Predicting financial distress using quantitative and qualitative performance measures, with specific reference to the South African life assurance industry.

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This report is not confidential and may be freely used by the UCT Graduate School of Business.

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This report is a collaborative dissertation and is the work of Happy-Girl Buthelezi and Charmaine Groves. All references are reported accurately.

Signed: _________________________ ______________________

HAPPY-GIRL BUTHELEZI  CHARMAINE GROVES
ABSTRACT

This is an exploratory study that focuses on the development of a model for predicting financial distress, with specific reference to life assurance companies. An assumption was made that a significant proportion of life assurance companies, taken over and dissolved into other life assurers in South Africa up to 1998, had been experiencing financial distress for at least 2 years prior to the take-over. The development of the model required analyses of both quantitative and qualitative measures of performance. It was found that a quantitative analysis incorporating both generic accounting and performance measures specific to the life assurance industry had a high accuracy level for classifying life assurance companies as either financially distressed or healthy. The study also found that qualitative variables, as lead indicators of financial performance in organisations, achieved a higher overall accurate classification rate than the quantitative variables.

KEYWORDS: financial distress, corporate failure, symptoms, causes, predicting, qualitative, quantitative, life assurance companies.
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1. Introduction

A number of prior studies on the subject of predicting financial distress and corporate failure focused on the development of models specific to the manufacturing industry. These models are not directly applicable to life assurance companies, as there are additional complexities in the life assurance environment, such as the long-term nature of the business, the intangibility of the products and the range of uncertainties which necessitates contingency reserving. These variables are unique to the industry and affect the long-term viability of life assurance companies. Life assurance companies are subjected to the same strategic and operational issues as companies in other industries, but also have to consider the long-term actuarially determined risks to the company. These have to be taken into account in a model for predicting financial distress this industry.

1.1. Overview of the research project

Existing models for predicting financial distress and/or corporate failure have been developed and tested in the manufacturing, banking and the US insurance industries. This study incorporates generic and life assurance specific performance measures that have been identified as critical in these past studies. It also incorporates some of the emerging performance measures in the South African life assurance industry that have been identified by the Actuarial Society of South Africa (ASSA) and are being tracked by analysts and stockbrokers.

The model was constructed by means of two analyses conducted separately, one quantitative and the other qualitative. Quantitative variables were found to be good at identifying signs of financial distress by assessing symptoms in key financial ratios. Qualitative variables are good at identifying possible causes of financial distress, as it assesses the behavioural aspects of the organisation and looks at variables like management skills, timeliness of strategic interventions, culture, and so on. The qualitative analysis effectively supported the findings of the quantitative analysis. The findings are further supported by a discussion of subjective views and opinions
obtained in interviews with individuals in the company that was used to test the model, as well as commentary from analysts and other media reports.

1.2. Significance of the research

The global economic and technological developments of the last 20 years have led to a dramatic increase in the number of businesses in financial distress, many resulting in corporate failure. The business environment has become more hostile, risky and competitive, thus making failure more probable. According to the American Bankruptcy Institute, the number of corporate bankruptcy filings of approximately 19,600 in the US in 1990 were nearly triple those in 1980, and had increased further to 54,027 in 1997.

The Bureau of Economic Research published the following numbers for South African failed companies (2nd quarter 2000 Trends publication, page 56).

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of Companies liquidated</th>
</tr>
</thead>
<tbody>
<tr>
<td>1995</td>
<td>1717</td>
</tr>
<tr>
<td>1996</td>
<td>2103</td>
</tr>
<tr>
<td>1997</td>
<td>2221</td>
</tr>
<tr>
<td>1998</td>
<td>2201</td>
</tr>
<tr>
<td>1999</td>
<td>1844</td>
</tr>
</tbody>
</table>

It appears that the steady increase over the period from 1995 to 1997 leveled off in 1998 and the trend started to go downward in 1999. However, when viewed in conjunction with the increasing trend in mergers and acquisitions in 1998 (see the graphs below), one could draw the conclusion that some companies were saved from financial distress and/or failure as a result of a merger or acquisition.
The conclusion drawn from these statistics is supported by a study of the "merger or insolvency alternative" in the insurance industry, conducted by BarNiv and Hathorn (1997:89-113). They found that accounting and financial information can explain merger or insolvency decisions in the life assurance industry. The study shows that a timely merger can serve as a viable alternative to insolvency. Their study determined the probability of insolvency for each merged insurer in the sample. Timely mergers were found to serve as an alternative to insolvency for 20% to 46% of the merged insurers, which is higher than that found in other industries.

The records of the Financial Services Board of South Africa show that 63 "transfers of long-term insurance business" have occurred in the industry up to 30 June 1998. On the assumption that BarNiv and Hathorn's findings hold true for the South African environment, it can be concluded that a significant proportion of these companies had been experiencing a degree of financial distress and might have been saved from corporate failure by a transfer of business to another life assurer.

Few studies have dealt specifically with models for identifying financial distress in the insurance industry and none appear to have been done in South Africa. This research has important implications for the insurance industry, policyholders, shareholders, regulators, researchers, stock market analysts and the wider investment community. Each of these parties has a vital interest in assessing the financial soundness of insurers. The use of models for predicting financial distress can provide early warning signs to companies and identify those areas of the business that need attention to ensure the company's long-term survival. Predictive analyses could also be used as a strategic tool to enhance consumer, broker and risk manager confidence in the stability of the organisation and its attractiveness to investors, should the results indicate organisational strength.
1.3. Layout of the report

The structure of the report provides an indication of the process that was followed in conducting this research and covers the following:

**Hypothesis and limitations of the study**
This section deals with the problem statement that the research is attempting to address. This is followed by a detailed discussion on the constraints placed on the research.

**Financial distress definition**
The terms financial distress and corporate failure are often used interchangeably. This study distinguishes between the two. Hence, definitions of the two terms are provided.

**Literature review:**
A review of literature, comprising South African and international studies, theories, and views on the subject of financial distress, covers the following:
- Models used in predicting financial distress and corporate failure,
- Accounting and other insurance specific ratios,
- Findings and conclusions of prior studies on financial distress in the life assurance industry that are of interest to this study, and
- Behavioural factors that contribute to financial distress in organisations

**Research methodology**
This section discusses the processes followed in the development of the model for predicting financial distress, divided into separate quantitative and qualitative analyses. It also describes the process followed to test the robustness and bias of the model.
Results and evaluation
Interpretation and evaluation of the findings are provided in this section with a detailed discussion on the qualitative aspects of the company used to test the model (the test company).

Conclusions and recommendations for future research
The report concludes with a discussion on the validity of the hypotheses. As this is an exploratory study, recommendations for future research on this subject are given, in line with the limitations of this study and the knowledge gained through the process.

2. Hypotheses

The objective of this research is to test the following hypotheses.

- A predictive model consisting of a synthesis of generic accounting performance measures and critical financial measures specific to the life assurance industry will identify financial distress in life assurance companies that were taken over or dissolved into other insurers two years prior to the takeover.

- Qualitative variables, as lead indicators of financial performance in organisations, are effective in discriminating between financially distressed and healthy life assurance companies.

3. Limitations of the study

3.1. Limitations pertaining to sample composition

The quantitative analysis was based on a sample size of only fourteen companies, consisting of 7 financially distressed and 7 healthy companies. One of the main criteria used in the selection of companies for the financially distressed grouping for inclusion in the sample was the availability of financial data. Financial information of life assurance companies that were absorbed into other life assurance companies was difficult to obtain. Hence, only 7 companies were included in the sample of
financially distressed companies. Prior studies conducted in the US found that the best results were obtained in studies that used the total target population (refer to the discussion in section 5.3). Any definitive study in this area would require a larger sample that is much closer to the total target population for generalisations to be made.

3.2. Limitations pertaining to statistical packages

The statistical method used in this analysis is the multiple discriminant analysis (MDA). MDA assumes that the data is normally distributed and that covariances are equal. These basic assumptions are often violated, especially where the distribution of financial data used is skewed. Whereas MDA was proven to be suitable for failure prediction in the manufacturing, banking and other industries, prior studies conducted on the prediction of financial distress in the life assurance industry show that a probabilistic approach like that employed in logistic regression analysis (Logit) is best suited to the life assurance industry (BarNiv and Hershbarger, 1990:110; Ohlson (1980); Zavgren (1985)). The Logit method could not be used for this study as the statistical package that contains the required software could not be accessed.

3.3. Limitations pertaining to financial data

“Markets in SA are greatly disadvantaged by the lack of proper disclosure and regulatory controls which are vital to facilitate the operations of and orderly financial market. In essence, our markets are dangerously and unnecessarily exposed.” Donny Gordon, Liberty Life's chairman, Financial Mail, 20 March 1998.

South African (SA) life assurers are known for poor financial disclosure. This is a subject of concern to major stakeholders in the industry, like the ASSA, stockbrokers and analysts, as well as the broader investment community. Some aspects of disclosure have improved with the requirement that an actuarial review is published annually. However, the following issues still present difficulties in assessing comparative financial performance of SA life assurance companies:
The notion of ‘profit’ in the life assurance business.

Profit is determined by deducting claims and expenses from premiums received. In this sense, profits arise from what has occurred in the past, not from what may occur in the future. However, profit declared in any one year is impacted by the need to reserve for future contingencies and this reserving is based on the actuary's assumptions of risk, expected growth in capital, etc over the life of the policy. The accounting notion of profit is therefore not applicable in this environment.

Surplus

The calculation of surplus, involves assessing probabilities relating to the life expectancy of policyholders, probabilities of achieving specific returns from assets under administration in the life fund, level of fee income from managing assets for outside parties like retirement funds. Therefore in calculating the surplus, the actuaries evaluate not only what has occurred in the past but also what is considered likely to occur in all existing lines of business in future. Variations in the assumptions made by the actuaries can change the size of the surplus and the range of variation that is likely based on different assumptions is not disclosed.

Information on the life assurer's profit margin in products is not disclosed and this is a key profitability measure as life assurance business is highly commoditised and the market (in line with competitors' prices) generally sets prices. This is one of the reasons that the cost-to-income ratio in the life assurance industry is such a critical ratio.

The practice of smoothing earnings creates the impression that earnings are not volatile. This smoothing is done via the stabilisation reserve and this makes the assessment of risk for a life assurance company extremely difficult.

Expected embedded value growth and other ratios related to embedded value are becoming very popular measures with analysts as it provides and indication of the expected increase in the economic value of the life assurer. Embedded value growth has always been a key indicator of increased financial strength in the industry, but this information has not been publicly disclosed prior to 1999. This study could therefore not include embedded value related ratios.
The lack of variables in the published accounts that measure the efficient use of intangible assets to generate profits makes it impossible to assess profitability and strength of life assurance companies operating in the new information-based economy. Lately stock exchange investors are paying less attention to companies backed by hard assets. Instead, they are placing high ratings on companies whose growth in earnings per share is driven by intellectual capital backing. The implication of this shift is that smaller, efficient life assurance companies would be preferred over companies with larger tangible capital bases as they are likely to produce better earnings in the long term and yet this strength is not reflected in the balance sheet.

The fact that financial reporting is not standardised in the industry and key performance variables were not disclosed in the published financial statements of some of the companies in the sample was a major constraint. Ratios dependent on this information have had to be excluded from the analysis.

In line with the findings of prior studies that showed that the predictive ability of a model is highest over this period, this study attempted to use financial data for the 12-month period preceding the take-over date of the financially distressed grouping. However, due to difficulties in obtaining financial and other data for companies that were taken over, financial statements of two years prior to the take over date were used for two companies in the sample.

3.4. Limitations of the qualitative research

The use of a sample size of one company in the financially distressed grouping limits the general conclusions that can be drawn from this analysis.

Due to the timing of the study there was a significant reliance on respondents' ability to remember what organisational and management behaviours were present in the organisation at the time. Responses in a study of this nature would be more accurate if conducted prior to the company being taken over or merged.
4. Definition of financial distress and corporate failure

Corporate failure has been defined by experts in a number of ways, from lower than expected return on investment to forced declaration of bankruptcy. Some definitions of failed companies found in the literature include companies that:

- Liquidate and go out of business without filing for bankruptcy.
- Are technically insolvent due to the realisable value of their assets being insufficient to meet total liabilities.
- Seek a merger partner due to financial distress.

It can be concluded from the literature definitions that corporate failure occurs when an organisation can no longer meet its obligations to its stakeholders, i.e., shareholders, policyholders, employees, suppliers, customers, etc.

Financial distress is defined as a situation where a company’s financial performance indicates that the company is at risk of failing in the foreseeable future, unless a turnaround strategy is successfully implemented.

Financial distress and corporate failure are often used interchangeably. This research differentiates between the two, as companies may encounter financial distress for a number of years before this resulting in company failure. For purposes of this research, it was assumed that a life assurance company that was taken over and dissolved into another insurer had been in financial distress for at least two years prior to the take-over.
5. Literature Review

This literature review provides a brief overview of the main techniques that have been developed to predict financial distress and corporate failure. Most of the conventional statistical models developed in the application of these techniques were based on generic accounting measures. Since the focus of this study is specifically on the life assurance industry, the evolvement of the techniques and financial performance applied in the prediction of financial distress in insurance companies in the US is discussed in some detail. The findings of prior research in this area provides useful guidelines regarding the suitability of various statistical models for predicting financial distress in the life assurance industry and the key financial performance measures that produce the best results.

The study found no specific models for predicting financial distress in the South African environment, but solvency models used by the Actuarial Society of South Africa and Merrill Lynch provides an indication of the financial performance measures that are critical in this industry.

This section concludes with a review of the behavioural aspects of organisations that contribute to financial distress, as prior studies have also successfully applied qualitative variables in the prediction of financial distress and corporate failure.

As the earlier studies were focused on failure prediction only and did not differentiate between financial distress and failure, reference to these studies deal specifically with corporate failure prediction.

5.1. Models used in predicting financial distress

Various types of failure prediction models have been developed over the past 30 years. Table 1 below shows some of the models that researchers have used in predicting corporate failure in a number of industries, including the insurance industry. The models are derived statistically from a set of ratios that discriminate between failed and non-failed companies. The two main types of models are
univariate and multivariate. The former examine a single variable in isolation and compares it to an industry benchmark. The multivariate models simultaneously examine a number of key variables, such as profitability, gearing, liquidity, company size, industry membership (for example listed or mutual), and so on.

Table 1: Types of models

<table>
<thead>
<tr>
<th>Derivation</th>
<th>Univariate</th>
<th>Multivariate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iterative (simulation)</td>
<td>(1) Recursive partitioning algorithm (RPA)</td>
<td>(2) Artificial neural networking (ANN)</td>
</tr>
<tr>
<td>Statistical</td>
<td>(1) Gambler's ruin</td>
<td>(1) Discriminant analysis (MDA)</td>
</tr>
<tr>
<td></td>
<td>(2) Systematic ratio analysis</td>
<td>(2) Logit analysis (Logit)</td>
</tr>
<tr>
<td></td>
<td>(3) Conventional ratio analysis</td>
<td>(3) Regression analysis</td>
</tr>
</tbody>
</table>

Beaver (1967), one of the earliest researchers, used a univariate systematic analysis of a number of financial ratios to discriminate between failed and non-failed companies. Beaver's work set the stage for the multivariate (developed by Altman (1968)) and other univariate statistical analyses (such as the Gambler's ruin).

Gambler's ruin adopts a different approach in that it concentrates on the likelihood of a sequence of negative cash flows occurring in successive periods. Wilcox (1976) under this approach, concluded that failure is probable when a company's net liquidation value (NLV) becomes negative. The Actuarial Society of South Africa (ASSA, 2000) in some studies have adopted a similar approach by determining a life assurer's business risk levels based on its ability to meet actuarial liabilities (unmatured policies) with the assets at its disposal, should the business close at the date of valuation. While the gambler's ruin researchers have made a substantial contribution to business failure prediction, they do not appear to have developed the generally accepted framework of business failure.
Multiple discriminant analysis (MDA), based on the normal distribution assumption, identifies discriminating variables and assigns weightings (coefficients) to those variables. The output is a function:

\[ Z = K + V_1X_1 + V_2X_2 + \ldots + V_nX_n, \]

where;

- \( K \) = constant,
- \( V_1, V_2, V_n \) = discriminant coefficients,
- \( X_1, X_2, X_n \) = independent variables

Altman's (1968) research on industrial corporations provided the foundation for studies on financial distress. MDA has also been extensively used in several life assurance empirical studies to identify insolvent or financially distressed insurance companies (Ambrose and Seward, 1988; BarNiv and Hershbarger, 1990; and McDonald, 1992).

More recently it has become commonplace for Logit to be used in assessing the likelihood of financial distress in a company as this model has the potential advantage of being non-linear. Logit requires fewer assumptions in theory compared to the MDA, is more statistically robust in practice, and is easier to understand (Lea Stephen, Professor of the University of Exeter, 1997). While MDA classifies a company as failed (1) or non-failed (0), Logit assess the probability of a company belonging to 1, or else 0.

Previous studies suggest that the Logit model has higher accuracy prediction ability compared to other models, including the MDA, when applied in the insurance company insolvency or solvency studies (BarNiv and McDonald, 1992; Carson and Hoyt, 1995; Lin Shun-Lan, 1996).

Alternative models include Recursive partitioning algorithm (RPA) and Artificial neural networking (ANN). ANNs are computer-based models constructed to process information, in parallel, similar to the human brain. ANNs store information in the form of patterns and are able to learn from their processing experience. ANN have been found to be more useful in constructing qualitative models due to its ability to recognise and process complex data relationships (Court, 1991:3-15).
In many respects, researchers favour the use of statistical techniques over common sense (iterative) ones, even when the variables examined have been extended to embrace a variety of qualitative measures, Court (1991:3-15). While most studies praise the predictive strength of models such as Logit, ANN, and RPA, multivariate discriminant analysis (MDA) remains a widely used statistical technique in failure prediction research.

5.2. Financial measures specific to the insurance industry

In the 1970's a number of large insurance companies in the US faced bankruptcy when they discovered that they had been paying out large sums to non-existent policyholders. In July 2000 Equitable Life, the oldest mutual life assurer in the world, put itself up for sale as it did not have sufficient reserves to meet its with-profit fund liabilities and lost a legal battle to pay guaranteed rate bonuses to 90 000 pensioners. Financial distress, such as that experienced by these companies, together with other insurance industry complexities, have led to the establishment of financial measures by industry regulators to monitor performance of insurance companies. In the US the Insurance Regulatory Information System (IRIS) and the A.M. Best rating agencies are the widely accepted performance monitoring systems. In South Africa, the Financial Services Board regulates the financial services industry. However, there is no evidence of similar financial modelling and disclosure to the wider investment community as in the US. Both the US and South African rating and monitoring systems are discussed below. Refer to Appendix 3 for a summary of the ratios discussed in this report.

5.2.1. Insurance Regulatory Information System (IRIS)

The development of performance measures for monitoring the financial condition of life assurance companies started in the early 70's when the US National Association of Insurance Commissioners (NAIC) implemented the NAIC Early Warning System, later known as the Insurance Regulatory Information System (IRIS). The objective of this system is to detect financially distressed insurers so that early action can be taken.
to prevent insolvency and minimise its social cost. The IRIS uses a set of twelve financial ratios to monitor financial strength of insurance companies.

The majority of the studies consulted on the development of financial distress prediction models in the broader insurance industry (life, health, and property-liability insurance) have used the IRIS ratios. Cheong (1991) was the first researcher to develop a model that predicts financial impairment of life assurers at one and two years prior to insolvency using the twelve IRIS ratios and the NAIC database. Other studies have combined IRIS and other insurance industry-specific financial ratios to predict insolvency in insurance companies (BarNiv and Hershbarger, 1990; Ambrose and Carroll, 1994; Lin Shun-Lan, 1996). Similar to these studies, Cheong concluded that the IRIS needed improvement to deal with the dynamic insurance business environment.

The IRIS ratios were found to be significant performance measures in the life assurance industry and this study therefore includes 6 of the 12 IRIS ratios. The other 6 ratios were excluded in the final model due to the non-availability of data to calculate them and to avoid multicollinearity problems in some instances. The statistical elimination process is discussed in detail in the research methodology section.

5.2.2. AM BEST ratings

A. M. Best Company in the US has been reporting on the financial condition of insurance companies since 1899. Since 1976 it has been assigning an alphabetical rating to insurance companies which indicates the company's financial soundness and long term viability. A.M. Best's rating philosophy and methodology is current as it is adapted on an ongoing basis to take into account changes in the industry, as well as regulatory and legal developments.

A.M. Best' rating system assesses three high levels of an insurance company, i.e. financial strength, operating performance and market profile. A.M. Best's ratings provide an opinion of an insurer's ability to meet its long-term obligations to its policyholders. Ratings are assigned after evaluating a company’s financial condition.
and operating performance both in qualitative and quantitative terms. Quantitative evaluation examines profitability, leverage, liquidity, reserve adequacy and reinsurance. The majority of these factors are concerned with the risks associated with an insurer's business and capital adequacy to ensure that the insurer can meet its long-term liabilities to policyholders. The interpretation of A.M. Best's quantitative measurements involves the incorporation of more subjective qualitative measures in the process. Factors considered are the spread of risk, soundness and appropriateness of reinsurance, quality and diversification of assets, adequacy of policy reserves, adequacy of surplus, capital structure and management experience. These are considered against industry benchmarks and taken into account in assigning the company's overall rating. The variables calculated are compared with industry standards established by A.M. Best and a rating assigned based on the deviation from the industry standard.

A combination of A.M. Best's and other accounting measures was found to be more effective in terms of the predictive ability and robustness of the model as it combines generic company ratios with variables that are specific to the life assurance industry.

5.3. Prior research on financial distress in the insurance industry

Prior studies (Pinches and Trieschmann, 1974; Ambrose and Seward, 1988; BarNiv and McDonald, 1992; and others) on predicting insolvency of the US property-liability insurance companies provided a foundation for several financial distress prediction studies for the life assurance business. Some of the life assurance financial distress prediction studies focused on comparing the accuracy of the widely used statistical methodologies such as MDA, Logit analysis, Artificial Neural Networks (ANN), and Recursive Partitioning Algorithms (RPA) in the prediction of life insurers' financial distress (Carson and Hoyt, 1995; Lin Shun-Lan, 1996; and others). Other studies have examined the predictive ability of financial ratios such as the IRIS ratios, other insurance specific financial ratios, and A.M. Best' ratings (Ambrose and Carroll, 1994; and Pottier, 1998). The next two sections of the report review past US studies on predictive ability of statistical methodologies and financial ratios.
5.3.1. Prior studies: A comparison of predictive models

Studies conducted by Carson and Hoyt (1995) and Shun-Lan (1996) compared the accuracy of various statistical methodologies in classifying financially distressed and healthy life assurance companies. These have shown that Logit is a superior statistical methodology to MDA and RPA. Another important finding was that the models constructed on data of one year prior to insolvency were more accurate than those constructed on data of two years prior to insolvency.

The main contributions of the Carson and Hoyt (1995) study to this subject were the following:
- They applied the Recursive Partitioning Algorithm methodology (RPA) for the first time in a life assurer’s insolvency classification or prediction study.
- The study employed a nonmatched-pair sample, thus minimising biases resulting from choice-based samples.
- The study was based on more current data and a relatively short sample period (1986-1990, using data for insolvencies that occurred during 1989-1991).

This study included ratios from prior research, IRIS ratios, and new ratios established by the researchers. Twenty financial ratios were considered in the study initially, but only nine ratios were considered critical for predicting financial distress in a life assurance company. These ratios emphasised the need for a large capital base and diversification of products and assets to manage risk effectively (refer to Appendix 3).

Coefficients of all the variables were significant except the coefficient of the mutual-listed variable (p-value = 0.20). This would suggest that one year prior to failure, insurers that maintain a strong capital base have a lower probability of insolvency or failure.

Lin Shun-Lan (1996) extended prior research by implementing the ANN model, which was new at the time and considered powerful. He incorporated more ratios (52) for consideration in his model and found that Logit continued to dominate other statistical models, including the ANN, in its predictive accuracy.
Similar to Carson and Hoyt (1995), Shun-Lan's study was also based on a non-matched pair of observations but used a longer and more dated test period, 1976-1992. The 52 financial variables included in the models relate to product mix, financial strength, size, growth, management behaviour, profitability, investments portfolios, cash flows, demographic and decomposition measures.

Although MDA and Logit models are not based on any rigorously derived theoretical foundation, they have performed well in predicting financial distress of companies in various industries. Previous studies suggest that Logit has a higher accuracy prediction ability compared to the MDA when applied in the life assurance industry.

5.3.2. Prior studies: The predictive ability of financial ratios

Various studies, including those of Ambrose and Carroll (1994) and Pottier (1998), have shown that combining insurance specific financial ratios (including IRIS ratios), key variables used in other studies, and A.M. Best' ratings, produces a more robust financial distress prediction model and reduces the risk of misclassification. In an attempt to construct a financial ratios-based model for predicting financial distress in the life assurance industry, this study followed suit by combining ratios from various studies and regulatory institutions with generic accounting measures of performance.

Ambrose and Carroll (1994) applied Logit regression analysis to a matched-pair sample (26 solvent and 26 insolvent) of life insurers and found that financial ratios, including IRIS ratios, outperformed AM Best's ratings recommendations in distinguishing between solvent and insolvent companies. However, he also found that combining the financial ratios with A.M. Best' ratings into one model produced a more accurate classification of the two groups of companies.

Pottier, S. (1998) improved on Ambrose and Carroll study by taking into account the expected cost of misclassification (ECM) in developing a model for predicting financial distress in the life assurance environment and by testing the model on a time-series holdout sample rather than a naïve sample. Similar to the Ambrose and Carroll study, Pottier's study compared the predictive ability of (1) A.M. Best's
ratings, (2) financial ratios, (3) a combination of financial ratios and A.M. Best's ratings and found that a combination of variables produces a more robust model.

With regard to incorporating ECM in constructing the models, Pottier found that the model that used a combination of financial ratios and A.M. Best' ratings has a relatively higher ECM than a model with A.M. Best' ratings only.

While the Ambrose and Carroll study used a matched-pair sample set and did not consider ECM, Pottier used a non-matched sample set, thus minimising biases resulting from choice-based samples, and took ECM into account. Both studies applied Logit in developing the models and both concluded that a combination of financial ratios and A.M. Best' ratings produces a more accurate distress classification model than models constructed with either variables on its own.

5.4. South African studies

Significant studies found in the South African environment are not directly related to predicting financial distress, but are concerned mainly with the determination of the solvency status of an organisation and its future viability as an investment opportunity. However, these studies provide valuable information about the critical performance measures that should be observed in a model for predicting financial distress in the South African life assurance environment. The studies that are discussed in this section are those that have been conducted by the Actuarial Society of South Africa (ASSA) and investment analysts at Merrill Lynch.

5.4.1. Financial soundness measures: An analysts' perspective

Common practice today is to value life assurers based on the company's embedded value. Embedded value is an actuarially determined estimate of the economic value of a life assurance company, excluding any value attributed to future new business. Put simply, embedded value is the discounted cash flow of the expected profit stream from a policy. To this is added the net asset value (NAV) of the company's other shareholder assets to arrive at the total embedded or adjusted embedded value.
Growth in the present value of the in-force policies and growth in the return on shareholder capital have thus become the most important elements of success of a life assurer (Stewart Rider, Merrill Lynch, 2000).

Analysts and stockbrokers, as the watchdogs of the investor community, have a particular interest in evaluating life assurers against the critical performance criteria. Merrill Lynch assigns a weighted ranking to life assurance companies, similar to the A.M Best' rating system in the US, which assesses the company in terms of both quantitative and qualitative performance measures. (Financial Mail, August 2000). The critical financial performance measures in life assurance companies that Merrill Lynch have included in their ranking framework are:

- growth and profitability as derived from growth in premiums, margins and new business embedded value
- the discount or premium on the share price to adjusted embedded value
- expected growth rate of embedded value or adjusted embedded value

The key qualitative variables included are:

- The degree of certainty that the company will provide investors with a reasonable return (as judged by the risk profile),
- Tradeability of the share.
- Appropriate strategy and depth of management.

The key objective of the Merrill Lynch ranking system is to determine the viability of a company as an investment option. Although the model was not designed with a view to predicting financial solvency or distress of life assurers, it can be inferred that negative growth in these variables would imply decline and could lead to financial distress in a life assurer.
5.4.2. Actuarial Society of South Africa (ASSA)

A number of studies conducted by the Actuarial Society adopts a "gambler's ruin" approach, in that it looks at the probability of ruin. The probability of ruin is generally defined as the probability that a situation arises where the company is unable to meet its liabilities with the assets to its disposal. Rudolf Johannes van den Heever (1998) believes that a balance needs to be struck between capital required to support the business, the probability of ruin and the premiums that can be charged in relation to the cost. In order to do this, the company needs to focus on and address the three most important areas of risk, ie

- The risk that reserves held in respect of liabilities will be inadequate,
- The risk that premium rates will be insufficient to support new business, and
- The risk that the assets backing the reserves will not match the liabilities.

These are quantitative risks that can lead to an insurer facing financial distress. The concept outlined in Van den Heever's paper is referred to as the risk adjusted capital method and is based on the premise of capital requirements for the business sold, given a certain requirement for the probability of ruin. Once the capital requirement has been established for the business as a whole, then capital is allocated to lines of business according to their riskiness. Other risks of a qualitative nature that Van den Heever believes an insurer should take into account in its capital reserving include:

- The risk of poor management
- The risk of catastrophic events, like a major stock market crash
- The risk of excessive growth
- The risk of inflexible finance or poor liquidity

5.5. Behavioural factors contributing to financial distress

Quantitative models for predicting financial distress are based on the premise that the symptoms of financial distress are visible from a company's financial statements. The main objective of these quantitative models is to provide early warning signs of financial distress to companies. However, a major shortcoming of these is that the model's predictive ability is based on financial data that are lag indicators of
performance. Qualitative variables that can be identified from the behavioural aspects of the organisation are lead indicators of performance and can thus be more powerful in their predictive ability. Key behavioural aspects identified from literature review are:

**A lack of foresight**
Senior executives often believe that they are in control, but they lack the foresight to anticipate a crisis in order that they may prevent it (Augustine, 1995:149-157). Clearly identifying the risks associated with every aspect of the business could aid the development of such foresight. Survival requires that top management is able to look beyond the obvious, contemplate the absurd and include it in their planning (Labich, 1994:52). If the company has become complacent, it would find it extremely difficult to do this.

**Not recognising the crisis**
Executives often refuse to accept that they are in a crisis, even when the financial results confirm it. Managers develop "an illusion of invulnerability" and do not or will not react to signals of financial distress (Lorinc, 1990:63). The process of decline is accelerated by internal control systems that are flawed and unable to adapt to external changes. Creative accounting techniques are often applied in bad times and it will temporarily cover up the losses, but perpetuates the underlying problem (Lorinc, 1990:63). It is presumed that companies behave in this way, as they are concerned with how the market is going to respond to their published results (Pierce-Brown, 1997:84-85). Another way in which managers blind their organisation to the real state of the company is through selective communication. Chris Argyris believes that managers often will not communicate the "bad" news to staff and will amplify any good news in the name of positive thinking and keeping up morale (Argyris, 1994:79). In this way they deprive employees and themselves of the opportunity to take responsibility for their own behaviour.

**Inability to bring about real change**
Companies often do not fail because management fails to take action, they fail because of inappropriate action being taken as a result of "active inertia"(Sull, 1999:42-52). Active inertia is an organisation's tendency to follow established
patterns of behaviour - even in response to dramatic shifts in the environment. This happens when companies become stuck in the modes of thinking and working that brought them their initial success. When business conditions change, their winning formulas instead lead to failure as they are unable to change with the environment. A major cause of this inability to bring about real change is that a company's past successes become the blinkers that prevents its senior managers from seeing beyond the strategies that worked in the past (Labich, 1994:52).

**Inability of senior management to execute**
The main reason for CEO's failing is their inability to execute (Charan and Colvin, 1999:31-37). This was concluded in a study done by Charan and Colvin in which they observed several dozen CEO failures. The logical extension of this argument is that the failure of executives to execute and implement strategies and change is one of the main reasons that companies fail as the success of executives are dependent on how successfully they grow the business. Even if the company is on the right track, without effective implementation of appropriate business strategies, the company is likely to go into decline (Augustine, 1995: ).

**Lack of focus**
Diversifying into new and unrelated business lines without the necessary competencies to sustain the expansion can cause financial distress (Briddell, 1998:23). A lack of focus causes executives to lose sight of the company's core business and competencies and what the company's key sources of profit are. This lack of business acumen could lead to the inappropriate deployment of resources and poor decision-making, that results in financial under-performance and corporate decline (Labich, 1994:52).

**Lack of rigour in performance measurement**
Success makes it easy to neglect or dismiss diagnostic control systems and often managers are not focusing on the critical performance measures in the organisation (Simons,1999:85-94). Performance measures are often either inappropriate or management fail to act on them. Watching the right numbers is very important to predict the future viability of the company.
Lack of financial rigour
One of the most common causes of financial distress is a lack of financial controls. This is characterised by defective budgetary control, cash flow planning and product costing systems (Argenti, 1993). These accounting related issues do not directly cause financial distress. However, they are catalysts for the following causes of financial distress:

- Overtrading in relation to the company's existing capital base and capacity
- High gearing that leads to cash flow strain as regular interest payments have to be met and this increases the business risk
- 'The big project' - investment in projects that are unmanageable and poorly financed that puts pressure on the organisation's resources.

Growing too fast
Paradoxically, companies can grow themselves into trouble. The increased cash flow is often insufficient to meet the incremental working capital requirements and cost of additional infrastructure, and this results in financial strain (Briddell, 1998:23).

Roles and accountabilities of the CEO and Chairman
Role clarity and decision-making frameworks are the core components of corporate governance. A popular belief in business is that the function of Chairman of the board and Managing Director should be separated so as to allow a focus on strategic issues and execution and avoid conflicts of interests. Gleason et al (1999) examined the impact of board structure and ownership on financial distress in the banking industry and found a significant relationship exists between ownership (or accountability) by the directors and senior managers and financial distress. Other researchers have also argued that, although it is the CEO's role to execute, the board (Chairman) still has final responsibility for the functioning and success of the firm. A misinformed and inattentive board of directors have been cited as the ultimate cause for failures in the banking industry in some studies (Gleason et al, 1999).
5.6. Summary of literature review

The key aspects that emerged from the review of prior studies and other literature on the subject of financial distress and corporate failure revolve around the predictive ability of various statistical models and the quantitative and qualitative performance measures included in these models. It also highlights the shortage of similar studies and literature in South Africa, as well as the fact that environmental changes are contributing to the emergence of measures and awareness of the need for predictive mechanisms to identify the risk of business failure.

The findings of most of the studies on the suitability of statistical models favour a probabilistic approach rather than the finite approach first adopted in the development of Altman's Z-score model. It is for this reason that logistic regression analysis (Logit) is emerging as the preferred statistical approach in the US.

Research conducted on financial distress prediction models in the life assurance industry found that a probabilistic approach (Logit), together with a combination of generic accounting measures and life assurance specific variables improves the predictive ability of the model.

There is a shortage of studies on the subject of financial distress in South Africa. The ASSA identifies methodologies for assessing long-term risks in life assurance companies as risks impact on the security of policyholder benefit. Merrill Lynch analysts have developed a quantitative model to predict the future viability of a life assurer with a view to assisting investors in making investment decision. Even though these do not focus specifically on the prediction of financial distress, they are useful in identifying the critical measures that stakeholders in life assurance companies are concerned with.

There were no insurance specific qualitative measures identified from the literature review. The behavioural aspects of companies across all industries are generic, and aspects relating to financial discipline and an action oriented culture emerging as the key themes. Key themes emerging from the quantitative literature review is that a
probabilistic approach is best suited to the life assurance industry. Critical measures are those that measure capital strength, long term profitability and the ability to meet policyholder benefits when they fall due. In addition, the ratios should be a combination of generic accounting and measures specific to the life assurance industry.

6. Research methodology

The development of a model that can best discriminate between financially distressed and healthy companies in the life assurance industry requires a sample data consisting of two groups with predefined characteristics. These characteristics should fit the profile of financially distressed and healthy life assurers. The model was developed in two separate stages, quantitative and qualitative analyses. It was not possible to combine quantitative variables into a single analysis, as the datasets used in the two analyses were different. Therefore the two analyses were separated, as discussed below, in applying the results of the model on the test-company in conjunction with each other.

6.1. The quantitative analysis

6.1.1. Sample selection

To obtain the population of the so-called financially distressed companies, a list consisting of one hundred and eight (108) South African long-term insurance companies that had been transferred or taken-over by other insurance companies up to 1998 was obtained from the South African Financial Services Board (FSB). The list included sixty-three long-term life assurance companies. Various sources were used to find audited financial statements for periods up to a maximum of two years before transfer date, and financial statements were found for 7 out of the 63 companies. These 7 companies formed the sample group of distressed companies. Appendix 1 shows the companies included in the total sample of 7 financially distressed and 7 healthy companies. Included in Appendix 1, are quotes from newspaper articles,
which highlight issues that led to deterioration and take-over of the companies that form the distressed sample group.

The sample group of healthy companies consists of life assurance companies that met the following criteria: were in operation between 1986 and 1998, the audited financial statements for the periods 1996 and 1997 were accessible, and are ranked in the top ten in terms of total assets and net premium income by the Financial Mail Top Companies (2000 Edition). To achieve a matched-pair sample, 7 companies are included in the healthy sample group.

6.1.2. Data collection

Financial statements of companies in the sample were obtained from various sources including I-Net Bridge, academic institutions' libraries, companies' information resource centres, the FSB, Merrill Lynch and other analysts' reports, and the Internet. Additional data relating to life assurers’ actuarial liabilities (under unmatured policies) and lapsed policies was obtained from the Registrar of insurance annual statistics reports. The published financial statements and other actuarial data for the 14 companies included in the sample are shown in Appendix 2.

Prior studies on predicting life assurance distress conclude that models based on financial data that relates to one year prior to failure are more accurate in predicting financial distress than those based on financial data of two years prior to failure. In line with these observations, this study used financial data of one year prior to take-over for the distressed companies, as far as this data was available. For two companies in the financially distressed grouping, data of 24 months prior to take-over have had to be used. The 1997 financial statements were used for the healthy companies, as this is approximately 12 months prior to take-over of Southern Life Association, which is used to test the results of the model.
6.1.3. Ratio selection

Developing a multivariate ratio-based distress prediction model requires the identification of financial ratios to be used as discriminating variables in the model. Based on the review of prior life insurer distress prediction studies, a bank of financial ratios was compiled. These studies are discussed in sections 5.2, 5.3, and 5.4 of this report. Fifty ratios from various studies were reviewed initially, of which 35 were considered for inclusion in the model and finally only 7 ratios were used to build the model. All the 7 ratios are shown in Appendix 3. The process of eliminating the ratios from 50 to 7 is discussed in section 6.1.4 below. The description of the 7 ratios used in building the model is provided in section 7.1 of this report (Results and evaluation).

As shown in Appendix 3, the full set of IRIS ratios (12 ratios) was considered for inclusion in building the model. The reason for considering all the IRIS ratios was because the IRIS system is one of the best recognised performance monitoring systems in the United States insurance industry and also, as shown in Appendix 3, various researchers in the life assurance insolvency studies have used IRIS ratios.

The study conducted by Lin Shun-Lan (1996) utilised 52 financial ratios of which 12 were IRIS ratios. Lin Shun-Lan published only the 30 ratios used in his final model. These were considered in this study.

From the 1998 study conducted by Pottier, 24 of the 33 ratios he used in his study were applicable to this study. On the same basis as above, ratios were identified and selected from the studies conducted by Ambrose and Carroll (1994) and Carson and Hoyt (1995).

From the Merrill Lynch study conducted for the South African industry, the ratio of ‘Share price to Embedded value’ – P/EV was identified as one of the most critical measures in the life assurance industry. However, this ratio was not included in the final set of ratios that was used to build the model. In South African, life assurance companies only started to disclose their actuarial balance sheets (which shows EV) in the public accounts in 1998. Since this study was conducted using data relating to 1997 and prior, these numbers could not be accessed.
On the initiative of the authors, further 3 ratios were included in the total set of 50 ratios. These ratios were: Earnings before tax to capital (a measure of profitability), Capital to Actuarial liabilities (a measure of financial leverage), and % Change in total assets (a measure of capital growth).

6.1.4. Statistical analysis

Of the full set of 50 ratios, 35 were considered for inclusion in building the model. Fifteen ratios were discarded on the basis of non-availability of data relating to variables used in their calculation, ratios that had similar meanings, and those ratios that were inversely related and were testing the same concept. To further reduce the number of ratios, correlation analyses were performed to remove variables with a correlation of more than 90%. Due to the fact that our sample consists of fourteen companies only, further correlation analyses were performed to eliminate those variables with a correlation of more than 50%. The result of this exercise was a list of 7 variables used to build the model. These are briefly discussed in section 8.1 of this report (Results and evaluation). The process by which ratios were removed is shown in Appendix 4.

6.2. The qualitative analysis

6.2.1. Sample selection

The objective of the qualitative survey was to enable valid generalisations of the sample findings to the target population. It was thus important to use a probability type of sampling method. The category of employees in managerial positions in life assurance organisations who have the ability to make and influence policy and the strategic direction of the organisation were targeted.

As the target population was part of two distinct groups of life assurance companies, a multi-stage approach was taken to firstly identify which companies to survey in each
group and then which groups of managers to include in the survey within each company.

In the first stage, the company sample was identified using a judgmental non-probability sampling method. Two groups of companies were identified. The healthy companies identified for inclusion consisted of the top five life assurance companies used in the quantitative analysis that best fits the profile of the test company in terms of relative size, products and asset mix, and market segments. Due to the fact that it was not possible to access employees of the financially distressed group of companies, except for employees in the test-company, this was the only company included in the sample of financially distressed companies.

In the second stage, a proportionate stratified random sampling approach was used to determine the sample of employees within each group, dividing the groups into sub-groupings of middle and senior management. The sample size for the financially distressed company sample was estimated using the following rule of thumb:

\[
 n = \frac{z^2 \, \text{pq}}{e^2}, \text{ where}
\]

\[
 n = \text{sample size}
\]
\[
 z = \text{required level of precision (assuming a normal distribution)}
\]
\[
 e = \text{allowable margin of error}
\]
\[
 p = \text{sample proportion (of total employee population)}
\]
\[
 q = (1-p)
\]

For \( p = 148 \) (including senior and middle management in Southern Life), the sample of management was calculated as:

\[
1.96^2 \times 148 \times .9 \frac{1}{5^2} = 20
\]

29
To make allowance for an expected response rate of 20%, the sample size was multiplied by 5 and a total of 100 questionnaires were sent to the test company in the financially distressed grouping. The same number of questionnaires was sent to the five companies in the healthy grouping, 20 questionnaires to each company, for random distribution to employees at senior and middle management levels in those organisations.

The questionnaire was sent out by email with an attached covering letter explaining the purpose of the study (Appendix 6a)

6.2.2. Design and scoring of the questionnaire

Questions for the qualitative survey were based on both secondary and primary research. Secondary research consisted of leading management journals and previous qualitative studies into causes of financial distress (refer to literature review). These were used to identify generic causes of financial distress and corporate failure. Primary research consisted of interviews conducted with the following people:

- Two Executive Committee members of Southern Life
- Managing Director of the newly formed FirstRand company (Holding company of Momentum Life)
- Mr Stuart Rider of Merrill Lynch (SA), who is a leading analyst in the life assurance sector of the Johannesburg Stock Exchange

The views and opinions expressed in these interviews were used to further refine and to distil the major causes of financial distress in a life assurance company.

Section A of the questionnaire identified the variables considered in the analysis of senior management behaviour in healthy and financially distressed companies. The aim was to check for differences in the strategic decisionmaking processes and to test if these variables are significant contributing factors to financial distress. Section B identified differences in structural and operational issues, while section C identified the effect of culture on company performance. The objective of Section D was to determine whether rigour exercised in terms of financial reporting and investment decisions were significantly different between the two groups. Questions in section E
were included to examine the extent of entrepreneurship and risk-taking in the company.

In summary, the questionnaire was constructed to examine the impact of the following qualitative aspects on financial distress

- Corporate governance - examining ownership and accountability of the board (in the person of the Chairman of the company) and the directors (in the person of the Managing Director).
- Decision-making frameworks, at executive and strategic business unit level.
- Financial disciplines in the organisation, with regard to the strength of financial controls, financial rigour in investment decisions, liquidity and cash-flow management, integrity in financial disclosure.
- Strategic frames in terms of long term planning and foresight displayed.
- The organisational structure, in the context of whether it might have added to complexity or ease of strategic focus and financial control.
- Management and leadership styles in terms of encouraging open debate, accepting accountability, an action orientation, open and honest communication.
- Organisational culture, with a focus on performance management, involvement and empowerment of employees, influence of company values on decision-making, innovativeness and entrepreneurship.

Scores were allocated to the different statements in the questionnaire, ranging from 5 to 1, with 5 indicating a strong agreement and 1 indicating strong disagreement (Appendix 5b).

### 6.2.3. Statistical analysis

The analysis was conducted in two stages. Firstly, responses to the weighted questions were analysed using the multiple discriminant function in Statistica 5 to determine what the key differentiating qualitative characteristics of the two groupings are. The 33 responses were reduced to 30 variables for consideration in the model after eliminating variables that exhibited multicollinearity problems. This was done by obtaining a correlation table with the use of ordinary least squares regression. The
multiple discriminant analysis was then conducted for the combined sample as well as for the sub-groupings of senior and middle management to also highlight the differences of viewpoints that exist within these important sub-groups.

Secondly, the responses to the questions relating to the level of change experienced over the respondents' working period with the company was analysed by aggregating the responses for each grouping into a single variable. This variable was applied as a 'score' for each grouping and to gauge the relative level of entrepreneurship and ability to adapt to changes in the environment within the two groupings.

6.3. Testing the models

The robustness of the model was tested on one company only, Southern Life Association Limited. This company was chosen as it had recently been taken over by Momentum Life, while in the process of implementing a transformation strategy to turn the company around. The turnaround process was started after the company had reported less than expected earnings and was experiencing escalating cost-to-income ratio for three years in succession. It is not possible to generalise the findings from this research, due to the fact that the combined model has been tested on only one company. However, this is an exploratory study and the findings should serve as a useful starting point for future research in this area.

7. Results and evaluation

Both the quantitative and qualitative data were analysed using a forward stepwise version of the multiple discriminant analysis (MDA) function of Statistica 5.0. The results of these two analyses are discussed below.
7.1. Quantitative analysis

The 7 ratios of the financially distressed and healthy companies were analysed in Statistica 5.0 with the following parameters: F-to-enter of 1.0, 7 steps, and a tolerance level of 0.01. The result was a final discriminant function of the form:

\[ Z = 6.0074 \ R_1 - 13.0652 \ R_2 - 5.9319 \ R_4 + 0.0147 \ R_{13} + 3.6035 \ R_{49} + 1.9617, \]

where:

- \( R_1 = \text{Net income} / \text{Total income} \) (profitability measure)
- \( R_2 = \text{Commissions \\& expenses} / \text{Premium income} \) (operational efficiencies and profitability measures)
- \( R_4 = \text{Earnings before tax (EBT)} / \text{Total assets} \) (return on assets, also a profitability measure)
- \( R_{13} = \text{Net premiums} / \text{Surplus} \) (Financial leverage)
- \( R_{49} = \text{Capital} / \text{Actuarial liabilities} \) (Financial leverage)

A description and the impact of the five discriminant variables used in the model is given below:

**\( R_1, \text{Net income} / \text{Total income} \)**

This IRIS ratio is a measure of profitability. Both net income and total income include underwriting and investment measures. Generally, this ratio estimates the overall managerial effectiveness and efficiency. The larger the ratio, the smaller the probability of financial distress.

**\( R_2, \text{Commissions \\& expenses} / \text{Premium income} \)**

This IRIS ratio is a measure of operating efficiency. This is similar to the 'Cost to Income' ratio that is closely monitored in the South African financial services industry. This ratio is especially critical in this industry because commissions and administration expenses are paid up-front to the insurance brokers while the life assurer receives the income relating to those expenses over a longer period. This ratio can also measure new business strain in a life assurer that has high initial expenses.
(growing too fast) that are not matched by income. The larger the ratio, the greater the probability of financial distress.

**R4, Earnings before tax (EBT) / Total assets**
This variable reflects how much the company has earned on the investment of all the financial resources committed to the company. Although this is a generic accounting measure, it is also applicable to the insurance industry. This variable was one of the ratios included in the final Z-score model developed by Altman (1968). The larger the ratio, the smaller the probability of financial distress.

**R13, Net premiums / Surplus**
This ratio measures the company's net retained premiums in relation to its surplus. This ratio can also reveal the company's exposure to pricing errors in its current book of business. The larger the ratio, the smaller the probability of financial distress.

**R49, Capital / Actuarial liabilities**
This is a solvency ratio that measures the extent to which capital can cover actuarial liabilities or unmatured policies. The larger the ratio, the smaller the probability of financial distress.

The following two ratios were included in the analysis but were not found to be significantly discriminatory between the two groups, and were excluded from the final model:

**R5, Profit attributable to ordinary shareholders / Equity (ROE)**
This ratio reflects how much the company has earned on the funds invested by shareholders (either directly or indirectly through retained earnings). This ROE ratio is obviously of interest to present or prospective shareholders, and is also of concern to management because this measure is viewed as an important indicator of shareholder value creation.

**R34, Property investments / Total assets**
This is a liquidity measure that measures the amount of illiquid investments in the company's total assets. This ratio may reveal the amount of assets that may be used to
settle the company's debt without prematurely selling long-term investments or to borrow money.

As can be seen from the classification table below, the model correctly classified 100% of the financially distressed companies and found that only one of the 7 healthy companies (85.7%) was misclassified. Overall, the model correctly classified 13 out of 14 companies in the sample, a 92.86% overall accuracy classification. Based on this data set, the model exhibits one of the highest classification accuracy levels for studies conducted on the financial distress prediction.

Table 3: Classification Matrix of the model

<table>
<thead>
<tr>
<th>Actual</th>
<th>Classified by the model (p=0.5)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Distressed</td>
<td>Healthy</td>
</tr>
<tr>
<td>Distressed (DS)</td>
<td>7 (100%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Healthy (H)</td>
<td>1 (14.29%)</td>
<td>6 (85.71%)</td>
</tr>
</tbody>
</table>

The calculated standardised coefficients indicate the relative importance of the variables in classifying companies. The table below shows standardised coefficients calculated on the sample, these are ranked from the most important variable to the least important variable. The interpretation of the table is provided below.
Table 4: Standardised coefficients for variables

<table>
<thead>
<tr>
<th>Ratio (variable)</th>
<th>Full ratio description</th>
<th>Coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td>R2</td>
<td>Commissions &amp; expenses / Premium income</td>
<td>-1.18076</td>
</tr>
<tr>
<td>R49</td>
<td>Capital / Actuarial liabilities</td>
<td>1.10069</td>
</tr>
<tr>
<td>R1</td>
<td>Net income / Total income</td>
<td>1.03568</td>
</tr>
<tr>
<td>R4</td>
<td>Earnings before tax (EBT) / Total assets</td>
<td>-0.53492</td>
</tr>
<tr>
<td>R13</td>
<td>Net premiums / Surplus</td>
<td>0.00968</td>
</tr>
</tbody>
</table>

As depicted in Table 4 above; gross margin (R2), as measured by commissions & expenses to premium income is the most critical variable in classifying distressed and healthy life assurance companies. This finding is in line with the current industry view that the cost-to-income ratio is one of the critical ratios in assessing a life assurer's profitability. The second most important ratio in identifying financial distress of the life assurer is the solvency ratio (R49), as determined by the ability to meet policy liabilities with the existing capital base. This confirms the finding in prior studies that a large capital base is critical to protect the life assurer's long-term liabilities. Net income to total income (R1) provides an indication of the proportion of total income (premium plus investment income) that is left to increase shareholders' funds and other reserves. These results also show that return on the company's total asset (R4) and the financial leverage measure (R13) variables are the least critical measures in identifying a life assurers' financial distress.

In summary, the quantitative analysis identified profitability variables as the most critical determinants of financial distress life assurance companies. This finding is similar to those of prior studies conducted on financial distress in life assurance companies (BarNiv and Hershbarger, 1990 and Lin Shun-Lan, 1996). The analysis also confirms that a combination of generic accounting variables and insurance specific variables increases the predictive ability of the model. The model contains generic variables, such as ROA and Net income / Total income, and insurance specific variables, such as financial leverage, and capital / actuarial liabilities. The implication of this is that life assurance companies have to monitor similar operational issues to
companies in other industries, in addition to monitoring the more complex actuarially
determined variables.

7.2. The qualitative analysis

7.2.1. The overall result

The multiple discriminant analysis identified those qualitative aspects that
significantly discriminate between financially distressed and healthy companies,
based on the sample responses. The test was conducted at a 95 percent confidence
level. The following variables were included in the model:

Table 5

<table>
<thead>
<tr>
<th>Variable</th>
<th>f-statistic</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strong finance function and controls</td>
<td>17.59924</td>
<td>.000120</td>
</tr>
<tr>
<td>Executive accountability for company performance</td>
<td>13.38404</td>
<td>.000640</td>
</tr>
<tr>
<td>Financial rigour exercised in investment decisions</td>
<td>8.30386</td>
<td>.005945</td>
</tr>
<tr>
<td>Separate Chairman and Managing Director function</td>
<td>6.75845</td>
<td>.012430</td>
</tr>
<tr>
<td>Tough decisions made without hesitation (action orientation)</td>
<td>5.69032</td>
<td>.021142</td>
</tr>
</tbody>
</table>

The results indicate that the qualitative aspects in Table 5 above, were strongly
present in the healthy companies, but lacking in the financially distressed company.
The qualitative factors are listed in order of significance in the table, based on the f-
statistic. The f-statistic indicates the level of significance of the particular variable,
with the higher values indicating higher significance. As can be seen, a strong
financial function and controls, together with executive accountability for overall
company performance were shown to be the most significant factors in terms of discriminating between financially distressed and healthy companies. The p-value is the highest level at which the particular variable is observed to be significant and at the values obtained, the aforementioned variables could be reported to be very highly significant.

The qualitative analysis was found to have a high accuracy level in classifying responses as being in respect of financially distressed or healthy companies. It correctly classified 96 percent of the responses from the financially distressed company and 93 percent of the responses from the healthy companies, with an overall accurate classification rate of 94 percent. It is interesting to note that the misclassification rate (7%) in healthy companies is higher than that in the financially distressed company. This is due to the fact that some of the respondents in this grouping identified behavioural aspects in their companies that are characteristic of those in financially distressed companies. This information could prompt a company to take corrective action timeously and prevent financial distress and/or failure.

The analysis produced standardised coefficients for the means of each of the variables. Applying these coefficients to the mean scores for each of the variables in the model yielded the following result (shown in Table 6 below):

<table>
<thead>
<tr>
<th></th>
<th>Financially distressed</th>
<th>Healthy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Z</td>
<td>-0.49551(4)+0.58654(3)+0.74688(2)-0.38399(2)+0.38961(1)-5.36478</td>
<td>-0.49551(4)+0.58654(4)+0.74688(4)-0.38399(4)+0.38961(3)-5.36478</td>
</tr>
<tr>
<td></td>
<td>-2.1</td>
<td>1.6</td>
</tr>
</tbody>
</table>

The midpoint between the two results was taken as the cut-off point, i.e. a z-value of -0.3. A score of below -0.3 indicates financial distress and a score in excess of -0.3 indicates a healthy company. As can be seen, applying the coefficients produced by the model to the mean scores correctly identifies the groupings. The financially
distressed company has a z-score of -2.1, which is below the cut-off, while the healthy companies have a z-score, which is well in excess of the cut-off point, at 1.6.

To get an understanding of the impact of differences of views and the responses of senior management and middle management were also analysed separately. The results are given below.

7.2.2. Senior management views

The model for senior management included only one variable. Details are given in Table 7 below.

Table 7

<table>
<thead>
<tr>
<th>Variable</th>
<th>f-statistic</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Financial rigour exercised in investment decisions</td>
<td>13.39286</td>
<td>.004392</td>
</tr>
</tbody>
</table>

The result indicates that the key differentiating factor between financially distressed and healthy companies, based on senior management responses, is the exercising of financial rigour, i.e. investment decisions based on a business case and favourable cost benefit analyses. This is in line with the view that financial distress in many organisations has been caused by the 'big project' syndrome when project costs escalate out of control and drains the company financially while not yielding the expected benefits. This can also be interpreted in the context of the need generally to have financial discipline in an organisation, i.e. to maintain a balance between focusing on the soft and hard issues. Again, the f-statistic (at a hurdle rate of 3.99) indicates that this variable is very significant in this model. The model had a accurate classification rate of 91 percent.

7.2.3. Middle management views

The analysis conducted on middle management views produced a model consisting of the following 5 variables.
Table 8

<table>
<thead>
<tr>
<th>Variable</th>
<th>f-statistic</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strong finance function and controls</td>
<td>27.49570</td>
<td>.000008</td>
</tr>
<tr>
<td>Tough decisions made without hesitation (action orientation)</td>
<td>22.91328</td>
<td>.000030</td>
</tr>
<tr>
<td>Executive accountability for company performance</td>
<td>18.60947</td>
<td>.000125</td>
</tr>
<tr>
<td>Taking a long-term strategic view</td>
<td>8.75355</td>
<td>.005509</td>
</tr>
<tr>
<td>Empowerment of employees</td>
<td>4.29369</td>
<td>.045685</td>
</tr>
</tbody>
</table>

The qualitative aspects identified as significantly discriminatory between financially distressed and healthy companies in middle management responses is ranked in order of significance in the table above (based on the f-statistic). It is interesting to note that, as with senior management (and in the overall analysis), financial discipline has been identified as the most discriminatory variable between financially distressed and healthy companies. Middle management responses also seem to indicate that under-performance on the part of the senior management team (with regard to taking a long term strategic view, taking accountability for overall company performance, and making tough decisions) are key discriminatory factors between financially distressed and healthy groups. The result point to the fact that middle management tend to adopt a more balanced view, since the variables in this model encapsulates important behavioural aspects at senior management (long term strategy, etc), middle management (strong finance function and controls), and the operational level (empowerment of staff). It is therefore important to get a representative sample of key stakeholder views and opinions for consideration in a qualitative analysis.
7.3. **Synthesis of the quantitative and qualitative analyses**

As different datasets were used in the quantitative and qualitative analyses, it was not possible to combine these into a single statistical model. However, the two separate analyses should be used in conjunction with each other to predict financial distress, as was demonstrated in the evaluation above. The more subjective qualitative component of the model is used to support and provide substance to the results of the quantitative analyses. The two separate analyses thus combine and provide a single model.

7.4. **Robustness and bias of the model**

To test the classification accuracy of a model for predicting financial distress, the model is applied to a secondary sample. In past studies, researchers have either used a completely new sample of financially distressed or healthy companies (Lin Shun-Lan, 1996) or used subset of the original dataset. Due to the sample size limitation of this study and the difficulty in obtaining data of a sensitive nature for financially distressed companies, it was decided to use a single company (the test sample) to test the robustness of the quantitative model. The test is conducted by applying the z-score discriminant coefficients of the model to the company's data to classify the company as either financially distressed or healthy. The quantitative model correctly classified the test company as financially distressed.

The test-company was also correctly classified as financially distressed in the qualitative model, which confirmed the quantitative findings. The results of the test for both the quantitative and qualitative analyses are discussed below.

7.4.1. **Background to the test-company**

The test-company is Southern Life Association Limited. This was a traditional life assurance company that was dissolved into Momentum Life in April 1998. Southern life was chosen on the assumption that the merger with Momentum Life provided an alternative to financial distress and/or eventual failure, despite the fact that on the
surface, the company appeared to be healthy as it maintained a consistent dividend payout. This assumption was based on numerous analyst and media reports about the company's declining performance over the three year period leading up to the merger. Some of the issues raised were:

- Complicated cross-holdings with First National Bank that resulted in an unwieldy structure and contributed to a large extent to ineffective financial management.
- A consistent dividend growth of 22% being declared while earnings are declining
- Lower than expected results for the year to March 1997.
- A declining share price
- High cost ratios relative to competitors

At the time of the merger, the company was also in the middle of a major transformation programme, as senior management had acknowledged the need for a turnaround strategy to get the company back onto a healthy footing.

7.4.2. Test result of the quantitative analysis

The quantitative model correctly classified Southern Life (Southern) as a financially distressed company. The calculated Z-score for Southern is -3.1287, which is far below the cut-off point. Southern is also the only company in the total sample that has negative values for ratios of net income-to-total revenue (R1) and return on assets (R4). These are profitability ratios and they show that the company was not adding value for both their shareholders and policyholders. In line with the assumption drawn from the study on mergers as an alternative to insolvency in the insurance industry (BarNiv and Hathorn, 1997), it can be concluded from the test results that financial distress could have been predicted for Southern Life at the time of being taken over by Momentum Life. Had the take-over not taken place, the company would have been at risk of failure.

7.4.3. Discussion of qualitative analysis in the context of Southern Life

As shown in section 7.2.1, the qualitative analysis correctly classified Southern as financially distressed. The discussion in this section is based on information obtained
in interviews with senior management of Southern Life and Momentum Life, analysts' reports and other media reports, and supports the test results already obtained.

**Separate Chairman and Managing Director function**

According to the model, the separation of the function of Chairman and Managing Director (MD) is a key discriminating factor in financially distressed and healthy companies. The separation allows the incumbents to focus on different aspects of the business and avoids conflicts of interests. Even though the analysis shows that this factor significantly discriminates between healthy and distressed companies, this was not true for Southern Life as the company in fact had a separate Chairman and MD.

The reason for this conflicting result could be that the Chairman and his board members were not so knowledgeable about the insurance business as their core business was mining, and as such they were not involved in the running of the business. Therefore, in essence the MD was performing both the duties of the Chairman and his own.

**Strong finance function and controls**

The significant cross-holdings between Southern and First National Bank, made the accounting and finance functions complex. According to analysts and the executives interviewed, the company maintained its dividend policy despite shortfalls in earnings and cashflow to support dividend payments. Due to the company's unhealthy financial structure that led to illiquidity, cash to pay shareholders' dividends was borrowed from policyholder funds. The interest payments on the policyholders' funds impacted negatively on the company's financial position because the company was paying the borrowed money back at a higher rate (in policyholder funds) compared to the rate that it was earning on invested assets.

One of the key contributing factors to the poorly developed financial disciplines could be the fact that the company did not give accountability for its financial management to a suitably qualified financial director. Instead this was treated as an additional responsibility to the role of the Chief Actuary. The data therefore confirmed that Southern Life did not have a very strong or well-developed finance function.
Financial rigour exercised in investment decisions

Toward the end of 1996, Southern Life employed Gemini Consulting to lead a transformation programme aimed at turning the company around. One of the key findings of the analysis conducted at that time was the lack of financial rigour in the financing of projects. The consultants found more than 200 projects in progress, most of them without a business case or cost-benefit analysis. Others had huge budget overruns (e.g., approximately R 60 million for a single project), while investments like the refurbishment of the head office building in the Johannesburg CBD at a cost of R80 million rand, when most businesses had already started to move out of the CBD, was done without due process of common sense debate and consideration of a positive net present value for the investment. The lack of a profit focus also resulted in the launch and maintaining of unprofitable products on the books.

Executive accountability for company performance

Senior management in Southern Life did not operate as a team that had joint responsibility for the company's overall performance. Divisions operated in silos and, while directors focused on maintaining and protecting their individual power bases, there was no evidence of directors being held accountable by the board for financial under-performance in their respective strategic business units. Comments made during interviews indicated that the right performance measures were also not in place.

Tough decisions made without hesitation (action orientation)

Examples of Southern Life's senior management's inability to make tough decisions were demonstrated by the fact that the company continued to fund projects and products that were incurring losses over extended periods. In addition, the organisational culture was tolerant of senior management's non-performance. These issues were raised in interviews with senior management of both Southern Life and Momentum Life who expressed the view that the executive team often knew what corrective action had to be taken, but lacked the courage to deal with the consequences that this might have for individuals. Loss-making divisions, costly support structures, and unprofitable products were not closed down. The behavioural aspect manifested in these issues is supported by the aggregate entrepreneurial rating calculated from the responses to section E of the questionnaire. The aggregate rating
for healthy companies was 3 and that for Southern was 2, indicating a lower action orientation in Southern Life.

8. Conclusions

The model developed in this study correctly identified financial distress in those life assurance companies that were dissolved into other insurers over the period 1985 to 1997. The quantitative analysis achieved a 92% overall accuracy, classifying 100% of the financially distressed companies in the sample correctly and misclassifying only one company in the healthy grouping.

The findings of the qualitative analysis effectively support the results of the quantitative analysis. The variables used in building the qualitative model, as lead indicators of organisational performance, discriminated between financially distressed and healthy companies, achieving a 96% accuracy classification rate.

In both analyses, Southern Life ('the company') was correctly classified as a financially company, thus confirming the assumption that the take-over by Momentum Life was an alternative to possible failure (BarNiv, R. and Hathorn, J, 1997), and thus proving the hypothesis. Senior and middle management opinions and views expressed in the questionnaire and interviews, together with commentary from analysts, provided an indication of the causes of financial distress in Southern Life.

Notwithstanding the high accuracy classification levels achieved by the model, it is not intended to be an objective and finite failure prediction mechanism. The analyses should rather be used in conjunction with other quantitative and qualitative risk assessment measures, such as those proposed by the Actuarial Society of South Africa, to aid in the assessment of risk related to financial distress and corporate failure.
9. Recommendations for future research

This research was exploratory in nature and it is hoped that further research in this area will be undertaken. In light of critical issues identified in this research, the authors recommend that the following aspects of the study could be improved to enhance the result.

**Recommended statistical methodology**

Prior studies in predicting financial distress have concluded that logistic regression analysis (Logit) have been superior in predicting financial distress in the insurance industry. Unlike multiple discriminant analysis that attempts to classify companies as either financially distressed or healthy as an absolute truth, Logit gives the probability of the company belonging to either grouping. It therefore identifies the degree to which a company is at risk of financial distress. For these reasons, Logit analysis is a more widely used model for predicting financial distress in the insurance industry. The statistical package (*Statistica 5.0*) applied in this study does not have the logit function, and therefore, the superiority of logit analysis applied in the South African environment could not be assessed. The authors recommend that future research on financial distress classification study for the South African life assurance industry apply the logit analysis.

**Recommended ratios**

Performance measures considered key in the South African insurance industry have had to be excluded from this study due to non-disclosure of the variables used to calculate the ratios. Improved financial disclosure has led to the inclusion of these critical measures in analysts' and stockbrokers' assessment of the future viability of a life assurance company. Embedded value (EV), which is the present value of the projected stream of future after-tax profits from the life assurer's in-force book of business, has become the key performance measure. It is recommended that future research include the following performance indicators related to embedded value:
Table 9

<table>
<thead>
<tr>
<th>Measure</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>P / EV</td>
<td>This is similar to the P/E ratio, that compares the stock market expectations of future earnings with the company's current earnings, but using embedded value instead of earnings.</td>
</tr>
<tr>
<td>% growth in EV</td>
<td>Total embedded value added over the year.</td>
</tr>
<tr>
<td>EVE = Change in EV + dividend paid - new capital</td>
<td>Embedded value created in the current year.</td>
</tr>
<tr>
<td>EVA = EVE-(opening EV*ROE)</td>
<td>Embedded value added, analogous to economic value added, measures the shareholder value created over the year based on the value of the in-force book of business at the beginning of the year.</td>
</tr>
<tr>
<td>% ROEV</td>
<td>Return on equity in the life assurance context becomes return on EV (ROEV)</td>
</tr>
<tr>
<td>Policyholder funds / EV</td>
<td>The proportion of the expected future profit streams received to date of valuation. This is a risk measure, as it relates actual profits to expected future profit streams.</td>
</tr>
</tbody>
</table>

These ratios should be updated in line with the standards set by the ASSA from time to time.

**Risk factors in the life assurance industry**

This study relied heavily on prior life assurance distress prediction and classification research conducted in the United States. This is partly because no evidence was found that similar studies have been conducted for the South African environment. An implication of this is that the performance measures utilised in the study could not capture risk factors unique to the South African life assurance industry. Issues like
relatively high inflation and interest rates, increasing mortality rates due to the HIV/AIDS epidemic and low literacy rates, are amongst current and future forces affecting performance in the South African life assurance industry. These, together with the impact of the new economy and technological developments on the performance of life assurance companies should be taken into account in future studies on predicting financial distress and corporate failure in the life assurance industry.
### 10. Glossary of terms

<table>
<thead>
<tr>
<th>Term</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actuarial liabilities</td>
<td>Actuarially determined present value of expected future benefit payments under a policy.</td>
</tr>
<tr>
<td>Actuarial reserves</td>
<td>Includes reserves to meet actuarial liabilities plus other reserves (e.g. capital adequacy requirement - CAR)</td>
</tr>
<tr>
<td>Capital</td>
<td>Excess of assets over actuarial liabilities</td>
</tr>
<tr>
<td>Embedded value</td>
<td>The present value of the projected stream of future after-tax profits from the life assurer's in-force book of business</td>
</tr>
<tr>
<td>Gross premium income</td>
<td>Payment received from policyholders before commissions and administration fees.</td>
</tr>
<tr>
<td>Net income</td>
<td>Same as retained earnings, i.e. earnings after tax, dividends, and transfers to reserves.</td>
</tr>
<tr>
<td>Surplus</td>
<td>Same as capital.</td>
</tr>
<tr>
<td>Total income</td>
<td>Sum of investment income and premium income</td>
</tr>
<tr>
<td>Life Assurance</td>
<td>Long term insurance business providing predominantly life assurance and retirement benefits.</td>
</tr>
<tr>
<td>Insurance</td>
<td>Often used interchangeably with life assurance, but is generally broader and includes insurance business other than life and pensions, e.g. health and property insurance.</td>
</tr>
</tbody>
</table>
11. References


Argenti, J., "Discerning the cracks of company failure", The Director, October 1993, p67 to 69.


Ernst & Young, A review of '99 merger and acquisition activity, www.ey.co.za


Gerald, Hershon, "Methods of Valuation: Different things to different people", www.fm.co.za/00/0908/report/brankins.htm:


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www.cse.dmu.ac.uk/~mln/report.htm : 'Use of Neural Networks to forecast Corporate Failure'.

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www.education.umd.edu/EDMS/LRA/LRA.html

www.sbaer.uca.edu/docs/proceedingsII/97wds065.txt

## Appendix 1: Companies included in the sample of the study

<table>
<thead>
<tr>
<th>Company Code</th>
<th>Financial statement date used</th>
<th>Take over or merger date</th>
<th>Issues identified at the time of the take-over</th>
</tr>
</thead>
</table>
| DS 1 Southern Life | 1997 | 4/98 | • Complex cross-holdings  
• 'Has been a subject of take-over speculation for some time' (BT 01/97)  
• Big project, R18m that yield return less than the company's cost of capital. (Source: one of the company's previous executives)  
• Inability to cope with market conditions, Decline in free reserves, Low solvency ratio, high investments guarantees, Declaring dividends & profits not backed by an increase in reserves, Cumbersome overhead structures, (FM06/02/98) |
| DS 2 AA Life | 1994 | 7/96 | • Under-performing asset portfolio and high lapsed ratios (FM 14/07/95) |
| *DS 3 Crusader Life | 1992 | 893 | • Placed under judicial management  
• Extremely high exposure to single-premium business: 54% vs 1.5% industry average. (FW 22/09/93) Implication is lack of steady income from recurring premiums.  
• Low investment returns: 7% vs 15.6% industry standards.  
• Poor economies of scale  
• Life funds as a % of actuarial liabilities: 76% vs 112% industry average, reflecting a negative unfunded position. |
| DS 4 Prudential Life | 1985 | 6/87 | • Shortage of management and other business skills, lack of innovative products (FM 06/11/87) |
| DS 5 Colonial Mutual | 1986 | 6/87 | • Size - small as a result could not cope with competition (FM16/01/87). |
| DS 6 Lifegro | 1988 | 6/87 | • Growing too fast relative to capital base - new business strain (FM 06/11/87)  
• High operating costs (FM 02/12/88)  
• Undercapitalised (FM 20/05/88)  
• Management lacked the depth of experience in assurance (FM 27/05/88)  
• Misreading the financial markets  
• |
| DS 7 Norwich Life | 1997 | 12/98 | • High proposition of guaranteed bonus funds - which poses high risk for the company  
• Low market-linked proportion of liabilities, 27% vs 90% for competitors  
• Low surplus assets over liabilities (Focus 23/05/97)  
• Low growth in premiums income  
• Low investments returns (FM 15/05/98)  
• Investment in a big project (R25m) without assessing true returns of the project (FM 15/05/98). |

H 1 African Life | 1997 | Ranked No 8 i.t.o total assets and net premium income |
H 2 Fedsure | 1997 | Ranked No 5 i.t.o total assets and net premium income |
H 3 Metropolitan | 1997 | Ranked No 6 i.t.o total assets and net premium income |
H 4 Sanlam | 1997 | Ranked No 2 i.t.o total assets and net premium income |
H 5 Sage Life | 1997 | Ranked No 7 i.t.o total assets and net premium income |
H 6 Liberty life | 1997 | Ranked No 3 i.t.o total assets and No 4 i.t.o net premium income |
H 7 Old Mutual | 1997 | Ranked No 1 i.t.o total assets and net premium income |

FM = Financial Mail  
FW = Finance Week  
BT = Business Times, Sunday Times  
Appendix 3: Full ratio set based on literature review

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>R1 Net income / Total income</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R2 Commissions &amp; expenses / Premium income</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R3 ROA-investment income / Invested assets</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R4 ROA=EBT / Total assets</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R5 ROE=Profit attributable to ordinary shareholders / Equity</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R6 ROA=Net income / Total income</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R7 Benesits paid / Net premiums written</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R8 Premium operating income / Total income</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R9 Net income / Surplus</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R10 Net investment income / Total income</td>
<td>X</td>
<td></td>
<td></td>
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</thead>
<tbody>
<tr>
<td>R11 Log of capital &amp; surplus</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R12 Insurance leverage=Capital adequacy reserves / Surplus</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R13 Financial leverage=Net premium / Surplus</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R14 Separate account assets / Total assets</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R15 Surplus relief= Surplus / Actuarial liabilities</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R16 Nonadmitted assets / Assets</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R17 Log of total assets</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R18 Capital &amp; surplus / Actuarial liabilities</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R19 Total assets / Capital &amp; surplus</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R20 Gross premium / Capital &amp; surplus</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R21 Net premiums written / Capital &amp; surplus</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R22 Total liabilities / Capital &amp; surplus</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R23 Investment in affiliates / Capital &amp; surplus</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R24 Investment in affiliates / Capital &amp; surplus</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<td>R25 Foreclosed mortgage / Capital &amp; surplus</td>
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<td>R26 % Change in capital &amp; surplus</td>
<td>X</td>
<td>X</td>
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<td>R27 % Change in Premium income</td>
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<td>X</td>
<td>X</td>
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<td>X</td>
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<td>X</td>
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<td>R30 % Change in reserve ratio</td>
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<td>R31 Current ratio = Current assets / Current liabilities</td>
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<td>R32 Cash inflow / Cash outflow</td>
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<tr>
<td>R33 Property investments / capital &amp; surplus</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<tr>
<td>R34 Property investments / Total assets</td>
<td>X</td>
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<tr>
<td>R35 Actuarial liabilities / Current assets</td>
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<tr>
<td>R36 Property investment / Invested assets</td>
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<td>R37 Bonds / Invested assets</td>
<td>X</td>
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<td>R38 Equity / Invested assets</td>
<td>X</td>
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<tr>
<td>R39 Mortgage loans / Invested assets</td>
<td>X</td>
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<tr>
<td>R40 Cash &amp; Short-term investments / Invested assets</td>
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<td>R41 Total assets</td>
<td>X</td>
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<tr>
<td>R42 Total prem &amp; deposits</td>
<td>X</td>
<td></td>
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<td>R43 Capital &amp; surplus</td>
<td>X</td>
<td></td>
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<tr>
<td>R44 Net gain from ops</td>
<td>X</td>
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<tbody>
<tr>
<td>R45 Lapse ratio</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
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<tr>
<td>R46 Mutual or Listel</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
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<tr>
<td>R47 P/EV = Share price / Embedded value</td>
<td>X</td>
<td></td>
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<tr>
<td>R48 Earnings before tax / Surplus</td>
<td>X</td>
<td></td>
<td></td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>R49 Capital / Actuarial liabilities</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>R50 % Change in total assets</td>
<td>X</td>
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X: Indicates that the ratio was used in a previous study.
## Appendix 4: Ratio Removal Process

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<th>Ratio codes</th>
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<th>Removal 2</th>
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<td></td>
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<tr>
<td>R1</td>
<td>Net income / Total income</td>
<td>R1</td>
<td>R1</td>
<td></td>
<td></td>
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<tr>
<td>R2</td>
<td>Commissions &amp; expenses / Premium income</td>
<td>R2</td>
<td>R2</td>
<td></td>
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</tr>
<tr>
<td>R3</td>
<td>ROI = Investment income / Invested assets</td>
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<tr>
<td>R4</td>
<td>ROA = EBT / Total assets</td>
<td>R4</td>
<td>R4</td>
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<tr>
<td>R5</td>
<td>ROE = Profit attributable to ordinary shareholders / Equity</td>
<td>R5</td>
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<tr>
<td>R6</td>
<td>ROP = Net income / Premium income</td>
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<tr>
<td>R7</td>
<td>Benefits paid / Net premium written</td>
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<tr>
<td>R8</td>
<td>Pretax operating income / Total income</td>
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<td>*</td>
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<tr>
<td>R9</td>
<td>Net income / Surplus</td>
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<tr>
<td>R10</td>
<td>Net investment income / Total income</td>
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<td><strong>Financial strength measures</strong></td>
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<td>R11</td>
<td>Log of capital &amp; surplus</td>
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<td>R12</td>
<td>Insurance leverage = Capital adequacy reserves / Surplus</td>
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<tr>
<td>R13</td>
<td>Financial leverage = Net premiums / Surplus</td>
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<td>R13</td>
<td>R13</td>
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<td>R14</td>
<td>Separate account assets / Total assets</td>
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<tr>
<td>R15</td>
<td>Surplus relief = Surplus / Actuarial liabilities</td>
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<td>R16</td>
<td>Nonadmitted assets / Assets</td>
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<td>R17</td>
<td>Log of total assets</td>
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<tr>
<td>R18</td>
<td>Capital &amp; surplus / Actuarial liabilities</td>
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<tr>
<td>R19</td>
<td>Total assets / Capital &amp; surplus</td>
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<tr>
<td>R20</td>
<td>Gross premium / Capital &amp; surplus</td>
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<tr>
<td>R21</td>
<td>Net premium written / Capital &amp; surplus</td>
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<tr>
<td>R22</td>
<td>Total liabilities / Capital &amp; surplus</td>
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<td>#</td>
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<tr>
<td>R23</td>
<td>Government &amp; other public investments / Capital &amp; surplus</td>
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<tr>
<td>R24</td>
<td>Investment in affiliates / Capital &amp; surplus</td>
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</tr>
<tr>
<td>R25</td>
<td>Foreclosed mortgage / Capital &amp; surplus</td>
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<td><strong>Growth measures</strong></td>
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<td>% Change in capital &amp; surplus</td>
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<td>R27</td>
<td>% Change in Premium income</td>
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<tr>
<td>R28</td>
<td>% Change in Product mix</td>
<td></td>
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<tr>
<td>R29</td>
<td>% Change in asset mix</td>
<td></td>
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<tr>
<td>R30</td>
<td>% Change in reserving ratio</td>
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<tr>
<td>R31</td>
<td>Current ratio = Current assets / Current liabilities</td>
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<tr>
<td>R32</td>
<td>Cash inflow / Cash outflow</td>
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<tr>
<td>R33</td>
<td>Property investments / Capital &amp; surplus</td>
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<tr>
<td>R34</td>
<td>Property investments / Total assets</td>
<td></td>
<td></td>
<td>R34</td>
<td></td>
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<tr>
<td>R35</td>
<td>Actuarial liabilities / Current assets</td>
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<td><strong>Investments portfolio measures</strong></td>
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<td>R36</td>
<td>Property investment / Invested assets</td>
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<tr>
<td>R37</td>
<td>Bonds / Invested assets</td>
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<td>R38</td>
<td>Equity / Invested assets</td>
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<td>R39</td>
<td>Mortgage loans / Invested assets</td>
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<td>R40</td>
<td>Cash &amp; Short-term investments / Invested assets</td>
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<td><strong>Size measures</strong></td>
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<td>R41</td>
<td>Total assets</td>
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<td>R42</td>
<td>Total prem &amp; deposits</td>
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<td>R43</td>
<td>Capital &amp; surplus</td>
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<td>R44</td>
<td>Net gain from ops</td>
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<td><strong>Other measures</strong></td>
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<td>R45</td>
<td>Lapse ratio</td>
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<td>R46</td>
<td>Mutual or Listed</td>
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<td>R47</td>
<td>P/EV = Share price / Embedded value</td>
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<td>R48</td>
<td>Earnings before tax / Surplus</td>
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<td>R49</td>
<td>Capital / Actuarial liabilities</td>
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<td>R49</td>
<td>R49</td>
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<tr>
<td>R50</td>
<td>% Change in total assets</td>
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# Ratios removed for reasons related to non-availability of data, applicability to this study, and duplication.
* Ratios discarded based on correlation of more than 50%
Appendix 5: Interview questions for senior management

- Did Southern Life ('the company') experienced chronic and serious losses in the three years leading to the merger with Momentum Life?
- Over the same period, did the company experience a decreasing sales trend?
- In your opinion was the take-over of Southern Life due to poor management of the company's affairs? If so, can you give examples of poor management?
- From an actuarial perspective, was the company in a situation where its liabilities were disproportionate to its assets?
- In your opinion, was the leadership style of senior management autocratic?
- Did the company readily adapt to environmental changes?
- One of the critical concerns in the insurance industry is escalating costs, was this a concern for SL? And if so, what initiatives were taken to address the problem? Did the company have a mechanism for measuring and managing costs?
- Was the company in a situation where it was unable to meet its cash obligations? What was done about it?
- Specifically, was there a situation where the company declared dividends in spite of insufficient earnings or cash from operations to cover those dividends? How was that situation managed?
- Was there a lack of experience and / or knowledge among top management?
- On average, how many new products were launched over the five year period prior to the take-over?
- Did the company maintain any outdated and / or unprofitable products in its portfolio?
- To what extent did the company embrace technological development?
- When problems occurred in the company, did management recognise the problems and proactively deal with them?
- Did financial reporting reflect the company's financial situation fairly and accurately?
- In your opinion, were the right measures of performance used and how effectively were they monitored? To what extent were performance measures integrated across the divisions?
- How did the company deal with repeated non-performance?
- Complexity. Prior to the take-over, what was the organisational structure in terms of the following:
  - Capital structure
  - Number of divisions in the company, and departments within those divisions?
  - Number of management levels?
- In your opinion, what proportion of senior management time was spent on strategic (long-term) issues in relation to time spent on day-to-day administrative issues?
- Did the company reward entrepreneurial initiatives?
Appendix 6a: Covering Letter

TO WHOM IT MAY CONCERN

The attached questionnaire examines the key organisational attributes and management issues that are prevalent in organisations operating in the life assurance industry. This study is being done as part of an MBA under the supervision of Professor Paul Sulcas who lectures in corporate strategy at the Graduate School of Business. The questionnaire should take approximately twenty minutes to complete.

The objective of the questionnaire is to determine if there are any significant qualitative differences between life assurance companies where there have been a transfer of part or all of the company's business to another institution (e.g. in terms of a merger or takeover agreement), and those where activities of this nature have not occurred. Any information provided in this questionnaire will be treated as confidential. You may choose to remain anonymous and responses will not be traced back to individuals.

The questionnaire contains a number of statements and questions about the organisation. You are requested to think about the organisational attributes that existed in your organisation or the organisation that you were a part of 3 years ago (in 1997) and to respond to each of the statements or questions accordingly. Please note there are no right or wrong answers. It is your opinion on each of the issues that matters.

Please return the completed questionnaire to the address provided above for the attention of Charmaine Groves and Happy-Girl Buthelezi or email back to cgroves@oldmutual.com to reach us by no later than Wednesday, 15 November 2000.

Many thanks for your time
Organisational Attributes –
examining qualitative aspects of a life assurance company

This questionnaire comprises 6 sections and has 40 questions or statements and requires you to score each question or statement. The information requested in section F is optional. When answering, please:

(a) assume that each question or statement applies to the organisation as a whole, not just the organisational unit applicable to you.
(b) answer each question or statement from the perspective of your organisation as it existed 3 years ago (1997).
(c) evaluate each question or statement in terms of the extent to which you agree or disagree with it in relation to your organisation.
(d) answer all the questions or statements. The whole questionnaire should take approximately 20 – 25 minutes to complete.
(e) give the answer that first occurs to you. Do not give an answer because you feel it is how things should have been or because you feel it is the right thing to say.
(f) answer each question or statement by scoring (circling or shading) the appropriate number on the scale provided. The meaning of the numbers is as follows:

5 – Strongly Agree
4
3 – Neutral
2
1 – Strongly Disagree

(g) Provide approximate numbers in section E.
Appendix 6b: Questionnaire

SECTION A: MANAGEMENT ISSUES

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<td>1. The functions of Managing Director and Chairman were separated in my organisation</td>
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<td>4</td>
<td>3</td>
<td>2</td>
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<tr>
<td>2. Key strategic decisions for the organisation were made by the Managing Director or Chairman only</td>
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<td>4</td>
<td>3</td>
<td>2</td>
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<tr>
<td>3. The Executive Team made all key strategic decisions</td>
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<td>4</td>
<td>3</td>
<td>2</td>
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<tr>
<td>4. Key strategic decisions were made by the senior management team of each business unit and approved by the Executive Team</td>
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<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
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<tr>
<td>5. The company had a strong finance function (e.g. finance director)</td>
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<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
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<tr>
<td>6. Strategic issues were debated rigorously at all levels</td>
<td>5</td>
<td>4</td>
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<tr>
<td>7. The Executive team got very involved in the day-to-day running of the business</td>
<td>5</td>
<td>4</td>
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<td>8. The Executive team took tough decisions without hesitation</td>
<td>5</td>
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<td>9. The company adopted a long term view of strategy</td>
<td>5</td>
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<tr>
<td>10. The full Executive team was accountable for the company's performance</td>
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<td>4</td>
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SECTION B: ORGANISATIONAL ISSUES

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<tbody>
<tr>
<td>11. The organisation's structure was very hierarchical and complex</td>
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<td>4</td>
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<td>12. More than 50% of executive time was spent on admin issues</td>
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<td>13. Staff were rewarded for new innovative ideas</td>
<td>5</td>
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<tr>
<td>14. Profitable divisions were spun off into separate, profitable businesses</td>
<td>5</td>
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<td>15. Performance standards were consistent across business units</td>
<td>5</td>
<td>4</td>
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<td>16. Performance measures were appropriate</td>
<td>5</td>
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<tr>
<td>17. Each business unit operated as a profit centre</td>
<td>5</td>
<td>4</td>
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<td>18. Senior management were committed to implementing corrective actions based on performance measures</td>
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SECTION C: CULTURAL ISSUES

19. Management decisions were informed by the company's values
   
20. Employees felt empowered in their jobs
   
21. Employees were generally happy in their jobs
   
22. Issues were debated rigorously at senior and middle-management levels before decisions were made
   
23. Non-performing divisions were closed down without hesitation
   
24. Above average performance was rewarded generously both at an individual and divisional level
   
25. Senior management dealt with concerning situations quickly and effectively
   
26. Staff were involved in decisions that affected them
   
27. The Executive Committee imposed the necessary financial rigour when investing in large projects

SECTION D: GENERAL ACCOUNTING AND FINANCE ISSUES

28. The organisation had significant cross shareholding of assets with other companies
   
29. The company had experienced operational losses over a significant period of time prior to the merger/take-over/liquidation
   
30. Management tried to keep up staff morale by amplifying good news and downplaying bad news
   
31. The company always delivered the required shareholder dividend, even when performance was down
   
32. Investment in new initiatives were always done in terms of a business case that showed a positive return on the investment
   
33. The company often adjusted its accounting policies and or actuarial assumptions in order to show better financial performance
SECTION E: OTHER KEY INFORMATION

Are/were you in:

Senior Management
Middle Management
Junior Management

How long have you worked for the organisation

……………….. years and/or
……………….. months

In the time that you worked for the organisation

34. How many times did the company's strategy change?
35. How many different Chief Executives have you had?
36. How many times did the Executive team change?
37. How many new divisions were started?
38. How many divisions were closed down?
39. How many new products were launched?
40. How many product lines were stopped?

Please fill in the actual number

Have you any further significant comments about the strategic and operational issues relating to your company?

…………………………………………………………………………………………
…………………………………………………………………………………………

SECTION F: OPTIONAL INFORMATION

For summary information purposes only, please complete the following:

1. Your name
2. Your current job title
3. Your contact details:
   Name of organisation
   Address
   Tel number:
   Fax number:
   Email:

Thank you for completing this questionnaire