EVALUATION OF APPLICABILITY OF ALTMAN'S REVISED MODEL IN PREDICTION OF FINANCIAL DISTRESS IN KENYA

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Declaration

I declare that this research project is my original work and has never been presented for examination in any University.

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Signature .....Date.....15/11/2010.....

This research project has been submitted for examination with my approval as the University Supervisor

Name: **MR MARTIN ODIPO**

Signature.....Date.....15.11.2010

Dedication

I would like to dedicate this work to my beloved parents Mr Julius Bwisa and Mrs Bascilisa Nanjala,siblings Oliver,Doreen,George,Kevin and Metrine. Son Lewis and fiancé Sheila Ayesa Thank you for encouraging me to be the best I can be. May God bless you.

Acknowledgement

I thank the Almighty God who has been my source of inspiration for allowing me to undertake this project, without His intervention I would not have managed.

The completion of this study was realized through the will of God and I would like to express my sincere thanks to all my friends, relatives and institutions contribution towards the production of this research study.

I specifically sincerely acknowledge the efforts of Martin Odipo supervisor for the advice and guidance that facilitated the successful completion of this study.

May the almighty God bless you abundantly.

Abstract

Edward Altman's financial distress prediction model is a linear analysis in that five measures are objectively weighted and summed up to arrive at an overall score that then becomes the basis for classification of firms into one of the a priori groupings (distressed and non-distressed).

The objective of this study was to assess whether Edward Altman's financial distress prediction model can apply locally. This study used a descriptive survey design. The study population of this study was all the companies listed in the Nairobi Stock exchange in 1989 to 2008. The sample size of this study was 10 firms listed and 10 firms delisted in Nairobi stock exchange 1989 to 2008. Secondary data was obtained from financial reports of the listed companies at the Nairobi Stock Exchange and the Capital Markets Authority.

This research study revealed that Edward Altman's financial distress prediction model was applicable locally. Edward Altman's financial distress prediction model was found to be applicable in 6 out of the 10 failed firms that were analyzed, which indicates a 60% validity of the model. Out of the 10 firms which had not failed that were analyzed, 8 of them proved that Edward Altman's financial distress prediction model was applicable locally indicating an 80% validity of the model. This gives an aggregate average of 70% validity of the model.

This study therefore recommends that studies should be done on how to eliminate the type I and type II errors. The study also recommends that firms in Kenya should be using Altman's business failure prediction model annually in order to predict whether there is a possibility of failing.

Table of Contents

Declaration ii

Dedication iii

Acknowledgement iv

Abstract v

Table of Contents vi

List of figures ix

List of tables x

List of abbreviations xi

CHAPTER ONE 1

1.0 INTRODUCTION 1

1.1 Background of the Study 1

1.1.1 Business Failure 2

1.1.2 Avoiding Failure 3

1.2 Statement of the Problem 3

1.3 Objective of the Study 5

1.4 Importance of the Study 5

CHAPTER TWO 6

2.0 LITERATURE REVIEW 6

2.1 Introduction 6

2.2 Business failure Prediction 6

2.3 Theoretical review 6

2.3.1 Qualitative models 6

2.3.2 Quantitative models 7

2.3.3 Edward Altman's Z – Score Model 7

2.3.4 Financial Ratios in Z score 8

2.4 Factors that lead to business failure 8
2.4.1 Capital structure and capital adequacy 8
2.4.2 Cash Flow 9
2.4.3 Business Planning 10
2.4.4 Demand 10
2.4.5 Rise in costs or lack of control over costs 11
2.4.6 Company image 11
2.4.7 Competition 12
2.4.8 Customer Base 12
2.4.9 Uncontrolled Growth 12
2.4.10 Entrepreneurial Skills 12
2.5 Preconditions of failure 13
2.6 Processes for recovery of business failure 14
2.7 Empirical Literature 15
2.7.1 Altman Z-Score Model 15
2.7.2 Altman's Revised Z-Score Model 17
2.7.3 Springate (Canadian) 18
2.7.4 Blasztk system (Canadian) 18
2.7.5 Ca-score (Canadian) 18
2.8 Local studies 19
2.9 Conclusion 20
CHAPTER THREE 21
3.0 RESEARCH METHODOLOGY 21
3.1 Introduction 21
3.2 Research Design 21

3.3 Study Population 22
3.4 Data Collection Methods 22
3.5 Data Analysis 23
3.5.1 Revised Z-Score Model 23
CHAPTER FOUR 24
4.0 DATA ANALYSIS 24
4.1 Introduction 24
4.2 The Response Rate 24
4.3 Assessing whether Edward Altman's financial distress prediction model can apply locally 24
4.4 Failed firms 25
4.5 Non failed firms 33
CHAPTER FIVE 43
5.0 DISCUSSIONS, CONCLUSIONS AND RECOMMENDATIONS 43
5.1 Summary of Key Findings 43
5.1.1 Failed firms 43
5.1.2 Non failed firms 45
5.2 Conclusion 47
5.3 Recommendations 47
5.4 Limitations of the study 47
5.5 Suggestion for further studies 48
References 49
Appendices 54
Appendix I: List of failed firms in Nairobi stock exchange (1989 - 2008) 54
Appendix II: List of Non failed firms in Nairobi stock exchange (1989 -2008) 55

List of figures

Figure 2.1: Failure process..... 7

List of tables

Table 4. 1: EA Packaging 25

Table 4. 2: Kenya National Mills 26

Table 4. 3: Dunlop Kenya 27

Table 4. 4: Baumann & Co 28

Table 4. 5: Reagent Undervalued Assets Ltd 28

Table 4. 6: Pearl Drycleaners 29

Table 4. 7: Hutchings Biemer 30

Table 4. 8: Theta Group 31

Table 4. 9: Lonhro East Africa 31

Table 4. 10: Uchumi Supermarkets Ltd 32

Table 4. 11: Kakuzi Ltd 33

Table 4. 12: Rea Vipingo Plantations 34

Table 4. 13: Sasini Tea Ltd 35

Table 4. 14: Kenya Airways 36

Table 4. 15: Marshalls East Africa 37

Table 4. 16: Nation Media Group 38

Table 4. 17: Scan Group Ltd 39

Table 4. 18: Standard Group 40

Table 4. 19: BOC Kenya 41

Table 4. 20: British American Tobacco 42

List of abbreviations

CBR- Case Based-Reasoning

EBIT- Earnings before Interest and Taxes

EBITDA- Earnings Before Interest and Taxes and Before Depreciation and Amortization

KPCU- Kenya Planters Co-operative Union

NSE- Nairobi Stock Exchange

UDA- Univariate Discriminant Analysis

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background of the Study

There is a dire need for prediction of business failures since the results of business failure leads to heavy losses both financially and non-financially. Thus a model that could accurately predict business failure in time would be quite useful to managers, shareholders, the government, suppliers, customers, employees amongst other stakeholders. The prediction of business failure is an important and challenging issue that has served as the impetus for many academic studies over the past three decades. The widely applied methods to predict the risk of business failure were the classic statistical methods, data mining and machine learning techniques. Case Based-Reasoning (CBR) is an inductive machine learning method that can apply to diagnosis domain, classification, and enhanced some of the deficiencies in statistical models. Concerning attributes extraction and weighting approach could enable CBR to retrieve the most similar case correctly and effectively (Bryant, 1997).

O'Leary (2001) argued that Prediction of bankruptcy probably is one of the most important business decision-making problems. Affecting the entire life span of a business, failure results in a high cost from the collaborators (firms and organizations), the society, and the country's economy (Ahn, Cho, and Kim, 2000). Thus, the evaluation of business failure has emerged as a scientific field in which many academics and professionals have studied to find other optimal prediction models, depending on the specific interest or condition of the firms under examination.

Over the last 35 years, the topic of company failure prediction has developed to a major research domain in corporate finance. Academic researchers from all over the world have been developing a gigantic number of corporate failure prediction models, based on various types of modelling techniques. Besides the classic cross-sectional statistical methods, which have produced numerous failure prediction models, researchers have also been using several alternative methods for analyzing and predicting business failure. To date, a clear overview and

discussion of the application of alternative methods in corporate failure prediction is still lacking. Moreover, frequently, different designations or names are used for one method.

1.1.1 Business Failure

This refers to a firm's inability to meet its obligations as and when they fall due. Signs of potential financial distress are evident long before the failure/bankruptcy actual occurs. Business failure can be caused by either internal or external factors. Internal factors are those factors which are within the general operations of the firm and of which management could be in a position to stop or control them before they get out of hand. External factors are those which the management has no direct linkage to and could be in the form of changes in government policies such as introduction of new laws or tax policies, natural catastrophes such as fires, floods and earthquakes (O'Leary, 2001).

Research has shown that most business failure is caused by bad or poor management (Ahn et al., 2000). This could be in the form of inexperienced management styles, fraud, and rapid technological changes amongst other variables. There are many forms of business failures. The first one is economic failure. This occurs when an organization is not able to generate revenue that would be sufficient enough to meet its costs. This normally leads to such a firm incurring losses.

Financial failure may take the form of bankruptcy or insolvency. Insolvency refers to where a firm is unable to meet its current obligations as and when they fall due. This happens when the current liabilities exceed the current assets. Bankruptcy on the other hand refers to where the total liabilities exceed the fair value of assets. Financial statements are normally used to gauge the performance of the firm and its management. The financial statements commonly used are profit and loss statement, balance sheet and cash flow statements. From the financial statements, various ratios can be calculated to assess the current performance future prospects of the concerned firm. Some of the ratios used include current ratio, quick ratio, and working capital to total debt, total debt to total assets, profit margin to sales and return on total assets (Ahn, 2000).

Corporate failure models can be broadly divided into two groups: quantitative models, which are based largely on published financial information; and qualitative models, which are based on an

internal assessment of the company concerned. Both types attempt to identify characteristics, whether financial or non-financial, which can then be used to distinguish between surviving and failing companies.

1.1.2 Avoiding Failure

Perhaps the best way to avoid failure is to examine the myriad explanations for business failure. Many books and articles have focused on identifying reasons for failure as a remedy for prevention. Studies carried out by Altman (2003) used financial ratios to predict occurrence of bankruptcy and he was able to predict 94% correctly one year before bankruptcy occurred and 72% two years before its actual occurrence. Significant ratios identified by Altman with regard to bankruptcy prediction were working capital over total assets, retained earnings over total assets, earnings before interest and taxes over total assets, market value of equity over book value of total liabilities and sales over total assets.

1.2 Statement of the Problem

Accurate business failure prediction models would be extremely valuable to many industry sectors, particularly financial investment and lending. The potential value of such models is emphasized by the extremely costly failure of high-profile companies in the recent past. Consequently, a significant interest has been generated in business failure prediction within academia as well as in the finance industry. Statistical business failure prediction models attempt to predict the failure or success of a business. Discriminant and logit analyses have traditionally been the most popular approaches, but there are also a range of promising non-parametric techniques that can alternatively be applied.

Dimitras *et al.*. (2006) pointed out that after 30 years of research on this topic, there is no generally accepted model for business failure prediction that has its basis in a causal specification of underlying economic determinants. Because of the confusingly varied and restrictive assumptions (such as a large number of samples, normal distributed independent variables, and linear relationship between all variables) underlying these classic statistical models, there is need to recourse to alternative methods.

Prior empirical studies of failure have concentrated almost exclusively on financial ratio data, though other studies of failure usually cite managerial variables as being critical (Scherr, 2002). The usefulness of ratio-based business failure prediction models has been questioned. For example, El-Zayaty (2003) found ratio models to be poor predictors of bankruptcy: of 132 businesses predicted to fail, only 5 were discontinued over a five-year period. Storey et al. (2000) indicated that qualitative data can provide at least as good predictions as traditional financial ratios. Locally, Keige (1991) did a study on business failure prediction using discriminate analysis. Kiragu (1993) did another study on the prediction of corporate failure using price adjusted accounting data. Kogi (2003) did an analysis of the discriminant corporate failure prediction model based on stability of financial ratios.

Altman is known for the development of the Z-Score formula, which he published in 1968. The Z-Score for Predicting Bankruptcy is a multivariate formula for a measurement of the financial health of a company and a powerful diagnostic tool that forecasts the probability of a company entering bankruptcy within a 2 year period. Studies measuring the effectiveness of the Z-Score have shown that the model has 70%-80% reliability. Altman's equation did a good job at distinguishing bankrupt and non-bankrupt firms. Of the former, 94% had Z scores less than 2.7 before they went bankrupt. In contrast, 97% of the non-bankrupt firms had Z scores above this level. This study was motivated by the need to have an alternative business failure prediction method.

The economic cost of business failures is relatively large. Evidence shows that the market value of the distressed firms declines substantially. The Kenyan corporate history is pronounced with a number of companies that have gone into bankruptcy but only a handful of companies have managed to come of out of it in sound financial health. At the moment a number of public and private companies among them Kenya Planters Co-operative Union KPCU (2010), Ngenye Kariuki Stockbrokers (2010), Standard Assurance (2009), Invesco Assurance (2008), Hutchings Beimer (2010), Discount Securities (2008), Uchumi Supermarkets (2006) and Pan Paper Mills (2009) are under statutory management (NSE, 2010). Hence, the suppliers of capital, investors and creditors, as well as management and employees are severely affected from business failures. The study would therefore like to predict financial distress using Altman's model.

1.3 Objective of the Study

Assess whether Edward Altman's financial distress prediction model can apply locally

1.4 Importance of the Study

The findings of this study might be useful to managers, policy makers, government, suppliers, and shareholders. The findings of the study could be used for decision making and long-term planning by the aforementioned stakeholders. These findings can be of help as a basis for further research.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Introduction

This chapter commences with a discussion on business failure prediction. In the theoretical review section, a number of models have been examined with emphasis on Edward Altman's model. The factors that lead to business failure are also discussed as well as preconditions of business failure. The chapter ends with a summary of process of recovery from business failure.

2.2 Business failure Prediction

Business failure includes creditors' or voluntary liquidation, and appointment of receiver (Taffler, 2001). Beaver adopted Univariate Discriminant analysis (UDA) and concluded that financial ratios of failing firms differ from those of non-failed firms. The study extended Patrick's (2004) ratio analysis approach and concluded that ratio analysis could prove a useful tool for company successful firms with failed ones. Charitou et al. (2000) concluded that the ratio of retained earnings to total assets maintains its unique ability to predict failure in the other two years prior to failure.

2.3 Theoretical review

Business failure models can be broadly divided into two groups: quantitative models, which are based largely on published financial information; and qualitative models, which are based on an internal assessment of the company concerned. Both types attempt to identify characteristics, whether financial or non-financial, which can then be used to distinguish between surviving and failing companies (Robinson, 2001)

2.3.1 Qualitative models

This category of model rests on the premise that the use of financial measures as sole indicators of organizational performance is limited. For this reason, qualitative models are based on non-accounting or qualitative variables. One of the most notable of these is the A score model

attributed to Argenti (2003), which suggests that the failure process follows a predictable sequence:

Figure 2.1: Failure process

2.3.2 Quantitative models

Quantitative models identify financial ratios with values which differ markedly between surviving and failing companies, and which can subsequently be used to identify companies which exhibit the features of previously failing companies (Argenti, 2003). Commonly-accepted financial indicators of impending failure include: low profitability related to assets and commitments low equity returns, both dividend and capital poor liquidity high gearing high variability of income.

2.3.3 Edward Altman's Z – Score Model

Most credit managers use traditional ratio analysis to identify future failure of companies. Altman (1968) is of the opinion that ratios measuring profitability, liquidity, and solvency are the most significant ratios. However, it is difficult to know which is more important as different studies indicate different ratios as indicators of potential problems. For example, a company may have poor liquidity ratios and may be heading for liquidation. That same company's good profitability may undermine the potential risk that is highlighted by the poor liquidity ratios. As a result, interpretation using traditional ratio analyses may be incorrect.

Altman's 1968 model took the following form -:

$$Z = 1.2A + 1.4B + 3.3C + 0.6D + .999E$$

$Z < 2.675$; then the firm is classified as "failed"

WHERE A = Working Capital/Total Assets

B = Retained Earnings/Total Assets

C = Earnings before Interest and Taxes/Total Assets

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

E = Sales/Total Assets

Z=Overall index

2.3.4 Financial Ratios in Z score

The Z score is calculated by multiplying each of several financial ratios by an appropriate coefficient and then summing the results. The ratios rely on working capital, total assets, retained, EBIT, market value of equity, net worth. Working Capital is equal to Current Assets minus Current Liabilities (Milkkete, 2001). Total Assets is the total of the Assets section of the Balance Sheet. Retained Earnings is found in the Equity section of the Balance Sheet. EBIT (Earnings before Interest and Taxes) includes the income or loss from operations and from any unusual or extraordinary items but not the tax effects of these items. It can be calculated as follows: Find Net Income; add back any income tax expenses and subtract any income tax benefits; then add back any interest expenses. Market Value of Equity is the total value of all shares of common and preferred stock. The dates these values are chosen need not correspond exactly with the dates of the financial statements to which the market value is compared (Milkkete, 2001). Net Worth is also known as Shareholders' Equity or, simply, Equity. It is equal to Total Assets minus Total Liabilities. Book Value of Total Liabilities is the sum of all current and long-term liabilities from the Balance Sheet. Sales include other income normally categorized as revenues in the firm's Income Statement.

2.4 Factors that lead to business failure

2.4.1 Capital structure and capital adequacy

Companies finance their long-term operations primarily through two sources of capital, namely debt and equity. One of the most important financing decisions a company makes is determining the proportion of debt to owner's equity in the company's capital structure. Summary measures of

a company's capital structure include the company's Debt to Equity ratio (D/E) and Debt to Total Capital Ratio (D/ [D+E]). Interest and principal payments on debt must be paid from operations before any payments can be distributed to equity holders (in the form of dividends or share buy backs). As a result, the interest and principal debt which must be paid on debt are considered fixed-costs of operations. From an operational perspective, the extent of the burden of these fixed obligations can be measured relative to the company's continuing ability to pay fixed obligations. A frequently used measure of a company's ability to cover its interest payments is its Earnings Before Interest and Taxes and Before Depreciation and Amortization (EBITDA) to its interest expense (Taffler, 2001).

A company is financially distressed whenever its EBITDA is less than its interest expenses. Financial leverage involves the substitution of fixed-cost debt for owner's equity in the hope of increasing equity returns. Financial leverage improves financial performance when business financial prospects are good but adversely impact on financial performance when things are going poorly. As a result, increasing the ratio of debt to equity in a company's capital structure implicitly makes the company relatively less solvent and more financially risky than a company without debt. Capital adequacy relates to whether a company has enough capital to finance its planned future operations. If the company's capital is inadequate, then it must either be able to successfully issue new equity, or arrange new debt.

The amount of debt a company can successfully absorb and repay from its continuing operations, is normally referred to as the company's debt capacity (Thynne, 2006). Capital adequacy is normally evaluated by looking at the company's operational cash flow projections and its projections of capital needs. When companies undertake major new projects or undergo a significant financial restructuring, they often perform financial feasibility studies to determine whether the company has the financial capacity to undertake the project and whether the company will be able to repay all future debt payments, once the project is completed.

2.4.2 Cash Flow

For many small and newly formed businesses, this is often the single most important reason for business failure. The problem arises when the money coming into the company from sales is not enough to cover the costs of production. It is important to remember that it is a case of having the

money to be able to pay debts when the debts are due, not simply generating enough revenue during a year to cover costs (Patrick, 2004).

Cash is regularly flowing out of the business but not very often flowing in. If the business does not manage this carefully, it can find itself in difficulties and facing insolvency.

Some firms have periods of time when they do not receive much revenue a good example is companies who make toys. The peak times for toy sales are November and December it may be that 80% of all the revenue it receives in a year is received during these two months. The firm does, however, have to survive for the rest of the year - it will have staff, rent, insurance, taxes, energy and so on to pay for as well as costs incurred in manufacturing products throughout the year.

2.4.3 Business Planning

Many new businesses will have to put together a business plan to present to the bank before it receives loans or financial help. The time and effort put into these plans is crucial for success. Bad planning or poor information on which the plan is based is likely to lead to difficulties for the firm. For example, if the firm plans to sell 2,000 units per month in the first year because it used only limited market research and ends up only selling 500 per month, it will soon be in serious danger of collapse (Chiritou, 2002).

2.4.4 Demand

There are a number of reasons why demand might fall. Some of these might be to do with the business taking their eye off the ball and not paying sufficient attention to their customers' needs perhaps the product is not up to scratch, perhaps the quality is poor, maybe the price is too high most of these things are within the businesses control.

Falling sales might be a sign that there might be something wrong with the product or the price or some other aspect of the marketing mix. Sometimes the fall in sales might be as a result of the competition providing a better product or service - in part the business can do something about this they have to recognize it in the first place (Moyer, 2006).

Changing tastes, technology and fashion can cause demand for products to fall - the business needs to be aware of these trends. Demand might fall for other reasons not in the firm's control. It might be due to a change in the economic climate of the country. If the economy is experiencing a downturn then maybe people may not have as much money to spend on the businesses products or services. The Bank of England may have increased interest rates and this has led to people cutting back their spending (Sipika and Smith, 2002).

Other factors might also lead to a fall in demand - the product may have gone out of fashion, maybe people's tastes have changed - all of these things could be an explanation. The important thing for a business is to try and recognize when demand changes and to understand why it is changing. If it does not then it can be too late and the business may fail.

2.4.5 Rise in costs or lack of control over costs

Costs of production can rise for a number of reasons. There may have been wage rises, raw material prices might have increased (for example the price of oil or gas), the business might have had to spend money on meeting some new legislation or standard and so on. In many cases, a firm can plan for such changes and is able take them into account but if the costs rise unexpectedly, this can catch a firm off guard and tip them into insolvency (Kip, 2002).

Many firms have many costs in producing their product - a rise in these costs or failure to control them can lead to problems. Some firms face difficulties because they do not keep a close eye on their costs. Wastage in the workplace is a good example of this. Every piece of paper, every nut, bolt, screw, light left on, tap left dripping and so on represents a cost to a business. If it does not keep control of these costs, the problem can get worse. Staff using telephones to make personal calls, sending e-mails that are nothing to do with the business, wasting paper or leaving PCs switched on all might be areas where a business might want to exert some control to keep costs controlled.

2.4.6 Company image

To project a high profile image for the company by hiring expensive office space and a fancy logo and website will not do much to facilitate in the success of your business. In fact high

overheads, because of expensive space and website maintenance costs, can drive you out of business very fast, because the golden rule for the success of any business is to keep overheads low especially at the start up time (Argenti, 2003).

2.4.7 Competition

Capitalism is a cutthroat system. Customers are always looking for the best deal, or at least, a better deal. And if the competition offers better products, services, or prices, the customers will succeed at the expense of the business. Keeping an eye on competitors and positioning the products accordingly is vital to staying in business (Eidleman, 2003).

2.4.8 Customer Base

Competition can cause the customer base to diminish. From a small business's perspective, it is good to focus on a customer strategy that works well for their business. At the same time it is also dangerous to focus only on one recipe for success. Diversifying the customer base is an important factor in building the business. Being flexible enough to adapt to new trends and ideas is important to staying in business (Eidleman, 2003).

2.4.9 Uncontrolled Growth

Uncontrolled growth of the business can also cause it to fail if not handled appropriately. Obesity is a problem in business as it is in an individual's health. Proper planning must be in place even for business growth. Successful growth requires a professional management team, flexible organization, and proper systems and controls (Eidleman, 2003).

2.4.10 Entrepreneurial Skills

Mostly during the startup phase of a new business, lack of entrepreneurial skills in an owner can cause a business to fail. This may not be true during the later growth and maturity periods of business where more administrative and management skills are required. A small firm's performance outcome is a function of many variables, including individual owner characteristics, owner behaviors, and environmental influences. Entrepreneurs generally have a high need for achievement and social awareness, and they are high risk takers. Consequently, the personal and personality characteristics of an owner can be a cause of business failure.

2.5 Preconditions of failure

Corporate decline generally does not stem from a single factor; it results from an accumulation of decisions, actions and commitments that become entangled in self-perpetuating workplace dynamics (Moss Kanter, 2003). Francis and Desai (2005) refer to preconditions as contextual factors. Lorange and Nelson (2001) describe the configurations that lead to decline in business performance, especially after the firms have been successful for a period of time. They confirm that preconditions do exist and that the signs are often invisible, especially during the early stages of the decline process. Richardson, Nwankwo and Richardson (2003) describe a range of environmental configurations that lead to different types of business failure crises. These preconditions to failure are often presented as metaphors. Each metaphor suggests a configuration that would require a different intervention to turn the business around towards improved financial performance. Richardson *et al.* (2004) use four 'frog analogies' as metaphors to describe the specific preconditions that would lead to each type of failure and differentiate how these would appear different for small and large ventures. They further equate organizations in their metaphors with leader type, personality and style to explain the configurations. There are four analogies. Boiled frog metaphorically describes organizational leadership that suffers from introversion and inertia in the face of environmental change (confirmed by Chowdhury and Lang, 2006). Drowned frog describes organizational leaders that try to do everything through hyperactivity and ambition to perform well. After early success, the leadership pursues high growth through uncontrolled diversification and an eventual loss of focused strategic competitive advantage occurs. The Bullfrog metaphor represents a leadership that spends money from the organization (which it cannot afford) on personal benefits that often can be categorized as aimed at prestige and establishing an image in the community. The bullfrog's behavior raises ethical questions and proper governance guidelines are clearly not complied with. Tadpole refers to a start-up venture that never turns into a proper business, or the big new project in a large organization that drags it under. Arrogance and success seem to lie at the heart of much of business failure in the research of Richardson *et al.* (2003). However, whereas the 'boiled frog' managers, for example, may exhibit arrogance based on their longstanding position as a major market player, the 'drowned frog' managers exhibit arrogance based on the belief that their early and often remarkable success can be reproduced time after time, notwithstanding the new and

increasingly different and bigger contexts in which success is sought. The 'bullfrog' shows arrogance of a different kind, feeling untouchable and indestructible, while not acknowledging the wrongdoing that hurts the business financially. Bollen *et al.* (2005) expanded the same metaphors into a classification system for evaluation of failures in European firms. They refer to the tadpole as the unhealthy firm, the drowned frog as the firm that is over-ambitious and shows extreme growth, the boiled frog as a firm that is unable to adapt to environmental change, while the bullfrog refers to management involvement in unethical and fraudulent behaviors. Their conclusion confirms that no single factor is dominant and can be used to explain the majority of business failures of large public companies in Europe. While these frog metaphors are helpful, they focus strongly on the leadership variables of decision-makers (supporting the human factor perspective), which are not necessarily conclusive as determinants of the preconditions, as other authors (Stead & Smallman, 2000) describe alternative configurations of variables that may determine specific preconditions to failure. The preconditions for and triggers of failure are specifically relevant to understanding decline, while crisis and recovery periods are relevant to the reversal of decline (turnaround).

2.6 Processes for recovery of business failure

Turnaround has mostly to do with strategies after a threatening decline. There appears to be a classic five-step turnaround process accepted and supported by the global Association of Turnaround Professionals (Burbank, 2005), but many others also refer to the process with slight variations in the key steps. These steps include: situation analysis; changing the management; emergency actions; restructuring actions; and finally returning to normality (profitability).

Some studies suggest a different sequence regarding the first two steps – situation analysis and changing the management. The turnaround process generally has two key activity stages, namely decline stemming and recovery strategies (Smith & Graves, 2005). Robbins and Pearce (2003) describe a "turnaround situation" that requires specific strategies (retrenchment and recovery), depending on the cause and severity of the turnaround situation. They propose specific strategies based on combinations of both the retrenchment (confirmed by Bruton, Ahlstrom & Wan, 2003: 528) and recovery phases of the process. Robbins and Pearce's (2005) process requires action to achieve stability first and thereafter recovery. Retrenchment as the first step in a two-phase process remains the foundation of business turnaround (Pearce & Robbins, 2001). They suggest

that regardless of the cause or severity of the turnaround situation or long term competitive strategy used to combat the situation, the most expeditious road to turnaround begins with a sustained retrenchment response (Robbins & Pearce, 2001). Pearce and Michael (2006) suggest that strategies for turnaround vary when the cause of failure is recession, but remain rooted in the original retrenchment and recovery focuses to make firms recession-proof and to fight the effects of recession. Given the complexity of failure, Sheppard and Chowdhury (2005) suggest that there are four issues to consider in order to better understand organizational failure, namely:
Failure is not typically the imperfection of either the environment (external preconditions) or the organization (internal preconditions), but rather it must be attributed to both of these forces, or to be more exact, failure is the misalignment of the organization with the environment's realities.
Because failure involves the alignment – or misalignment – of the organization with its environment, it is, by definition, about strategy (Carroll & Mui, 2008). Because failure deals with strategy, we can make choices to accelerate it or avoid falling into its clutches (Pretorius, 2008). Because organizational failure can be avoided even after a decline – rapid or prolonged – the ultimate failure of the organization really stems from a failure to successfully execute a turnaround. It is therefore critical to our understanding of organizational decline and failure to recognize that three intertwined factors – a firm's management (including leadership), its environment and the way the firm interacts with its environment (strategy) – all contribute to the specific configuration of variables facing the firm at a point in time. Essentially, recovery from a set of preconditions is therefore about strategy (Kow, 2004).

2.7 Empirical Literature

2.7.1 Altman Z-Score Model

Altman set out to combine a number of ratios and developed an insolvency prediction model - the Z–Score model. This formula was developed for public manufacturing firms and eliminated all firms with assets less than $1 million. This original model was not intended for small, non-manufacturing, or non-public companies, yet many credit granters today still use the original z score for all types of customers. Two further prediction models were formulated by Altman (sometimes referred to as model 'A' and model 'B') to the original Z score (Altman, 1968).

The model 'A' z-score was developed for use with private manufacturing companies. The weighting of the various ratios is different for this model as well as the overall predictability scoring. In addition, while the original score used the market value of equity to calculate the equity to debt formula, model 'A' used shareholder's equity on the balance sheet. Model 'B' was developed for private general firms and included the service sector. In this statistical model, the ratio of sales to total assets is not used, the weighting on this model is different, and the scoring again, different. Although computerized statistical modeling would aid in determining the weighting of each ratio, common sense helps us understand the purpose of each ratio.

In its initial test, the Altman Z-Score was found to be 72% accurate in predicting bankruptcy two years prior to the event, with a Type II error (false positives) of 6%. In a series of subsequent tests covering three different time periods over the next 31 years (up until 1999), the model was found to be approximately 80-90% accurate in predicting bankruptcy one year prior to the event, with a Type II error (classifying the firm as bankrupt when it does not go bankrupt) of approximately 15-20% (Altman, 1968).

From about 1985 onwards, the Z-scores gained wide acceptance by auditors, management accountants, courts, and database systems used for loan evaluation (Eidleman, 2003). The formula's approach has been used in a variety of contexts and countries, although it was designed originally for publicly held manufacturing companies with assets of more than $1 million. Later variations by Altman were designed to be applicable to privately held companies (the Altman Z'-Score) and non-manufacturing companies (the Altman Z"-Score).

Altman's 1968 model took the following form -:

$$Z = 1.2A + 1.4B + 3.3C + 0.6D + .999E$$

$Z < 2.675$; then the firm is classified as "failed"

WHERE A = Working Capital/Total Assets

B = Retained Earnings/Total Assets

C = Earnings before Interest and Taxes/Total Assets

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

E = Sales/Total Assets

2.7.2 Altman's Revised Z-Score Model

Rather than simply inserting a proxy variable into an existing model to calculate the Z-Scores Altman advocated for a complete re-estimation of the model, substituting the book values of equity for the Market value in D. This resulted in a change in the coefficients and in the classification criterion and related cut-off scores. The revised Z score model took the following form :

$Z' = 0.717T_1 + 0.847T_2 + 3.107T_3 + 0.420T_4 + 0.998T_5$

Where :

T_1 = (Current Assets-Current Liabilities) / Total Assets

T_2 = Retained Earnings / Total Assets

T_3 = Earnings before Interest and Taxes / Total Assets

T_4 = Book Value of Equity / Total Liabilities

T_5 = Sales/ Total Assets

Zones of Discrimination:

$Z' > 2.9$ -"Safe" Zone

$1.23 < Z' < 2.9$ -"Grey" Zone

$Z' < 1.23$ -"Distress" Zone

2.7.3 Springate (Canadian)

The Springate model developed by Gordon Springate follows the procedure used by Altman. Springate selected four out of 19 popular financial ratios using step wise multiple discriminate analysis. The selected ratios distinguished between sound business and those that actually failed.

The springate model was used to test 40 companies and achieved an accuracy rate of 92.5%. Botheras (2000) tested the Springate Model on 50 companies with an average asset size of $2.5 million and found an 88.0% accuracy rate. The model was also used by Sands (2001) to test 24 companies with an average asset size of $63.4 million and found an accuracy rate of 83.3%. The Springate model takes the following form -:

$$Z = 1.03A + 3.07B + 0.66C + 0.4D$$

$Z < 0.862$; then the firm is classified as "failed"

WHERE A = Working Capital/Total Assets

B = Net Profit before Interest and Taxes/Total Assets

C = Net Profit before Taxes/Current Liabilities

D = Sales/Total Assets

2.7.4 Blasztk system (Canadian)

Blasztk system model is the only business failure prediction method that was not developed using multiple discriminate analysis. Using this system the financial ratios for the company to be evaluated are calculated, weighted and then compared with ratios for average companies in that same industry. An advantage of this method is that it does compare the company being evaluated with companies in the same industry (Bilanas, 2004).

2.7.5 Ca-score (Canadian)

This model was developed using step-wise multiple discriminate analyses. In this model thirty financial ratios were analyzed in a sample of 173 Quebec manufacturing businesses having

annual sales ranging between $1-20 million. This model has an average reliability rate of 83% and is restricted to evaluating manufacturing companies (Bilanas, 2004).

2.8 Local studies

Kiragu (1993) carried out a study on the prediction of corporate failure using price adjusted accounting data. He used a sample consisting of 10 failed firms and 10 non failed firms. Financial ratios were calculated from price level adjusted financial statistics. Discriminant model developed showed that 9 ratios had high corporate failure predictive ability. These ratios were times interest coverage, fixed charge coverage, quick ratio, current ratio, equity to total assets, working capital to total debt, return on investments to total assets, change in monetary liabilities, total debt to total assets. The most critical ratios were found to be liquidity and debt service ratios. The results were consistent with the finance theory relating to the firm's risk. The firm has to maintain sufficient liquidity in order to avoid insolvency problems. It also needs to generate sufficient earnings to meet its fixed finance charges. The results however differed from earlier studies done by Altman (1968) and Kimura (1980) who had concluded that liquidity ratios were not of any significance in bankruptcy prediction. Both had indicated that efficiency and profitability ratios were the most important.

Keige (1991) did a study on business failure prediction using discriminate analysis. He concluded that ratios can be used to predict company failure. However, the types of ratios that will best discriminate between failing companies and successful ones tend to differ from place to place. In Kenya current ratio, fixed charge coverage, return on earning to total assets, and return on net worth can be used successfully in predicting for a period up to 2 years before it occurs. Keige concludes that stakeholders should pay attention to liquidity, leverage and activity ratios.

The current study seeks to evaluate Altman revised model and determine whether it is necessary to come up with a more up to date model of predicting financial distress in Kenya. The studies preceding the current one have all concentrated on ratios independently and not trying to relate with the rest of the studies that have been carried out earlier. This study will change that approach and take revised Altman model to guide it in a bid to establish its applicability in prediction of financial distress in Kenya.

2.9 Conclusion

A look at studies done on prediction of financial distress (bankruptcy) indicates that the accounting data are able to predict the financial distress in the companies. We must however consider this point that there is no consensus about the kind of the financial ratios which are used in prediction of financial distresses and that the yielded results have been according to different financial ratio and different methods of research. In this study Edward Altman's model will be used to predict financial distress in Kenya.

CHAPTER THREE

3.0 RESEARCH METHODOLOGY

3.1 Introduction

This chapter outlines the method that was used to achieve this study's objectives. It starts with the research design to be used and move to describe the study population. The chapter culminates with a highlight of data collection methods and analysis.

3.2 Research Design

This study used a descriptive survey method to achieve its set objectives. This method observes the descriptive statistics of a phenomenon from which deductions can be made. This method was chosen owing to its potential ability to describe the status of various businesses that would be selected for the study based on their Z-scores. The descriptive statistics obtained by this method provided a strong diagnostic tool to forecast the probability of a business entering into bankruptcy.

The use of descriptive survey design techniques not only assures sample estimates having satisfactory levels of precision, but it also enables measurement of what that level of precision is. The usual measure of precision is the standard error of the estimate. Second, the use of sound sample survey design procedures improves the ratio of cost to level of precision, by enabling higher precision for a given level of cost, or lower cost for a desired level of precision. The increase in precision or decrease in cost is effected by allocating the sampling effort in ways that take into account the costs of sampling, the variability of the target population, and special features of the target population (such as the occurrence of natural "clusters" of the population). Third, the use of sound sample survey procedures assures high validity of the estimates, i.e., the estimates had low bias. A final advantage in the use of statistical design concepts is in enhancing the usefulness of the survey results by assuring (prior to implementation of the survey) that the level of precision of the sample estimates was sufficient to permit meaningful interpretation (Des Raj, 1972).

3.3 Study Population

The study population of this study was all firms at the Nairobi Stock Exchange. Currently there are 46 listed companies in the Main Investment Market Segment at Nairobi Stock Exchange and 6 in the Alternative Investment Market Segment. The population selected composed of all the companies listed in the Nairobi Stock exchange in 1989 to 2008.

Sample Selection- Failed Firms

Failed firms were considered to be those that have either been suspended or delisted from the NSE to date. Sample to be selected composed of all 10 firms de-listed or suspended from the Nairobi Stock Exchange from 1989 to 2008.

Sample Selection- Non Failed Firms

Non-failed firms were a list of all entities listed and stated in the NSE since the year 1989-2008. To fall under this study's category of non-failed firms, they must have not been suspended or delisted for the period under focus. The firms were chosen randomly from commerce and service sector, agriculture sector, the industrial and allied sector. Entities in the banking sector, insurance and finance, unit trust, public sector, transportation, investment (including property), were not included in the sample. According to studies (Beaver 1972-1996), financial institutions were excluded as their ratios and cash flows are always substantially different from other entity types even when they are in no danger of failure. Ohlson (1980) also excluded financial institutions from the study on the prediction of bankruptcy as entities in the financial and investment industry are structurally different and have bankruptcy environment.

3.4 Data Collection Methods

Secondary data was used for this study. This was obtained from financial reports of the listed companies at the Nairobi Stock Exchange and the Capital Markets Authority. The secondary data was in form of current assets and liabilities, total assets, retained earnings, earnings before interest and taxes, book value of equity, and sales.

3.5 Data Analysis

For the purpose of the study, Altman's Z score model was used to analyze the data. Altman (1968) is of the opinion that ratios measuring profitability, liquidity, and solvency are the most significant ratios. Altman combined a number of ratios and developed an insolvency prediction model - the Z–Score model.

3.5.1 Revised Z-Score Model

The Z-score is a linear combination of four or five common business ratios, weighted by coefficients. The coefficients were estimated by identifying a set of firms which had declared bankruptcy and then collecting a matched sample of firms which had survived, with matching by industry and approximate size (assets). The Z-Score model is a linear analysis in that five measures are objectively weighted and summed up to arrive at an overall score that then becomes the basis for classification of firms into one of the a priori groupings (distressed and non-distressed).

The Z-score formula: $Z' = 0.717T_1 + 0.847T_2 + 3.107T_3 + 0.420T_4 + 0.998T_5$

T_1 = (Current Assets-Current Liabilities) / Total Assets

T_2 = Retained Earnings / Total Assets

T_3 = Earnings before Interest and Taxes / Total Assets

T_4 = Book Value of Equity / Total Liabilities

T_5 = Sales/ Total Assets

Z' Score Bankruptcy Model:

$Z' = 0.717T_1 + 0.847T_2 + 3.107T_3 + 0.420T_4 + 0.998T_5$

Zones of Discrimination:

$Z' > 2.9$ -"Safe" Zone $1.23 < Z' < 2.9$ -"Grey" Zone

$Z' < 1.23$ -"Distress" Zone

CHAPTER FOUR

4.0 DATA ANALYSIS

4.1 Introduction

This chapter focuses on the data analysis and presentation of the findings. The objective of this study was to assess whether Edward Altman's financial distress prediction model can apply locally.

4.2 The Response Rate

The researcher targeted a total of all the 11 firms that had failed from 1989 to 2008 and firms from Commerce and Service Sector, Agricultural Sector and Industrial and Allied Sector. Out of the targeted 11 firms that had failed from 1989 to 2008 the researcher got data from 10 firms which included; EA Packaging, Kenya National Mills, Dunlop Kenya, A. Baumann & Co, Reagent Undervalued Assets Ltd, Theta Group, Lonhro Motors, Uchumi Supermarket, Pearl Drycleaners and Hutchings Biemer. The percentage response in the failed firms was 90.9%%. In the non failed firms the researcher had targeted 11 firms in the Agricultural Sector, Commercial and Services and Industrial and Allied Sector. Out of the 11 firms the researcher got data from 10 firms giving a percentage response of 90.9%. According to Babbie (2002) any response of 50% and above is adequate for analysis. The non failed firms included; Kakuzi Ltd, Rea Vipingo Plantations, Sasini Tea Ltd, Kenya Airways, Marshalls East Africa, Nation Media Group, Scan Group Ltd, Standard Group, BOC Kenya and British American Tobacco.

4.3 Assessing whether Edward Altman's financial distress prediction model can apply locally

The researcher used five common business ratios weighted by coefficients to calculate the Z-score. To test the applicability of Edward Altman's financial distress prediction model in Kenya the coefficients were estimated by identifying a set of firms which had declared bankruptcy and then collecting a matched sample of firms which had survived, with matching by industry and approximate size (assets). The Z-Score model is a linear analysis in that five measures were

objectively weighted and summed up to arrive at an overall score that then formed the basis for classification of firms into one of the a priori groupings (distressed and non-distressed).

The Z-score formula: $Z' = 0.717A + 0.847B + 3.107C + 0.420D + 0.998E$

The researcher used the following zones of discrimination: $Z' > 2.9$ -"Safe" Zone, $1.23 < Z' < 2.9$ -"Grey" Zone and $Z' < 1.23$ -"Distress" Zone. All the companies which had a z score below 1.23 the researcher classified them as companies in a distress zone, companies which had a z score of between 1.23 and 2.9 the researcher classified them as companies in a grey zone while those companies which had a Z score above 2.9 the researcher classified them as companies in a safe zone. In a distress zone there is a high probability of bankruptcy for a firm, in a grey zone there is uncertainty where the firm get bankrupt or not, while in a safe zone there is a low probability of bankruptcy for the firm.

4.4 Failed firms

EA Packaging

Table 4. 1: EA Packaging

	Amount in millions				
	2002	2001	2000	1999	1998
Working capital	578.998	564.801	466.203	367.453	366.456
Total assets	2667.287	2661.970	2549.064	2456.356	2454.234
A (working capital/total assets)	0.2170	0.2122	0.1829	0.1496	0.1493
Retained earnings	129.425	128.450	116.265	112.245	111.673
B (retained earnings/ total assets)	0.0485	0.0482	0.04561	0.0457	0.0455
Earnings before interest and taxes	11.256	11.785	31.319	26.789	25.678
C (earnings before interest and taxes/ total assets)	0.004	0.0044	0.0123	0.0109	0.0105

Book value of equity	428.453	417.543	401.507	398.367	394.325
Total liabilities	8189.098	8186.689	7770.427	6789.35	6676.53
D (book value of equity/ total liabilities)	0.0523	0.051	0.05167	0.0587	0.0591
Sales	2098.760	2094.650	1853.145	1798.234	1697.365
E (sales / total assets)	0.7869	0.7869	0.727	0.7321	0.6916
Z score	1.0164	1.0134	0.955	0.9325	0.8932

Kenya National Mills

Table 4. 2: Kenya National Mills

	Amount in millions				
	2001	2000	1999	1998	1997
Working capital	2534.598	1327.458	1160.253	1253.267	1342.287
Total assets	3231.287	3269.097	3436.761	3452.279	3327.278
A (working capital/total assets)	0.7844	0.4061	0.3376	0.3630	0.4034
Retained earnings	168.958	167.789	169.602	171.784	173.865
B (retained earnings/ total assets)	0.0523	0.0513	0.0493	0.0498	0.0523
Earnings before interest and taxes	689.642	654.358	246.032	652.826	589.295
C (earnings before interest and taxes/ total assets)	0.2134	0.2002	0.0716	0.1891	0.1771
Book value of equity	321.678	315.113	273.492	275.263	289.267
Total liabilities	1289.908	1050.000	1905.000	1792.000	1865.678
D (book value of equity/ total liabilities)	0.2494	0.3001	0.1436	0.1536	0.1550
Sales	2946.239	2962.986	2900.858	2125.286	2948.256
E (sales / total assets)	0.0009	0.9063	0.8441	0.6156	0.8861
Z score	1.3754	1.9872	1.4090	1.5627	1.8332

Dunlop Kenya

Table 4. 3: Dunlop Kenya

	Amount in millions				
	1988	1987	1986	1985	1984
Working capital	378.274	425.804	100.323	446.484	295.725
Total assets	1426.87	1434.57	1467.28	1367.67	1392.58
A (working capital/total assets)	0.2651	0.2902	0.0684	0.3265	0.2136
Retained earnings	79.738	84.060	76.162	82.642	81.479
B (retained earnings/ total assets)	0.0559	0.0586	0.0519	0.06042	0.0585
Earnings before interest and taxes	72.473	76.897	15.187	74.548	73.763
C (earnings before interest and taxes/ total assets)	0.0508	0.0536	0.0103	0.0545	0.0529
Book value of equity	59.369	30.94	107.838	111.593	104.247
Total liabilities	1411.092	1403.629	1359.183	1407.274	1389.482
D (book value of equity/ total liabilities)	0.0421	0.022	0.0793	0.0793	0.0750
Sales	15.234	137.472	175.829	142.635	152.956
E (sales / total assets)	0.0107	0.0958	0.1198	0.5671	0.717
Z score	0.4235	0.5530	0.2779	1.054	1.114

A. Baumann & Co

Table 4. 4: A Baumann & Co

	Amount in millions				
	2007	2006	2005	2004	2003
Working capital	149.453	153.471	188.051	176.054	184.378
Total assets	746.456	750.348	756.182	776.456	804.275
A (working capital/total assets)	0.2002	0.2045	0.2487	0.2267	0.2292
Retained earnings	116.265	111.633	92.091	123.652	121.178
B (retained earnings/ total assets)	0.1558	0.1488	0.1218	0.1593	0.1507
Earnings before interest and taxes	37.238	36.813	45.993	39.864	41.379
C (earnings before interest and taxes/ total assets)	0.0499	0.0491	0.0608	0.05134	0.0514
Book value of equity	59.276	54.981	57.980	64.389	61.276
Total liabilities	708.34	711.982	707.201	713.632	698.256
D (book value of equity/ total liabilities)	0.0837	0.0772	0.0819	0.0902	0.0878
Sales	73.938	70.445	83.422	78.375	79.376
E (sales / total assets)	0.099	0.0939	0.1103	0.1009	0.0987
Z score	0.5645	0.5514	0.6148	1.5956	1.9073

Reagent Undervalued Assets Ltd

Table 4. 5: Reagent Undervalued Assets Ltd

	Amount in millions				
	2001	2000	1999	1998	1997
Working capital	117.269	109.367	112.323	134.367	138.375
Total assets	1487.367	1445.376	1437.286	1445.378	1467.334
A (working capital/total assets)	0.0788	0.0757	0.0781	0.0929	0.0943
Retained earnings	72.639	73.356	75.162	76.457	75.457

B (retained earnings/ total assets)	0.0488	0.0508	0.0523	0.0529	0.0514
Earnings before interest and taxes	14.384	14.454	16.187	17.368	18.582
C (earnings before interest and taxes/ total assets)	0.0097	0.0100	0.0113	0.012	0.0126
Book value of equity	124.268	125.276	127.838	129.457	131.367
Total liabilities	1356.368	1367.842	1359.183	1437.368	1436.367
D (book value of equity/ total liabilities)	0.0916	0.0916	0.0941	0.0900	0.0915
Sales	172.269	173.539	174.829	178.368	198.357
E (sales / total assets)	0.1158	0.1201	0.1216	0.1236	0.1352
Z score	0.2820	0.2867	0.6949	1.3122	1.2850

Pearl Drycleaners

Table 4. 6: Pearl Drycleaners

	Amount in millions				
	2001	2000	1999	1998	1997
Working capital	149.368	158.257	168.041	174.369	173.276
Total assets	713.278	723.647	736.182	738.378	801.279
A (working capital/total assets)	0.2094	0.2187	0.2283	0.2362	0.2162
Retained earnings	69.267	69.357	72.091	69.378	73.836
B (retained earnings/ total assets)	0.0971	0.0958	0.0979	0.0939	0.09214
Earnings before interest and taxes	44.398	43.380	45.993	54.270	52.682
C (earnings before interest and taxes/ total assets)	0.0622	0.0599	0.0625	0.0735	0.0657
Book value of equity	35.568	37.456	37.980	39.478	41.378
Total liabilities	693.899	685.378	687.201	689.479	691.379
D (book value of equity/ total	0.0513	0.0547	0.0553	0.0573	0.0598

liabilities)					
Sales	61.357	62.480	63.422	65.394	67.379
E (sales / total assets)	0.086	0.0863	0.0861	0.0886	0.0841
Z score	0.533	0.5332	0.5499	0.5897	0.5462

Hutchings Biemer

Table 4. 7: Hutchings Biemer

	Amount in millions				
	2002	2001	2000	1999	1998
Working capital	229.378	231.287	241.392	241.835	247.373
Total assets	528.256	534.598	545.367	546.378	543.368
A (working capital/total assets)	0.4342	0.4326	0.4426	0.4426	0.4552
Retained earnings	66.739	68.958	69.378	71.253	73.267
B (retained earnings/ total assets)	0.1263	0.1289	0.1272	0.1304	0.1348
Earnings before interest and taxes	83.267	89.642	91.360	93.258	94.268
C (earnings before interest and taxes/ total assets)	0.1576	0.1677	0.1675	0.1707	0.1735
Book value of equity	122.257	121.678	123.357	128.386	131.468
Total liabilities	287.356	289.908	292.369	294.383	496.379
D (book value of equity/ total liabilities)	0.4255	0.4197	0.4219	0.4361	0.2649
Sales	136.537	146.239	136.367	156.368	158.367
E (sales / total assets)	0.2585	0.2735	0.2500	0.2862	0.2915
Z score	1.115	1.2246	1.3722	1.4269	1.3818

Theta group

Table 4. 8: Theta group

	Amount in millions				
	2001	2000	1999	1998	1997
Working capital	119.269	129.367	122.323	134.367	148.375
Total assets	1587.367	1545.376	1537.286	1545.378	1567.334
A (working capital/total assets)	0.0751	0.0837	0.0796	0.0869	0.0947
Retained earnings	73.639	74.356	76.162	77.457	78.457
B (retained earnings/ total assets)	0.0464	0.0514	0.0495	0.0501	0.0500
Earnings before interest and taxes	14.384	14.454	16.187	17.368	18.582
C (earnings before interest and taxes/ total assets)	0.0090	0.0094	0.0105	0.0112	0.0119
Book value of equity	124.268	125.276	127.838	129.457	131.367
Total liabilities	1356.368	1367.842	1359.183	1437.368	1436.367
D (book value of equity/ total liabilities)	0.0916	0.0915	0.094	0.0900	0.0915
Sales	172.269	173.539	174.829	178.368	198.357
E (sales / total assets)	0.1085	0.1123	0.1137	0.1154	0.1265
Z score	0.6216	0.2833	0.7982	1.2925	1.3119

Lonhro EA Ltd

Table 4. 9: Lonhro EA Ltd

	Amount in millions				
	2001	2000	1999	1998	1997
Working capital	569.998	563.801	453.203	377.453	386.456
Total assets	2767.287	2661.970	2649.064	2556.356	2554.234

A (working capital/total assets)	0.2060	0.2118	0.1711	0.1477	0.1513
Retained earnings	139.425	138.450	126.265	122.245	121.673
B (retained earnings/ total assets)	0.0504	0.052	0.0477	0.0478	0.0476
Earnings before interest and taxes	11.256	11.785	31.319	26.789	25.678
C (earnings before interest and taxes/ total assets)	0.0041	0.0044	0.0118	0.0105	0.01
Book value of equity	428.453	417.543	401.507	398.367	394.325
Total liabilities	7989.098	8486.689	8770.427	5689.35	8776.53
D (book value of equity/ total liabilities)	0.054	0.0491	0.0457	0.07	0.045
Sales	2098.760	2094.650	1853.145	1798.234	1697.365
E (sales / total assets)	0.7584	0.7869	0.6995	0.7034	0.6645
Z score	0.9827	1.016	1.917	1.9103	1.8619

Uchumi Supermarket

Table 4. 10: Uchumi Supermarket

	Amount in millions				
	2005	2004	2003	2002	2001
Working capital	127.458	1160.253	1285.472	1273.456	1323.256
Total assets	3269.097	3436.761	3486.364	3553.367	3635.876
A (working capital/total assets)	0.039	0.3376	0.3687	0.3584	0.3639
Retained earnings	0	169.602	171.267	172.368	173.268
B (retained earnings/ total	0	0.0493	0.0491	0.0485	0.0476

assets)					
Earnings before interest and taxes	654.358	246.032	237.387	286.276	287.368
C (earnings before interest and taxes/ total assets)	0.2001	0.0716	0.0681	0.0806	0.079
Book value of equity	1050	1905	2064	2146	2240
Total liabilities	3151.132	2734.920	2725..356	2734..376	2825.897
D (book value of equity/ total liabilities)	0.3332	0.6965	0.7576	0.7848	0.7927
Sales	796.298	890.858	892.263	893.263	894.365
E (sales / total assets)	0.2097	0.2592	0.256	0.2514	0.246
Z score	0.8132	1.0799	1.0912	1.2514	1.251

4.5 Non failed firms

Kakuzi Ltd

Table 4. 11: Kakuzi Ltd

	Amount in millions				
	2008	2007	2006	2005	2004
Working capital	-134.367	-7.975	-152.973	-156.283	-154.47
Total assets	2673.58	2742.44	2754.77	2854.37	2734.4
A (working capital/total assets)	0.0503	0.5029	0.556	0.548	0.565
Retained earnings	401.365	397.240	238.726	134.764	338.35
B (retained earnings/ total assets)	0.5101	0.1448	0.0867	0.0472	0.1237
Earnings before interest and taxes	-67.276	-68.776	6.452	67.252	65.374
C (earnings before interest and taxes/	0.0252	0.0251	0.0023	0.0236	0.0239

total assets)					
Book value of equity	1034	1128	936.0	903	933
Total liabilities	2225.21	2138.05	1080.44	1126.26	1245.4
D (book value of equity/ total liabilities)	0.4647	0.5276	0.8663	0.8018	0.7492
Sales	1473	1385	1100	980	1298
E (sales / total assets)	0.5509	0.505	0.39933	0.5433	0.5747
Z score	1.2913	1.287	0.947	1.4576	1.4724

Rea Vipingo Plantations

Table 4. 12: Rea Vipingo Plantations

	Amount in millions				
	2008	2007	2006	2005	2004
Working capital	67.453	64.875	69.211	71.345	69.543
Total assets	1972.21	2054.519	2000.672	1987.456	1986.375
A (working capital/total assets)	0.034	0.0316	0.0346	0.0359	0.035
Retained earnings	444.252	448.653	356.091	448.567	487.546
B (retained earnings/ total assets)	0.2253	0.2184	0.1779	0.2458	0.2454
Earnings before interest and taxes	187.257	197.540	199.968	198.657	197.547
C (earnings before interest and taxes/ total assets)	0.0949	0.0961	0.0999	0.0999	0.0994
Book value of equity	1725.78	1827.582	1054.003	1987.567	1747.857
Total liabilities	963.56	962.880	997.012	1002.345	998.456
D (book value of equity/ total liabilities)	1.791	1.898	1.0572	1.9829	1.7506
Sales	1653.467	1672.490	1217.130	1765.7	1567.52

E (sales / total assets)	0.8384	0.81145	0.6084	0.8884	0.7891
Z score	2.099	2.1132	1.5371	2.2638	2.0646

Sasini Tea Ltd

Table 4. 13: Sasini Tea Ltd

	Amount in millions				
	2008	2007	2006	2005	2004
Working capital	1606.678	1604.271	1603.564	1654.678	1606.865
Total assets	4758.786	4642.423	4656.654	4565.689	4465.567
A (working capital/total assets)	0.3376	0.3456	0.3444	0.3624	0.3598
Retained earnings	158.457	157.933	159.465	161.765	162.764
B (retained earnings/ total assets)	0.0333	0.0340	0.0342	0.0354	0.0364
Earnings before interest and taxes	521.654	531.592	512.475	513.796	514.689
C (earnings before interest and taxes/ total assets)	0.2597	0.2648	0.2554	0.2562	0.2568
Book value of equity	509.564	507.933	507.864	523.756	504.646
Total liabilities	4135.674	4134.490	4167.546	4165.648	4256.745
D (book value of equity/ total liabilities)	0.1232	0.1228	0.1218	0.1257	0.1186
Sales	691.464	690.791	692.586	693.534	694.649
E (sales / total assets)	0.1453	0.1488	0.1487	0.1519	0.1556
Z score	1.5266	1.5573	1.5285	1.5588	1.5677

Kenya Airways

Table 4. 14: Kenya Airways

	Amount in millions				
	2008	2007	2006	2005	2004
Working capital	161.374	160.587	159.374	159.256	163.366
Total assets	8093.562	7972.434	7982.257	8025.265	8124.267
A (working capital/total assets)	0.0199	0.0201	0.0199	0.0198	0.0201
Retained earnings	785.376	838.721	835.267	836.235	826.253
B (retained earnings/ total assets)	0.0970	0.1052	0.10464	0.1042	0.1017
Earnings before interest and taxes	361.276	360.622	459.365	486.267	362.673
C (earnings before interest and taxes/ total assets)	0.1799	0.1797	0.229	0.2426	0.1809
Book value of equity	1205	1206	1208	1309	1247
Total liabilities	7792.272	7770.427	7794.373	7682.263	7646.378
D (book value of equity/ total liabilities)	1.6393	2.0672	2.0636	2.2254	2.2854
Sales	1956.256	1853.145	1926.265	1927.257	2089.265
E (sales / total assets)	0.2417	0.2324	0.2413	0.2401	0.2571
Z score	1.5828	1.7597	1.9195	2.0279	1.8767

Marshalls East Africa

Table 4. 15: Marshalls East Africa

	Amount in millions				
	2008	2007	2006	2005	2004
Working capital	1442.26	1443.14	1451.26	1452.69	1459.26
Total assets	468.365	469.104	467.252	469.256	471.245
A (working capital/total assets)	3.07936	3.07636	3.10594	3.09572	3.0966
Retained earnings	216.289	214.625	213.258	211.572	209.259
B (retained earnings/ total assets)	0.4618	0.45752	0.45641	0.45087	0.44406
Earnings before interest and taxes	52.356	51.163	51.264	53.246	53.987
C (earnings before interest and taxes/ total assets)	0.02607	0.02549	0.02556	0.02656	0.02694
Book value of equity	475.252	474.625	476.352	478.253	479.258
Total liabilities	4273.25	4174.48	4173.27	4227.25	4267.28
D (book value of equity/ total liabilities)	0.11122	0.1137	0.11414	0.11314	0.11231
Sales	714.527	716.188	718.562	719.264	721.415
E (sales / total assets)	1.52558	1.52671	1.53785	1.53278	1.53087
Z score	4.15302	4.14942	4.18087	4.16342	4.15605

Nation Media Group

Table 4. 16: Nation Media Group

	Amount in millions				
	2004	2003	2002	2001	2000
Working capital	417.556	418.777	419.356	511.264	513.268
Total assets	8176.234	8297.41	8328.465	8341.257	8352.567
A (working capital/total assets)	0.051069	0.05047	0.050352	0.061293	0.06145
Retained earnings	861.265	859.047	851.672	853.693	862.275
B (retained earnings/ total assets)	0.105338	0.10353	0.10226	0.102346	0.103235
Earnings before interest and taxes	262.256	260.467	259.246	257.235	256.245
C (earnings before interest and taxes/ total assets)	0.130606	0.12978	0.129235	0.128297	0.127867
Book value of equity	1182	1080	1167	1216	1289
Total liabilities	8289.265	8186.69	8254.256	8145.267	8245.263
D (book value of equity/ total liabilities)	0.142594	0.13192	0.141382	0.149289	0.156332
Sales	21056.28	21094.7	21087.26	21076.26	21056.79
E (sales / total assets)	2.575303	2.54232	2.53195	2.526748	2.520997
Z score	3.135918	3.09432	3.085198	3.088381	3.085186

Scan Group Ltd

Table 4. 17: Scan Group Ltd

	Amount in millions				
	2008	2007	2006	2005	2004
Working capital	48.777	160.587	159.256	55.276	76.376
Total assets	8297.41	7972.43	8025.27	8734.66	8562.27
A (working capital/total assets)	0.00588	0.02014	0.01984	0.00633	0.00892
Retained earnings	859.047	838.721	836.235	839.254	836.365
B (retained earnings/ total assets)	0.10353	0.1052	0.1042	0.09608	0.09768
Earnings before interest and taxes	260.467	360.622	486.267	512.264	601.264
C (earnings before interest and taxes/ total assets)	0.12971	0.17968	0.24241	0.25549	0.30003
Book value of equity	1080	1206	1309	1024	1425
Total liabilities	8186.69	7770.43	7682.26	7926.26	8046.37
D (book value of equity/ total liabilities)	0.13192	0.1552	0.17039	0.12919	0.1771
Sales	2094.65	1853.15	1927.26	1998.26	1945.28
E (sales / total assets)	0.25245	0.23244	0.24015	0.22877	0.22719
Z score	0.79975	0.95666	1.16447	1.16003	1.32018

Standard Group

Table 4. 18: Standard Group

	Amount in millions				
	2003	2002	2001	2000	1999
Working capital	1453.14	1455.24	1458.37	1459.35	1467.25
Total assets	2649.1	2756.37	2735.36	2667.39	2563.38
A (working capital/total assets)	0.54854	0.52795	0.53315	0.54711	0.57239
Retained earnings	1024.63	1034.35	1018.34	1015.37	1021.25
B (retained earnings/ total assets)	0.38678	0.37526	0.37229	0.38066	0.3984
Earnings before interest and taxes	51.163	53.354	54.426	49.235	49.998
C (earnings before interest and taxes/ total assets)	0.02548	0.02658	0.02713	0.02456	0.02495
Book value of equity	774.625	1175.37	978.857	498.265	467.365
Total liabilities	374.479	376.276	298.265	299.626	412.272
D (book value of equity/ total liabilities)	2.06854	3.12368	3.28184	1.66296	1.13363
Sales	716.188	714.165	713.143	721.365	812.265
E (sales / total assets)	0.27035	0.2591	0.26071	0.27044	0.31687
Z score	1.93596	2.34692	2.41785	1.75663	1.61456

BOC Kenya

Table 4. 19: BOC Kenya

	Amount in millions				
	2008	2007	2006	2005	2004
Working capital	1452.69	1462.28	1478.25	1456.28	1467.29
Total assets	1469.26	1471.28	1472.27	1439.37	1438.26
A (working capital/total assets)	0.98872	0.99388	1.00407	1.01175	1.02018
Retained earnings	211.572	209.286	208.265	206.256	211.165
B (retained earnings/ total assets)	0.144	0.14225	0.14146	0.1433	0.14682
Earnings before interest and taxes	53.246	54.254	55.376	55.265	53.467
C (earnings before interest and taxes/ total assets)	0.02652	0.02703	0.02761	0.02756	0.02668
Book value of equity	478.253	474.262	481.259	479.263	478.253
Total liabilities	4227.25	4228.27	4231.22	4267.24	4256.78
D (book value of equity/ total liabilities)	0.11314	0.11216	0.11374	0.11231	0.11235
Sales	719.264	703.265	699.254	721.264	723.256
E (sales / total assets)	0.48954	0.478	0.47495	0.5011	0.50287
Z score	1.44446	1.43646	1.44252	1.47469	1.48274

British American Tobacco

Table 4. 20: British American Tobacco

	Amount in millions				
	2004	2003	2002	2001	1999
Working capital	1443.14	1524.27	1542.26	1549.26	1565.26
Total assets	4649.1	4767.27	4688.37	4567.38	4625.28
A (working capital/total assets)	0.31041	0.31974	0.32895	0.3392	0.33842
Retained earnings	214.625	224.267	226.377	234.365	223.263
B (retained earnings/ total assets)	0.04616	0.04704	0.04828	0.05131	0.04827
Earnings before interest and taxes	51.163	51.265	52.276	55.343	54.256
C (earnings before interest and taxes/ total assets)	0.02548	0.02554	0.02606	0.0276	0.02707
Book value of equity	4174.63	4176.36	4178.35	4167.38	4167.37
Total liabilities	4174.48	4175.15	4176.27	4263.36	4126.25
D (book value of equity/ total liabilities)	1.00003	1.00029	1.0005	0.97749	1.00996
Sales	2316.19	2414.26	2416.26	2419.28	2322.26
E (sales / total assets)	0.4982	0.50642	0.51537	0.52969	0.50208
Z score	1.25307	1.26893	1.28712	1.3063	1.28789

CHAPTER FIVE

5.0 DISCUSSIONS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Summary of Key Findings

5.1.1 Failed firms

The findings of this study show that in the year 2002 East Africa Packaging had a Z score value of 1.0164 which indicates that the company was in a distress zone. In the years 2001 to 1998 the Z score values indicate that the company was in a distress with the Z score decreasing in each year. This indicates that in each year there was a high probability that EA packaging could be bankrupt. This reduces the validity of Altman's business failure model since in each year the Z score values indicated that the company was failing

The Z score values for Kenya National Mills were; 1.3754 in 2001, 1.9872 in 2000, 1.409 in 1999, 1.5627 in 1998 and 1.8332 in 1997. All these Z score values in the five analyzed years indicate that the company was in a grey zone. From the year 2000 to 1997 the Z score value of Kenya National Mills was decreasing each year except in year 2000 where the Z score value was 1.9872. From these results there was uncertainty whether Kenya National Mill could be bankrupt or not. Kenya National Mills was classified as one of the failed firms by Nairobi Stock Exchange and therefore the results as listed above indicate a type two error (false positive).

Dunlop Company was classified as one of the failed firms in Nairobi Stock Exchange. As shown by the findings the Z score value was decreasing from year 1984 to 1988. The Z score value in 1986 was 0.2779 and therefore we expect the company to have failed in this year but instead of becoming bankrupt the Z score value increased in 1987 to 0.553. This indicates a type II error in Altman's business failure prediction model.

In the years 2003 and 2004 A. Baumann and Company Limited was in a grey zone whereby there was uncertainty in predicting whether the company would fail or not. In the years 2005 to 2007 the company had Z score values less than 1.23 which indicated that the company had a high probability of failing. A. Baumann and Company Limited was listed as one of the failed firms in Nairobi Stock Exchange this shows that the Altman's business failure prediction model is

applicable locally since it predicted the failure of A. Baumann and Company limited two years before its failure.

Regent Undervalued Assets Limited is one of the firms listed as failed firms by Nairobi Stock Exchange. The Z score values 1997 and 1998 indicate that the firm was in a grey zone which means there was uncertainty whether the firm would be bankrupt or not. In 1989 to 2001 the Z score values indicate the company was in the distress zone and there was a high probability that the firm would be bankrupt. This proves that Altman's business failure prediction model is applicable locally.

The results show that Pearl Drycleaners was in distress zone for all the five years analyzed. This means that in each of the years from year 1997 to 2001 the company was expected to fail. This indicates a type II error in the Altman's business failure prediction model.

In the year 1998 to 2001 Hutchings Biemer Limited was in a grey zone whereby there was uncertainty in predicting whether the company would fail or not. In the years 2001 and 2002 the company had Z score values which indicated that the company had a high probability of failing. Hutchings Biemer Limited was listed as one of the failed firms in Nairobi stock exchange. This shows that the Altman's business failure prediction model is applicable locally since it predicted the failure of Hutchings Biemer Limited two years before its failure.

From the results above the Theta Group's Z score values were decreasing from year 1997 to 2001. In the years 1997 and 1998 the company was in a grey zone. This shows that in these to years it was uncertain whether the company would become bankrupt or not. In the years 1999 to 2001 the firms Z score values indicated that it was in distress and had a high probability of failing. This proves the applicability of Altman's business failure prediction model in predicting business failure.

Lonhro Motors is classified as one of the failed companies by Nairobi Stock Exchange. In the years 1997 to 2000 the firms Z score values were in the range of between 1.23 and 2.9. this indicates that the Lonhro Motors was in a grey zone whereby it was uncertain whether the firm would fail or not. In the years 2000 and 2001 the firm was in a distress zone. This proves the applicability of Altman's business prediction model locally.

Table 4.10 above shows the Z scores values for Uchumi Supermarket. In the year 2003 and 2004 the company was in a grey zone whereby there was uncertainty in predicting whether the company would fail or not. In the years 2002 and 2003 the company had Z score values between 1.23 and 2.9 which indicated that there was uncertainty in predicting whether the company was failing. In the years 2004, 2005 and 2006 the Z score values in Uchumi Supermarket indicated that the company was in a distress zone. During these years Uchumi Supermarket was de-listed from Nairobi Stock Exchange proving the applicability of Altman's business failure prediction model.

5.1.2 Non failed firms

Kakuzi Limited is one of the non failed firms that were analyzed in this study. The findings shows that the company had been in a grey zone from year 2004 to 2008 except year 2006 where the Z score value was 0.947 indicting that it was within the grey zone. This indicates a type II error since this was a false negative.

From the findings Rea Vipingo Plantations Z score values were varying from 1.5 to 2.2. This indicates that Rea Vipingo Plantations was in a grey zone in the years 2004 to 2008. This shows that in these to years it was uncertain whether the company would become bankrupt or not. This proves the applicability of Altman's business failure prediction model in predicting business failure.

This study revealed that Sasini Tea Limited was in grey zone in the years 2004, 2005, 2006, 2007 and 2008. This shows that there was uncertainty on whether the firm was about to be bankrupt or not. The fact that Sasini Tea Limited is still listed in Nairobi Stock Exchange means that we would expect the firm to have a Z score value of above 2.9 for it to be in a safe zone.

Kenya Airways was in a grey zone in the years 2004, 2005, 2006, 2007 and 2008. In a grey zone it is uncertain whether a company was about to fail or not. This indicates that Altman's business failure prediction model is applicable locally.

From the findings of this study Marshalls East Africa had high values of Z scores in the five analyzed years. For Z score values above 2.9 the company is classified as being in a safe mode

and with a low probability of failing. These results prove the applicability of Altman's business failure prediction model since Marshalls East Africa was classified as a non failed firm in Nairobi Stock Exchange.

Nation Media Group is one of the listed firms in Nairobi Stock Exchange. The firms Z score values were as follows ; In year 2000 the Z score value was 3.085, in 2001 the Z score value was 3.088, in 2002 the Z score value was 3.088, in 2003 the Z score value was 3.09 while in 2004 the Z score value was 3.14. From the Altman's model any firm with a Z score value above 2.9 is classified as being in a safe zone. This clearly indicates that in the five years analyzed, Nation Media Group had been in a safe zone.

Scan Group Limited is one of the companies listed in Nairobi Stock Exchange. The findings show that the company's Z score values from the year 2004 to year 2008 ranged between 0.7 and 1.32. In year 2004 the results indicate that the company was in a grey zone. From year 2005 to 2008 the results indicate that the company was in a distress zone and with a high probability of failing. Since Scan Group is a listed company in Nairobi Stock Exchange the values indicated above can be considered as false negative which is a type II error.

This research study revealed that Standard Group was in a grey zone in the years 1999, 2000, 2001, 2002 and 2003. In a grey zone it is uncertain whether a company was about to fail or not. This indicates that Altman's business failure prediction model is applicable locally.

BOC Kenya is one of the companies listed in Nairobi Stock Exchange. The findings show that the company's Z score values from the year 2004 to year 2008 ranged between 1.43 and 1.48. These results indicate that in the five analyzed years BOC Kenya was in a grey zone. This shows there was uncertainty whether the firm would fail or not. This proves the applicability of Altman's business failure prediction model in predicting business failure.

The study found that British American Tobacco Z score fall within a range of between 1.23 and 2.9. According to Altman's business failure prediction model if a Z score falls within this range the firm is considered to be in a grey zone. In the grey zone it is uncertain to predict whether a firm will fail or not.

5.2 Conclusion

This research study concludes that Edward Altman's financial distress prediction model was applicable locally. Edward Altman's financial distress prediction model was found to be applicable in 6 out of the 10 failed firms that were analyzed, which indicates a 60% validity of the model.

Out of the 10 firms which had not failed that were analyzed, 8 of them proved that Edward Altman's financial distress prediction model was applicable locally indicating an 80% validity of the model. This gives an aggregate average of 70% validity of the model.

5.3 Recommendations

- This study recommends that studies should be done on how to eliminate the type I and type II errors.
- The study also recommends that firms in Kenya should be using Altman's business failure prediction model annually in order to predict whether there is a possibility of failing.

5.4 Limitations of the study

- This research study was limited to the 10 failed firms in Nairobi stock exchange in the years between 1989 and 2008. The study also selected 10 non failed firms out of the total 46 firms listed in Nairobi stock exchange. Due to time and other resources the study analyzed 5 years financial statements in each of the firms to prove the applicability of Altman's business failure prediction model applicability in locally.
- Financial ratios generated from financial statements can't be better than the data from which they were based. This study is therefore constrained by the limitation of financial statement preparation.
- Financial data is only one signal of business failure. In reality, other non quantifiable circumstances and reasons lead to business failure e.g. catastrophes and exogenous factors.

5.5 Suggestion for further studies

From the study and related conclusions, the researcher suggests further research in the area applicability of Edward Altman's financial distress prediction model in Kenya.

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Appendices

Appendix I: List of failed firms in Nairobi Stock Exchange (1989 – 2008)

AGRICULTURAL SECTOR

1. Theta Group –Delisted on 2nd January 2002

COMMERCIAL AND SERVICES

1. Hutchings Biemer-Suspended in 2003
2. Lonhro Motors - Delisted on 2nd January 2002
3. Pearl Drycleaners - Delisted on 2nd January 2002
4. Uchumi Supermarket – Suspended in June 2006

FINANCE AND INVESTMENT

1. Regent Undervalued Assets Ltd- Delisted on 2nd January 2002

INDUSTRIAL AND ALLIED

1. EA Packaging- Delisted on 4th February 2003
2. Kenya National Mills - Delisted on 2nd July 2002
3. Dunlop Kenya –Delisted in 1989

ALTERNATIVE INVESTMENT

1. A.Baumann & Co. – Delisted on May 2008
2. Kenya Orchards- Delisted on May 2006

Appendix II: List of Non failed firms in Nairobi Stock Exchange (1989 - 2008)

AGRICULTURAL SECTOR

1. Kakuzi
2. Rea Vipingo Plantations
3. Sasini Tea Ltd

COMMERCIAL AND SERVICES

1. Access Kenya Group ltd
2. Car & General (K)
3. C.M.C Holdings
4. Kenya Airways
5. Marshalls (E. A)
6. Nation Media Group
7. Safaricom Ltd
8. Scan Group Ltd
9. Standard Group
10. TPS EA (Serena)

FINANCE AND INVESTMENT

1. Barclays Bank
2. Centum Invest Co Ltd
3. CFC Stanbic Holdings Ltd
4. Diamond Trust Bank
5. Equity Bank Ltd
6. Housing Finance Co
7. Jubilee Holdings
8. Kenya Commercial Bank
9. Kenya Re Corporation

10. National Bank of Kenya
11. NIC Bank
12. Olympia Capital Holdings
13. Pan Africa Insurance
14. Standard Chartered Bank
15. Cooperative Bank of Kenya Ltd

INDUSTRIAL AND ALLIED

1. Athi River Mining
2. B.O.C. Kenya
3. Bamburi Cement
4. British American Tobacco K Ltd
5. Carbacid Investments
6. Crown Berger
7. EA Cables
8. EA Portland Cement
9. Firestone
10. EA Breweries
11. Eveready EA Ltd
12. Kengen Ltd
13. KenolKobil Ltd
14. Kenya Power & Lighting Co
15. Mumias Sugar Company
16. Sameer Africa Ltd
17. Total Kenya
18. Unga Group

ALTERNATIVE INVESTMENT

1. City Trust Ltd
2. Eaagads
3. Express Kenya Ltd
4. Williamson Tea Kenya
5. Kapchorua Tea Co
6. Limuru Tea Co