on the internet. These points of collection are easier to administer even though the internet, in the absence of internet addresses, may prove to be time consuming. Alternatively, the annual reports may be obtained from the Top Companies (these may be requested per e-mail, telephone or facsimile message). Profile's Stock Exchange Handbook is obtainable from book stores, or direct from Profile Media in Johannesburg, at a price in both instances.

3.1.5. Administration of data collection procedures

The administration involves keeping a register of accounting data obtained and the sources (i.e. library, internet etc). Where a sample unit is approached with a request for an annual report, record is kept of the mode

of communication and the interaction. An acknowledgement of receipt and a note of thanks are sent to a sample unit when accounting data is received. The purpose of keeping a record is to ensure tracking of the data. For instance, an annual report obtained from a library has to be sent back before the return date. Should there be a need to refer to such annual report after four months (during or after the preparation of the report), it would save time to know immediately where to locate such report (i.e. there would be a note such as 'returned to the library' or 'on file (hardcopy or electronic copy)'.

3.1.6. Methodology limitations

Limitations in the methodology relate, in the main, to the computation of ratios in the application of the research instrument, the diversity in the format of the accounting data of the sample unit, the difference in the financial years of the sample, and the feasibility of applying the research instrument (Figure 5a) on a sample of sixty companies. These limitations are discussed under paragraph 3.6.

3.1.7. Analysis of data

The methodology followed to unravel the research problem involves three broad stages (these are broken down under paragraph 3.7. – Other methodology issues):

- The measures highlighted by the Top Companies are tabled and interpreted.
- The instrument developed for this research study (Figure 5a) is applied with the view to analyse and interpret the financial position of

the companies. This is done with reference to, and analyses of the measures highlighted by the Top Companies.

Figure 5a, the 'ratio map and Z-Score' is developed from the literature review in Chapter 2, after a critical analysis of the usefulness of ratios and their interpretation, and the usefulness of the bankruptcy prediction models. Figure 5a is a group of interrelated ratios and a bankruptcy prediction model (the Z-Score model).

 Conclusions on the research questions and the research problem are then drawn.

The first two steps are the core of the research problem as they cover the practical use of the arsenal of performance measures identified as available. The third step draws conclusions, from the first two steps, and addresses the research questions and the research problem. Whether or not the Top Companies use the available arsenal (bearing in mind that internal financial performance measures have not been explored), can only be determined over time, using the trend in the financial performance of the Top Companies as an indicator.

3.2. The development of the research instrument

As a starting point, financial ratio analysis and the more popular bankruptcy prediction models are discussed critically.

3.2.1. Financial Ratio Analysis and Interpretation

It is submitted that ratio analysis and interpretation still serve as a very useful measure. Each ratio is intended to identify specific strengths or weaknesses of a firm. Just as a doctor will do several tests to determine a diagnosis, the analyses of ratios assist in identifying specific strengths and

weaknesses of a firm. As suggested by Altman (1968:589), the gap between the modern statistical techniques and the traditional ratio analysis needs to be bridged.

The interpretation of financial data can only be meaningful if the quality of the data is beyond doubt. This means that the data, not necessarily deviating from the accounting principles, need to be presented in such a manner that a knowledgeable reader, or an analyst, may find answers to questions that may arise in his mind, within the presented data. In other words, the task of the reader or analyst should be made easier so that assumptions are kept to a minimum. This can possibly be done by giving more information in the notes to the financial statements. As pointed out by Cilliers (1967: 12), the financial statements can only be read with meaning by means of "a prudent analysis and interpretation of those statements". It is submitted that this can only be done if 'valuable' information is given in the financial statements. This aspect is dealt with in the discussion on the various ratios.

In this research study, it is held that the important ratios fall under three categories: profitability (mainly Income Statement and to a lesser degree, Balance Sheet), liquidity, and solvency (Balance Sheet). These may be called the parents of ratios.

3.2.1. (a) Profitability

Profitability arises from the operations of a firm. This can be likened to an engine room which makes it possible for the ship or train or car to move. The

operations unit of a firm is the engine room, where goods are bought and sold, giving life to the firm so that profits may be made.

The importance of the ratios under this umbrella flows from the profits earned, as well as the measurement of such profits in relation to other aspects of the firm. To borrow from Beaver (1966:80), a firm is a reservoir of liquid assets, which is fed by inflows and reduced by outflows. The difference between the inflows and the outflows (not necessarily relating to cash-flows) is profit. Sales represent the inflows while the expenses incurred to generate the sales represent outflows.

Finally, the profit has to be related to other aspects of the firm to be able to determine the reasonableness of such profit, i.e. profit in relation to total assets (return on investment).

The popular ratios found in literature, and which also enjoy application in practice are: profit margin on sales, return on total assets, return on net worth (equity), and headline earnings per share. It is deemed that the ratio 'gross profit margin on sales' is an important ratio even though it does not appear to be popular in the literature and in practice. Part of a thorny issue with this ratio is that, for public reading, the ratio is strategic since it measures the efficiency of sales against the internal pricing policy.

<u>Gross Profit Margin on Sales</u> (a measure of gross profit in relation to sales) is an important ratio that measures the efficiency of the sales activity. Sales are conducted with the view to making a profit. In the ordinary course of running a 'manufacture and sell' firm, or a 'buy and sell' firm, a margin is attached to the cost of the goods to be sold. During the course of selling the goods, numerous problems such as obsolescence, shrinkage, pilferage, and marketing gimmicks (discounts) creep in. The 'creeps-in' may result in reduced margins. As a first step, the efficiency in the sales activity must be assessed by means of the gross profit margin on sales.

<u>Profit Margin on Sales</u> (a measure of profit after tax in relation to sales) has to be read together with the reasonableness of the gross profit margin on sales. If the latter ratio is far below the average mark-up percentage on sales, and no immediate reason for such a level can be advanced, the profit margin would be meaningless since problems would have probably occurred at the sales activity level.

Return on Equity (ROE) (return on shareholders' funds) and Return on Total Assets (ROA) (return on total investment) need to be read together as they convey almost the same message. While the ROA depicts the return on total investment, including the debt financed portion, the ROE depicts only the return on the portion contributed by the owners as well as any reserves built over time. The ratio may be useful since it shows whether or not the return on the shareholders' funds is reasonable compared to market prices. However, ROE need to be interpreted critically since equity may represent a small proportion of total capital, giving rise to a high ROE. Also, ROE is calculated after the costs of debt, but before the cost of equity. Both ROE and ROA need to be read together with the debt ratio discussed under solvency below.

<u>Headline Earnings per Share</u> (HEPS) (Ordinary earnings with exceptional items and their tax effects stripped out) is a measure which indicates how much of the attributable profit is represented by each share. The measure is particularly useful when dividends are being declared - under normal circumstances, a higher dividend than the HEPS would not be logical.

The ratio that is not included in the list of popular ratios is *Price/Earnings* (*P/E*) *Ratio* which is used to estimate the value of a firm's share. While the estimate of the value of a share relates to the value of the firm, it is not necessarily a true measure of profitability or performance of a firm; hence this tool is not included under measures. Gitman (2000:145) supports this view. The market price of a share is affected by numerous factors and may, therefore, not necessarily be ascribed to profitability or performance.

Generally, the importance of profitability cannot be over-emphasis as it feeds the liquidity of a firm.

3.2.1. (b) Liquidity Ratios

Liquidity ratios indicate the extent to which a firm is able to cope with its current commitments, i.e. the operations as well as the payables, including the current portion of long-term payables. The current ratio is applied as the liquidity measure. This ratio is discussed, together with the cash flow coverage, the Acid test ratio, and the defensive interval measure.

<u>Current Ratio</u> (the extent at which current assets exceed current liabilities) is a useful ratio as a measure of liquidity. The ratio is also popular as borne out in the literature. However, its validity and usefulness depend on the quality of

information provided in the accounting data. Since the inventory value is normally given in a broken down manner, showing: raw materials and work-in-progress (where applicable), finished goods, and obsolete goods, the computation of the current ratio is made much easier, and can also be validated (all things being equal). The analysis of inventory, coupled with the 'inventory turnover' measure, can give a good indication of the liquid value of inventory. Similarly, additional information on debtors is important to determine the quality, that is, which portion is recoverable and which portion should be provided for as bad debts.

The determination of the quality of debtors (debtors may, in some instances constitute a major portion of current assets) may be facilitated by providing, in the accounting data, a broad note on the debtors. The activity ratios - debtors' collection period (number of days it takes to collect outstanding debts) - as well as the debtors' age analysis (classification of debtors in terms of days outstanding) are useful tools. It is accepted that these may have been taken into account in the provision for bad debts. But, for the benefit of an analyst, a note showing the closing debtors, debtors overdue (say more than ninety days depending on the credit policy), and the collection period would assist the analyst to form an opinion on the reasonableness of the bad debts and the provision for bad debts. This would then give an indication of the quality of the debtors that may be regarded as 'liquid'. However, the debtors' collection period may not always give a true reflection of the actual position since part of the turnover may be cash sales.

This problem may be overcome by a classification of credit sales and cash sales in the accounting data notes. In the absence of this information, the age analysis is a more reliable tool (all things being equal).

A further screening tool for debtors is a table of *recovery rates* (payments during a period as a percentage of total charges for that period). This tool is however, only practical in those instances where sales are on terms such as 'payment on presentation of invoice' with a grace period of, say, thirty days. In the case of longer terms, the recovery rates would need to be tailored in terms of the instalments due within the financial year. The recovery rates may serve as a validation test of the collection period (where credit sales are disclosed), and, of the age analysis.

The current ratio, as a liquidity test, is an important step in determining the financial position of a firm. It is the gate-keeping point of the operations of a firm. If liquidity is poor, operations may not continue as short-term commitments may not be honoured.

A supporting ratio to the current ratio is the 'cash flow coverage'.

<u>Cash Flow Coverage</u> (a measure of cash in-flows in relation to preferred outflows) is a useful measure in support of liquidity. It is a measure that needs to be computed regularly as part of cash management. Whenever this coverage is low, the current ratio would also be low, depending on the depth of analysis of the current assets components.

The <u>Acid Test ratio</u> is similar to the current ratio except that inventory is excluded from the current assets. The reason for the exclusion is that

inventory may not be converted into cash immediately, i.e. part of the inventory may be partly completed items. Also, even if the total inventory were to be sold within a short space of time, part of the sales may be conducted on credit.

Inventory is analysed (broken down) in the financial statements as pointed out above. On the question of credit sales, debtors are included in the computation of the acid test ratio even though not all debtors may be recoverable, either immediately or in the future. It does not seem logical therefore, to include debtors, which may not be converted into cash immediately due to the possibility of bad debts. The acid test ratio, therefore, is regarded as having no value in the analysis because of the uncertain value of inventory and/or debtors. As long as adequate information is provided on inventory and debtors (see current ratio) the acid test ratio would be easily covered by the current ratio.

<u>Defensive interval measure</u> (an estimate of the cover of projected daily operating expenditure in days) is an internal measure which is part of cash management. This measure can also be covered, outside the confines of the cash management activities, by the current ratio and the cash flow coverage ratio.

Other ratios with an effect on liquidity

The discussion on the current ratio above, includes a discussion on the activity ratios (per classification given in Chapter 2). The 'activity ratios' are *inventory turnover* (cost of goods sold divided by inventory/stock) and the

average collection period (accounts receivable divided by 'sales divided by 365 days'). It is submitted that these ratios serve a supporting role in the determination of liquidity.

In this study, the mentioned activity ratios are grouped with other liquidity support tools, i.e. the age analysis and the recovery rates. The ratio on *payment of creditors* ('creditors' divided by 'expenses divided by 365 days') is also a useful tool for testing the soundness of liquidity. If the payments to creditors are poor, while the liquidity is good, further investigation may be necessary. However, the accuracy and value of the creditors' payment period depend on the quality of the information on creditors, provided in the accounting data (i.e. an analysis of creditors showing the different components – trade, tax, dividends etc, as well as the creditors specifically outstanding for expenses).

The accuracy of liquidity depends on the accuracy of the support ratios that validate the current ratio. Liquidity is important in that it is a feeder to the solvency of a firm.

3.2.1. (c) Solvency

The ratios under this umbrella give an overall picture of the financial position of a firm. A firm is financially sound if its total assets exceed its total liabilities. This is referred to as the debt ratio. The higher the difference, the more comfortable the owners would be that their investment is safe. The ratios applied under solvency are the debt ratio, the debt/equity ratio and a 'reasonableness test' of the optimum capital structure.

<u>Debt Ratio</u> (calculated as total liabilities divided by total assets) measures the solvency of a firm. A firm whose total liabilities exceed its total assets is insolvent, i.e. it is regarded as incapable of meeting its obligations, and is therefore bankrupt. As important as this ratio is, it needs to be seen with other ratios to make the analysis meaningful. An important ratio in support of the debt ratio is the debt/equity ratio.

Debt/Equity ratio (a measure of debt in relation to equity) supports the debt ratio in that it confirms the capital structure in relation to the financed assets. The goodness of this ratio is determined with a test of the capital structure optimisation.

<u>Capital Structure</u> is the financing of a firm represented by long-term debt, preference shares, and shareholders' equity (Weston & Copeland 1986:553). Optimum Capital Structure (OCS) is a level at which the weighted average cost of capital (WACC) is at a minimum (Gitman: 2000:517). The calculation of the WACC and the assessment of the level of the WACC is the 'reasonableness test' referred to above.

As pointed out, the *debt ratio* determines the solvency of a firm, and is influenced by the capital structure. In turn, the test for the appropriateness of the capital structure is the WACC. The WACC assists a company to keep its solvency in check and, at the same time, monitor the costs of financing. This is achieved by means of the cost of capital test. In this sense, a test for an OCS is indispensable as part of performance measurement. The test

determines whether or not the costs of capital are kept to a minimum, thereby enhancing the maximisation of the value of the firm.

Solvency is the most crucial measurement. This is where the overall financial state of a firm may be seen. For instance, a debt ratio of 90% would indicate that the firm is possibly heading for troubled times, implying for instance, that not enough cash may be generated to feed, via liquidity, the solvency.

The aspect of capital structure is dealt with in the financial literature, but not so much as a performance yardstick. As a result, it has not been discussed in depth in the literature review. The cost of capital is affected by three factors: the tax benefit in the case of debt, possible agency and bankruptcy costs.

The Cost of Capital and its effects

The interest paid, as price for debt, is deductible for tax purposes. A firm that is financed by internal funds (equity) only, without debt, is not able to enhance its value by means of this tax shelter. The benefit of using the tax shelter, referred to as leverage, comes in the form of increased net inflows which add to the value of the firm. This would be the case at some point in the level of the debt/equity ratio. An example may illustrate this aspect.

The leverage factor is illustrated by means of two assumed companies, Boikanyo Ltd (Boikanyo) and Khumo Ltd (Khumo). Table 3 gives a comparison of the financial position of the two companies.

The data for the two companies are the same, except for the capital structure (lines 1 - 8). The operations income is the same (line 9). Since

Boikanyo carries no debt, she does not have interest charges (line 10). As a result, her profit after tax is more than the profit posted by Khumo (line 13). The return on equity (ROE) for Khumo is higher (line 14) (the value of ROE ratio is discussed in this report), and the WACC is lower than that of Boikanyo (line 18) - a result of the tax shelter (the cost of debt is post-tax in the computation of the WACC). However, the return on total assets is the other way around – that of Khumo is lower (line 15). The reason is that the net profit after tax in the case of Khumo is lower while the total assets for both companies are the same (line 3). The benefit of leverage is still evident though - the difference in the net profit after tax between the two companies, is R9 100 (line 13), which is lower than the interest charge of R14 000 in the case of Khumo (line 10).

Table 3: Illustration: Comparison of a levered and an un-levered company

Details/D			
Capital Structure Data	Line No.		
Equity	R 1 000 000	R 800 000	1
Debt (bullet payment*)	R 0	R 200 000	2
Total Capital	R1 000 000 R1 0		3

^{*} Bullet payment: annual interest payments and single capital payment at maturity

Other Data	Boikanyo Ltd	Khumo	Line No.
Number of shares	100 000	80 000	4
Price per share (cents)	1000	1000	5
Cost of debt (before tax)	7%	7%	6
Dividend per share – last few	100c	100c	7
Cost of Equity*	10%	10%	8

^{*} Calculated as Dividend per share divided by price per share

Income Statement	Boikanyo Ltd	Khumo	Line No.
		Ltd	
Operating income	R 250 000	R 250 000	9
Interest charges	R 0	R 14 000	10
Income before tax	R250 000	R236 000	11
Tax @ 35%	R 87 500	R 82 600	12
Net Income after tax	R 162 500	R153 400	13

Results	Boikanyo Ltd	Khumo	Line No.
Return on equity	16%	19%	14
Return on Total assets	16%	15%	15
Debt/Equity Ratio	N/A	25%	16
Debt ratio	N/A	20%	17
Weighted Average Cost of	10%	8.91%	18

Source: Developed for this research study from the literature review (Chapter 2)

Table 3a illustrates, in the case of a levered company (Khumo Ltd), the effects of changes in the capital structure (lines 2 – 9). Three scenarios are compared (line 1). Equity remains the same, while debt increases (lines 2 and 3). Each time debt increases, the risk level becomes higher, resulting in an effect on the cost of debt as well as an effect on the cost of equity (lines 7 and 9). However, the WACC decreases (line 19) up to a point where equity is equal to debt (scenario 2 – lines 2 and 3). From this point, increases in debt (line 3) result in a significant increase in risk, resulting in an increase in the WACC (line 19). At a point where the debt/equity ratio reaches 1.38 (scenario 3 – line 17), the WACC increases to 9.71%, from 8.75% (line 19).

Based on Table 3a, the OCS can be said to be at the lowest when the debt/equity ratio is at a level of 1.00 (scenario 2 – line 17). At this point, the profit after tax is higher compared to the other two scenarios (scenario 2 – line 14), the return on total investment is 11% (scenario 2 – line 16) (which is higher than the WACC of 8.75: scenario 2 - line 19).

At a debt level of R1 100 000 (scenario 3 – line 3), the inference is that Khumo would be in trouble. This would bring the capital structure to an imbalance. The increase in the cost of equity would most probably be the result of agency costs, while the increase in the cost of debt would be the result of bankruptcy costs.

Agency costs relate to the efforts that may need to be taken by the shareholders to ensure that management plays its part. The increase in debt leading to a debt/equity ratio of 1.38 would see the shareholders make an effort to ensure that their investment is safe. This may result in extended monitoring procedures which would attract additional monitoring costs aimed at ensuring that the management is Table 3a: Illustration: Effects of changes in the capital structure of a levered

Table 3a: Illustration: Effects of changes in the capital structure of a levered company

Capital Structures		Line No.		
Capital Structures	Scenario 1 Scenario 2		Scenario 3	1
Equity	R 800 000	R 800 000	R 800 000	2
Debt (bullet payment*)	R 400 000	R 800 000	R 1 100	3
Total Capital	R1 200 000	R1 600 000	R 1 900	4

^{*} Bullet payment: annual interest payments and one capital payment at maturity

Data	Scenario 1	Scenario 2	Scenario 3	Line No.
Number of shares	80 000	80 000	80 000	5
Price per share (cents)	1000	1000	1000	6
Cost of debt (before tax)	8.6%	10%	12.7%	7
Dividend per share (cents) –	106	110	117	8
Cost of Equity*	10.6%	11%	11.7%	9

^{*} Calculated as Dividend per share divided by price per share

Income Statement	Scenario 1	Scenario 2	Scenario 3	Line No.
Operating income	R 300 000	R 350 000	R 400 000	10
Interest charges	R 34 400	R 80 000	R 139 700	11
Income before tax	R265 600	R 270 000	R 260 300	12
Tax @ 35%	R 92 960	R 94 500	R 91 105	13
Net Income after tax	R172 640	R 175 500	R 169 195	14

Results	Scenario 1	Scenario 2	Scenario 3	Line No.
Return on equity	22%	22%	21%	15
Return on Total assets	14%	11%	9%	16
Debt/Equity Ratio	50%	1.00	1.38	17
Debt ratio	33%	50%	58%	18
Weighted Average Cost of	8.93%	8.75%	9.71%	19

Source: Developed for this research study from the literature review (Chapter 2)

running the firm efficiently.

In the early 1990s, the shareholders at IBM took a step to overcome the agency problem. They created a structure that ensured management and shareholders alignment. At the time, IBM was said to be in "a lot of trouble". The crucial turnaround plan was to insist that the "executives take positions alongside the shareholders". In terms of the plan, the executives could not receive share (stock) options until they had a multiple of their salary – up to four times – in company shares bought on the open market. IBM had a successful turnaround. (Antill 2006.)

Bankruptcy costs relate to lenders taking more stringent measures as a result of the higher risk of default brought about by additional debt.

The view held, therefore, is that the debt ratio, as the ultimate ratio that determines the solvency of a firm, must be read together with the debt/equity ratio, return on equity (which requires a critical analysis), return on total investment, and, as a final test of the OCS, the WACC.

3.2.1. (d) An overview on Financial Ratio Analysis and Interpretation

It is concluded that ratio analysis is still a useful tool for determining the financial strength of a firm. As a result, the first stage of the instrument for this research study is built on ratio analysis and interpretation.

3.2.2. The first stage of the development of the research instrument

The analysis and interpretation of ratios need to be seen in their interrelatedness and not as individual measures. Shim (1992) has suggested that, to overcome some of the shortcomings of ratio analysis, it is necessary to combine "mutually exclusive ratios into a group to develop a meaningful predictive model". In this study, the intention is not to develop a predictive model, but to combine the ratios into a group to facilitate the analyses in an interrelated manner. Even as a group, the individual ratios may identify specific problems within the firm. One ratio leads to another and two ratios may be used to check on the validity of one or two other ratios.

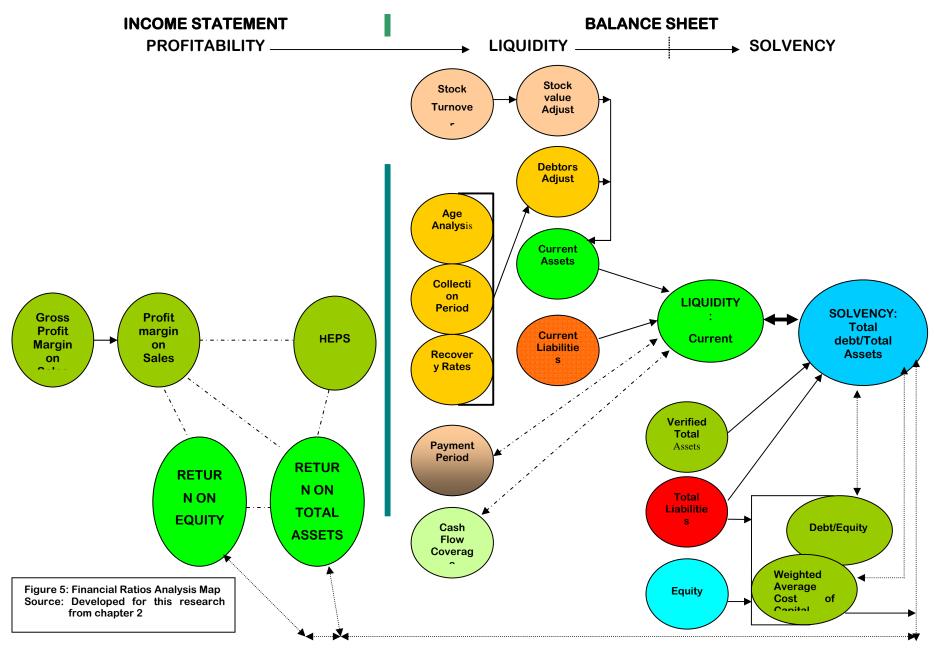
Figure 5 illustrates the instrument - the financial ratio analysis map which is derived from ratios. The map may be seen as similar to the DuPont System of ratio analysis. While the DuPont system emphasises return on equity (the remarks by de Wet and du Toit (2007:60) need to be borne in mind), the ratio map analyses (Figure 5) emphasise solvency and its up-keep. Basically, the ratio map proposes that profitability feeds liquidity and that liquidity feeds insolvency.

Solvency is the solid reservoir content of a firm (total assets: current, fixed and long-term) and how this content is financed (equity, long-term and short-term debts). This is the point where any effects on the investment in assets,

as a result of either good or bad financing performance (debt/equity ratio and debt ratio), would be evident. Figure 5 emphasises vigilance on the relationship between total debt and total assets; the debt/equity ratio and the capital structure; the return on total assets and, remotely, the return on equity.

Secondly, figure 5 emphasises liquidity (the liquid reservoir) as the next step.

That is, if the solvency is good, is liquidity also being maintained at good levels? This is important because liquidity feeds solvency.



Thirdly, profitability is the result of the activities in the engine room – the operations. If profits are good and are managed well, liquidity will be maintained at good levels.

The development of the ratio analysis map (Figure 5) starts with the Income Statement analysis. The gross profit margin is analysed by comparing it to the mark-up percentage as a benchmark. This is followed by the profit margin on sales. If the two ratios are good in terms of standards, then the return on total assets (total investment), and the headline earnings per share should be according to standards.

The development of Figure 5 then moves to the analysis of the Balance Sheet. Liquidity check is initiated with an analysis of the stock (inventory) turnover which would be used to adjust the stock figure (leaving out any obsolete or slow moving stock or, alternatively, applying a mark-down valuation). This would be done after analysing the break-down of stock in its different components. The debtors are also analysed in terms of age analysis, collection period (where possible), and recovery rates (where appropriate) leading to the adjustment of debtors by means of a provision or an adjusted provision for bad debts.

Both the adjusted stock and adjusted debtors are then carried to total current assets, and together with current liabilities, the current ratio is computed. The next step is to compute the cash flow coverage ratio and the creditors' payment period. These are then compared to the level of the current ratio. If the current ratio is good but creditors are not being paid well, then there would be a gap for analysis. If the cash flow coverage is

good then the current ratio should also be good. Otherwise, it would mean that after the payment of committed outflows from 'cash' profits, very little or nothing gets left for other outflows. This activity, which critically examines the composition of the current assets, ensures that these assets represent a true liquid value as suggested by Gitman (2000:135).

The next step is to look at solvency. All asset values need to be verified, i.e. valuation certificates are necessary. A different verification approach would have been done in the case of inventory and debtors. The liabilities should be accompanied by a note that these have been confirmed with the lenders and creditors. The debt/equity ratio and the WACC are then computed.

The approach followed in the calculation of the WACC – the weighted cost of all the components of capital - is as follows:

Cost of Equity/retained earnings

The constant-growth model is adopted for the determination of the cost of equity. Using a financial calculator, the growth of dividends is determined for a four-year period from 2001 to 2004. The use of the Present Value Interest Factor (PVIF) table has not proved precise compared to the financial calculator. Where dividends do not show growth or have declined, the growth rate equals zero.

Cost of preference shares

The cost as disclosed in the accounting data is used.

Cost of debt

The cost of debt is taken as given in the accounting data, including the interest free portions. The cost of debt taken into account is 'after-tax' and is for all the components of debt (that is, short-term loans, bank overdraft etc).

The last lap is the computation of the debt ratio. Once this is done, it is viewed against the current ratio to ensure that the solvency is protected by a well-balanced liquidity. The debt ratio is further read together with the debt/equity ratio as well as the WACC. The WACC may initially not have meaning until it is compared to the WACC over time and after the determination of the optimum cost of capital level. The debt ratio is taken further by looking at the return on total assets and remotely, the return on equity.

Once the development of the map is complete, its reading and interpretation is done from the end, that is, at the solvency point. Any discomfort with the solvency can be diagnosed by moving backwards to relate the solvency to other ratios where problem spots may be identified.

The researcher holds the view therefore, that ratio analysis is still a useful tool. Ratios need to be read as a whole to be able to get an overall picture of the financial position of a firm. One of the propositions in the literature is that the analysis of ratios may require the examination of other related information (Moyer *et al.* 1984:153). The development of Figure 5 has attempted to narrow the gap for examining other related information, by suggesting that the related information should be incorporated in the notes to the financial statements.

3.2.3. The Bankruptcy Prediction Models

In chapter 2, a number of bankruptcy prediction models were discussed. The researcher views these tools as performance measures rather than bankruptcy prediction tools. One of the writers has posed the question: "... why forecast bankruptcy? This is a difficult question, and no answer or justification is given here" (Ohlson 1980:111). What would be the purpose? There are, in fact, organisations that could find purpose for these models as bankruptcy prediction models, i.e. government regulatory bodies which have to monitor the financial position of organisations that deal with 'public savings' such as banks, insurance companies, retirement funds etc.

In this research study, the models are viewed as useful tools for company financial performance measurement. In the final analysis, the verdict would be that company A is either too far away from the cut-off point or too close to such point. This would then lead to an analysis to determine the areas of strength (score above the cut-off point) or areas of weakness (score close to or below the cut-off point). The model, FRAM, developed by Naidoo (2006) is in line with this approach – the model uses a four-state classification, with two states between non-failed and failed.

Amongst the models discussed in Chapter 2, five of these stand out as popular: the Beaver (1966) model, the Z-Score by Altman (1968), the Zeta ® Model by Altman, Haldeman and Narayanan (1977), the K-model by De Ia Rey (1981), and the O-Score by Ohlson (1980). The discussion of the models in Chapter 2 led the researcher to weigh the pros and cons of the variables of the models, in comparison with the ratios per Figure 5. It was concluded

that the Z-Score model was appropriate as a test case in this research study. The salient aspects of the 'popular' models are briefly discussed, including the fairly new FRAM model. The Z-Score model is discussed last, including the motivation for its application in this research study.

3.2.3. (a) Beaver Model

The Beaver (1966) model has a fair space in recent literature. The model set the scene for the development of multivariate analyses by Altman and others.

With some thirty ratios, the model is quite complicated. Even in the discussion of the six selected ratios, coming to some conclusion proves cumbersome. The model was developed during 1966 and must have been appropriate at the time. No updates have been observed in the literature, except the study done by Daya (1977). The latter study was also done a long time ago. Since ratio analysis remains a big part of the corporate world, some of the ratios suggested in the development of this model may be useful. One important aspect raised and which has not lost its importance is the cash flow and the problems associated with high levels of debt.

3.2.3. (b) The Zeta ® Model

The Zeta ® Model is under proprietorship and its details are not available. The model was developed as an improvement on the Z-Score model. Since the details of the model are not available without subscription, the discussion on the model is limited.

3.2.3. (c) De la Rey Model

The K-Model by De la Rey (1981) has a fair space in South African dissertations/thesis. Some of the problems encountered during the development of the model are (De la Rey 1981:169):

- The model requires complicated calculations which must be carried out by a computer.
- The model is "not suitable to classify businesses according to a failure risk as it is inclined to give the same value to financially sound businesses as well as to all the financially failed businesses".
- The number of failed firms was not high enough to be representative for accurate results.
- Due to the limited number of listed companies at the time, the model was developed for the JSE industry sector as a whole, while a model per production sector would have yielded better results.
- Some of the firms do not include, in their annual reports, information that an analyst may need, i.e. turnover. This limited the choice of elements for the model variables.

The elements of the model are easily obtainable, except for adjusting for inflation since De la Rey (1981) has not indicated the inflation figure relative to time, which must be used. However, De la Rey (1981:146) admits that for practical reasons, an attempt was made to develop a reasonably reliable model, which can indicate to an investor the risk profile involved, while bearing in mind that reliability may not be placed on statistical purity.

3.2.3. (d) The Ohlson Model

A feature of the model is that, at face value, it is difficult to understand and to apply. The information relating to the variables may neither be easily understood nor easily available. The variable - SIZE - is a case in point. It is not easy to understand the model without referring to McFadden (1973),

whose work may possibly be better understood by mathematicians or statisticians. The descriptions of Models 1, 2, and 3 as given in Chapter 2 of this report, are intended to facilitate an understanding of the model.

Some writers have pointed out that the use of models is sometimes cumbersome as information is not always readily available, and that the computations are also sometimes difficult to carry out. The researcher submits that the model by Ohlson (1980) fits these descriptions.

The model was developed in 1980. The literature search has not revealed any model improvements, except the modification in the study by Lin and Piesse (2004).

3.2.3. (e) The Four-state Model – Financial Risk Analysis Model

The model is fairly new, having been developed during 2006. The four states of the model make it a valuable financial performance management tool. However, the "flexibility of the model" (Naidoo 2006:188) may create a loose application of the model. Naidoo (2006;188) believes that the flexibility of the model "allows" for the analysts to choose or add their own categories of ratios. This may lead to 'each analyst' using his own judgement resulting in loss of uniformity in analysis.

Since the model is still new, it still needs to be tested in practice to determine its reliability.

3.2.3. (f) The Z-Score Model

The Z-Score model features prominently in recent literature and Altman (2000) revisited the model about seven years ago. The variables for the model are readily available in the accounting data and in the newspapers

(share prices). The SE Handbook also gives share prices at the end of each company's year end. The model also caters for the different types of companies, i.e. public, private, manufacturers and non-manufacturers.

Comments on the model in recent literature portray a positive picture. However, Daya (1977) and De la Rey (1981) have pointed out that the model cannot be used locally without adjustment. The one adjustment that they proposed, related to turnover which, it would appear, was not disclosed in the accounting data. Turnover figures are now generally disclosed and the proposed adjustment no longer seems necessary.

A cursory view of the models discussed above shows the Z-Score model as an appropriate test measure of the financial position of the sampled South Africa's Top Companies. The intention is not to recommend the use of the Z-Score as a model superior to others. The dominating reason is that the variables of the model match fairly well with commonly used ratios, making it a simple model. This makes the identification of problems easier. The calculations required are easily carried out.

Although the model was developed some forty years ago, Altman (1968) the developer, has revisited it several times, most recently in 2000. Lastly, and contrary to many writers, the researcher views the Z-Score model and all other bankruptcy prediction models, as financial performance measures, rather than as bankruptcy prediction models.

For these reasons, it was decided to use the Z-Score model in addition to the ratio analysis map (Figure 5), as a test case on the financial soundness of the Top Companies, and thereby justify, provisionally, whether or not the Top Companies use the arsenal that is available to measure financial performance.

Since the Z-score model was applied in the pilot study, it is discussed from a practical perspective. The pilot study sample consisted of ten public companies, i.e. Messina, Mvelaphanda, Implats, Aspen, Barplat, Northam, Johncom, Martprop, KG Media, and Group 5. The pilot study sampling approach is discussed under paragraph 3.3.1.

The 2002 accounting data is used. The Z-Score function has been given as -

$$Z = 0.012X1 + 0.014X2 + 0.033X3 + 0.006X4 + 0.999X5$$

Where

Z = The discriminant function score of the company (%)

X1 = Net working capital/Total assets (%)

X2 = Retained earnings/Total assets (%)

X3 = Earnings before Interest & Tax (EBIT)/Total assets (%)

X4 = Market value of total equity (ordinary & Preference Shares)/Total debt (book value) (%)

X5 = Sales/Total assets (number of times)

The definitions of the terms were covered in Chapter 2. However, Altman (1968) has not defined total assets. Intangible assets usually pose a problem in that their value is not always easy to verify. De la Rey (1981:79) excluded intangible assets on the premise that not all companies included them in their financial statements. Notwithstanding, the model was applied, in the pilot study, on both 'excluded' and 'included 'intangible assets.

Secondly, variable X4 required book value of equity in the case of public companies. It is noteworthy that there may be a big difference between book value and market value of equity. The benefits or otherwise of the

market price are essentially in the hands of the investor and not of the company. Alternatively, the difference between the two would be 'paper money' in the hands of the shareholders and not in the hands of the company. Nonetheless, the 'value' of the firm may also be determined on the basis of market value of equity as representing total assets. But the total assets in this case would essentially include the difference as intangible assets.

Altman (2000:12) explains that the "equity market value serves as a proxy for the

firm's asset values". The question is: How does the market value of shares prevent

a company from becoming bankrupt? Alternatively, how reliable is a proxy in this

instance? Ohlson (1980), in the development of his model, has not used what he terms non-accounting data such as market price data.

It is common knowledge that the market value of shares may not always reflect the true value of a firm. The market value also fluctuates from time to time, and may tumble within a very short space of time. Recently, Primedia shares increased by .15 after the company announced that private equity buyers had made an advance to buy the company (Gunnion 2007). The stock market is also known to "crash", at times, without warning. The collapse of companies such as Enron, Global Crossing and Kmart in the United States of America, and locally, Saambou Bank, Regal Treasury Bank and LeisureNet are cases in point.

To be able to see the extent of the effects and variations, both equity book value and market value were applied in the pilot study.

The calculated **Z**-scores of the ten companies were as follows:

	Z Scores			
COMPANY	Including Intangibles		Excluding Intangible	
	Book Value	Market Value	Book Value	Market Value
MESSINA	0.05	-04	0.05	-04
MVELAPHANDA*	2.71	6.35	2.91	6.55
IMPLATS	4.20	7.37	4.20	7.37
ASPEN*	2.89	4.42	3.61	5.14
BARPLATS	-13.12	-8.62	-13.12	-8.62
NORTHAM	4.59	7.49	4.59	7.49
JOHNCOM*	3.04	4.21	3.12	4.29
MARTPROP	8.50	7.91	8.50	7.91
KG MEDIA*	4.66	6.24	4.75	6.33
GROUP 5	2.37	2.29	2.37	2.29

^{*}Companies that had intangible assets.

Source: Analysis of company annual reports (2002) applying the Z-Score model

The Z-Scores were interpreted based on a cut-off point of 2.675.

Four companies included intangible assets in their Balance Sheets. The results above show lower scores where the intangibles are included (a higher level of total assets). It was found best to include them, both in the pilot study and in the main study. The reason for their inclusion is two-fold: some of the companies are in mining and the associative rights are included in the intangibles; secondly, the inclusion decreases the score, in other words, the inclusion does not give the companies the advantage of a higher score.

It is noteworthy that the use of the market values gave rise to significant variations. It was decided, therefore, not to use market values in the research study since the values are not always a reliable measure as evidenced by the collapse of large organisations within a short space of time.

The following interpretation of the scores was therefore based on the equity book values, with the assets including the intangible assets.

- Martprop had the highest score. Even though the company had a low EBIT/Total Assets relationship, as well as nil Retained Earnings, the only debt was current and was maintained at very low levels. The current liabilities represented only 7.5% of shareholders' equity. The score tended to reflect a realistic position in that the company was solvent, with a good debt ratio of 7%. With the low levels of debt (not overlooking the benefits of gearing), the company was in a good financial position. The score of 8.50 was high and far removed from the 2.675 cut-off score.
- KG Media, which had the second highest score, was strong on the relationships between EBIT and Total Assets (1: 2.65), and debt and equity

(1:1.77). The debt ratio was 36%.

- Barplats had the lowest score at -13.12, far below the 2.675 cut-off score. The company had negative retained earnings, which in turn, 'reduced' the share capital. The debt ratio was 41%.
- Messina, which was ranked number one by the Financial Mail, had the second lowest score of .05. The company had a low EBIT in relation to Total Assets, low Retained Earnings in relation to Total Assets, a negative net working capital base, and nil revenue. The debt ratio was quite high at 75%.

It proved cumbersome to obtain the complete accounting data of this company. As a result, the score for this company could not be fully

analysed. However, according to the Annual Report of Southern Era (a Canadian public company that holds 70.9% of the equity of Messina Ltd), "construction of the Messina Phase 1 mine" was completed during 2002 and production of platinum group metals was commenced only then. This explained the lack of revenue for the company during the 2002 year.

Mvelaphanda, which came second to Messina as a Top Performer, also obtained a low score at 2.91, even though this was above the cut-off point. The company had a good EBIT/Total Assets relationship as well as a good Retained Earnings/Total Assets relationship. However, the company had negative reserves that represented 76% of the shareholders

debt ratio was 25%. The debt was short-term with a loan that represented 98% of current liabilities. The company also had linked debentures representing 135% of equity.

• It was noteworthy that <u>Martprop</u> and <u>KG Media</u> were ranked ninety-fifth and ninety-seventh respectively, in the *Financial Mail* survey. The two companies obtained the highest scores in terms of the Z-Score.

In view of these results, it was concluded that, generally, the 'bankruptcy prediction models' may prove to be useful financial performance measurement tools. Since the Z-Score model had been tested successfully, it was deemed appropriate for application in this research study.

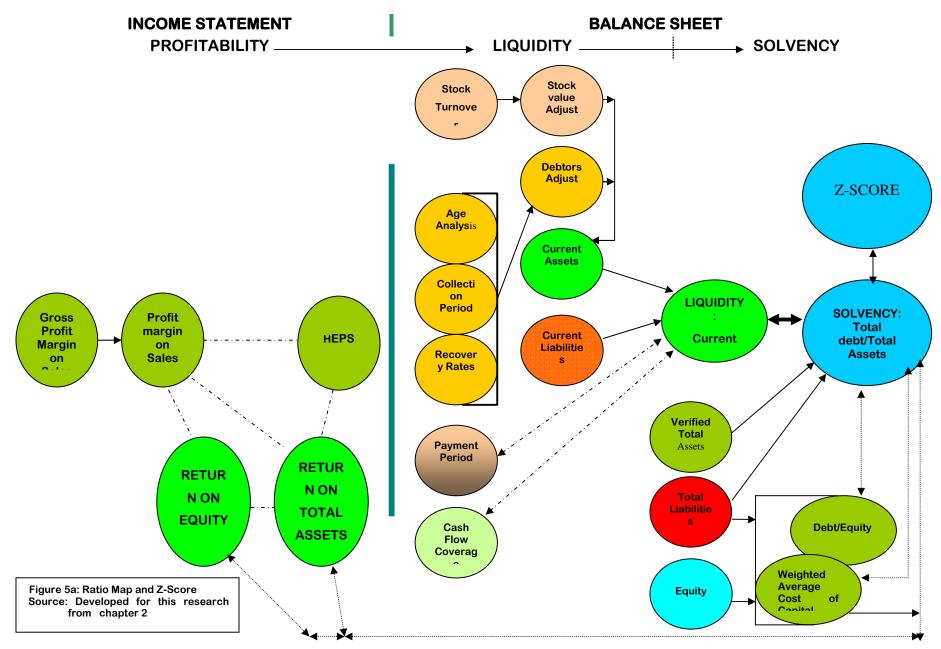
3.2.3. (g) Overview of the Models

The models are a given and having applied his mind to the models, the researcher decided that the Z-Score was best suited for the purpose of this research study. The model's variables are readily available in the accounting data, and those that require adjustment would have been adjusted in the course of applying the principles per Figure 5.

3.2.4. The second and final stage of the development of the research instrument

Solvency has a direct relationship with the Z-Score - the definition of the terms 'business failure', 'bankruptcy', and 'winding-up', bond this relationship. The value of the Z-Score has been discussed and for these reasons, the ratio analysis map (Figure 5) is modified at this stage, by importing the Z-Score into Figure 5 on the same level as the debt ratio (the solvency ratio). This becomes the complete instrument termed the 'Ratio

map and Z-Score' (Figure 5a). The application of Figure 5a is illustrated per Appendices I, J, and K (discussed in Chapter 4). The



ratios per Appendices I, J, and K are extracted from Appendices F1 and F(S)1 while the Z-Scores are extracted from Appendices F and F(S). The Appendices are computed from the accounting data of the sample (Appendices DAi, DAii, DBi, and DBii).

Figure 5a does in a way, give vent to the observation by Eidleman (1995), that the Z-Score model and the rest of the models "are a valuable, cost effective weapon to be added to the arsenal, and that as long as they are used to "complement our existing knowledge and we are not fooled by their apparent exactness, they can only improve the quality of our work."

The reading of Figure 5a is as described under paragraph 3.2.2., but with additional comment on the Z-Score.

3.3. Unit of Analysis and Sources of Data

3.3.1. The Sample

The population selection is similar to the approach adopted for the pilot study. The population for that study was drawn from the winners of the Top Companies surveys conducted by the *Business Times* and the *Financial Mail*. Both publications

conduct the surveys each year. The pilot study was based on the 2002 and 2003 surveys.

The publications have been handpicked because of their circulation. The *Business Times* is described as the biggest weekly newspaper in South Africa in terms of circulation (Publicitas Promotion Network). On the other hand, the *Financial Mail*, being a weekly magazine, is described as having the highest circulation in South Africa (familymagazines). Both publications

run the Top Companies surveys independently. The population for the surveys is the public companies listed on the JSE Securities Exchange (JSE). Obviously, the public companies strive hard to achieve the Top Companies awards, and are, therefore, suited to be role models in financial performance management. There can be no better population for this research study.

The criteria applied in the surveys are dealt with in Chapter 2 as part of the discussion on the financial performance measurement tools that are available and in

use.

The two publications have different 'winner' categories, one of which applies the criteria of compound growth (*Business Times*) and the other, the criteria of discounted cash flows (*Financial Mail*). The categories are the 'Top 100 Companies' by the *Business Times*, and the '200 Top Performers' by the *Financial Mail*. The two categories made up the sampling units for the pilot study.

The pilot sample was selected by drawing two lists, side by side, of the first forty winners in the two categories (sampling units) by the *Business Times* and the Financial Mail for 2002. The two lists were compared based on the 'winner companies', and their rankings. Only twelve companies out of the forty (for each survey) appeared on both lists, but placed at different rankings.

A second two-list of the first forty *Business Times* winners for 2002 and 2003 was compiled. The lists for the two years were compared and only eight companies appeared on both lists, also with different rankings. Lastly, a two-

list of the first forty winners of the *Financial Mail* survey for 2002 and 2003 was compiled. Sixteen companies appeared on both lists but with varying rankings. The conclusion was that, all things being equal, the sixteen companies maintained consistency, and that the criteria used by the *Financial Mail* appeared consistent during the two year period. It was decided to draw the pilot sample from the *Financial Mail* 200 Top Performers for 2002.

The sample (unit of analysis) for the pilot study was determined as follows: The first six top performers per their rankings were taken as part of the sample. As information on the sixth company was difficult to obtain, the seventh company was selected instead. A random selection was then made of four companies amongst the companies ranked from ninety-one to one hundred.

Based on the pilot study information, the sample (unit of analysis) for this research study was selected from the *Financial Mail* 200 Top Performers for 2004. The first one hundred companies were chosen as the sample frame (Appendix B). Drawing from the sampling frame, the convenience type of sampling was used by choosing the highest ranked companies (the first forty companies) and the lowest ranked at the bottom-end of the one hundred companies (from eighty one to one hundred), resulting in a total sample (unit of analysis) of sixty companies (Appendix C). The results of the pilot study showed that some of the companies ranked lower in the *Financial Mail* survey were in a better financial position than some of those ranked higher -

hence the inclusion of the twenty companies in the lower end. The sixty companies represent thirty percent of the 200 Top Performers population.

As it became cumbersome to obtain the accounting data on eleven of the sixty companies, it was decided to supplement the sample. Generally and briefly, the reasons for dropping the eleven companies were:

Reason	Count
Information not easily available as company had de-listed	1
Companies taken over by other companies and de-listed	3
No response to 'last resort' request - phone/fax	7
Total	11

The sample was extended with a supplementary sample of eleven (11) companies. Eight of the dropped companies fell within the first forty companies. The supplementary sample was selected from the 41st rank to the 50th rank on the criterion of readily available information. The other three companies were selected from the 70th rank to the 80th rank, also on the criterion of readily available information. The samples are tabulated per Appendices C (original sample), C1 (supplementary sample), and CC (final sample).

3.3.2. Sources of Data

The financial performance of the Top Companies is the subject of analysis. The information to be analysed is the annual reports of the companies, in particular, the accounting data (and all relevant information) for the years 2003 and 2004. The sources of data are, therefore, accounting data of the sampled companies. The accounting data are summarised per Appendices

DAi, DAii, DBi, and DBii. In addition to the accounting data, the following data was sourced from the SE Handbook (2004, 2005): company sectors, company short names, share prices, and more importantly, the dividends paid.

3.4. Data Collection Procedures

The plan was to obtain the accounting data (annual reports) from the UNISA library. When it became apparent that not all the reports were available, the annual reports were requested from the sixty companies by means of e-mails (the addresses were obtained from the SE Handbook). Since not all companies responded, the websites of some of the companies were visited (the internet addresses were obtained from the SE Handbook). Some of the annual reports were obtained electronically in this way. A further approach was to phone the companies and/or to send facsimile messages. The latter two approaches were the most unsuccessful. Some of the outstanding reports were obtained from the UNISA library. At this stage, eleven reports still had to be obtained. In the process, information came to light that, amongst the eleven companies, three had been taken over and had de-listed, and one had de-listed. This led to the supplementary sample where a company was only selected if its annual report was readily available. A breakdown of approaches applied to obtaining the annual reports is given under paragraph 3.5.

Since the sample consisted of public companies that are governed by the Companies Act, no. 61, 1973 (as amended), tests for both internal and external validations relied on this legislation and its application.

Section 286 of the Act (as amended) spells out the conditions under which the annual financial statements of companies have to be prepared. In addition, the statements have to be signed by the directors attesting to their correctness. The statements are further signed by the auditors. In terms of section 302 of the Act, companies are required to send copies of the financial statements to the company shareholders, as well as to the Registrar of Companies. As a gate-keeping measure, section 251 (subsections 1 and 2) of the Act provides that each director or officer or accountant or auditor of a company shall be guilty of an offence if he or she makes a false statement on any aspect of the affairs of the company.

Before the Companies Act, no. 61, 1973 was amended by the Corporate Amendment Act, no. 24, 2006, the Johannesburg Securities Exchange (JSE) could, in terms of its rules, report any listed company to the Generally Accepted Accounting Practice (GAAP) Monitoring Panel when such company failed to meet financial reporting standards (GAAP Monitoring Panel Charter). Somehow, this further strengthened the value of the public company's financial statements.

[As discussed in Chapter 1, paragraph 1.2, the GAAP Monitoring Panel has now been replaced in terms of sections 440P and 440W of Act 24, 2006.]

Therefore, for all intents and purposes, the audited financial statements are regarded to have "truth value". Since all public companies are governed by

the same legislation, the information in the financial statements of any company, albeit in a different form, should be consistent and applicable. Finally, the source of the accounting data, is the same for the sampled companies and no company was approached for additional information. This was done to ensure neutrality. (Lincoln & Guba 1985:290-294).

Still on the question of "truth value", sight is not lost of instances of companies whose financial positions were found, too late in the day, to be in poor shape, i.e. Masterbond (Masterbond saga 1983-2005), Saambou Bank (BankGate), and Regal Treasury Bank (Brand 2001). Also, the contents of paragraph 1.2. (Justification for the Research) regarding financial reporting problems by companies, are borne in mind.

3.5. Administration of the Data Collection Procedures

In the case of the pilot study, the data were obtained on the websites of the sampled companies. The process was time consuming (searching and printing). This resulted in an unintended limiting of the sample to ten companies. For the main study, reliance was placed on obtaining the data from the UNISA library. This was not completely successful. The one option still open was to approach the companies. E-mails were sent to fifty-seven companies to request the data. The e-mail addresses of these companies were obtained from the SE Handbook. Five of the e-mails were returned undelivered. A register of the communication chain was kept. This covered acknowledgements of receipt of the data, and a note of thanks to the companies that responded. The responses to the e-mails and the approach for obtaining the rest of the data are tabled below.

Procedure	No. obtained	Procedur	No. obtained	Procedure	No. obtained
e-mail*	18	Internet	26	UNISA	5
Procedure	No. obtained	Procedur	No. obtained	Procedure	No. obtained

^{* 57} e-mails sent (5 returned undelivered).

Where the e-mail requests failed to yield any further data, the internet was used. The internet addresses of some of the companies were obtained from the SE Handbook. After exhausting this avenue, the additional data were obtained from the UNISA library.

Since all avenues were exhausted while there was still a need for data of eleven companies, the sample was extended to a supplementary one. The data on the supplementary sample was obtained as follows:

Procedure	No. obtained	Procedur	No. obtained	Procedur	No. obtained
UNISA	6	Internet	5	Total	11

3.6. Methodology Limitations

The accounting data does not cover all the required information for the ratio map and Z-Score (Figure 5a). As far as the Z-Score part of the instrument is concerned, information is readily available in the accounting data except where an item does not exist, i.e. where a company does not have retained earnings.

Despite gaps in data for the application of the instrument (Figure 5a), the variables have neither been changed nor has any been dropped. The researcher places considerable importance on the affected 'ratios'. As a

^{** 8} Telephone calls made (three repeats) (successful in 'going through' in only two instances).

^{*** 3} fax messages sent.

result, it would be useful to recommend that the appropriate information be included in the annual reports to make the use of the instrument meaningful. Also, in view of the research question – 'Is the information covered in the financial statements adequate for a meaningful analysis to be done?' The purpose of the research would be diluted if any of the ratios were dropped. The general limitations are as follows:

3.6.1. Determination of profitability

The sampled companies operate in different sectors and types of businesses. Some companies do not buy or sell hard goods [for example insurance companies (premium income) and some holding companies (dividends income only)] – the list is not exhaustive. As a result, the gross profit margin and the profit margin are not relevant in all cases.

3.6.2. Determination of liquidity

A significant lack of information is on the ratios/activities that support and validate the current ratio, i.e. stock turnover, age analysis, debtors' collection period, recovery rates, cash flow coverage, and creditors' payment period. The following instances relate to general information that is lacking, to the extent that the relevant ratios have been left out in the analysis to ensure consistency.

♦ Stock turnover (cost of goods sold divided by inventory/stock)
The cost of goods sold is not disclosed in all cases – this activity could not be computed in these instances.

- Age Analysis (classification of debtors in terms of days outstanding)
 This is usually an internal tool that is not disclosed in the financial statements. Obviously, the information is not available in all cases.
- ♦ Debtors Collection Period (accounts receivable divided by 'sales divided by 365 days')
 - The limitation in the calculation of this activity is that sales are not broken down into credit and cash sales. The formula should in fact read 'credit sales' because the inclusion of cash sales (if any) does not give a true picture of the collection measure.
- Recovery rates (payments during a period as a percentage of total charges for that period)
 - Generally, this activity tool is not in common use and has not been computed due to lack of the relevant information.
- ♦ Cash Flow coverage
 - Even though loan details have not been given in some cases, the current liabilities portion (where relevant) was taken as the obligation for the following year.
- ♦ Creditors Payment period ('creditors' divided by 'expenses divided by 365 days')
 - It has not been possible to match the creditors to expenses. In other words, on the basis of the information made available, the principle of matching creditors to expenses has not been possible to apply. For this reason, this ratio that supports the current ratio (where computed) is not accurate.

As a result of these shortcomings, the current ratio was computed by excluding inventory/stock for the following reasons:

- ♦ In some cases, inventory consists of consumables (which may never be converted into cash).
- ♦ There are cases where inventory is not broken down (raw materials, work in progress etc) to enable some judgement on its liquidity.
- ♦ In some cases, no indication of inventory obsolescence is given.

Although the accounts receivable are included in the computation of the current ratio, this is done purely for convenience. The rationale is that, since the inventory has been sold, every effort would be made to recover the outstanding amounts.

Finally, in the analysis of the results, the researcher does not regard the current ratio to be near accurate as a result of the gaps in the support ratios.

This is the case even where the current ratio is mentioned in the analysis.

3.6.3. Determination of Solvency

The reasonableness of the value of the Balance Sheet items may best be verified by means of valuation certificates. It is assumed, in this research study, that the appropriate and necessary valuations have been verified. The 'equity' variable for the application of Figure 5a was taken at book value.

3.6.4. The Weighted Average Cost of Capital (WACC)

The calculation of the WACC has attracted assumptions.

- ♦ Where interest rates are given as, say, between 12% and 15%, the cost was roughly estimated at the midpoint, i.e. .15 -.12= .03, and (.03*.5)+.12=.1350.
- ♦ In some cases the loan costs have not been furnished making it impossible to compute the WACC. Some of the loans carry costs determined on the basis of 'euribor rate', 'Libor', 'Bank bill rate', 'BA rate' etc. The currency is however, expressed in Rand.
- ♦ The dividends, for determining the cost of equity, were taken from the SE Handbook. Regrettably, there are some discrepancies in the dividends figures given in the SE Handbook and those in the annual reports (highlights) of the companies.

The constant-growth model was applied to determine the cost of equity. The growth of some of the dividends is high, some as high as .71 and .95. This is partly so, because, in those instances, the difference between the dividends for 2001 and 2004 is high. Even so, the dividend growth was determined using the 'present value interest' approach by means of a financial calculator or the PVIF (Present Value Interest Factor) table. It will be noticed that the WACC in some cases appear unrealistic at, say, .99, .92 etc. This is the result of the high dividend growth-rates.

3.6.5. Measures highlighted by the Top Companies

It is assumed that great importance is placed by the Top Companies on the highlighted measures. These measures, as highlighted by the individual companies, are summarized per Appendices EAi, EAii, EBi and EBii. In the case of property companies, 'distributions per linked unit' (generally called headline earnings per share (HEPS)) have been ignored. This is due to the debatable issue of whether or not the linked debentures should form part of equity or long term-liabilities.

3.6.6. Other limitations

The companies have different year end. Also, the survey done by the *Financial Mail* is usually completed by June each year. Some of the yearsend of the sampled companies is after June. There is very little that can be done about the timing problem. The area of comfort, however, is that the difference in the periods of assessments is within a period of twelve months of each other.

- Local companies prepare their financial statements in different forms but within the confines of Generally Accepted Accounting Practice (GAAP). Some of the companies that have off-shore primary listings prepare their financial statements in USA Dollars (US\$), others use both US\$ and South African Rand (ZAR). Some of these companies also prepare their statements in accordance with UK GAAP. For this reason, the format of the accounting data has been re-arranged to make the creation of a model simple. The accounting data that are not in ZAR are left in the currency of preparation, with a clear indication of such currency.
- In the interpretation and analysis of the results (based on Appendices F1 and F(S)1), a blanket analysis is given of the financial position of each of the three classifications of the companies, that is, high (Z-score above 2.675), average (Z-Score between 2.675 and 1.81) and low (Z-score below 1.81) (see paragraph 3.7.4.). A brief discussion of the financial position of the individual companies is covered per Note AB at the end of Chapter 4. As part of the analyses, the popular measures highlighted by the companies are also discussed.
- Since the application of Figure 5a requires sixty pages, the presentation of the computed ratios is done in table form (Appendices F1 and F(S)1). As a result of the 'problem' of the sixty page volume, and for convenience, three companies have been selected for the purpose of illustrating the application and interpretation of Figure 5a. The three hand-picked companies are from each of the three classifications (high, average, and low). Further, the researcher is of the opinion that a detailed discussion

of all the results may confuse the issue and lead to loss of focus. All the Appendices are made available as part of the results.

3.7. Other Methodology issues

3.7.1. Gaps in Accounting Data

Even though the ratio map and Z-Score (Figure 5a) is not applied fully due to gaps in information, the unavailable information is possibly available internally at the Top Companies, and may be made available without much ado in future annual reports.

3.7.2. Towards a conclusion on the Research Problem

The methodology used to arrive at a conclusion on the research problem
Do South Africa's Top Companies use the available arsenal to measure their

financial performance? – is in five stages:

- The measures highlighted by the sampled Top Companies are tabled (Appendices EAi, EAii, EBi, and EBii), as well as the frequency of application of the measures (Table 5 in chapter 4). The highlight measures are analysed and interpreted.
- The computed ratios per Figure 5a are presented in table form (Appendices F1 and F(S)1). The ratios are summarised per Appendix F and F(S) with the latter broken down into Tables 7, 7A, 8, and 9 in chapter 4). The ratios are interpreted with the aid of Tables 7 to 9. Emphasis is placed on solvency, and in particular, the debt ratio and the Z-scores. Appendices F and F(S) include the popular company highlight measures (HEPS and dividends paid).
- The application of the 'ratio map and Z-Score' (Figure 5a) is illustrated by means of three randomly selected Top Companies (the application of the instrument would require a page for each sample unit (some

sixty pages). This is deemed to be unnecessary, hence the illustration by means of only three companies).

- Conclusions are arrived at on the following research questions:
 - I. Is ratio analysis and interpretation useful as a financial performance measure?

A conclusion on the question is arrived at by means of critical analyses of the ratios per Appendices F1 and F(S), and Tables 7, 7a, 8, and 9 in Chapter 4. Figure 5a is not applied in this instance due to the volume of paper this would require.

- II. Is the bankruptcy prediction model applied in this research study reliable as a financial performance measurement tool?
 - A conclusion on this question is arrived at by means of the interpretation of the results yielded by the instrument, seen in conjunction with any critical areas of the financial position of the companies (Appendix F1 and F(S), and Tables 7, 7a, 8, and 9 in Chapter 4). In particular, emphasis is on the interpretation of the Z-Scores.
- III. Is the bankruptcy prediction model applied in this research study user-friendly as a financial performance measurement tool?
 A conclusion on this question is arrived at by determining how readily available the Z-Score variables are in the annual reports, and how simple the computation is (i.e. does one need a computer or a simple calculator and a piece of paper?).
- IV. Is the information covered in the annual financial statements of the Top Companies adequate for a meaningful analysis to be done?

A conclusion on this question is arrived at by identifying any gaps in the analysis done, in particular, gaps that result from lack of information. This is done by exploring the results of the research instrument (Appendix F1 and F(S), and Tables 7, 7a, 8, and 9 in Chapter 4).

The analysis of the measures highlighted by the sampled companies is critically discussed in conjunction with the results of the research instrument (Appendices EAi, EAii, EBi, EBii, F, and F(S)).

- Finally, conclusions are drawn on the research problem from the following:
 - o the answers to the research questions; and
 - the critical analyses of the measures applied by the sampled companies in conjunction with the results of the research instrument.

3.7.3. The Variables for Figure 5 and the Z-Score

The ratios in the Z-Score model are all, except for one, based on total assets. The model emphasises total investment in relation to other performance aspects of the firm, i.e. net working capital, retained earnings, earnings before interest and tax, and sales. The other ratio is based on debt, i.e. market value of equity (ordinary and preference shares).

- ♦ One Z-Score ratio is almost identical to one ratio per Figure 5, i.e. 'earnings before interest and tax/total assets'. The difference is that earnings per Figure 5 are after tax.
- ♦ The equity/debt ratio and 'X4' ('Market value of Equity/Total debt (Z-Score model)) are identical in that in this study, book value for equity is applied for both the Z-score and the ratios per Figure 5, instead of market value as stipulated for the Z-Score.

The similarity in the Figure 5 ratios and the Z-Score function is, therefore, not significant. This allows for a broad assessment covering 'everyday' ratios

and the Z-Score ratios, which are merged into a single instrument (Figure 5a).

3.7.4. Data Analysis

The strengths and/or weaknesses of the sampled companies, per Figure 5a are analysed in parallel with the results of the measures highlighted by the individual companies to measure their performance.

For analysing the results per Figure 5a (Appendix F1 and F(S), and Tables 7, 7a, 8, and 9), the companies are classified based on the Z-Scores. Altman (2000) recommended a cut-off score of 1.81. This was brought down from 2.675 (Altman 1968). Based on these cut-off points, the companies are classified as follows:

1.81 Low : below 1.81	High: above 2.675 Average: between 2.675 and 1.81
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The intention is to keep the analysis simple, confining the analysis of the financial position of the companies to the following measures:

- ♦ The debt ratio the extent of asset financing by means of debt. The debt/equity ratio is also discussed.
- ♦ The WACC and how it compares with the return on total assets.
- ◊ Z-Scores important areas are aspects which contribute insignificantly to the Z-Score (weaknesses that need attention) and those with a major contribution (strengths).
- Headline earnings per share (HEPS) whether or not this measure conveys a message on the financial position of a company when compared to the results per the instrument developed for this research study.
- Dividends paid whether or not this measure conveys a message on the financial position of a company when compared to the results per

Figure 5a. Also, the reasonableness of the ratio of dividends to HEPS constitute an important area – i.e. are dividends a reasonable percentage of HEPS. Further, what are the effects of the payment of dividends on the WACC and other aspects of a company (i.e. liquidity).

3.8. Software Requirements

The methodology does not require specialist programs. The computations are done on Excel using self-designed and created models.

3.9. Ethical issues

The research study is literature based and does not require contact with respondents. Since the sample is made up of juristic persons, the financial position of the companies (public companies whose annual reports are generally available to the public) is always subject to scrutiny for the benefit of investors. Notwithstanding, the sampled companies were approached with requests for their annual reports as pointed out under paragraph 3.4. The introduction to the request was succinct: 'I am doing research on the *Financial Mail* Top Performers for 2004'. It is assumed therefore, that the following companies are most probably aware of this research study: the fifty-two companies sent e-mails (assumed to have been delivered and received), the two companies that received the researcher's telephone call, and the three companies sent facsimile messages.

The instrument used in this research study, i.e. the ratio map and Z-score (Figure 5a), is made up of tools that are available in the literature as means to assess the financial position of companies. The assessment done in this study, even though exploratory in nature, is accompanied by proposals that may have value as a benefit.

The proposals or recommendations are made in simple terms, and the language is appropriately courteous. Similarly, the approaches adopted by the *Business Times* and *Financial Mail* have been treated with respect.

3.10. Conclusion

The methodology was discussed in this chapter. This includes a discussion on the justification for the methodology, the unit of analysis and sources of data, the data collection process, the administration of the data collection procedures, the methodology limitations, other methodological issues, and ethical issues.

With the methodology set out, the researcher is confident that a conclusion to the research problem will become evident.

CHAPTER 4

ANALYSIS OF DATA

4.0. Introduction

This chapter analyses the data collected to be able to find answers to the research questions, and in so doing, unpack the research problem. The findings in this chapter, flowing from the analysis of the data, are discussed in Chapter 5. The discussion of the findings is within the context of the literature discussed in Chapter 2, as well as the methodology discussed in Chapter 3.

The sample comprises of companies in different industries/sectors, with differing accounting data presentations. In the case of property companies, the accounting data presentations differ even more. The format of all accounting data has been re-arranged (Annexure DA) to ease the design of models.

In Chapter 3, paragraph 3.6., it is pointed out that some of the ratios could not be computed due to gaps in the data. This would be the case where, for instance, costs of loans are not provided, making it impossible to compute the weighted average cost of capital (WACC). Companies with such a gap in data have been excluded from the analysis. The rationale is that this measure is crucial in the performance of a company. The companies excluded from the analysis are tabulated per Table 6.

It is also pointed out in Chapter 3 (paragraph 3.6.) that some of the current ratio support ratios (i.e. stock turnover, age analysis, debtors' collection period, recovery rates, cash flow coverage, and creditors' payment period)

have not been computed due to lack of information. In these instances, the companies have not been excluded from the analysis. The current ratio is computed excluding the inventory item as explained in Chapter 3 – paragraph 3.6.

Table 6: Sampled Top Companies excluded from the analysis due to incomplete information

Compan y Rank	Company name	Information not available	Ratio/Measure affected/not fully computed		
4	Iscor/Mittal	Loan prices	WACC		
17	Goldfields Ltd	Loan prices	WACC		
36	BHP Billiton plc	Loan prices	WACC		
44	Pretoria Portland	Loan prices	WACC		
87	Glenrand MIB	Loan prices	WACC		
90	Astrapak Ltd	Loan prices	WACC		
96	Anglogold Ashanti	Loan prices	WACC		

Other companies excluded from the analysis, together with the reasons for their exclusion, are

> KWV Investments (Rank 70):

The main asset of the company is a shareholding of 29.88% in Distell Group Limited (Distell). The source of income is dividends as well as a share of retained earnings flowing from Distell. The running of this company depends, therefore, on the success of Distell. It would, therefore, not serve much purpose to analyse the financial performance in this instance. As a matter of interest, the Z-Score of this company is 1923.92, which is well above the cut-off point.

Pick 'n Pay Holdings (Rank 83):

The main asset of the company is a shareholding of 53.2% in Pick 'n Pay Stores Limited. The only source of income is dividends, implying that little effort is required to manage this company. As in the case of KWV

Investments, management effort is concentrated at the subsidiary — Pick 'n Pay Stores. The Z-Score for this company is 91.09.

African & Overseas Enterprises (AF-&-OVER) (Rank 88):

The annual report obtained is that of a subsidiary - Rex Trueform Clothing Company Ltd (Rex Trueform). The results of the two companies (Rex Trueform and AF-&-OVER) only differ slightly as is evident in the figures furnished for each company in the SE Handbook, and the annual report. At a glance, it would appear that management is concentrated at the subsidiary – Rex Trueform.

The excluded companies represent .166 of the sample of sixty companies.

The frequency of use of the popular 'highlights' measures is based on the total of sixty companies.

The research problem, as stated, is: *Do South Africa's Top Companies use* the available arsenal to measure financial performance? The analyses of data should provide answers to the research questions and at the same time provide information to be able to arrive at a conclusion on the research problem. The research questions are

- Is ratio analysis and interpretation useful as a financial performance measure?
- Is the bankruptcy prediction model applied in this research study reliable as a financial performance measurement tool?
- Is the bankruptcy prediction model applied in this research study user-friendly as a financial performance measurement tool?
- Is the information covered in the annual financial statements of the Top Companies adequate for a meaningful analysis to be done?

The analysis is approached in the following manner:

• The measures given by the companies under 'highlights', 'salient features', 'at a glance' are analysed with the view to attempt to relate

them to financial performance as well as the assessment of the companies' financial positions. For convenience, these measures are referred to as the 'highlights' measures. In the process, the popular measures amongst the measures given by the Top Companies are identified. The identified popular measures form the core of the analysis. This is the basis and first step towards finding an answer to the research problem. The measures highlighted by the Top Companies also form part of the analyses of the results of the instrument (Figure 5a) developed for this research study.

• An analysis and interpretation is done on the financial performance of the Top Companies. The instrument developed for this research study (Figure 5a) is applied in this regard. For convenience, Appendices F (summary of Appendix F1), F1, F(S) (Summary of Appendix F(S)1, and F(S)1 are the points of reference. Appendices F and F(S) are broken into Tables 7, 7A, 8, and 9. These Appendices and the Tables also carry two of the most popular measures applied by the Top Companies (dividends and HEPS). For convenience, Appendices F, F1, F(S), and F(S)1 and Tables 7, 7a, 8, and 9 are points of analyses reference as it would be tedious to analyse each company individually on the basis of Figure 5a (as discussed in Chapter 3). For that reason, three companies have been handpicked for illustrating the application of Figure 5a.

The analysis per figure 5a, coupled with the analysis of the highlight measures by the Top Companies, should provide answers to the research questions and a conclusion on the research problem.

- The analysis is concluded with an overview.
- 4.1. Analysis and interpretation of the Top Companies 'highlights' measures by the Top Companies (Appendices EAi, EAii, EBi, and EBii)

As a starting point, the analyses are best served with the identification of the popular 'highlights' measures by the Top Companies.

4.1.1. Identification of the popular Top Companies 'highlights' measures

Table 5 sets out the frequency of the different 'highlights' measures by the Top Companies. These are captured from the accounting data.

Table 4 is an abridged Table 5 based on a randomly selected frequency cutoff of 12 points (20%). Eleven 'highlights' measures have a frequency of 12
points (20%) and above, out of a total of 60 points (100%) (Table 4). The two
most popular measures are on profitability (Headline Earnings per Share
(HEPS)) and share performance (Dividends). The two 'highlights' measures
have frequencies of 54 points (90%) and 49 points (82%) respectively. In
terms of the area of performance, the two measures are closely related to
net assets per share [frequency: 30 points (50%)], return on equity
[frequency: 24 points (40%)], share price [frequency: 21 points (35%)],
operations margin [frequency: 20 points (33%)], return on total assets
[frequency: 18 points (30%)], and dividend cover [frequency: 17 points
(28%)].

Table 4: Summary: Frequency of application of 'highlights' measures by the Top Companies (Summary of Table 5)

	Measure	Frequency of use	% Frequency: (Total sample: 60)
PROFITABILITY: HEPS*	Headline Earnings Per	54	90%
SHARE PERFORMANCE:	Dividends	49	82%
SHARE PERFORMANCE:	Net Assets Per Share	30	50%
PROFITABILITY: Returns*	Equity	24	40%
SHARE PERFORMANCE: Price*	Share Price	21	35%
PROFITABILITY: Margins*	Operations Margin	20	33%
SOLVENCY	Debt/Equity	19	32%
PROFITABILITY: Returns*	Total Assets	18	30%
SHARE PERFORMANCE:	Dividend Cover	17	28%
LIQUIDITY	Current Ratio	14	23%

SOLVENCY	Interest Cover	12	20%
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Source: Analysis of research data

Eight of the popular measures are on shareholder wealth (profitability which has great effect on share performance – marked '*'). There is no doubt that great importance is attached to these measures; otherwise they would not be applied as highlights in the accounting data. The 'highlights' also imply that greater importance is attached to communicating shareholder wealth creation. The other three highlights measures per Table 4 are on liquidity and solvency.

The information gathered for this research is sourced from the annual reports of the Top Companies. An annual report is not just an internal document, the information is mainly meant for shareholders/stakeholders and other interested parties. Therefore, there may be other measures that are used internally as gate-keepers (over and above the 'highlights') on the financial performance of the companies.

A question that arises is whether or not the information made available in the annual reports enables shareholders/stakeholders to satisfy themselves on the soundness of their investments. Looking further at Tables 4 and 5, it is surprising that the current and debt ratios, as important as they seem to be, are seldom brought to the notice of interested parties. The frequency of the current ratio as a highlight measure has 14 points (23%), while the debt ratio (Table 5) has 4 points (7%). The importance of the current ratio cannot be over-emphasised, as it shows the position in relation to the cash flows within the operations activities of a company. The debt ratio, on the other

hand, reflects the total position of the company, the strength of the Balance Sheet.

Table 5: Frequency of application: 'Highlights' financial performance measures applied by the Top Companies

	Measure	Frequenc y of use	% Frequency (Total sample: 60)
	Interest Cover	12	20%
Solvency	Debt/Equity	19	32%
	Debt Ratio	4	7%
	Stock Turnover	1	1.6%
	Days Sales Outstanding	1	1.6%
	Creditors' Payment	1	1.6%
Liquidity	Net Working Capital	2	3%
	Acid Test	3	5%
	Current Ratio	14	23%
Profitability Margins/HEPS	Operations Margin EBITDA Margin	20	33% 3%
	Net Profit Margin	1	1.6%
	Headline Earnings Per	54	90%
Returns	Equity	24	40%
	Total Assets	18	30%
	Assets Turnover	1	1.6%
	Price Received	3	5%
Sales/Production	Vacancy Factor	1	1.6%
	Production (ounces/kg)	4	7%
	Total Cash Costs	3	5%
Share Performance			
Share Price &	Share Price	21	35%
Dividends	Dividends	49	82%
	Dividend Cover	17	28%

Cash to Equity	1	1.6%
Net Assets Per Share	30	50%

Source: Analysis of research data

Part of the 'highlights' measures that need mentioning are those unique to mining companies. These relate mainly to the areas of 'Sales/Production'. While the frequencies of these measures per Table 5 appear low, there are eight (8) mining companies in the sample which means that the frequency of the measure of productivity, even though it is only four times, is 50% of the mining companies.

As pointed out in Chapter 1, it is noteworthy that the bankruptcy prediction models do not enjoy application amongst the Top Companies.

4.1.2. The Top Companies 'highlights' measures - analysis and interpretation

The most popular 'highlights' measures are HEPS with a frequency of 54 (90%), 'Dividends Paid' with a frequency of 49 (82%), and 'Net assets per share' with a frequency of 30 (50%), see Table 4. The intriguing question is 'Do these measures and others given under highlights give a good picture of the financial performance and financial position of the companies?' It is also intriguing that only three 'highlights' measures have a frequency of use of 50% and more. As pointed out previously, there are, probably measures that are applied vigorously internally, but interested outside parties need to be given information that will give them further insight into the state of the companies.

An interesting observation is that the popular 'highlight' measures are within the same boundary as the criteria applied by the *Business Times* and the *Financial Mail* in their respective surveys to determine the Top Companies. The boundary is shareholder wealth creation expressed in the form of

- ◇ Profitability (HEPS), share performance (dividends paid), and (net assets per share). These are the popular 'highlight' measures by the Top Companies; and
- ♦ Shareholder returns expressed in the one case, as investment compound growth over five years (*Business Times*) and in the other case, as investment discounted cash flows over five years (*Financial Mail*).

The analysis and interpretation is based on the message conveyed by the highlight measures. Financial performance measures, or ratios, convey different, but specific information on the various aspects of the financial position of a company. In fact, one of the problems of ratio analysis as pointed out in Chapter 2 is that each ratio conveys a specific meaning, leaving the analyst to judge the overall position of the company. For instance, the popular 'highlights' measures used by the Top Companies concentrate on profitability and share performance.

In general, the 'highlights' measures do cover a wide spectrum of the financial areas of the companies, i.e. profitability, liquidity, solvency, sales/production and share performance. Part of the problem lies in the frequency within which the measures are applied as highlights.

The measure most frequently used as a highlight is HEPS. This is defined as "ordinary earnings with exceptional items and their tax effects stripped out"

(Profile's Stock Exchange Handbook). The measure conveys the Rand amount earned for each issued ordinary share. While the measure is considered an important indicator of corporate success by the investing public (Gitman 2000:145), it can only have meaning if compared to some standard. In this case, a historical trend would serve a useful purpose. However, even so, the measure cannot be seen in isolation. This aspect is discussed further in Chapter 5.

The payment of dividends is also frequently applied as a highlight measure. This is closely related to HEPS since part of the base of declaring dividends is the profit per share posted. The measure 'assets per share', also a highlight, is also related to HEPS. Therefore, the three measures convey a picture of one side of an organisation – what is attributable to each share in the form of profits, dividends, and the distribution of assets.

The frequency of the rest of the 'highlights' measures are below 50% (Table 5). Since the frequency spread of application of the 'highlights' measures is skewed, the analysis of the total 'highlights' measures may best be done by analysing and interpreting the measures per the instrument developed for this research study (Figure 5a), to determine whether or not there are underlying problems that have not been unearthed by the 'highlights' measures.

4.2. Analysis and interpretation of the financial position of the Top Companies per the Research Instrument (Figure 5a)

The instrument developed for this research study (Figure 5a) is applied (in table form) to analyse the financial position of the Top Companies. This is done to get a balance of probabilities on the information conveyed by the

'highlight' measures that are used by the Top Companies, and to establish whether or not the Top Companies are not oblivious to problems that are not revealed by the measures they apply. The analyses concentrate on solvency. In the absence of benchmarks, the reading of the results is done purely on the basis of what is reasonable and what is not reasonable – a WACC of .99 would generally not be reasonable.

The analysis of the financial position of a company can take different forms. The analyst's ability plays an important part, as some of the ratios may not make much sense – some of these are discussed in Chapter 3. De Wet and du Toit (2007:59), borrowing from Black, Wright and Davis (2001:9), point out that shareholders' value is created when the equity returns of a company exceed the cost of that equity. If "equity returns" refers to "Net profit after tax and preference dividends, divided by shareholders equity" (de Wet and du Toit 2007:60), then this may be meaningless. Equity may represent a small portion of the total capital of a company – resulting in a good ratio (at face value). The ratio may, in fact, be manipulated by means of financial gearing to give rise to a higher ratio (de Wet & du Toit 2007:59). In this study, as part of the analyses, the WACC is compared to the return on investment (total assets). This approach is supported by de Wet and Hall (2006:57).

The analysis is done on three classifications of the Top Companies in terms of the scores of the Z-Score model. The classification is given as

Taking the results per Appendix F and F(S), the classification of the sample in numbers and proportion are as follows (based on the Z-Scores for 2004):

High	Number:	39	Average	Number:	4	Low:	Number:	7
:			:					
	Proportion	78.0%		Proportion	8.0%		Proportion	14.0%
	:			:			:	

Note: The unit of analysis is reduced to 50 as a result of the exclusions per Table 6 as well as the note immediately following the Table.

Source: Analysis of the research data

If the Z-Score model was anything to go by, and assuming a cut-off point of 2.675 (cut-off point for the Z-Score prediction of bankruptcy model), eleven companies (22.0%) of the sample should be regarded as bankrupt.

First, the 'low' classification is analysed, this is followed by the 'average' classification and the analysis is completed with the 'high' classification.

The data is analysed with reference to the following appendices:

DAi: Financial Statements (2004) (original sample)

DAii: Financial Statements (2003) (original sample)

DBi: Financial Statements (2004) (supplementary sample)

DBii: Financial Statements (2003) (supplementary sample)

EAi: Financial performance measures applied as highlights by

the Top Companies (2004/2003) (original sample)

EAii: Financial performance measures applied as highlights by

the Top Companies (2004/2003) (original sample)

(continued)

EBi: Financial performance measures applied as highlights by

the Top Companies (2004/2003) (supplementary sample)

EBii: Financial performance measures applied as highlights by

the Top Companies (2004/2003) (supplementary sample)

(continued)

F: Summary of results per research instrument including Top

Companies highlight measures (2004/2003)

F1: Company Ratios – Results of instrument (2004/2003)

F(S): Summary of results per research instrument (2004/2003)

(supplementary sample)

F(S)1: Company Ratios – Results of instrument (2004/2003)

(supplementary sample)

GAi: The Z-Scores calculation worksheet (2004)

GAii: The Z-Scores calculation worksheet (2003)

GBi: The Z-Scores calculation worksheet (2004) (supplementary

sample)

GBii: The Z-Scores calculation worksheet (2003) (supplementary

sample)

H: Company Z-Scores (2004/2003)

H1: Company Z-Scores (2004/2003) (supplementary sample)

: Ratio Map and Z-Score: WESCO INVESTMENTS LTD (10)

J: Ratio Map and Z-Score: NICTUS LTD (89)

K: Ratio Map and Z-Score: GROUP FIVE LTD (18)

LAi: Weighted Average Cost of Capital (WACC) Calculation

(2004)

LAii: Weighted Average Cost of Capital (WACC) Calculation

(2003)

LBi: Weighted Average Cost of Capital (WACC) Calculation

(supplementary sample) (2004)

LBii: Weighted Average Cost of Capital (WACC) Calculation

(supplementary sample) (2003)

Note: Reference in the text to Appendices D means all the appendices starting with a D, i.e. DAi, DAii, DBi, and DBii. Appendices F would therefore be F, F1, F(S) and F(S)1.

Source: Accounting Data and the Analysis of Data

The data per Appendices F and F(S) are abridged per Tables 7, 7A, 8 and 9.

The tables include the two popular company 'highlight' measures – HEPS and dividends paid.

What follows is a summary of the observations on the analysis of the data per classification. Brief individual analyses notes are given per NOTE AB at the end of this chapter.

4.2.1. Top Companies classified as 'low' - Z-Score below 1.81

Table 7 tabulates the companies under this classification. In addition to the classification of 'low', the analysis is done in terms of sectors (where necessary) as given by the JSE.

The companies in the 'real estate' sector show a unique feature in the treatment of

debentures in the Balance Sheet. Table 7A tabulates these companies. It is necessary to look at companies in this sector due to this unique feature.

The low Z-Scores are accompanied by high debt/equity ratios ranging between 3.31 and 24.83 for 2004. Further, the financing of assets by means of debt is between .77 and .96 for 2004. Financing (over and above equity and debt), is also by means of 'linked debentures'. A debenture is a bond described as a "full-faith-and-credit obligation" (Amling 1984). The term *linked debenture* is not defined in the SE Handbook. In the case of these companies, the debenture holders are 'linked' to the ordinary shareholders. In other words, some shareholders are also debenture holders. The maturity date on these debentures is twenty-five years in all cases. The debentures are treated as long-term debt in the Balance Sheet with the declaration of dividends linked to the interest payable on them. An argument may be raised as to why the 'linked debentures' are not treated as part of equity. In fact, one of the companies has treated this item as part of equity.

Table 7: Top Companies with a Z-Score below 1.81 (2004) (Sectors in parenthesis)

	COMPANY	SOLVENCY							SOLVENCY EARNINGS AND DIVIDEND (COMPANY MEASURES)					
တ	SHORT	•	1	2	2	3	3	4	Į.	ţ	5	(6	
N N	NAME	DEBT/E	EQUITY	WA	CC	DEBT	RATIO	Z-SC	ORE	HEPS	(cents)	DIVID	ENDS	
RANKIN												(ce	nts)	
Α/		2004	2003	2004	2003	2004	2003	2004	2003	2004	2003	2004	2003	
1	Mvela Res (M)	0.62	0.11	0.04	0.02	0.38	0.10	0.94	6.29	-96.14	78.35	0.00	0.00	
5	Premium (RE)	3.98	5.83	0.14	0.12	0.80	0.85	0.92	0.75	0.00	0.00	38.00	29.40	
25	Schamin (M)	1.83	1.58	0.16	0.18	0.65	0.61	1.74	1.70	46.60	23.20	7.50	4.50	
37	Sable (RE)	0.73	0.91	0.27	0.24	0.42	0.48	1.74	1.17	26.00	-78.60	35.00	10.00	
89	Nictus (Re)	4.54	3.54	0.21	0.20	0.82	0.78	1.61	2.13	1.09	11.29	6.00	5.00	
47	Octodec (RE)	3.31	5.19	0.12	0.11	0.77	0.84	0.92	0.57	0.00	0.00	177.00	143.00	
48	Metboard (RE)	24.83	10.69	0.09	0.09	0.96	0.91	0.47	0.51	0.00	0.00	39.00	38.00	

Sectors: M=Mining RE=Real Estate Re=Retailing

Source: Analysis of research data

Three of the companies carry the debentures which represent 30%, 40% and 48% of the total liabilities respectively (Appendices D). The one other company does not carry debentures. Without debating the merits or demerits of treating this item as equity, a scenario on what the position would be if the debentures were taken as part of equity is created for convenience.

Table 7A illustrates the position where the linked debentures are moved from long term liabilities to equity in the Balance Sheet. The Z-Scores become slightly improved, but are still low. Taking the debt/equity ratio and the debt ratio into account, the financial position of the companies may require re-engineering. Looking further at other aspects of these companies, the WACC for the companies is fairly good at levels ranging between 9% and 14%. But, on comparing these costs with the returns on total assets, an imbalance emerges – the returns on total assets range

between 2% and 8%. Therefore, the treatment of the linked debentures does not change the position of the companies.

Table 7A: Top Companies (Property Companies) with a Z-Score below 1.81 (2004)
Linked Debentures treated as Equity
(Sectors in parenthesis)

RANKING	COMPANY SHORT NAME				EARNINGS AND DIVIDENDS (COMPANY MEASURES)								
		1		2		3		4		5		6	
		DEBT/EQUITY		WACC		DEBT RATIO		Z-SCORE		HEPS (cents)		DIVIDENDS	
				_						_		(cents)	
3		2004	2003	2004	2003	2004	2003	2004	2003	2004	2003	2004	2003
5	Premium (RE)	1.27	1.25	0.14	0.12	0.56	0.56	1.24	1.12	0.00	0.00	38.00	29.40
47	Octodec (RE)	0.86	1.24	0.12	0.11	0.46	0.55	1.43	0.94	0.00	0.00	177.00	143.00
48	Metboard (RE)	0.99	0.86	0.09	0.09	0.50	0.46	1.06	1.15	0.00	0.00	39.00	38.00

Sectors: RE=Real Estate

Source: Analysis of research data

Moving to all the companies in this category (a Z-Score below 1.81), the possible weakness of the companies is:

- high levels of debt;
- > WACC that does not compare favourably with the return on investment (Appendices F and L);
- poor liquidity, in particular, low or negative levels of net working capital (Appendices G);
- profitability that does not sufficiently feed liquidity, as well as retained earnings (Appendices G); and
- > the payment of dividends (not applicable in all cases) which, in some cases, represents more than the HEPS for 2004.

The most popular highlight measures applied by the companies are HEPS and the payment of dividends. As already explained, HEPS is left out of the analysis in the case of the 'real estate' companies. The analysis concentrate on dividends as this is relevant to all companies. Other than in one case, dividends have been paid. The dividends paid look good for both

2004 and 2003. The question is: Do the 'Dividends Paid' convey the financial position of the Top Companies? A response to this question is given in Chapter 5.

A closer look reveals that, in some of the cases, the payment of the dividends would appear not to be well-timed as they represent more than the available earnings for 2004. It is noteworthy that the financial position of seven (.137) of the sampled companies appears to be at the bottom of the scale. Two of the companies are ranked 1st and 5th by the *Financial Mail*. Considering the definition of bankruptcy - a state where the liabilities exceed the assets, the four companies whose debt ratios are above .70 may require attention to improve their financial positions. One of these companies is ranked 5th by the *Financial Mail*.

4.2.2. Companies classified as 'medium' - Z-Score between 1.81 and 2.675

The companies are tabulated per Table 8.

The companies in this category are in different sectors as tabulated per Table 8.

Table 8: Top Companies with a Z-Score between 1.81 and 2.675 (2004) (Sectors in parenthesis)

	COMPANY SHORT NAME	SOLVENCY									EARNINGS AND DIVIDENDS (COMPANY MEASURES)			
(5)		1 DEBT/EQUITY		2 WACC		3 DEBT RATIO		4 Z-SCORE		5 HEPS (cents)		6 DIVIDENDS		
RANKING														
Ž												(cents)		
Z.		2004	2003	2004	2003	2004	2003	2004	2003	2004	2003	2004	2003	
15	WBHO (C)	2.70	2.73	0.21	0.22	0.73	0.73	2.56	2.55	208.00	175.00	51.00	42.00	
18	Group-5 (C&M)	3.32	3.58	0.30	0.33	0.77	0.78	2.37	2.48	135.10	115.10	44.00	37.00	
42	Fambrands (Res)	1.34	0.79	0.06	0.09	0.57	0.44	2.38	3.97	-40.30	135.70	0.00	0.00	
46	Lonmin US\$ (M)	0.94	0.86	0.03	0.06	0.48	0.46	2.22	2.20	88.40	52.50	72.00	72.00	

Sector: C=Construction M=Mining C&M=Construction & Building Material Res=Restaurants

Source: Analysis of survey data

The identified weaknesses of the companies are

- high levels of debt;
- poor liquidity, in particular, low or negative levels of net working capital (Appendices G); and
- ➤ the payment of dividends, which range between .24 and .81 of HEPS for 2004. Dividends at a level of .81 of HEPS may lead to poor liquidity (Appendices F).

Considering the two frequently applied highlight measures, the relationship between HEPS and dividends paid is not proportionally reasonable. While the dividends may look good, the financial position of the companies, based on Figure 5a, does not look good. Generally, the two popular 'highlights' measures seen together, give a reflection of the dividend policies of the companies.

It is noteworthy that the financial position of four (.08) of the sampled companies is average (Z-Score between 1.81 and 2.675). Two of these companies are ranked 15th and 18th in terms of the *Financial Mail* 'Top Performers' survey. The two companies have debt ratios above .70.

Bearing the definition of bankruptcy in mind, the companies whose debt ratios are above .70 may require attention to improve their financial position.

4.2.3. Companies classified as 'high' - Z-score above 2.675

The companies in this category are also in different sectors. Reading from the good Z-Scores, it appears that the financial performance of the companies in this category is good. However, some of the companies have areas of weaknesses.

The companies are tabulated per Table 9.

The companies whose financial performances appear good (on the balance of probabilities and in terms of Figure 5a) are listed below. The rankings are given in parentheses. The areas of weakness are also given where necessary.

- ♣ Metair Investments Ltd (8): WACC is .18 with the return on investment at .13.
- ♣ Trans Hex Group Ltd (23): WACC is .22 with the return on investment at .13.
- Northam Platinum Ltd (27): Dividends paid represent .96 of HEPS.
- Crookes Brothers Ltd (31): WACC is .22 while the return on investment is .06. The dividends paid represent .70 of HEPS.
- ♣ Medi-Clinic Corporation Ltd (34): WACC is .24 with the return on investment at .15.

♣ Ceramic Industries Ltd (91): the WACC is .21 while the return on investment is .16.

(See Appendices F and L)

Only one of these companies appear to have a 'clean record' – Wesco Investments Ltd ranked 10th. It would appear that this is not unique. Naidoo (2006:188), on the

Table 9: Top Companies with a Z-Score above 2.675 (2004) (Sectors in parenthesis)

	COMPANY				SOLV	ENCY				EARNINGS AND DIVIDENDS (COMPANY MEASURES)					
ត្ន	SHORT	1		2		3		4			5		6		
RANKING	NAME	DEBT/E	QUITY	WA	CC	DEBT	RATIO	Z-SCORE		HEPS (cents)		DIVIDENDS (cents)			
RAN		2004	2003	2004	2003	2004	2003	2004	2003	2004	2003	2004	2003		
		2004	2003	2004	2003	2004	2003	2004	2003	2004	2003	2004	2003		
2	Pals (Re)	0.33	0.58	0.92	0.75	0.25	0.37	4.32	4.55	-40.30	135.70	50.00	24.00		
3	Grindrod (S&P)	2.08	2.40	0.44	0.73	0.23	0.71	2.69	1.99	618.40	250.90				
6	Cashbil (C&M)	2.14	2.40	0.51	0.53	0.68	0.71	4.02	4.04	251.40	224.10	78.00			
8	Metair (Ma)	0.50	0.50	0.18	0.17	0.33	0.33	4.77	4.96	2704.00	2297.00				
10	Wesco (Au)	0.00	0.03	0.09	0.09	0.00	0.02	231.09	28.23	2417.00	-1088.00	220.00	5500.00		
11	AECI (Ma)	1.22	1.39	0.16	0.17	0.55	0.58	2.86	2.46	392.00	356.00	138.00	120.00		
12	Bearman (Re)	0.62	0.97	0.45	0.46	0.38	0.49	4.96	4.30	75.30	90.50	36.00	36.00		
14	Implats (M)	0.58	0.58	0.05	0.06	0.37	0.37	3.43	3.67	3966.00	5140.00	2100.00	2650.00		
19	Invicta (E&Ma)	1.00	1.01	0.50	0.51	0.50	0.50	4.36	4.05	164.00	133.00	66.00	45.00		
20	M&R-Hld (C)	1.28	1.52	0.15	0.16	0.56	0.60	2.71	2.84	155.00	181.00	45.00			
22	Brandco (Re)	0.73	0.87	0.54	0.52	0.42	0.46	5.17	4.90	80.40	58.20	24.00			
23	Trnshex (M)	0.40	0.50	0.22	0.23	0.28	0.33	3.98	3.58	222.00	270.20	73.00			
24	Iliad (C&M)	0.93	0.87	0.41	0.42	0.48	0.47	4.43	3.46	97.40	76.40	24.00			
27	Northam (M) Putco (T)	0.37	0.38	0.12	0.07	0.27	0.28	2.99	2.84	109.50	118.70	105.00			
28 29	Oceana (F&F)	2.43 0.71	2.94 0.64	0.20	0.18 0.17	0.71 0.41	0.75 0.39	2.79 4.15	2.75 4.76	179.10 143.80	159.00 181.00	0.00 76.50	0.00 76.50		
30	Hudaco (E&Ma)	0.71	0.64	0.17	0.17	0.41	0.39	4.13	4.70	371.00	365.00	128.00			
31	Crookes (F&F)	0.36	0.72	0.22	0.25	0.39	0.42	3.75	4.24	152.40	151.50	106.00	100.00		
32	Argent (DI)	0.72	1.10	0.19	0.19	0.42	0.52	3.54	2.89	106.20	83.70	18.00			
34	Medclin (H&C)	0.32	0.29	0.24	0.26	0.24	0.22	4.79	4.80	127.70	105.70	40.00			
38	Winhold (Re)	1.28	1.47	0.32	0.33	0.56	0.60	3.85	4.18	23.10	16.40	5.20			
39	CMH (Au)	1.96	2.06	0.24	0.25	0.66	0.67	5.25	5.03	341.90	282.80	79.40	68.00		
40	Reunert (EI)	2.17	1.85	0.20	0.19	0.68	0.65	3.59	2.76	275.00	175.00	160.00	120.00		
81	M-&-F (I)	1.07	1.06	0.04	0.04	0.52	0.51	2.87	2.48	0.00	0.00	0.00	0.00		
82	Grayprop (RE)	0.15	0.17	0.11	0.12	0.13	0.15	4.62	4.08	32.20	29.90	32.20	30.90		
84	Amaps (Re)	1.40	1.36	0.99	0.95	0.58	0.58	4.24	3.24	45.20	16.20	15.00	3.75		
85	Bell (E&Ma)	1.27	0.97	0.00	0.00	0.56	0.49	2.86	3.86	-13.00	39.00	0.00			
86	Indfin (I)	0.20	0.15	0.46	0.41	0.16	0.13	4.90	5.79	10.10	8.00	4.00			
91	Ceramic (C&M)	0.39	0.46	0.21	0.20	0.28	0.31	4.27	3.88	754.00	742.00	135.00			
92	Seardel (Ma)	1.54	1.88	0.34		0.61	0.65				71.80				
94	Dawn (C&M)	1.97	2.11	0.08		0.66			5.01	30.53	18.70				
97 99	Unitran (T) Johncom (Me)	1.14 0.57	1.14	0.10	0.11	0.53 0.36	0.53 0.42	3.55 2.80	3.40	346.70 170.00	307.90 151.00				
100	Caxton (Me)	0.57	0.71	0.33	0.30	0.36	0.42	4.35	2.63 4.39	74.00	64.00				
41	Netcare (H&C)	0.89	0.90	0.16	0.20	0.25	0.23	3.24	2.80	45.90	41.20				
42	Assore (M)	0.69	0.53	0.24	0.24	0.47	0.47	3.33	3.41	584.00	483.00				
50	Itltile (C&M)	0.47	0.48	0.74	0.72	0.32	0.32	4.56	4.69	856.30	691.40				
76	Assmang (M)	0.70	0.58	0.10	0.10	0.41	0.37	2.95	3.28	6026.00	5745.00				
77	Masonite (Ti)	0.45	0.52	0.00	0.00	0.31	0.34	3.88	3.67	86.00	19.10				
	. ,				_										

Sectors: Au=Automobiles C=Construction C&M=Construction & Building Material DI=Diversified Industries EI=Electronics E&Ma=Engineering & Machinery F&F=Farming & Fishing H&C=Hospital & Clinics I=Insurance M=Mining Ma=Manufacturer Me=Media RE=Real estate Re=Retailing Res=Restaurants S&P=Shipping & Ports T=Transport Ti=Timber

Source: Analysis of research data

FRAM model, observed that "non-failed" or "healthy" companies had negative real sales growth and negative real earnings growth, as well as poor working capital.

The areas of 'weakness' (on the balance of probabilities and in terms of Figure 5a) common to the Top Companies per Table 9 (39 companies) are listed below.

Possible weakness	Frequency of occurrenc e	% Frequen cy (total: 39)
Mismatch between WACC and the return on investment*	26	66%
Debt/equity ratio above .50*	25	64%
Effect on Z-Score – low net working capital (Appendices G)	6	15%
Effect on Z-Score – low retained earnings/low EBIT	2	5%
Dividends paid despite a negative HEPS/dividends taking up close to 100% of HEPS*	3	8%

*See Appendices F and L.

Source: Analysis of research data

The variables that contributed (positively) significantly to the Z-Score (Appendices G) are listed below:

Possible strengths	Frequency of occurrenc e	% Frequency (total: 39)
Effect on Z-Score: sales in relation to total assets	23	59%
Effect on Z-Score: Low debt (equity/debt)	6	15%

Source: Analysis of research data

The WACC and the debt/equity ratio are the most neglected aspects of the companies. On the other hand, sales give most companies good Z-Scores. It is notable and surprising though, that out of the thirty-nine companies with good Z-Scores, only one company has good ratios in all aspects.

Eleven of the thirty nine companies are ranked by the *Financial Mail* amongst the first twenty companies. Yet, only one of these companies appears to have a good financial performance record.

4.3. Illustration: The application of the Ratio Map and Z-Score (Figure 5a)

The illustration is done with reference to Appendices I, J, and K. It has been pointed out previously that it would not be feasible to apply the ratio map and Z-Score (Figure 5a) to all the companies as this would require some fifty pages. For this reason, three companies have been selected for the illustration - Wesco, Nictus and Group-5. The companies are selected from each of the three categories used in the analysis above.

The analysis does not include the ratios that support the current ratio, but includes the current ratio as qualified in chapter 3. As pointed already, some of the ratios could not be computed owing to gaps in data.

4.3.1. Ratio Map and Z-Score: Wesco Investments Ltd (10) (Appendix I) Starting with solvency, the company has a low debt ratio coupled with a good Z-Score. The variation in the Z-Score for 2004 and 2003 is significant at 202.9. This is mainly brought about by an increase of .176 in equity and a decrease of .878 in liabilities, which is not surprising since the liabilities are mainly short-term.

Flowing from the debt ratio, the debt/equity ratio is also low. The WACC at .09, being mainly equity costs (Appendices L), compares favourably with the return on investment of .15. The level of the investment return for 2003 (.02) is mainly due to the low gross profit margin (.03) that led to a low net

profit margin (.004). On the level of the investment return for 2003, the low gross profit margin also affected the HEPS for the same year.

The current ratios for the two-year period look good. Receivables represent .10 of current assets, while investments and cash represent the .90 (Appendices D).

Generally, the company is doing well.

4.3.2. Ratio Map and Z-Score: Nictus Ltd (89) (Appendix J)

Assets are financed with debt to the extent of .82, having deteriorated from .78 in the previous year. The Z-Score is below the cut-off point of 1.81 recommended for bankruptcy assessment. The variation in the Z-Score for 2004 and 2003 is significant at -.52. The area of weakness is the EBIT in relation to total assets (Appendices G). This is evident in the low net profit margin of .01 – the gross profit is at a fairly good level of .17 (without considering the specific operations of the company or its pricing policy). The net profit margin has also affected the retained earnings. Therefore, the Z-Score is affected by the levels of EBIT and retained earnings (Appendices G).

Flowing from the debt ratio, the debt/equity ratio at 4.54 should be an area of concern. However, the major part of liabilities is 'long-term provisions' (Appendices D), which may not pose an immediate threat. The WACC at .21, being mainly equity costs (Appendices L), does not compare favourably with the return on investment of .01. The effect of the low net profit margin is also evident in the low HEPS.

The current ratios for the two-year period look good. However, with the exclusion of 'inventory', which represents .126 of current assets, the receivables represent .78 of the rest of the current assets (Appendices D). The current ratio, therefore, may not be as good as it appears, depending largely, on the quality of the receivables.

4.3.3. Ratio Map and Z-Score: Group Five Ltd (18) (Appendix K)

Assets are financed with debt to the extent of .77, an improvement from .78 of the previous year. The Z-Score is below the upper cut-off point of 2.675 recommended for bankruptcy assessment. The variation in the Z-Score for 2004 and 2003 is not significant at -.11. The area of weakness is the net working capital in relation to total assets (Appendices G). This is evident in the current ratio of .76 (Appendices F).

Flowing from the debt ratio, the debt/equity ratio at 3.32 should be an area of concern. Current liabilities represent .91 of total liabilities, with trade debts taking up .77 of the current liabilities (Appendices D).

The WACC at .21, being mainly equity costs (Appendices L), does not compare favourably with the return on investment of .05. The low return is attributable to the low gross profit and net profit margins.

The current ratios for the two-year period do not look good. Excluding inventory, which represents .233 of current assets, the receivables represent .78 of the remaining current assets. The current ratio, therefore, may be worse than it appears, depending largely, on the quality of the receivables.

4.4. Conclusion

Even though the financial analysis of the individual companies (Note AB) consists of a paragraph, the analysis could go deeper. It is only the more salient areas that are mentioned and this could be seen as a lead or a start to a deeper analysis.

The analyses of the data has brought to the fore, information that makes it possible to arrive at a conclusion on the research problem, as well as to provide answers to the research questions. These are done in Chapter 5.

NOTE AB

BRIEF NOTES: INDIVIDUAL COMPANY FINANCIAL ANALYSIS

The companies in the sample have their unique strengths and weaknesses.

To facilitate the analysis, the individual financial analysis of the data is given below.

The individual data analysed is done with reference to the Appendices as stated on pages 179 and 180 in Chapter 4. Reference to the Appendices is not made in the text to avoid unnecessary repetition. For convenience, the abridged Appendices F and F(S) per Tables 7, 7A, 8 and 9 are included in these notes. As previously stated, the tables include the popular company 'highlight' measures – HEPS and dividends paid.

The individual analyses are discussed in terms of the three Z-Score categories: Low – a score below 1.81; Average – a score of between 1.81 and 2.675; and High – a score above 2.675.

- 1. Top Companies classified as 'low' Z-Score below 1.81 (2004) (Tables 7 and 7A)
- Mvelaphanda Resources Ltd (Mvela Res) (1)

A striking aspect of this company is the drop in the Z-Score from 6.29 (2003) to .93 (2004). The debt levels changed significantly during the two-year

period, with total liabilities increasing 17.02 times. At a glance, the asset that increased

significantly is a receivable long-term loan. The net working capital decreased 5.5 times during the two year period. The WACC was kept at reasonable levels both for equity and debt, considering the returns on total assets.

Premium Properties Ltd (Premium) (5)

The debt/equity ratio needs to be seen in the light of 'linked debentures', which represent .30 of total liabilities. When this item is stripped out to equity, the ratio drops from 3.98 to 1.27 (Tables 7 and 7A). The WACC does not compare favourably with the returns on total assets. The Z-Score, at .92 shows the company to be in need of a revamp in the areas of liquidity (net working capital) and retained earnings.

Scharrig Mining Ltd (Schamin) (25)

Debt in relation to equity is above 1.00. Total assets financed by debt are at an extent of .65. Return on investment is at .05, while the WACC is at .16. The Z-Score is low owing to poor liquidity and a negative net working capital.

Table 7: Top Companies with a Z-Score below 1.81 (2004) (Sectors in parenthesis)

	COMPANY		SOLVENCY									EARNINGS AND DIVIDENDS (COMPANY MEASURES)			
(D	SHORT	•	1		2	3	3	4	ı		5	6			
Ĭ	NAME	DEBT/E	EQUITY	WACC		DEBT RATIO		Z-SCORE		HEPS (cents)		DIVIDENDS			
RANKING												(cents)			
Α/		2004	2003	2004	2003	2004	2003	2004	2003	2004	2003	2004	2003		
1	Mvela Res (M)	0.62	0.11	0.04	0.02	0.38	0.10	0.94	6.29	-96.14	78.35	0.00	0.00		
5	Premium (RE)	3.98	5.83	0.14	0.12	0.80	0.85	0.92	0.75	0.00	0.00	38.00	29.40		
25	Schamin (M)	1.83	1.58	0.16	0.18	0.65	0.61	1.74	1.70	46.60	23.20	7.50	4.50		
37	Sable (RE)	0.73	0.91	0.27	0.24	0.42	0.48	1.74	1.17	26.00	-78.60	35.00	10.00		
89	Nictus (Re)	4.54	3.54	0.21	0.20	0.82	0.78	1.61	2.13	1.09	11.29	6.00	5.00		
47	Octodec (RE)	3.31	5.19	0.12	0.11	0.77	0.84	0.92	0.57	0.00	0.00	177.00	143.00		
48	Metboard (RE)	24.83	10.69	0.09	0.09	0.96	0.91	0.47	0.51	0.00	0.00	39.00	38.00		

Sectors: M=Mining RE=Real Estate Re=Retailing

Source: Analysis of research data

Table 7A: Top Companies (Property Companies) with a Z-Score below 1.81 (2004)
Linked Debentures taken as Equity
(Sectors in parenthesis)

	COMPANY				EARNINGS AND DIVIDENDS (COMPANY MEASURES)								
(D	SHORT	•	1	- 2	2	;	3	4	4	;	5	•	6
RANKING	NAME	DEBT/E	QUITY	WA	CC	DEBT	RATIO	z-sc	ORE	HEPS	(cents)	DIVID	ENDS
Ž												(ce	nts)
3		2004	2003	2004	2003	2004	2003	2004	2003	2004	2003	2004	2003
5	Premium (RE)	1.27	1.25	0.14	0.12	0.56	0.56	1.24	1.12	0.00	0.00	38.00	29.40
47	Octodec (RE)	0.86	1.24	0.12	0.11	0.46	0.55	1.43	0.94	0.00	0.00	177.00	143.00
48	Metboard (RE)	0.99	0.86	0.09	0.09	0.50	0.46	1.06	1.15	0.00	0.00	39.00	38.00

Sectors: RE=Real Estate
Source: Analysis of research data

♣ Sable Holdings Ltd (Sable) (37)

Debt to equity improved from .91 (2003) to .73 (2004). The WACC of .27 (2004) does not compare favourably with the return on total investment of .09. While the solvency as depicted by the debt ratio is fair at .42, liquidity is weak with the net working capital in the negative. Flowing from the weak liquidity, the Z-Score is low.

♣ Nictus Ltd (Nictus) (89)

The level of debt is 4.54 (2004) of equity. However, the debt ratio still shows a margin of solvency at .82 (2004). The return on total investment at .01 (2004) does not compare favourably with the WACC at .21. The poor return, flowing from a low EBIT and low retained earnings, is reflected in the low Z-Score.

Octodec Investments Ltd (Octodec) (47)

The debt/equity ratio needs to be seen in the light of 'linked debentures', which represent .39 of total liabilities. When this item is stripped out to equity, the ratio drops from 3.31 to .86 (Tables 7 and 7A). The WACC does not compare favourably with the returns on total assets (Appendices F). The Z-Score, at .92 shows the company to be in need of a revamp – the possible areas for attention are liquidity (net working capital) and retained earnings.

Metboard Properties Ltd (Metboard) (48)

The debt/equity ratio needs to be seen in the light of 'linked debentures', which represent .48 of total liabilities. When this item is stripped out to equity, the ratio drops from 24.83 to .99 (Tables 7 and 7A). The WACC does not compare favourably with the returns on total assets. The Z-Score, at .47 shows the company to be in need of a drastic revamp – the possible areas for attention are liquidity (net working capital), retained earnings, and the debt level.

2. Top Companies with a Z-score between 1.81 and 2.675 (2004) (Table 8)

♣ Wilson Bayly Holmes – Ovcon Ltd (WBHO) (15)

The level of debt to equity is 2.70. The debt ratio shows a margin of solvency at .73 (2004). The return on total investment at .07 (2004) does not compare favourably with the WACC at .21. Generally the ratios for the two-year period show a static pattern with minor or no differences. The liquidity at 1.01 has given rise to a low net working capital, which has had a bearing on the Z-Score (2.56).

♣ Group Five Ltd (Group 5) (18)

The debt to equity ratio is more than threefold at 3.32. The financing of assets by means of debt is at .77. The WACC is .30 with the return on total investment at .05. With this return, the profits would appear not to be at a good level to feed retained earnings as well as liquidity (networking capital) – hence the low Z-Score. Retained earnings would seem to be affected, also, by the dividends paid which represent .32 of the HEPS for both years reviewed.

Table 8: Top Companies with a Z-Score between 1.81 and 2.675 (2004) (Sectors in parenthesis)

	COMPANY	SOLVENCY									EARNINGS AND DIVIDENDS (COMPANY MEASURES)			
(2)	SHORT	•	1	- 2	2	;	3	4	1		5	(6	
NKING	NAME	DEBT/I	EQUITY	WA	CC	DEBT	RATIO	Z-SC	Z-SCORE HEPS		(cents)	DIVIDENDS (cents)		
Ž												(ce	nts)	
RA		2004	2003	2004	2003	2004	2003	2004	2003	2004	2003	2004	2003	
15	WBHO (C)	2.70	2.73	0.21	0.22	0.73	0.73	2.56	2.55	208.00	175.00	51.00	42.00	
18	Group-5 (C&M)	3.32	3.58	0.30	0.33	0.77	0.78	2.37	2.48	135.10	115.10	44.00	37.00	
42	Fambrands (Res)	1.34	0.79	0.06	0.09	0.57	0.44	2.38	3.97	-40.30	135.70	0.00	0.00	
46	Lonmin US\$ (M)	0.94	0.86	0.03	0.06	0.48	0.46	2.22	2.20	88.40	52.50	72.00	72.00	

Sector: C=Construction M=Mining C&M=Construction & Building Material Res=Restaurants

Source: Analysis of research data

♣ Famous Brands Ltd (Farmbrands) (42)

Debt to equity is 1.34 (2004), having deteriorated from .79 (2003). Just over half of the total assets are financed by debt. The WACC compares favourably with the return on total assets. The Z-Score fell from 3.97 (2003) to 2.38 (2004). The total assets increased 1.14 times without a near increase in the crucial area of earnings. Hence, net working capital and retained earnings, in relation to total assets, decreased. This explains the decrease in the Z-Score. Interestingly, the major increase in total assets is on intangible fixed assets. This has a strong effect on the debt/equity ratio, as well as the debt ratio.

♣ Lonmin plc (LONMIN) (46)

Debt to equity is .94 (2004), having deteriorated from .86 (2003). Just under half of the total assets are financed by debt. The WACC compares favourably with the return on total assets. The Z-Score is static at around

2.22 – the area of weakness is the liquidity that has given rise to a low net working capital.

3. Top Companies with a Z-score above 2.675 (2004) (Table 9)

Pals Holdings Ltd (2)

Except for the high WACC, the ratios and the Z-Score look good. A loss was posted for 2004. The good Z-Score is attributable to low debt in relation to equity, and high sales in relation to total assets. Dividends were paid during 2004 despite a negative HEPS for the same year. The WACC at .92 (2004), is due to the cost of equity – the result of a high dividend growth rate. On the other hand, the return on investment does not compare favourably with the WACC.

♣ Grindrod Ltd (3)

The debt/equity ratio is at 2.08 (2004), with the debt ratio at .67. The level of the WACC, which does not compare favourably with the rate of return, is the result of a high dividend growth rate. The Z-Score is a border-line case attributable to a negative net working capital and high sales in relation to total assets. Dividends for 2004 represent .28 of HEPS.

Cashbuild Ltd (6)

The debt/equity ratio is at 2.14 (2004), with the debt ratio at .68. The level of the WACC, which does not compare favourably with the rate of return, is the result of a high dividend growth rate. The level of the Z-Score is the result of high sales in relation to total assets. Dividends for 2004 represent .31 of HEPS.

Table 9: Top Companies with a Z-Score above 2.675 (2004) (Sectors in parenthesis)

	COMPANY				SOLV	ENCY				EARNINGS AND DIVIDENDS (COMPANY MEASURES)				
ត្	SHORT	1		2		3		4			5		6	
X	NAME	DEBT/E	QUITY	WA	CC	DEBT	RATIO	Z-SCORE		HEPS (cents)		DIVIDENDS (cents)		
RANKING		2004	2003	2004	2003	2004	2003	2004	2003	2004	2003	2004	2003	
_		2004	2003	2004	2003	2004	2003	2004	2003	2004	2003	2004	2003	
2	Pals (Re)	0.33	0.58	0.92	0.75	0.25	0.37	4.32	4.55	-40.30	135.70	50.00	24.00	
3	Grindrod (S&P)	2.08	2.40	0.44	0.41	0.67	0.71	2.69	1.99	618.40		175.00	60.00	
6	Cashbil (C&M)	2.14	2.40	0.51	0.53	0.68	0.71	4.02	4.04	251.40	224.10	78.00	65.00	
8	Metair (Ma)	0.50	0.50	0.18	0.17	0.33	0.33	4.77	4.96	2704.00	2297.00	700.00	500.00	
10	Wesco (Au)	0.00	0.03	0.09	0.09	0.00	0.02	231.09	28.23	2417.00	-1088.00	220.00	5500.00	
11	AECI (Ma)	1.22	1.39	0.16	0.17	0.55	0.58	2.86	2.46	392.00	356.00	138.00	120.00	
12	Bearman (Re)	0.62	0.97	0.45	0.46	0.38	0.49	4.96	4.30	75.30	90.50	36.00	36.00	
14	Implats (M)	0.58	0.58	0.05	0.06	0.37	0.37	3.43	3.67	3966.00	5140.00		2650.00	
19	Invicta (E&Ma)	1.00	1.01	0.50	0.51	0.50	0.50	4.36	4.05	164.00	133.00	66.00	45.00	
20	M&R-Hld (C)	1.28	1.52	0.15	0.16	0.56	0.60	2.71	2.84	155.00	181.00	45.00	52.50	
22	Brandco (Re)	0.73	0.87	0.54	0.52	0.42	0.46	5.17	4.90	80.40	58.20	24.00	16.00	
23	Trnshex (M)	0.40	0.50	0.22	0.23	0.28	0.33	3.98	3.58	222.00	270.20	73.00	66.00	
24 27	Iliad (C&M) Northam (M)	0.93	0.87	0.41	0.42	0.48	0.47	4.43	3.46	97.40	76.40	24.00	19.00	
28	Putco (T)	0.37 2.43	0.38 2.94	0.12 0.20	0.07 0.18	0.27 0.71	0.28 0.75	2.99 2.79	2.84 2.75	109.50 179.10	118.70 159.00	105.00	90.00	
29	Oceana (F&F)	0.71	0.64	0.20	0.16	0.71	0.75	4.15	4.76	143.80	181.00	76.50	76.50	
30	Hudaco (E&Ma)	0.65	0.72	0.17	0.17	0.39	0.42	4.69	4.70	371.00	365.00	128.00	122.00	
31	Crookes (F&F)	0.36	0.30	0.22	0.25	0.26	0.23	3.75	4.24	152.40	151.50	106.00	100.00	
32	Argent (DI)	0.72	1.10	0.19	0.19	0.42	0.52	3.54	2.89	106.20	83.70	18.00	17.00	
34	Medclin (H&C)	0.32	0.29	0.24	0.26	0.24	0.22	4.79	4.80	127.70	105.70	40.00	33.00	
38	Winhold (Re)	1.28	1.47	0.32	0.33	0.56	0.60	3.85	4.18	23.10	16.40	5.20	3.50	
39	CMH (Au)	1.96	2.06	0.24	0.25	0.66	0.67	5.25	5.03	341.90	282.80	79.40	68.00	
40	Reunert (EI)	2.17	1.85	0.20	0.19	0.68	0.65	3.59	2.76	275.00	175.00	160.00	120.00	
81	M-&-F (I)	1.07	1.06	0.04	0.04	0.52	0.51	2.87	2.48	0.00	0.00	0.00	0.00	
82	Grayprop (RE)	0.15	0.17	0.11	0.12	0.13	0.15	4.62	4.08	32.20	29.90	32.20	30.90	
84	Amaps (Re)	1.40	1.36	0.99	0.95	0.58	0.58	4.24	3.24	45.20	16.20	15.00	3.75	
85	Bell (E&Ma)	1.27	0.97	0.00	0.00	0.56	0.49	2.86	3.86	-13.00	39.00	0.00	0.00	
86	Indfin (I)	0.20	0.15	0.46	0.41	0.16	0.13	4.90	5.79	10.10	8.00	4.00	2.00	
91	Ceramic (C&M) Seardel (Ma)	0.39	0.46	0.21	0.20	0.28	0.31	4.27	3.88 3.28	754.00	742.00	135.00	120.00	
92 94	Dawn (C&M)	1.54 1.97	1.88 2.11	0.34		0.61 0.66	0.65 0.68		5.01	60.60 30.53				
97	Unitran (T)	1.14	1.14	0.08	0.05	0.53	0.53	3.55	3.40	346.70		93.00		
99	Johncom (Me)	0.57	0.71	0.10	0.11	0.36	0.55	2.80		170.00				
100	Caxton (Me)	0.33	0.71	0.33	0.20	0.25	0.42	4.35	4.39	74.00		35.00		
41	Netcare (H&C)	0.89	0.90	0.26	0.27	0.47	0.47	3.24	2.80	45.90		0.00		
42	Assore (M)	0.61	0.53	0.24	0.24	0.38	0.35	3.33	3.41	584.00				
50	Itltile (C&M)	0.47	0.48	0.74	0.72	0.32	0.32	4.56	4.69	856.30				
76	Assmang (M)	0.70	0.58	0.10	0.10	0.41	0.37	2.95	3.28	6026.00	5745.00	750.00		
77	Masonite (Ti)	0.45	0.52	0.00	0.00	0.31	0.34	3.88	3.67	86.00	19.10	0.00		

Sectors: Au=Automobiles C=Construction C&M=Construction & Building Material DI=Diversified Industries EI=Electronics E&Ma=Engineering & Machinery F&F=Farming & Fishing H&C=Hospital & Clinics I=Insurance M=Mining Ma=Manufacturer Me=Media RE=Real estate Re=Retailing Res=Restaurants S&P=Shipping & Ports T=Transport Ti=Timber

Source: Analysis of research data

♣ Metair Investments Ltd (8)

The ratios are at good levels. However, the WACC does not compare favourably with the return on investment. The strength of the company is in the debt/equity relationship and the high sales in relation to total assets, hence the level of the Z-Score. The dividends paid represent .25 of HEPS.

Wesco Investments Ltd (10)

The ratios are at good levels. The WACC compares favourably with the returns on total assets. The low debt in relation to equity contributed to the high Z-Score. The dividends paid represent .09 of HEPS.

♣ AECI Ltd (11)

The debt/equity ratio is at 1.22 (2004), with the debt ratio at .55. Even though the WACC does not compare favourably with the rate of return, the dividend growth rate has been modest. The Z-Score, not far from the cut-off point of 2.675, has its major contribution from the high sales in relation to total assets. Dividends for 2004 represent .35 of HEPS.

Bearing Man Ltd (12)

The debt/equity ratio is at .62 (2004), with the debt ratio at .38. The level of the WACC, which does not compare favourably with the rate of return, is the result of the dividend growth rate. The contributions to the Z-Score are more or less even, but with sales to total assets contributing more. Dividends for 2004 represent .48 of HEPS.

Impala Platinum Holdings (14)

The debt/equity ratio is at .58 (2004), with the debt ratio at .37. The level of the WACC, which compares favourably with the rate of return, is the result of the dividends representing about .05 of the share price, but increasing steadily. The dividends for 2004 actually dropped by .23 compared to 2003. The weakest contribution to the Z-Score is the low net working capital, while the contribution by the other variables is more or less even. Dividends for 2004 represent .53 of HEPS.

Invicta Holdings Ltd (19)

The debt/equity ratio is at 1.00 (2004), with the debt ratio at .50. The level of creditors (trade and other) represents 85% of total liabilities. The level of the WACC, which does not compare favourably with the rate of return, is the result of an average dividend growth rate of .44. The level of the Z-Score is the result of high sales in relation to total assets. Dividends for 2004 represent .40 of HEPS.

Murray & Roberts Holdings Ltd (20)

The debt/equity ratio is at 1.28 (2004), with the debt ratio at .56. Even though the WACC does not compare favourably with the rate of return, the dividend growth rate is modest at .13. The level of the Z-Score, a borderline case, is the result of high sales in relation to total assets. Dividends for 2004 represent .29 of HEPS. The company has since merged with The Cementation Company (Africa) Ltd and is now called Murray & Roberts Cementation (position during mid 2006).

Brandcorp Holdings Ltd (22)

The debt/equity ratio is at .73 (2004), with the debt ratio at .42. The level of the WACC, which does not compare favourably with the rate of return, is the result of a high dividend growth rate. The level of the Z-Score is the result of high sales in relation to total assets. Dividends for 2004 represent .30 of HEPS.

♣ Trans Hex Group Ltd (23)

The ratios are at good levels, even though the WACC at .22 (2004) does not compare favourably with the return on investment. The low debt in relation to equity made a major contribution to the Z-Score. The dividends paid represent .33 of HEPS.

♣ Illiad Africa Ltd (24)

The debt/equity ratio is at .93 (2004), with the debt ratio at .48. The level of the WACC, which does not compare favourably with the rate of return, is the result of a high dividend growth rate of .39. The level of the Z-Score is the result of high sales in relation to total assets. Dividends for 2004 represent .25 of HEPS.

Northam Platinum Ltd (27)

The ratios and the Z-Score look good. The WACC compares favourably with the returns on total assets. Dividends for 2004 represent .96 of HEPS.

♣ Putco Ltd (33)

The debt/equity ratio is at 2.43 (2004), with the debt ratio at .71. The level of the WACC, which does not compare favourably with the rate of return, is the

result of the cost of equity of .20. The level of the Z-Score is a borderline case mainly due to a low net working capital. This is compensated by the high sales in relation to total assets. The company has not highlighted any dividends paid. Dividends for 2004 represent .25 of HEPS. The company has since de-listed from the JSE.

Oceana Group Ltd (29)

The debt/equity ratio is at .71 (2004), with the debt ratio at .41. The level of the WACC differs moderately with the rate of return. The dividend growth rate is at .13. The level of the Z-Score is dominated by the high sales in relation to total assets. Dividends for 2004 represent .53 of HEPS.

Hudaco Industries Ltd (30)

The debt/equity ratio is at .65 (2004), with the debt ratio at .39. The level of the WACC, which does not compare favourably with the rate of return, is the result of a dividend growth rate of .20. The level of the Z-Score is dominated by sales in relation to total assets. Dividends for 2004 represent .35 of HEPS.

Crookes Brothers Ltd (31)

Except for the WACC, which does not compare favourably with the rate of return, the company has good ratios and a good Z-Score. Dividends for 2004 represent .70 of HEPS.

Argent Industrial Ltd (32)

The debt/equity ratio is at .72 (2004), with the debt ratio at .42. The level of the WACC, which does not compare favourably with the rate of return, is the result of a dividend growth rate of .17. The level of the Z-Score is dominated

slightly, by sales in relation to total assets. Dividends for 2004 represent .17 of HEPS.

♣ Medi-Clinic Corporation Ltd

Except for the WACC, which does not compare favourably with the rate of return, the company has good ratios and a good Z-Score. Dividends for 2004 represent .31 of HEPS.

♣ Winhold Ltd (38)

The debt/equity ratio is at 1.28 (2004), with the debt ratio at .56. The level of the WACC, which does not compare favourably with the rate of return, is the result of a high dividend growth rate of .38. The level of the Z-Score is dominated by high sales in relation to total assets. Dividends for 2004 represent .23 of HEPS.

Combined Motor Holdings (39)

Debt is almost twice equity, while the total assets are financed by debt to the extent of .66 (2004). The return on investment is quite low compared to the WACC – the growth in dividends contributed .19 to the cost of capital. The Z-Score is dominated by a ratio of 3.75 of sales to total assets. Dividends for 2004 represent .23 of HEPS.

♣ Reunert Ltd (40)

Debt is two-fold the size of equity, while total assets are financed by debt to the extent of .68. The cost of equity is the major contributor to the WACC – mainly due to a dividend growth rate of .20. The weakest link in the Z-Score

is the net working capital, which represents total assets to the extent of - 6.33. The strongest link is the sales to total assets ratio of 2.00. Dividends for 2004 represent .58 of HEPS.

♣ Mutual & Federal Insurance Co Ltd (81)

Debt and equity are almost equal, while the extent of debt financing of total assets is .52. The level of the WACC at .04 compares favourably with the rate of return of .16. Dividends dropped by .74 since 2001, hence the low cost of capital. The Z-Score is a borderline case at 2.87, but with no significant weakness in any of the variables. HEPS and dividends paid are not given as highlights, but the information is given with the income statements. Dividends for 2004 (including special dividends) represent .96 of HEPS.

Allan Gray Property Trust (82)

The debt/equity ratio is at .15 (2004), with the debt ratio at .13. The level of the WACC at .11 compares favourably with the rate of return of .22. The dividend growth rate is at .016. The low debt in relation to equity contributed significantly to the level of the Z-Score. The weak areas are the level of retained earnings as well as the level of the net working capital. Distributions for 2004 represent 1.00 of HEPS.

Amalgamated Appliance Holdings Ltd (84)

The debt/equity ratio is at 1.40 (2004), with the debt ratio at .58. A further observation is that current liabilities represent .99 of total liabilities. The level of the WACC does not compare favourably with the rate of return. The

dividend growth rate is at .96. The major contributor to the level of the Z-Score is sales in relation to total assets. Dividends for 2004 represent .33 of HEPS.

♣ Bell Equipment Ltd (85)

Debt to equity is at more than 1.00 and the total assets are financed with debt to the extent of .56. The WACC is low – the cost of equity is virtually nil due to low and no dividends during the last two years. The Z-Score for 2004 is a borderline case with EBIT to total assets weak at .05. Interest bearing debt is low, but current liabilities make up .95 of total liabilities.

Independent Financial Services Ltd (86)

The debt level is fairly low with the total assets financed with debt to the extent of .16. The company has no long-term debt and has low levels of current liabilities. The level of the WACC does not compare favourably with the rate of return – the dividend growth rate is .41. The equity/debt relationship contributed significantly to the Z-Score, while liquidity is the weakest link resulting in a net working capital to total assets of -0.05. Dividends for 2004 represent .40 of HEPS.

Ceramic Industries Ltd (91)

The ratios and the Z-Score look good. None of the variables of the Z-Score are exceptional. The level of the WACC does not compare favourably with the rate of return – the dividend growth rate is .19. Dividends for 2004 represent .18 of HEPS.

♣ Seardel Investment Corporation Ltd (92)

Debt to equity is above 1.00 with debt financing of total assets at .61. Current liabilities make up .58 of the total liabilities. The level of the WACC does not compare favourably with the rate of return – the dividend growth rate is .46. Sales in relation to total assets are at 1.70 making up the major contribution to the Z-Score. Dividends for 2004 represent .23 of HEPS.

♣ Distribution and Warehousing Network Ltd (94)

Debt in relation to equity is almost two-fold with debt financing of total assets at .66. The WACC compares favourably with the rate of return – the dividend growth rate is .05. Sales in relation to total assets contributed to the high Z-Score. Dividends were not declared during the two-year period.

Unitrans Ltd (97)

The debt ratio to equity is slightly more than 1.00 with debt financing of total assets at .53. The difference between the WACC and the returns on total assets is marginal. The major contributor to the Z-Score is the sales proportion to total assets of 2.1. Dividends for 2004 represent .27 of HEPS.

♣ Johnnic Communications Ltd (99)

The debt/equity ratio is at .57 (2004), with the debt ratio at .36. The level of the WACC, which does not compare favourably with the rate of return, is the result of a dividend growth rate of .33. The level of the Z-Score is the result of both sales in relation to total assets, and equity in relation to debt. Dividends for 2004 represent .18 of HEPS.

Caxton & CTP Publishers & Printers Ltd (100)

The debt/equity ratio is at .33 (2004), with the debt ratio at .25. The level of the WACC, which does not compare favourably with the rate of return, is the result of a dividend growth rate of .14. The strongest variable in the Z-Score is the equity/debt relationship. Dividends for 2004 represent .47 of HEPS.

♣ Assore Ltd (45)

The debt/equity ratio is at .61 (2004), with the debt ratio at .25. The level of the WACC, which does not compare favourably with the rate of return, is the result of a dividend growth rate of .27. The variables of the Z-Score are balanced without any exceptional variable. Dividends for 2004 represent .11 of HEPS.

! Italtile Ltd (50)

The debt/equity ratio is at .47 (2004), with the debt ratio at .32. The level of the WACC, which does not compare favourably with the rate of return, is the result of a dividend growth rate of .71. Both the equity/debt and the sales/total assets relationships contributed slightly more to the Z-Score. Dividends for 2004 represent .35 of HEPS.

Assmang Ltd (76)

The debt/equity ratio is at .70 (2004), with the debt ratio at .41. The level of the WACC does not compare favourably with the rate of return even though the margin is .05. The Z-Score variables are balanced. Dividends for 2004 represent .12 of HEPS.

Masonite (Africa) Ltd (77)

The debt/equity ratio is at .45 (2004), with the debt ratio at .31. The level of the WACC compares favourably with the rate of return. Both the equity/debt relationship and the sales/total assets relationship contributed slightly more to the Z-Score. Dividends were neither declared nor paid for the past three years – hence the low cost of capital.

CHAPTER 5

CONCLUSIONS AND IMPLICATIONS

5.0. Introduction

This chapter concludes the chain of writings initiated in Chapter 1. It concentrates more on Chapter 4 (the last step in the chain), which analysed the data collected.

Chapter 1 provides background to the research study, and introduces the research problem, as well as the research questions. Further, the chapter justifies the research study, and gives a brief outline of the methodology.

Chapter 2 builds a theoretical foundation on which the research is based.

The parent discipline of the subject matter is introduced, together with the immediate disciplines and its sub-disciplines, narrowing the focus to the research sub-discipline. Having described the parent discipline, and having cascaded it down to the research sub-discipline, the chapter further describes the relationship between the disciplines, the boundary of the research problem, the area of research and the research questions not resolved in previous studies. From this background, the chapter goes on further to review the literature.

Chapter 3 discusses the process or plan (methodology) towards finding answers to the research questions, and indicates the path followed to reach a conclusion on the research problem. The chapter justifies the methodology, and discusses it in depth. A critical view of the literature

review in Chapter 2 is given, culminating in the development of the 'ratio map and the Z-Score' (Figure 5a), the instrument developed for this research study. The chapter then details the plan on how a conclusion on the research problem is to be arrived at, as well as the steps taken to find answers to the research questions. Chapter 3 also discusses the methodology limitations, as well as ethical issues.

Chapter 4 carries out the methodology by analysing the data without coming to conclusions. In the absence of bench-marks, the analysis is done based on 'what is reasonable'.

The analyses cover the 'highlights' measures applied by the Top Companies. This is to determine whether or not the measures cover the arsenal of available measures discussed in Chapter 2. Further, the analyses determines whether or not the 'highlights' measures give a reasonable picture of the financial position of the companies.

Further analyses cover the results per Figure 5a. As explained previously, analysing each company per Figure 5a would require some fifty pages (the net number of companies analysed). The evident volume necessitated that the analysis be done by drawing information from Appendices F1 and F(S)1. The analysis looks at the results of Figure 5a, and compares them to the message conveyed by the highlight measures applied by the companies. This is done to identify any gaps in the financial performance of the companies and to draw conclusions on whether or not the Top Companies do use the arsenal that is available to measure financial performance.

The conclusions to the first three research questions are drawn from the analyses of the results per Figure 5a. The researcher has noted that he regards the Z-Score model, as part of Figure 5a, as a financial performance management tool and not as a bankruptcy prediction model. For this reason, a critical discussion of the readings of the Z-Score is carried out to show that a Z-Score, say above the 2.675 cut-off point, could still mean that a company has problems.

In this chapter, the following are dealt with: conclusions on the research questions, conclusions on the research problem, implications of the research study for theory, implications for policy and practice, other research findings, and implications for further research.

For convenience and ease of reference, the research questions as well as the research problem are repeated. The research questions are:

- Is ratio analysis and interpretation useful as a financial performance measure?
- Is the bankruptcy prediction model applied in this research study reliable as a financial performance measurement tool?
- Is the bankruptcy prediction model applied in this research study user-friendly as a financial performance measurement tool?
- Is the information covered in the annual financial statements of the
 Top Companies adequate for a meaningful analysis to be done?

The research problem is:

Do South Africa's Top Companies use the available arsenal to measure financial performance?

5.1. Conclusions on the research questions

5.1.1. Is ratio analysis and interpretation useful as a financial performance measure?

In the early 1900s, ratio analysis was still largely undeveloped, with the current ratio as a single ratio used for the evaluation of credit-worthiness. Later, in the 1960s, the development of ratio analysis involved the use of several ratios by different users for different purposes. (Beaver 1966:71.) Further developments took place, with Cilliers (1967:11) pointing out that the usefulness of financial statements is inherent in the information intended to be conveyed to the reader on the financial performance of an organisation over an immediate past period. In the same breath, it is stated that the information in the financial statements can only be read meaningfully by means of "a prudent analysis and interpretation of those statements" (Cilliers 1967:12).

Some years later, Moyer *et al.* (1984:152) expressed the view that ratio analysis and interpretation facilitates the identification of an organisation's major strengths and weaknesses. On the question of 'prudent analysis', Cilliers (1967:12) had added that such analysis would only be possible if the financial statements were prepared in such a way that the required information was disclosed.

Chapter 2, which deals with the literature review, discusses amongst other issues, problems relating to ratio analysis. The more pertinent problem identified is that ratio analysis looks at only one ratio at a time and then

relies on the analyst to form a judgement on the overall profile of the financial position of the firm (Moyer *et al.* (1984:177).

Recalling the statement by Cilliers (1967:12), that financial statements can only be read meaningfully by means of "a prudent analysis and interpretation of those statements", such analysis cannot be possible without the determination of the relationships between the various financial statements figures, that is, ratios. It is evident in the literature review that ratios are core to the reading of financial statements.

Ratio analysis and interpretation is useful as a financial performance measure. Since the 1960s, the financial community has seen the development of 'statistical techniques' generally referred to as bankruptcy prediction models. Ratio analysis and interpretation enjoy wide use – this is evident from the *Business Times* and the *Financial Mail* surveys, the SE Handbook, and the limited highlight measures applied by the Top Companies. However, the developers of the statistical techniques or models have tended to put ratio analysis on the back-burner.

The variables of the statistical techniques are in fact ratios (as discussed in Chapter 2). It will also become clear, in the discussion on the statistical technique adopted for use in this research study, that a score yielded by a model may be very helpful if its components are analysed to determine areas of strengths and/or weaknesses.

The ratio map and Z-Score (Figure 5a), the instrument developed for this research study, creates a trail to facilitate the reading and interpretation of

ratios, so that a single ratio is not read in isolation. This also dispels the notion of "a mass of contradictory ratios" as suggested by Eidleman (1995). In Chapter 4, the financial position of fifty companies is analysed, using, in tabular form, the ratios covered in Figure 5a. Three companies are also selected to illustrate the application of Figure 5a.

The research question posed is whether or not ratio analysis is useful as a financial performance measure.

Moving to the results of the ratio map and Z-Score (Figure 5a), only one company out of the fifty Top Companies has a good ratio balance. Without over-emphasis, the sample is made up of Top Companies, which, for all intents and purposes, would be expected to have 'top marks' in 'all departments'. Regrettably, the use of ratios by the Top Companies (as highlighted) is not widespread, with the most popular 'highlights' measures being HEPS, dividends and assets distributions. It has been pointed out that, although not disclosed in the annual reports, there may be internal measures that are applied by the companies. The question is: With the internal measures applied by the companies, are they enabled to identify some of their apparent shortcomings, say, per Figure 5a? If so, is corrective action being taken? An answer to the last question may possibly, only be found in a follow-up study.

Since ratio analysis and interpretation has unearthed a variety of aspects relating to the Top Companies (Appendices F1 and F(S)), it is safe to conclude that ratio analysis is useful as a performance measure.

An affirmation or rejection of this standpoint may best be determined in a follow-up study.

5.1.2. Is the bankruptcy prediction model applied in this research study reliable as a financial performance measurement tool?

The formulation of a conclusion to this question may best be done by bearing in mind that the variables of the bankruptcy prediction model applied in this research study, the Z-Score, are ratios. A ratio, as defined by McLeary (1992:203) is "an expression of a relationship between any two figures or groups of figures in the financial statements of an undertaking". In fact, most of the models discussed are based on ratios. While the interpretation of the Z-Score 'may' only go as far as the score itself, coupled with the decided cut-off point, there is more to the score than comparing it to the cut-off point.

A comparison of the Z-Scores of the following four randomly selected Top Companies illustrates the underlying factors of the scores.

Company Name		Z-Score	s	Debt	Debt/	
	Scor	Strength	Weakness	Ratio	Equity	
Famous Brands (42)	2.38	Sales/Total Assets: 1.127	Net working Capital/ Total Assets: .08	.57	1.34	
Combined Motor (39)	5.25	Sales/Total Assets: 3.75	Four variables on almost equal level	.66	1.96	
Allan Gray (82)	4.62	Equity/Debt: 4.11	Net working Capital/ Total Assets: .08 Retained Earnings/ Total Assets: 0.00	.13	.15	

Distribution & W	4.25	Sales/Total Assets:	Retained Earnings/	.66	1.97
(04)		2.822	Total Assets: .05		
(94)					

Famous Brands (42) is a 'middle of the road' case. Its strongest variable is 'sales to total assets', but this is not extreme at 1.127. The weakness is, however, extreme at .08 (Net working Capital/Total Assets). The rest of the model components are not good at between .30 and .45. As pointed out under note AB, the total assets increased 1.14 times between 2003 and 2004, with an increase of 3.75 times in intangible assets (Appendices DBi and DBii). The increase has not generated a significant increase in earnings (sales only increased by .24). On the other hand, liabilities increased 1.77 times between the two years (Appendices DBi and DBii). This may be traced to the deterioration in liquidity (Appendix F(S)1).

Combined Motor Holdings Ltd (39) has a good Z-Score because of high sales in relation to total assets. The objective of any organisation is to make a profit, which has to come from sales. But, sales on their own, without adequate margins coupled with efficient management, cannot see an organisation go far. The problem in this case is traceable to the management of margins on sales – the net profit margin is .02 (Appendix F1). Therefore, the Z-Score needs to be analysed - the contribution to the Z-Score of the four other variables is a total of 1.51, while the 'sales to total assets' contribution is 3.75. Further, the debt level in relation to equity is another area of weakness.

Allan Gray Properties Trust (82) has a good score of 4.62. The score is contributed mainly by the low level of debt in relation to equity (see also the low levels of the debt ratio), while the rest of the variables contributed a total of only .51. The weaknesses as tabled tell their story.

Distribution and Warehousing Network Ltd (94) has a good score of 4.25, contributed to mainly by the sales to total assets ratio (2.822). The net profit margin on sales is .05, leading to an effect on the bottom line and the retained earnings. The total contribution by the other four variables is 1.42, with retained earnings making the lowest contribution of .05.

An analysis of the Z-Scores of the four companies reveals underlying weaknesses that cannot be read from the Z-Score. At this point, it is necessary to recall the following quote from bankruptcyaction: "All developers of prediction models warn that the technique should be considered as just another tool of the analyst and that it is not intended to replace experienced and informed personal evaluation". Therefore, the Z-Scores need not be interpreted in terms of the 'bankruptcy' cut-off point only. The interpretation and analysis of the Z-Score needs to look further at the individual contributions of the variables to the score. Based on this, the model serves a useful purpose as a financial performance measure.

On discussing the individual companies, the Z-score and its components have been related to other ratios as part of the analysis and interpretation. This has brought cohesion to the fore. Alan Gray Properties Trust (82) discussed above, is a case in point – the low level of debt contributes

significantly to the Z-Score, while the debt ratio and the debt/equity ratios confirm this aspect as a strong area of the company. Further, the three other companies discussed above have 'sales to total assets' (X5) as a major contributor to the Z-Score. Generally, sales constitute a major activity in an organisation. But, sales need not be the beginning and the end. The analyses of the other variables in relation to sales have revealed weaknesses that point to poor management of the net profit margin on sales.

Recalling the discussion on the Z-Score model in Chapter 2, the F-ratio for variable X5 is given as 2.84 and that this is not significant at the .001 level. However, the contributing ability of X5 has been found to rank second in its contribution to the overall discriminating ability of the model. But, sales without efficient management leading to EBIT cannot keep a company from failure.

The conclusion is, therefore, that the Z-Score model, as applied in this research study, is a reliable financial performance measure.

5.1.3. Is the bankruptcy prediction model applied in this research study user-friendly as a financial performance measurement tool?

Thesaurus: English (U.K.) defines user-friendly as simply "easy to use".

In Chapter 2, some nine models were discussed. The models were developed between 1966 and 1981, except for the Artificial Neural Networks (ANN), which evolved since the 1990s. In addition, FRAM was developed during 2006. Most of the models were undoubtedly developed a

long time ago. The question is whether or not the models are still relevant in modern times.

The Z-Score model has seen some revisions, with Altman (2000) revisiting the model in 2000. Revisions of the other models (excluding FRAM) have not been found in the literature search.

Moving to the research question on the Z-Score model, the variables of the model are readily available in the accounting data. One variable that may not be readily available is the market price of equity. In this study, the book value of equity has been used as motivated in Chapter 3. However, the use of market value of equity need not create problems because this information is available in the daily newspapers. This would, however, require noting the price on the last day of the financial year of a company to be able to use the market price (as a matter of choice) in the calculation of the Z-Score. A good source of share market prices is Profile's Stock Exchange Handbook which lists the prices for every listed company at each financial year end for the previous four years.

The Z-Score is easy to compute, and does not require involved calculations. As Altman (1993:179) puts it, to calculate the Z-Score, the requirements are a recent balance sheet and income statement, a share price (for a public company), a hand-held calculator, a piece of paper, and about ten to fifteen minutes.

However, the model need not be used in isolation. The analysis and interpretation of the Z-Score has shown that the score cannot be read in

isolation, and that the underlying contributions should be analysed to determine the strengths and the weaknesses of a company. Further, analysis of the Z-Score variables leads to other aspects of the organisation not directly covered by the Z-Score.

On the basis that the variables of the model are readily available and that the calculations are simple to carry out, it is concluded that the model is 'user-friendly' as a financial performance management tool.

5.1.4. Is the information covered in the annual financial statements of the Top Companies adequate for a meaningful financial analysis to be done? Chapter 2 explores the tools that are available for the analysis of financial statements. The tools are discussed in two categories, i.e. financial ratios and their interpretation (sourced from literature, surveys, and company 'highlights'), and the bankruptcy prediction models (sourced from literature). The financial ratios discussed are the measures commonly found in literature - some of these measures are also in practical use. An important feature of the bankruptcy prediction models discussed is that their variables are ratios. It became evident also, while reviewing the literature, that ratios may be designed in many different forms, over and above those found in literature.

The tools used by the Top Companies were also explored in Chapter 2. The focus was to determine the measures considered important by the Top Companies, as well as to determine the extent of analysis of the financial position of the companies that is made available to the investing community.

Narrowing the focus, the components of the instrument developed for this research study (Figure 5a) were drawn from a critical analysis of the ratios found in the literature. This was extended to include one of the bankruptcy prediction models (the Z-Score model) - not necessarily as a bankruptcy prediction model, but as a performance measurement tool. Since the variables of the Z-Score model are ratios, the extension of Figure 5 to Figure 5a was merely an addition of ratios in the form of the Z-Score. Therefore, for the purpose of this research study, Figure 5a is regarded as a tool for a 'meaningful analysis'.

The definition of 'meaningful analysis', as part of the research question, is generally elusive, since the results of an analysis are basically the opinions of the analyst. But somewhere, the gap has to be narrowed, so that the opinions of analysts may come to be almost the same. The development of the instrument (Figure 5a) for this research study has attempted to close this gap.

Reading from the ratios computed per Figure 5a, shortcomings in the information made available in the accounting data relate mainly to the liquidity support ratios. It has been noted that the aspects may be enjoying use internally, but that an analyst would need the information to satisfy his analytical appetite. The cost of debt is another area where information is lacking.

Information not fully covered in the accounting data relates to the following:

(a) Liquidity support

The lack of information led to the abandonment of the adjustment on stock (inventory) as well as on debtors. Instead, the stock figures were dropped completely, but the debtors were taken as given. This approach has been discussed under paragraph 3.6. The importance of the liquidity support ratios is briefly discussed below.

♦ Inventory/Stock

This item is a reservoir for sales and an important part of liquidity. Without stock there would be no sales, but the stock must have liquid quality. In other words, the faster the turnover rate, and the more liquid the stock would be. Therefore, for the purpose of determining the liquidity of stock, information needs to be furnished in the financial statements on the breakdown of the item into categories such as raw materials and work-in- progress (where applicable), finished goods, and the obsolete portion.

This information, coupled with the computation of the turnover rate of stock, then eases the determination of the liquid value of stock and the computation of the current ratio.

♦ Debtors

Debtors constitute a very important element of a company, except where sales are conducted in cash only. The quality of debtors is very important as debtors form part of sales, and sales form the life-blood of a company, that leads to profits. For instance, any bad debts written-off have to go against the profits. Apart from being part of

sales, debtors constitute an important element of the liquidity of a company. Debtors may constitute a major portion of current assets. Therefore, including these without question in the computation of the current ratio may be deceptive, since only a small portion of the debtors may be recoverable.

The problem would be overcome by providing useful information on the debtors, including the following:

- Age analysis: the use of this tool depends on the credit terms extended to customers. If this is thirty days, any amounts outstanding for longer than, say 120 days, should be regarded as doubtful.
- Debtors' collection period: this measure can only be accurately computed if the sales are categorised into credit and cash sales. The computation would then be confined to credit sales.
- Recovery rates: this measure is not generally applicable as it is best applied where the credit terms are thirty days. What would be required is a three line table to say

Debits/Charges for the period R XXXXX

Receipts R XXXX

Receipts as % of 000%

The previous year's details would also be made available to be able to assess the status of any debtors brought forward.

A comparison of the results of the three tools would give a good picture of the conduct of the debtors and enable judgement on what portion should be considered irrecoverable.

♦ Creditors' payment period

The manner in which creditors are paid serves as an added indication of liquidity. The information required to compute this aspect is creditors, as well as the credit expenses/outflows. In other words, the short-term liabilities need to be analysed to show trade creditors, tax, provisions, and any other type. The credit expenses/outflows need also to be shown to be able to compute the payment period.

♦ Cash flow coverage

This measure of cash inflows in relation to preferred outflows is also a useful measure in support of liquidity. Whenever this coverage is low, the current ratio would also be low, depending on the depth of analysis of the components of current assets. Lack of information in this regard was not significant and was mainly on debt repayments. The short-term portion of long term-debt was deemed to be the loan repayment for the following period.

(b) Cost of loans

Capital constitutes the foundation of a business enterprise. There is a cost attached to it, and the logic is that capital needs to be obtained at the lowest possible cost, that is, the lowest weighted average cost of capital (WACC). The WACC in turn is matched against the return on investment. For this

reason, the costs of loans constitute important information for determining the WACC.

In some of the sampled companies, information given is that the cost of loans ranges between two given figures. In other cases the cost is not given at all. For these reasons, companies with these instances were excluded from the analysis. Problems encountered in the computation of the WACC are discussed under paragraph 3.6.4.

Since debt can make or break a business enterprise, this information relating to debt needs to be made available.

In conclusion, the information made available in the accounting data of the Top Companies is not adequate for a meaningful analysis to be done.

5.2. Conclusion on the research problem

Do South Africa's Top Companies use the available arsenal to measure financial performance?

In arriving at a conclusion on the research problem, it is necessary to recall a grey area – that the sampled companies are in different sectors (in terms of both commerce and industry). This difference means that the accounting data items may not be the same, and that it may not be possible to calculate all ratios per Figure 5a. For instance, insurance companies and property companies do not have a gross profit. For this reason, a conclusion on the research question bears in mind the differences in the nature of operations of the companies.

A second consideration in arriving at a conclusion is to recall briefly, also, the host of measures discussed in Chapter 2. The measures discussed, including the Z-Score model, have been organised into Figure 5a after a critical analysis. It was also pointed out in the discussion, that many other measures may be designed. Hence, Figure 5a does not carry an exhaustive list of measures, but carries measures that were critically unpacked during the design and development of the instrument. Figure 5a also includes the Z-Score which adds valuable measures. Therefore, Figure 5a is a convenient tool to determine whether or not the Top Companies do use the available arsenal to measure financial performance.

The determination of the use of the available arsenal does not have to hinge on the number of measures per Figure 5a. The Top Companies have their 'highlight' measures and their own internal measures. The question then becomes: are the Top Companies giving attention to any weaknesses that may have been identified? An answer to this question is not immediately possible, since only trends over time, would provide an answer. Therefore, for the purpose of this research study, the results per Figure 5a (depicted mainly in tabular form for convenience), provide a yardstick on the financial position of the Top Companies. The weaknesses identified need to serve as a starting point on whether or not the companies do use the available arsenal of measures. Another question arises at the same time: have the companies identified the weaknesses? If the companies have identified the weaknesses, then most probably they are using the arsenal that is available

to measure their performance. If not, then the companies are not using the available arsenal. The two-year period of analysis in this research study is too short for an all-embracing conclusion to be drawn.

The first three research questions have attempted to assess the value of the measures covered per Figure 5a. This has been done despite the popularity of the measures found in the literature. For the benefit of investors, lenders, and any other interested parties, the fourth research question deals with the adequacy of the information in the financial statements that is necessary for a meaningful analysis to be done.

In order to unravel the research problem, the 'highlight' measures of the Top Companies are assessed. These measures give an idea of what the companies regard as important for the knowledge of the investing community. The results of Figure 5a are then discussed.

5.2.1. The Top Companies 'highlight' measures

Table 5 depicts the frequency of use of the 'highlight' measures by the Top Companies (on a total of sixty sampled companies). It is necessary again to point out that the companies most probably have, and use other measures that are not covered in their annual reports. Generally, the more popular 'highlights' measures (above 20% per Table 5) fall under the categories of solvency, liquidity, profitability and share performance. The category of sales/production is excluded from the analysis as this relates to very few companies (i.e. mining and property companies).

The most widely used 'highlight' measures fall under the category of profitability (HEPS, returns on equity and returns on total assets), share performance (dividends, net assets per share, and share price), and solvency (debt/equity). Debt ratio, the more critical solvency measure, is highlighted by only .07 of the companies. If profitability and share performance are important, then surely it is important to give prominence to the measure that conveys information on the sustainability of profitability and share performance, that is, the debt ratio.

Table 5: Frequency of application: 'highlights' financial performance measures applied by the Top Companies

	Measure	Frequenc y of use	% Frequency (Total sample: 60)
Solvency	Interest Cover	12	20%
	Debt/Equity	19	32%
	Debt Ratio	4	7%
	Stock Turnover	1	1.6%
	Days Sales Outstanding	1	1.6%

	Creditors' Payment	1	1.6%
	Net Working Capital	2	3%
	Acid Test	3	5%
	Current Ratio	14	23%
Profitability			
Margins/HEPS	Operations Margin	20	33%
	EBITDA Margin	2	3%
Returns	Net Profit Margin	1	1.6%
	Headline Earnings Per	54	90%
	Equity	24	40%
	Total Assets	18	30%
	Assets Turnover	1	1.6%
	Price Received	3	5%
Sales/Production	Price Received Vacancy Factor	3	5% 1.6%
Sales/Production		-	
Sales/Production	Vacancy Factor	1	1.6%
Sales/Production Share Performance	Vacancy Factor Production (ounces/kg)	1 4	1.6% 7%
	Vacancy Factor Production (ounces/kg)	1 4	1.6% 7%
Share Performance	Vacancy Factor Production (ounces/kg) Total Cash Costs	1 4 3	1.6% 7% 5%
Share Performance Share Price &	Vacancy Factor Production (ounces/kg) Total Cash Costs Share Price	1 4 3	1.6% 7% 5%
Share Performance Share Price &	Vacancy Factor Production (ounces/kg) Total Cash Costs Share Price Dividends	1 4 3 21 49	1.6% 7% 5% 35% 82%

Source: Analysis of research data

The highlight measures need to be seen in relation to other measures. HEPS on its own may not have valuable meaning if the company is on the brink of collapse. One example is a case where the debt ratio is close to 1.00. For instance, some of the Top Companies have debt ratio of between .77 and .96. Similarly, the dividends paid do not convey the financial position of a company, the debt ratio does. Further, dividends have to be balanced to

ensure that the cost of equity does not go above a reasonable level. For instance, the dividends that represent .96 of HEPS appear excessive.

In conclusion therefore, the use of the 'highlight' measures does not give vent to the use of the available arsenal.

5.2.2. The results of Figure 5a (Appendices F, F1, F(S) and F(S)1)

The WACC and the debt/equity are the most neglected aspects by the unit of analysis. On the other hand, sales give most companies good Z-Scores. Of the thirty-nine companies with good Z-Scores, only one company has good ratios in all respects. A critical analysis of the reliability of the Z-Score has been given under paragraph 5.1.2.

The weaknesses concerning the WACC and the debt/equity ratio may be overcome with careful planning. Their effects on a company are not significant except that these should not be left unattended for long periods of time.

Other areas identified for possible attention are levels of debt and poor liquidity. Regrettably, liquidity has not been validated due to lack of information on the liquidity support ratios. However, the variables included give a reasonable measure of liquidity, which is supported by the 'net working capital' variable for the Z-Score.

The debt ratio is the crucial measure that indicates whether trouble is likely to loom. But this also depends on the truthfulness of the information in the financial statements. This requires a scrutiny of items such as intangible assets, which could lead to a distortion of the debt ratio. Since there are no

companies that have a debt ratio near 100% (the highest is 82% excluding the real estate companies), it may be assumed that the financial position of the companies is fairly sound. The property companies that have linked debentures and high debt ratios are borne in mind – logic says that these debentures should be part of equity.

The analysis of Figure 5a has not revealed any significant weaknesses in the performance of the Top Companies. However, the companies would do well to look at the areas identified as weaknesses, and then possibly take corrective action.

Figure 5a has, therefore, not revealed material gaps on the question of the use of the available arsenal to measure financial performance.

5.2.3. Conclusion

The information available to draw a conclusion on the research problem are the research questions, Table 5 on the frequency of use of the 'highlight' measures, and any gaps identified in the analysis of Figure 5a.

Three of the research questions give support to the research problem. The questions form the core of Figure 5a, as they explore the usefulness of ratio analysis, the reliability of the Z-Score, and the user-friendliness of the Z-Score. Table 5 (abridged per Table 4) reveals that, out of sixty Top Companies, only three 'highlight' measures enjoy use by 90%, 82% and 50% of the companies. The 'highlight' measures are HEPS; dividends paid; and net assets per share. These measures convey information on share performance only. The question raised is whether or not these measures

give a balanced picture of the performance of a company. It is concluded that the popular 'highlights' measures of HEPS and dividends paid alone cannot be seen to illustrate and convey the financial position of the companies.

Other ratios, considered important, have frequencies as follows:

	Measure	Frequenc y of use	% Frequency (Total sample: 60)
Solvency	Debt ratio	4	7%
Liquidity	Current ratio	14	23%
Profitability: Margins	Net Profit margin	1	1.6%
Returns	Total Assets	18	30%

The current ratio gives information on the state of the engine room – the operations. This ratio feeds the debt ratio since the cash flows at the operations level determine whether or not the debt ratio is well maintained. This would be true if the short-term obligations are met on due date. The net cash flows are fed by the net profit margin. If the net profit margin is low, then the cash flows would be weak. The frequency of use of these three ratios, generally indicate that the Top Companies are not utilising the available arsenal of measures to measure financial performance. The conclusion is also supported by the low frequency of use of the ratio 'returns on total assets'.

Finally, and in conclusion, the Top Companies do not use the available arsenal to measure financial performance. The conclusion is arrived at, by

emphasising the deduction that Figure 5a has not identified material gaps in the financial performance and financial position of the Top Companies.

5.3. Implications for theory

Ratio analysis and interpretation and the bankruptcy prediction models are discussed in Chapter 2 as financial management tools. The problem with ratios and their analysis is that they appear the same as they appeared in the literature some years ago – no tactical improvements have been suggested over the years. As a result, it has been left to the analyst to use his judgement, leading to subjective interpretations. The major criticism of ratios, as discussed in Chapter 2, is that each ratio is analysed individually, leaving the analyst to draw conclusion on the financial position of a company.

The introduction of the bankruptcy prediction models was aimed at overcoming the shortcomings of ratios, but the models themselves are a group of ratios, with the different variables given different weights.

The development of Figure 5a has attempted to overcome the shortcomings in ratio analysis. The addition of the Z-Score adds further ratios that are not dealt with in the normal cause of theory, strengthening the identification of problem areas.

While the Top Companies do not show material weaknesses per the results of Figure 5a, this instrument is theory at this stage. It should enrich theory along with other tools.

5.4. Implications for policy and practice

The policy makers are constantly looking for ways to streamline the regulatory framework. The events mentioned under paragraph 5.4.2. indicate the extent of vigilance that is necessary. The conclusion on the research problem - that the Top Companies do not use the arsenal that is available for financial performance measurement (for their external reporting) - creates a gap for analysis by the users (investors, lenders etc) of accounting data. The policy makers attempt to protect investors, but the users of accounting data still have to do their own analysis to satisfy themselves of the soundness of their investment. The last research question (on the adequacy of information in the financial statements) goes some way towards assisting the users with relevant information in the accounting data.

The application of Figure 5a may broaden the analysis horizon and improve the quality of analysis.

5.4.1. Implications for private sector managers and interested parties

Under paragraph 1.2., the importance of commerce and industry for the economy of a country is discussed. Also discussed is the importance of the sustainability of these activities. The closure of just one company means a loss of jobs (with serious consequences for the country – crime, poverty, health problems), and a reduction in the flows to the treasury. The

The sample for this research report is drawn from public companies. The problems faced by the owners vis-à-vis the managers have also been

implications are too many to mention.

discussed. The problems exist despite regulatory frameworks such as the Companies Act, no. 61 of 1973 (as amended by the Corporate Amendment Act, no. 24, 2006), which has established the Financial Reporting Standards Council (FRSC) (Section 440P) and a Financial Reporting Investigations Panel (FRIP) (Section 440W). There has also been the introduction of the Auditing Profession Act, no. 26 of 2005.

The owners need to look after their investment. What do they do if, despite the regulatory framework, problems persist? The managers need to use the best available tools to check on the financial performance of their companies. But this does not preclude the owners from using the tools that are available to check on the soundness of their investments. This is given prominence by the contention that managerial incompetence leads to business failure. The owner-manager problems cannot be under-estimated - Antill (2005) writes that "there's nothing to beat owner-managers".

In this research study, the financial performance measures highlighted by the companies have been explored. These are measures considered important enough to be included in the annual reports, for the information of the owners, the investing community, and other interested parties. The most highlighted measures are HEPS, dividends paid, and assets per share. Whether or not these measures convey a balanced view of the financial position of the companies is another matter.

The researcher holds the view that the instrument developed for this research study, Figure 5a, should enable managers, owners, the investing

public, and other interested parties to do their calculations. This depends, to a large extent, on the quality of data made available in the accounting data, as per the discussion on the fourth research question.

5.4.2. Implication for the policy/regulatory framework

The regulatory framework covers the Companies Act, no. 61 of 1973 (as amended), and the Auditing Profession, Act no. 26 of 2005. These are briefly discussed in Chapter 1 (paragraph 1.2.) with the poignant message that the regulatory framework is constantly under 'improvement'.

Despite the improvements in the regulatory framework, much more work still need to be done to arrest the problem of poor business performance and bankruptcies. The literature review has pinpointed three broad problem areas: accounting irregularities and fraud, management incompetence, and poor knowledge of financing (inexperienced borrowers) ((Altman 1993:19; Hemraj 2004:1; Saville 2004:504).

Value would be added if the policy and regulatory authorities looked at these problem areas critically. It is not going to be of any help to put in gate-keeping measures without attempting to address the underlying cause of problems. If accounting irregularities and fraud are rife, something should be done about it. If indeed there is managerial incompetence which is closely related to inexperienced borrowers, the authorities need to create an environment where problems of this nature may be kept to a minimum.

To emphasise the matter, the following cases are cause for concern:

- ♦ For the 2001 financial year (February), Regal Treasury Bank reported 50% growth in earnings per share, excluding one-time items, depreciation and amortisation. On or around 27 June of that year the Reserve Bank took over the management of the bank. The company results for 2001 had been released on 30 April, and on or around 25 June, the auditors stated that "new information that has come to their attention" made it impossible to express an opinion on the financial statements. (Brand 2001.)
- During 1995, Saambou Bank paid an admission of guilt for illegally charging administration fees on client's personal loans. The bank was later investigated for seven different contraventions of The Usury Act on personal and home loans. (Bank Gate.) The bank is no more. But surely, should the auditors not have picked up the contraventions?
- ♦ The collapse of Masterbond shook the local corporate world. A commission was set up to investigate the collapse. Its findings in the first report exposed "a history of abuse by directors and auditors, and serious deficiencies in the supervisory system and those sections of the Companies Act designed to protect investors". (The Masterbond saga: 1983-2005.)

The three cases cited illustrate the problem faced by the policymakers and the regulatory bodies. The importance of accounting data has to be given priority. In the face of this importance, Saville (2004:504) points out that the exposure of accounting irregularities and frauds has been on the increase. He further states that evidence gathered internationally shows that the "number and size of companies restating financials to disclose accounting irregularities and frauds" has been increasing with the passage of time.

Saville (2004:510) suggests that as a first step, the management of companies must "set" a "tone of accurate, reliable and responsible reporting". Whether or not the management of companies can bring a change in this regard is a moot question. The policy makers, including the relevant regulatory bodies need to find a way of doing 'checks and balances' on the companies. It would appear that the current regulatory mechanisms are not having the desired effect.

Research question number four becomes relevant here. The additional information recommended for inclusion in the accounting data, as discussed per paragraph

5.1.4., would need to be considered by the policymakers.

It is hoped that Figure 5a could make a contribution towards doing the 'checks and balances' on the companies, and unearthing any skeletons in the corporate cupboards. In addition to Figure 5a, a host of bankruptcy models have been discussed. The models may be adapted for use to assess the standing of companies. However, it is important to bear in mind that the scores yielded by the models may be distorted by having only one good element, while other elements are weak. This aspect is fully covered in the discussion of the third research question. The study by Naidoo (2006) may contribute immensely to dealing with the problem.

5.5. Other research findings

The original sample (Appendix C) had to be supplemented because data on some of the companies could not be obtained. The exclusion of these companies diluted the purpose of this study. This section addresses this anomaly.

Accounting data on eleven companies could not be obtained. Brief reasons for the problems experienced in obtaining the annual reports (paragraphs 3.3.1. and 3.5) have been given. These companies had to be dropped from the sample. These are highlighted per Appendix C.

Needless to say, the sample is drawn from top public companies. Despite the reasons per paragraph 3.3.1., the information on the companies should be readily available. Why then was it not possible to obtain the information?

- Three of the companies were taken over by other companies and were de-listed in the process. Maintaining these companies in the sample would not have been appropriate for a follow-up study.
- One company was de-listed owing to a Black Economic Empowerment (BEE) deal. Similarly, this company would not be appropriate for a followup study.
- All avenues for obtaining the annual reports were exhausted (libraries, company websites, e-mails, websites of the sampled companies). The last resort was a direct approach (telephone, fax) to the companies. Five companies did not respond. Of the seven companies, one company had, during June 2005, issued a statement on provisional liquidation (newratings 2005).

It is noteworthy that three companies were taken over within a year of being ranked amongst the Top Companies. There is not much that can be said about the companies that did not respond to the request for data. However, the one company that issued a statement on provisional liquidation within such a short period of time of being ranked a Top Company gives some indication of the problem related to financial performance management.

5.6. Implications for further research

There are various reasons that contribute to business failure. The literature review has brought to the fore the causes of business failure as: accounting irregularities and fraud, and managerial incompetence/inexperienced borrowers (Altman 1993:19; Hemraj 2004:1; Saville 2004:504).

Four companies in the original sample de-listed while one company issued a statement on provisional liquidation. It should be worrying to the drivers of the economy, as well as the *Financial Mail* (who did the Top Companies survey) to have companies de-listed so soon after being voted Top Companies. While the delisting may have been due to restructuring, such as opening the door for Black Economic Empowerment (BEE) shareholding, the case of the company that issued a statement on liquidation should indeed be worrying.

Future studies need to have a somewhat different focus. The studies should not attempt to deal with symptoms but should find answers to accounting irregularities and fraud, as well as management incompetence. This should assist to find the underlying causes of business failure. Also, the proposal by Botha (2000:8) on the necessity, in South Africa, of research on the audit review of the interim financial statements, need to be taken up, but not to be confined to audit reviews only.

While the current study has not unearthed 'failed businesses', it is important that further studies also be done as a follow up to

- Keep track of the financial performance of the sampled companies by applying Figure 5a or its improvement. This should also strengthen the usefulness or otherwise of ratio analysis as a performance measure; and
- Keep track of any changes in the 'highlight' measures applied by the Top Companies.

The follow-up study will also shed more light on the appropriate capital structure of the companies as well as the levels of the WACC.

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