THE RELATIONSHIP BETWEEN EFFICIENT WORKING CAPITAL MANAGEMENT AND PROFITABILITY

BY

HIWET TESFAMARIAM HABTEMARIAM

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DEPARTMENT OF ACCOUNTING

UNIVERSITY OF CAPE TOWN

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

CHAPTER ONE

INTRODUCTION

1.1 *INTRODUCTION*

Working capital management receives less attention in the literature than capital budgeting, investment and financing decisions, but it occupies the major portion of a financial manager's time (Weston and Brigham, 1993). About 50% of firm's capital is invested in working capital and this accounts for about 60% of the financial manager's time (Brigham and Gapenski, 1997). Moreover working capital plays an important role in enhancing profitability and maintaining corporate liquidity. Hence managers must make sure that working capital investments are managed efficiently and effectively in the same way as other capital investments in order to maximise the overall wealth of their business organisation.

Working capital management is about establishing an optimum liquidity position by managing the resources invested in the day-to-day operations of a business. This requires maintaining an optimum level of current assets, which is consistent with the current level of business activity and flexible enough to allow for any changes in the market place (Schilling, 1996). More importantly, managing working capital involves a trade off between liquidity and profitability. Increasing the level of investment in current assets such as cash, account receivables and inventory increases liquidity and decreases the risk of running out of stock. But at the same time such increase in current assets increases carrying cost, storage cost and opportunity cost of capital, which might outweigh the benefits of such investments and tends to decrease the overall profitability of the company. Conversely holding a low level of current assets decreases liquidity and might create serious liquidity problems. Hence, firms need to maintain the optimum level of working capital whereby the risk of under-investment and cost of over-investment is balanced.

1.2 *DEFINITION OF WORKING CAPITAL MANAGEMENT*

Foate (2003) states that different corporates have different views with regard to what efficiency in working capital management actually means and quote the following definitions of working capital management by different corporate managers:

- Working capital management is about holding the right amount of cash, in the right currency at the right place and at the right time.

- Working capital management efficiency is about getting receivables as quickly as possible, paying as late as possible and managing the gap in an intelligent way.

But generally working capital management is about establishing an optimum level of current assets by making sure that the available resources are invested and financed in an efficient and effective way.

1.3 *STATEMENT OF THE PROBLEM*

Foate (2003) states that European and US business tie up 30-40% more working capital than necessary via excessive receivables, superfluous inventory, lack of purchasing clout and high operating expenses and that a typical billion-dollar company would spend $27 million annually for unnecessary working capital and inefficient processing functions. In addition he also mentioned that financial time stock exchange (FTSE) 350 companies in the UK could save up to £25 billion per year by implementing a more efficient working capital management.

In the South African studies, Hall (2003) also found efficient working capital management to be one of the key drivers of shareholders value and states that industrial firms listed on the JSE can maximize their value by minimising their cash balances, reducing the average number of days debt outstanding, increasing their inventory turnover and by making maximum use of non interest bearing current liabilities.

Different variables are used to measure working capital efficiency such as the current and quick ratios, net working capital and the recently developed measures which include the CCC and NTC. But some of these measures such as the current and quick ratio have deficiencies in measuring working capital and depending on these less adequate measures may induce value-destroying decisions. In addition the relationship between working capital measures and profitability is not conclusive as the results found from different research studies are contradictory. Hence by investigating the relationship between the working capital measures and profitability of the South African industrial firms listed on the JSE, this paper will help the South African industrial firms to make efficient working capital management decisions that will maximise their shareholders wealth.

The theory of financial management states that different industries which are exposed to different technology levels, different products and markets employ different working management strategies. In confirmation Jose, Lancaster and Steven (1996), Hoffman (1997) and Hawawini, Viallet and Vora (1986) found a significant sector effect on the working capital management but Smith (1998) concluded that there is no significant sector effect on the working capital management of South African industrial firms. Since Smith's finding contradicts the other local and international findings, this paper will also investigate the significance of the sector effect on the working capital management of South African industrial firms.

1.4 OBJECTIVES OF THE STUDY

This research investigates the relationship between working capital management and profitability and the significance of sector effect on working capital management of South African industrial firms listed on the JSE. To measure this relationship Net Trade Cycle (NTC) and Cash Conversion Cycle (CCC) are used as measures of working capital and Return on Assets (ROA) and Return on Equity (RTE) are used as measures of profitability. Specifically this research has the following objectives:

- To investigate the relationship between NTC and CCC and ROA
- To investigate the relationship between NTC and CCC and RTE.
- To examine the sector effect on the working capital management of South African industrial firms.

1.5 ORGANIZATION OF THE STUDY

CHAPTER ONE- INTRODUCTION-Provides the general definition of working capital management and explains the importance and objectives of this study.

CHAPTER TWO- LITERATURE REVIEW-Covers research findings conducted on the field of working capital management and a brief explanation of the components of working capital management-Cash, Accounts receivables, Inventories and Trade credit.

CHAPTER THREE- RESEARCH METHODOLOGY-Explains testable hypotheses, statistical methods used, measurement of the working capital and profitability variables, data exploration and data collection.

CHAPTER FOUR- DATA PRESENTATION AND ANALYSIS-Provides the results of the Spearman's Rank order correlation, regression analysis and the Kruskal-Wallis test along with their respective analysis.

CHAPTER FIVE- CONCLUSION AND RECOMMENDATION-presents the conclusion and recommendation for further research.

CHAPTER TWO

LITERATURE REVIEW

2.1 *INTRODUCTION*

The major goal of senior management in every business organisation is to invest available funds in a way that would increase the value of shareholders. Therefore management must make sure that the funds that are invested in working capital are managed efficiently and that the highest possible return is obtained from such investment. Managing working capital efficiently means holding optimum level of current assets and investing extra funds in other more productive opportunities. Hence any decision to increase the level of investment in current assets must be based on the analysis of the associated marginal cost and anticipated marginal profit. Moreover in order to incorporate the additional cost of capital invested and to ensure the enhancement of shareholders wealth, working capital should be managed within the context of the economic value added (Shilling, 1996).

2.2 COMPONENTS OF WORKING CAPITAL MANAGEMENT

Working capital management involves the management of current assets and current liabilities. Current assets include cash, account receivables and inventory; current liabilities include trade credit, short term bank loans and accruals. Hence as the main components of working capital and main drivers of the NTC and the CCC, the following part of this chapter will provide a brief explanation of cash, account receivables, inventory and trade creditors management.

2.2.1 CASH MANAGEMENT

Cash is the most liquid asset and is needed to pay for labour and raw materials, to buy fixed assets, to pay taxes, to service debt, to pay dividends and so on (Brigham and Daves, 2002). External funds used for capital investments or to meet temporary cash shortfalls can always be obtained at a fair price but firms need to hold some amount of cash due to the capital market imperfection derived from transaction costs, financial distress costs, asymmetric information and agency costs. Cash reserves not only allow firms to sustain losses for a long period of time and avoid the significant cost of financial distress, but also provide the flexibility necessary in an opportunistic acquisition policy and allow the acquiring firm to move faster than competitive bidders (Soenen, 2003).

Even though there is a strong motive for holding cash, holding excessive cash has its own disadvantages. Excessive cash balances increase manager's degree of investment flexibility and encourage them to expand their empire by investing in projects or acquiring other firms that may not be strategically suitable nor value enhancing (Soenen, 2003). Research by Jarrad Harford of The University of Washington Business School reveals that cash–rich companies engage in value decreasing acquisitions, which increases the agency costs of free cash flow (Soenen, 2003). In addition, holding excessive cash decreases the company's value by decreasing its total asset turnover and consequently its share price if it is invested at below-market rates. Therefore firms need to manage their cash balances more efficiently by investing extra funds in other more profitable investments.

2.2.2 ACCOUNT RECEIVABLE MANAGEMENT

Generally firms would prefer to sell on cash than on credit but competitive pressures force most firms to sell on credit (Brigham and Daves, 2002). Even though the level of credit sales is influenced by the type and nature of the firm's industry as well as by the level of the competition in the industry, firms can control and manage their investments in account receivables by implementing a sound credit policy. A firm's credit policy includes the following elements:

Credit period -The length of time that a firm gives to its buyers to pay their purchases.

Early payment discount -Early payment discount is an important determinant of the level of account receivables investment and particularly during inflation, this discount must be increased in order to avoid increase in average collection period, increase in investment of receivables and decline in the wealth of shareholders (Roden, 1984)

Credit standards -Refers to the financial strength and credit worthiness that a customer must have in order to qualify for the credit sales (Brigham and Daves, 2002). By setting its credit standards, the firm determines the amount of risk it is willing to take when making credit sales. A firm with a strict credit policy expects low bad debt losses, small volume of account receivables, low collection costs and at the same time lower sales volumes. In contrast, firms with lax credit polices expect a higher volume of sales and a higher cost of collections.

Collection polices -Refers to the procedures that a firm follows to collect its accounts. The faster the firm collects its accounts due, the smaller the amount of capital tied up in the provision of credit and the smaller the quantity of current assets needed to conduct business. This in turn implies that the firm is managing

its current assets more efficiently and effectively and thus it will maximise the wealth of its shareholders (Paulo, 1992).

Generally, loosening of credit terms may increase sales and thus provides gross benefits to the firm but this loosening of credit is not costless. Any extension of credit policy is associated with additional costs, which include collecting costs, bad debt losses and financing costs. Therefore any decision to extend credit sales should be made based on the comparison of the associated marginal costs and benefits (Pringle and Harris, 1987).

2.2.3 INVENTORY MANAGEMENT

Since inventory is the least liquid of current assets, it should provide the highest return to justify the investment (Block and Hirt, 1997). As is true with other investments, the investment in inventories should be made only if the return that is obtained from such investment is greater than the return that would have been earned by investing the funds in other available opportunities.

Inventories are necessary for business operations. By holding inventories business organisations are able to facilitate and smooth their production and sales operation, take quantity discounts, avoid stock outs and gain some marketing benefits. If inventory levels are low, sales divisions will be unable to fill orders on a timely basis and profits will suffer due to loss of sales and cancellations of orders by customers. On the other hand holding an excessive inventory means high carrying costs, storage costs and financing costs (Jones, 1978). Therefore effective management of the firm's inventory should balance the costs and benefits associated with the investment of inventory.

Much research has been conducted to determine the optimum inventory size and order quantity. Economic Order Quantity (EOQ) is one of the models developed to determine the optimum inventory size but many authors such as Beraneki (1981), Kim and Atkins (1978) and others have questioned whether the traditional EOQ

model is consistent with wealth maximisation and suggested the development of inventory models that involve net present value methods. In addition Followill, Schllenger and Marchand (1990) state that for purchasers to be truly indifferent to changing the current EOQ level, a discount price must be offered for which the current wealth remains the same, but the traditional EOQ model can produce indifference prices that generate substantial changes in current wealth. Hence reliance on the traditional EOQ model can induce purchasers to unknowingly make wealth-reducing decisions. Thus in order to avoid such destruction of value, firms should manage their inventories within the context of wealth maximisation principles such as the net present value and the economic value added.

2.2.4 TRADE CREDIT MANAGEMENT

Business organisations obtain their funds from a variety of sources: banks, capital markets as well as other business organisations. Trade credit is a short-term credit extended by suppliers in respect of goods purchased for ultimate resale (Pringle and Harris, 1987). Trade credit is also the largest single category of short term financing and represents about 40% of the current liabilities of the average non-financial corporations (Brigham and Daves, 2002).

Trade credit is a spontaneous source of financing and thus firms can generate additional sources of financing by expanding sales and purchases as well as by lengthening the credit period (Brigham and Daves, 2002). Delaying payments to suppliers allows business organisations to access the quality of the products purchased and can be an inexpensive and flexible source of financing for the organisation (Deloof, 2003). Even though trade credit is non-interest bearing and represents a desirable source of financing, late payment can be very costly if the firm is offered early payment discount. Thus firms should forgo the cash discount and decide to pay the full amount on the due date only if the cost of these funds is less than the cost of funds that can be obtained from other sources.

In addition delaying payments beyond the net period can destroy the firm's relationship with its suppliers and can damage its credit reputation. Even though how far a firm can push its suppliers depends on circumstances, a late payment policy is generally a bad business practice and in the long run it is likely to be costly (Pringle and Harris, 1987).

In general, firms can reduce their level of investment in working capital by managing their cash, inventory, accounts receivables and trade creditors more efficiently which will in turn reduce their NTC and increase their profitability as a result of the lower need for external financing. As the main objective of this research is to examine the relationship between NTC and profitability the following part of this chapter will focus on some of the research conducted with regard to the relationship between working capital and profitability.

2.3 RELATIONSHIP BETWEEN WORKING CAPITAL MANAGEMENT AND PROFITABILITY

Little empirical research regarding working capital measures and profitability appears recently, and that research provides contradicting results. Kamath (1989) empirically investigated the relationship between current ratio, quick ratio and cash conversion cycle as measures of liquidity and their relationship with profitability by focusing on US large firms in six retail industries for the period 1970-1984. He found a negative correlation between cash conversion cycle and current and quick ratio and no significant relationship between the current and quick ratio and profitability. However, he found a negative correlation between the NTC and CCC and profitability.

Seonen and Shin (1998) also conducted their research upon a sample of 58,985 US firm years covering the period 1975-1994. They used NTC as a measure of liquidity as it is closely related to shareholder value and found the NTC to be negatively correlated with profitability. Hence they concluded that reducing the

firm's net trade cycle to a reasonable minimum is one way of maximising shareholder wealth. In addition they also state that considering the negative relationship between debt and market value, the true benefit of shorter Net Trade Cycle come from reducing assets rather than by increasing payables.

On the other hand, Deloof (2003) conducted his study on selected Belgian firms and found no significant relationship between CCC and profitability. But found a significant negative relation between gross operating income and the number of days of account receivables, inventories and accounts payable and concluded that Belgian firms can maximise their value by reducing the number of days of account receivables and inventories. Deloof also stated that the negative relation between working capital management and profitability is to some extent as a result of profitability affecting working capital management, not only because working capital management affects profitability and that the most reasonable explanation for the negative correlation between accounts payable and profitability is because less profitable firms wait longer to pay their bills.

To the contrary, Czyzewski and Hicks (1992) found a higher Return on Assets (ROA) to be associated with a higher cash balance. In addition Lyroundi and Lazaudis (2000) conducted their study on selected Greek firms belonging to the food industry and found a significant positive relationship between CCC and ROA and Net Profit margin which contradicts the findings of Kamath (1989), Soenen and Shin (1998) and Deloof (2003).

In summary, different researchers have found different results that differ from country to country. As a result this research will examine the relationship between NTC and CCC and profitability of the South African Industrial firms listed on the JSE.

2.4 SECTOR EFFECT ON WORKING CAPITAL MANAGEMENT

The level of investment in receivables, inventories and trade credit which make up the total investment in working capital, is a function of the firm's technology, degree of efficiency and level of sales (Hawawini, Viallet and Vora, 1986). Hence different firms which are exposed to different products, marketing channels, production process and different competition levels are expected to employ different working capital management strategies. Soenen (1993) conducted his study on a wide range of industries and didn't find a consistent relationship between the net trade cycle and the total rate of return on assets. The relationship between the net trade cycle and return on assets varied from positive to negative from industry to industry as a result of industry influence. Jose, Lancaster and Stevens (1996) also examined the relationship between the profitability and cash conversion cycle for a large cross section of firms over a time period of twenty years. The authors used return on assets (ROA) and return on equity (ROE) as a measure of profitability. In their studies Jose *et al* found:

- A significant inverse relationship between CCC and profitability for several industries including natural resources, manufacturing, service, retail and professional services and that this relationship is not driven by size.

- A statistically significant negative relationship between cash conversion cycle and profitability in the financial service industry only when size is controlled.

- A statistically significant relationship in the natural resources industry only when size is not controlled.

- No significant relationship in the construction industry.

This indicates that the type and nature of the industry in which the firm operates influence a firm's working capital management. In confirmation a South African research study conducted by Hoffman (1997) shows that working capital ratios are significantly influenced by the nature of the firm's operations. In addition Hawawini, Viallet and Vora (1986) also concluded in their study that there is a significant industry effect on a firm's working capital investment level.

To the contrary, Smith (1998) found a significant working capital sector effect for only six out of 13 working capital measures employed by South African industrial firms listed on the JSE and concluded that sector effect on working capital measures of South African industrial firms might not be as significant as that advanced in previous local and international research findings.

As shown above Smith's conclusion regarding the significance of the sector effect on working capital management contradicts the other local and international findings. Hence this paper will investigate the significance of the sector effect on the working capital management of South African industrial firms.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 TESTABLE HYPOTHESES

The main objectives of this research are:

- To empirically investigate the relationship between the working capital management measures-Net Trade Cycle (NTC) and Cash Conversion Cycle (CCC) and profitability measures-Return on Asset (ROA) and Return on Equity (RTE).
- To examine the sector effect on working capital management of industrial firms listed on the JSE.

Hence the study will empirically test the following two hypotheses:

Hypothesis one

This hypothesis investigates the relationship between measures of working capital (NTC and CCC) and measures of profitability (ROA and ROE). Generally a short trading cycle is associated with efficient management of working capital and higher financial performance as a result of the lower need for external financing. The lower the Net Trade Cycle the higher is the net present value of the cash flows generated by the assets and the higher the value of the firm to its shareholders (Shin and Soenen, 1998). Hence a negative relationship is expected between the measures of working capital (NTC and CCC) and measures of profitability (ROA and RTE).

Thus the null and alternative hypotheses can be stated as:

H_{10} = There is no significant relationship between working capital measures (NTC and CCC) and profitability (ROE and ROA).

H_{1A} = There is a significant negative relationship between the working capital measures (NTC and CCC) and profitability (ROA and RTE).

Hypothesis two

This hypothesis tests the sector effect on working capital management of South African industrial firms listed on the JSE. Theoretically firms belonging to the same industrial sector are anticipated to have similar technological developments and similar levels of managerial efficiency and firms belonging to different industrial sectors are exposed to different fundamental economic conditions which lead to different operating efficiencies and different working capital requirements (Smith, 1998). As a result a significant industrial sector effect is expected on the working capital management of the industrial firms listed on the JSE.

The null and alternative hypotheses are:

$H_{2\,O=}$ The CCC and the NTC have the same location of distribution (mean) across all the selected 17 industries.

$H_{2\,A=}$ The CCC and NTC have different locations of distribution (mean) across all the selected 17 industries.

Accepting the null hypothesis shows that there is no significant sector effect on working capital management of the industrial firms listed on the JSE and rejecting the null hypothesis shows the presence of a significant sector effect on the working capital management of the industrial firms listed on the JSE.

3.2 DATA EXPLORATION

In order to use parametric statistical measures the data must meet the following four assumptions (Brightman and Howard, 1994):

Linearity- it is assumed that the population regression line connecting the means of sub-population is linear.

Normality- each sub-population is normally distributed

Equal variance- the variances of the conditional probability distributions of the dependent variable are equal.
Independence- the Y- value of any sub population is unrelated to y-values from the same or other sub-populations.

To test the data for the above assumptions, the distribution pattern of each variable is examined by using the Kolmogrov- Smirnov and Lilliefors test for normality and it is found that most of the variables are not normally distributed. Jordan and Smit and Hamman (1994) in their study of the normal distribution of South African financial ratios also found that most of the financial ratios of South African industrial firms are not normally distributed. Hence in order to improve the distribution of the variables the raw data is examined for outliers and values with ±3 standard deviation from the mean are excluded from the analysis.

Tabachnick and Fidell (1989) state that transformations may improve the analysis and may also have the further advantage of reducing the influence of outliers and that it is better to consider transformation of variables in all situations unless there is some reason not to. Thus the variables whereby their distribution pattern is improved by doing so are transformed by using the square root transformation. Because some variables contain negative values, a constant is added to each value before the transformation is performed so that the smallest number is one.

The distribution pattern of each variable after the exclusion of outliers and transformation is provided in Figures 3.1-3.7 and the normal probability plots are given in Figures 3.8 and 3.9. In addition the Skewness and Kurtosis of each variable are also provided in Table 3.1. Skewness measures the symmetry of the distribution and Kurtosis measures the peaked ness of the distribution. As can be seen from the graphs some of the variables such as sales growth and RTE are not normally distributed. Summers and Peters (1973) state that when there is a reasonable doubt about the assumptions needed for a parametric test, a non-parametric test that is nearly as powerful if the assumptions apply, and broadly applicable if they don't, can be the most attractive alternative. Hence both the non-

parametric measure, Spearman's rank order correlation, and the parametric measure, forward stepwise regression analysis, will be used in this study.

FIGURE 3.1- NORMAL DISTRIBUTION TEST FOR THE VARIABLE - ROA

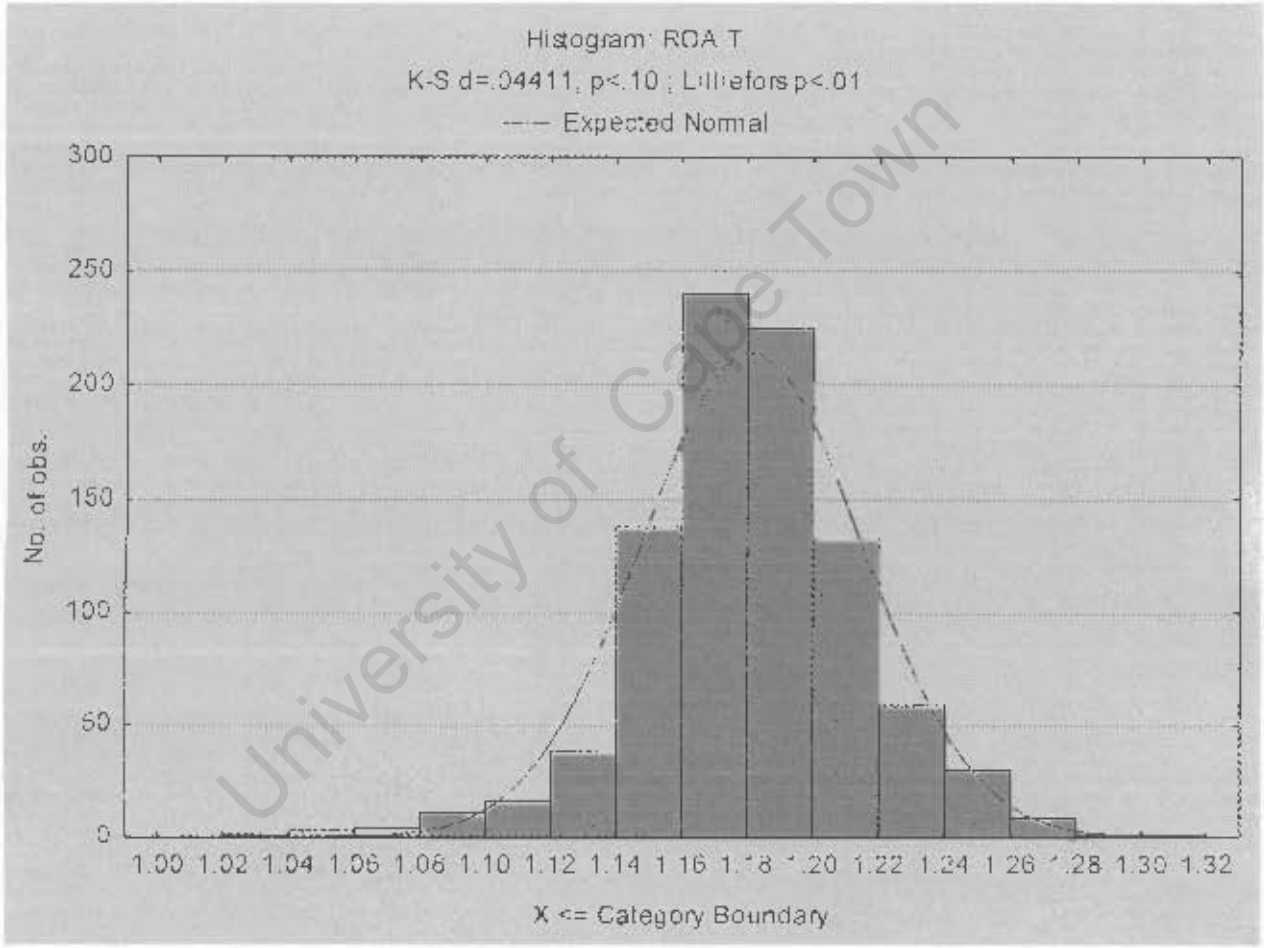

FIGURE 3.2- NORMAL DISTRIBUTION TEST FOR THE VARIABLE – NTC

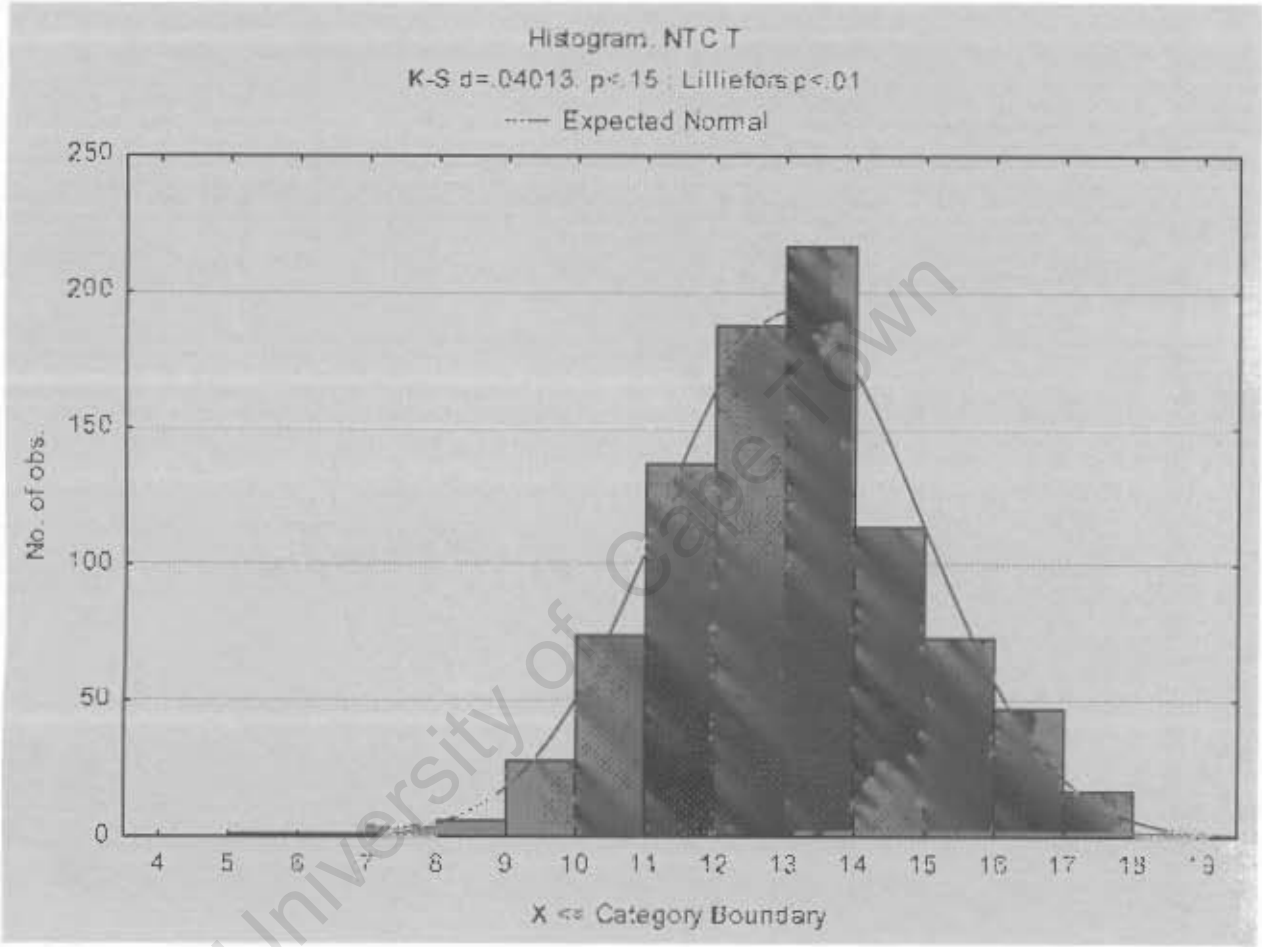

FIGURE 3.3- NORMAL DISTRIBUTION TEST FOR THE VARIABLE- CCC

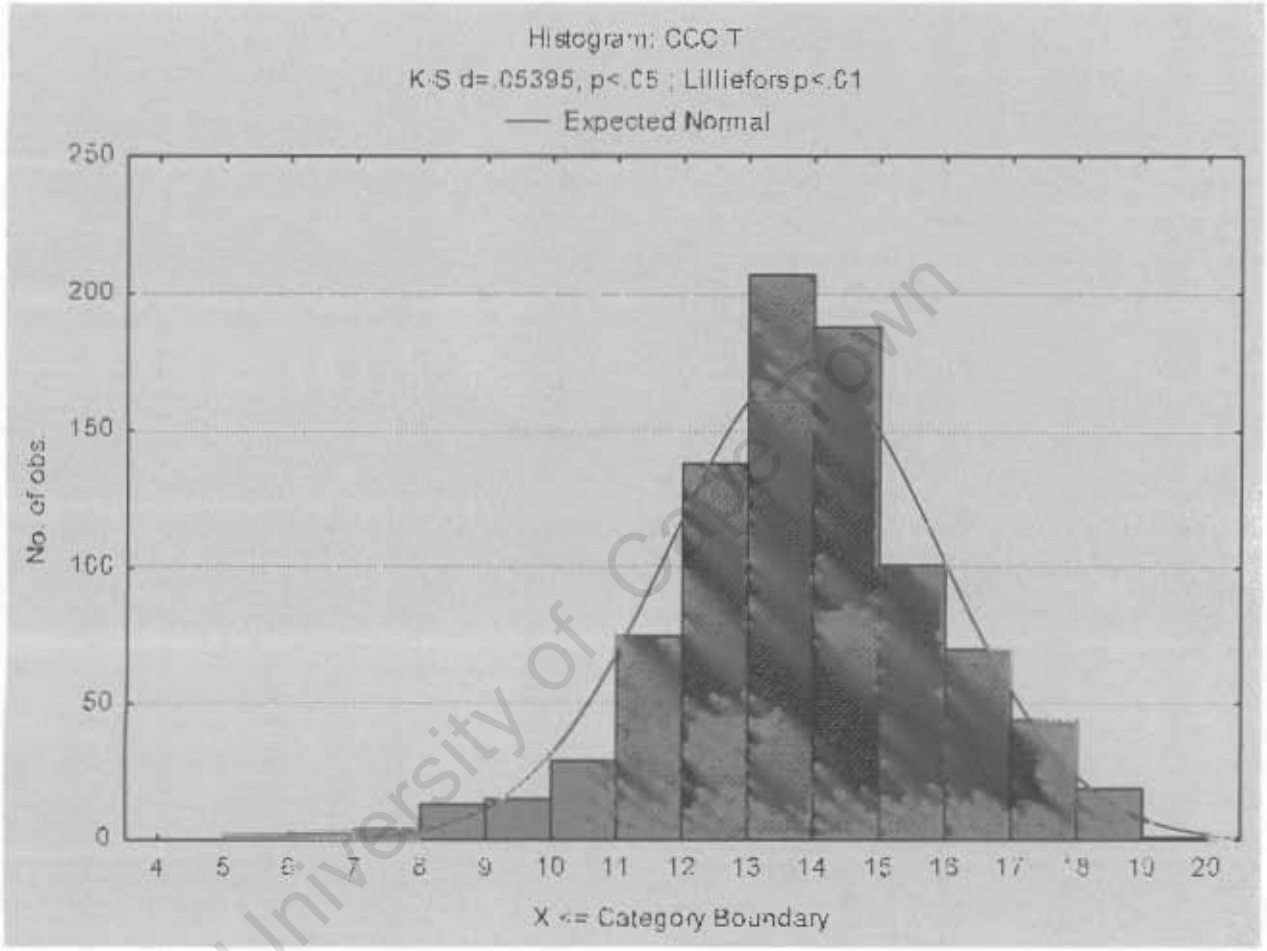

FIGURE 3.4- NORMAL DISTRIBUTION TEST FOR THE VARIABLE- DTA

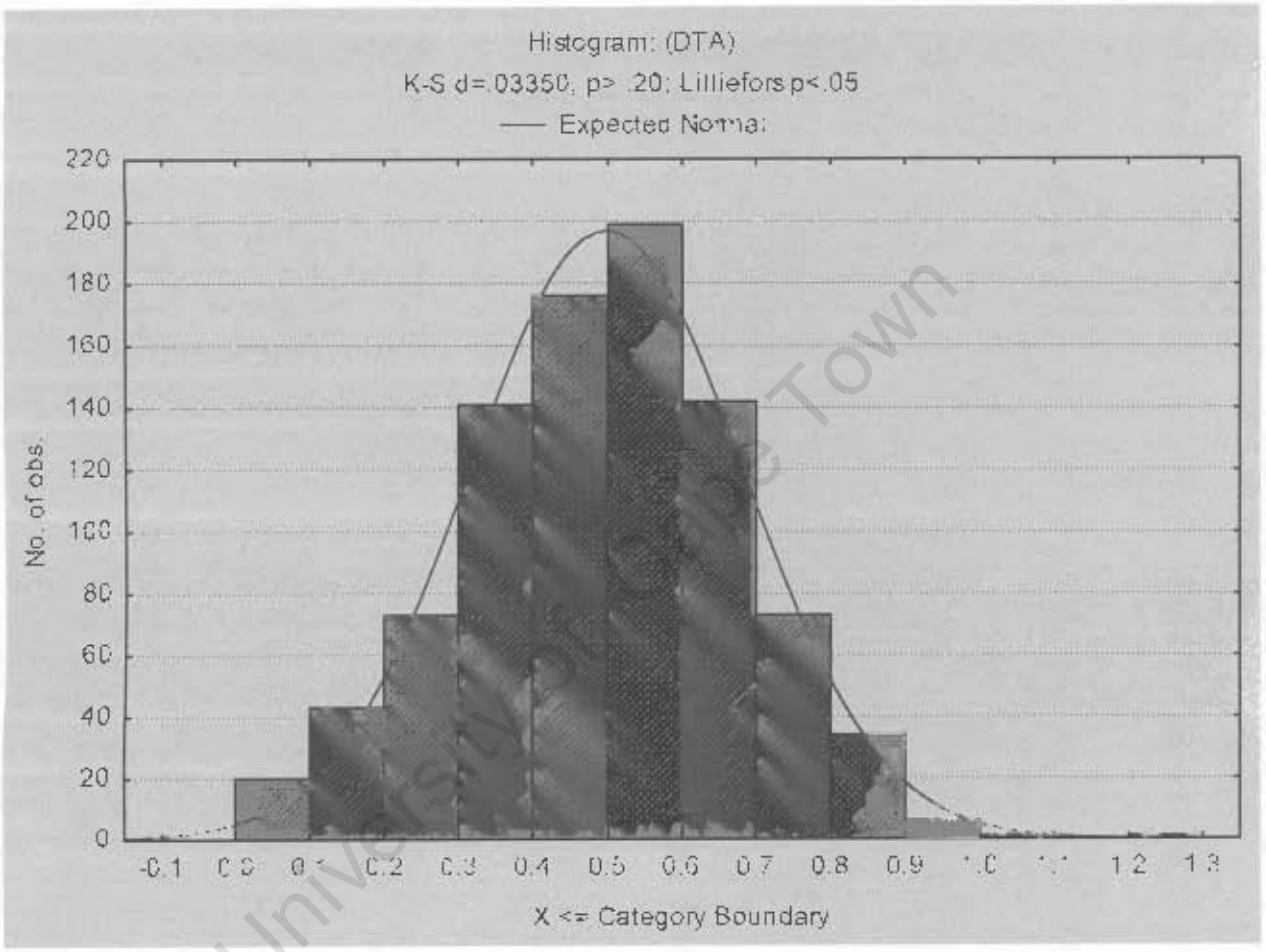

FIGURE 3.5 NORMAL DISTRIBUTION TEST FOR THE VARIABLE – SIZE

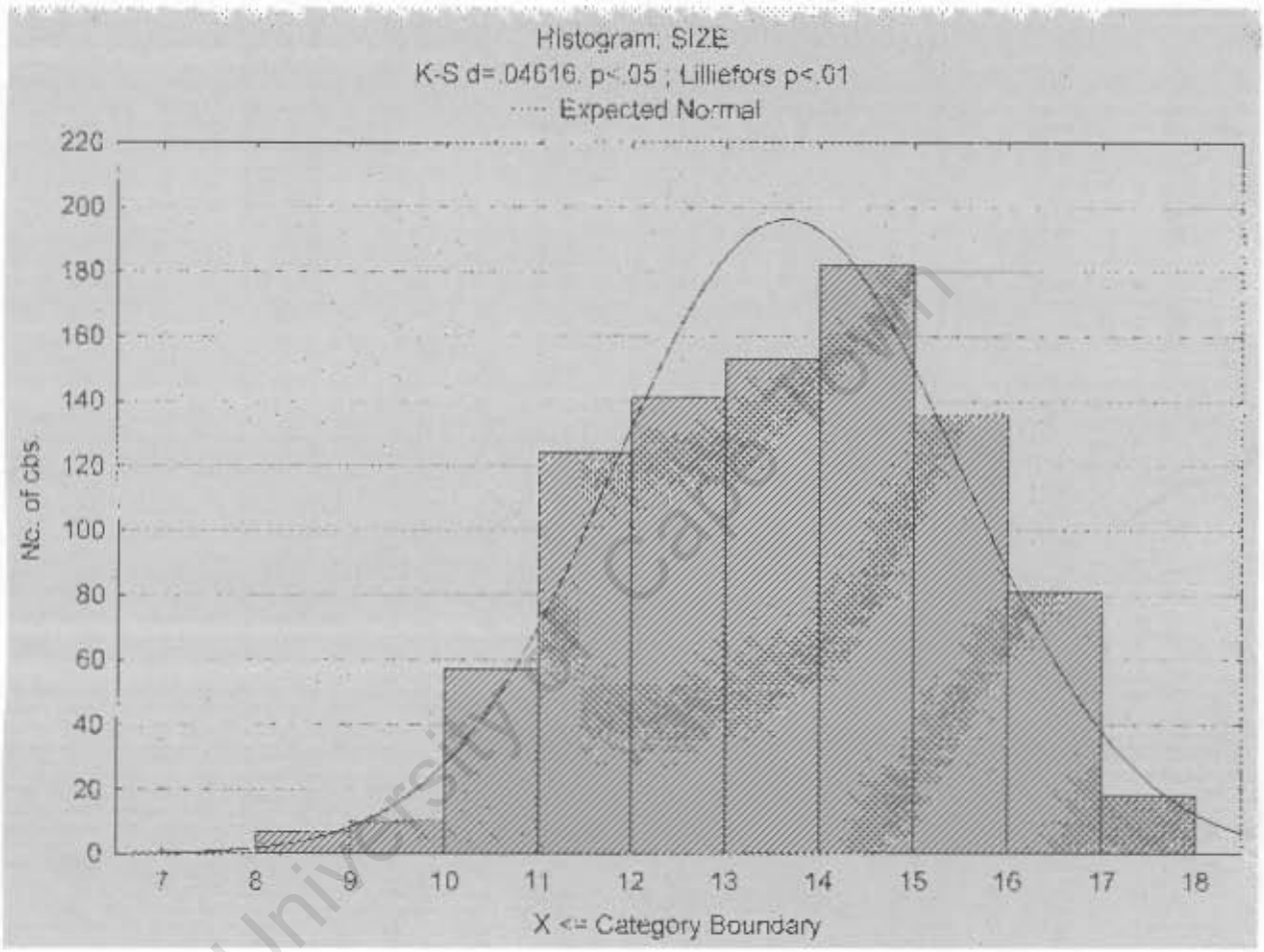

FIGURE 3.6- NORMAL DISTRIBUTION TEST FOR THE VARIABLE- RTE

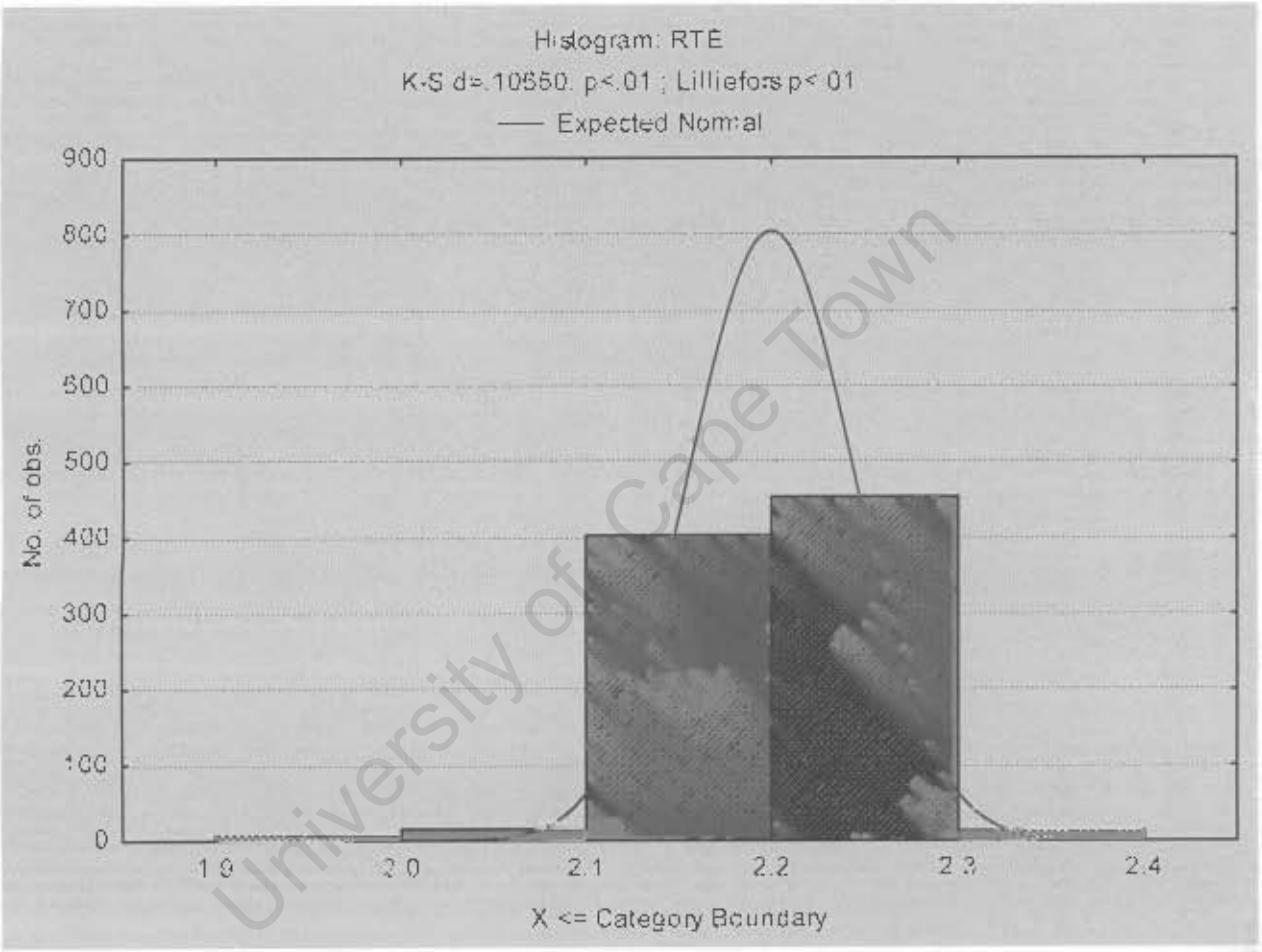

FIGURE 3.7- NORMAL DISTRIBUTION TEST FOR THE VARIABLE- SALES GROWTH

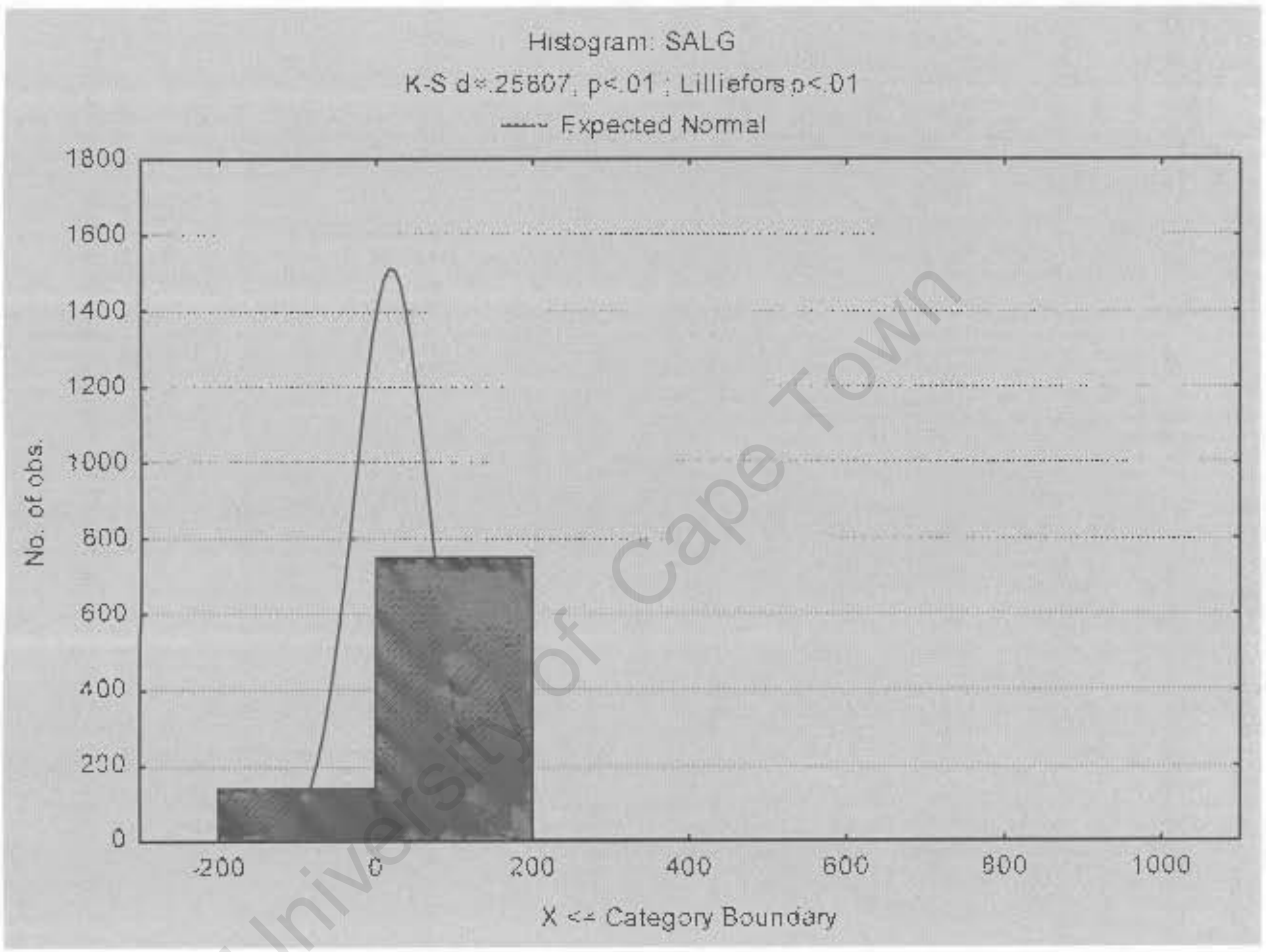

FIGURE 3.8- NORMAL PROBABLITY PLOTS FOR THE DEPENDENT VARIABLE- ROA

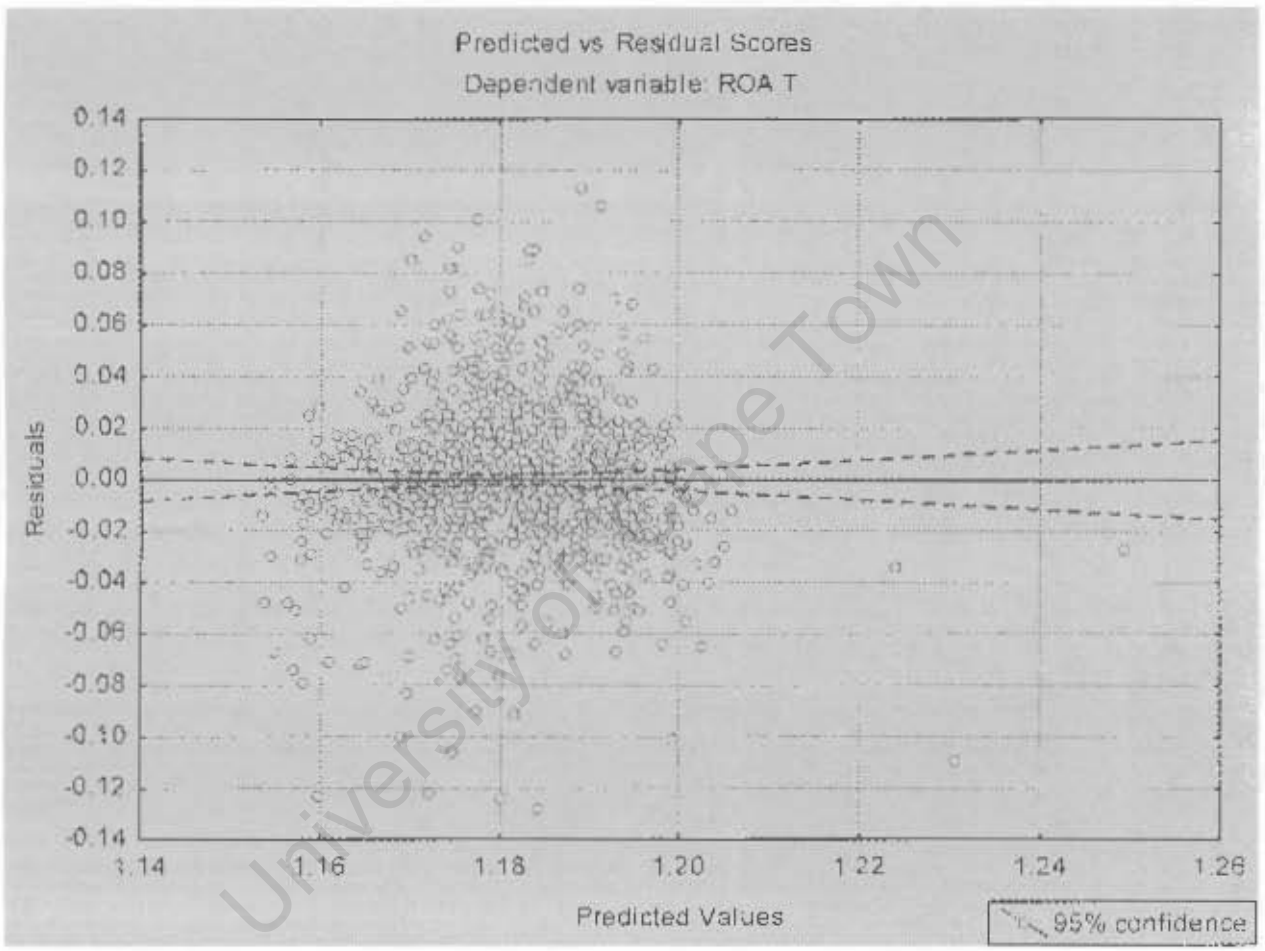

FIGURE 3.9– NORMAL PROBABILITY PLOTS FOR THE DEPENDENT VARIABLE – RTE

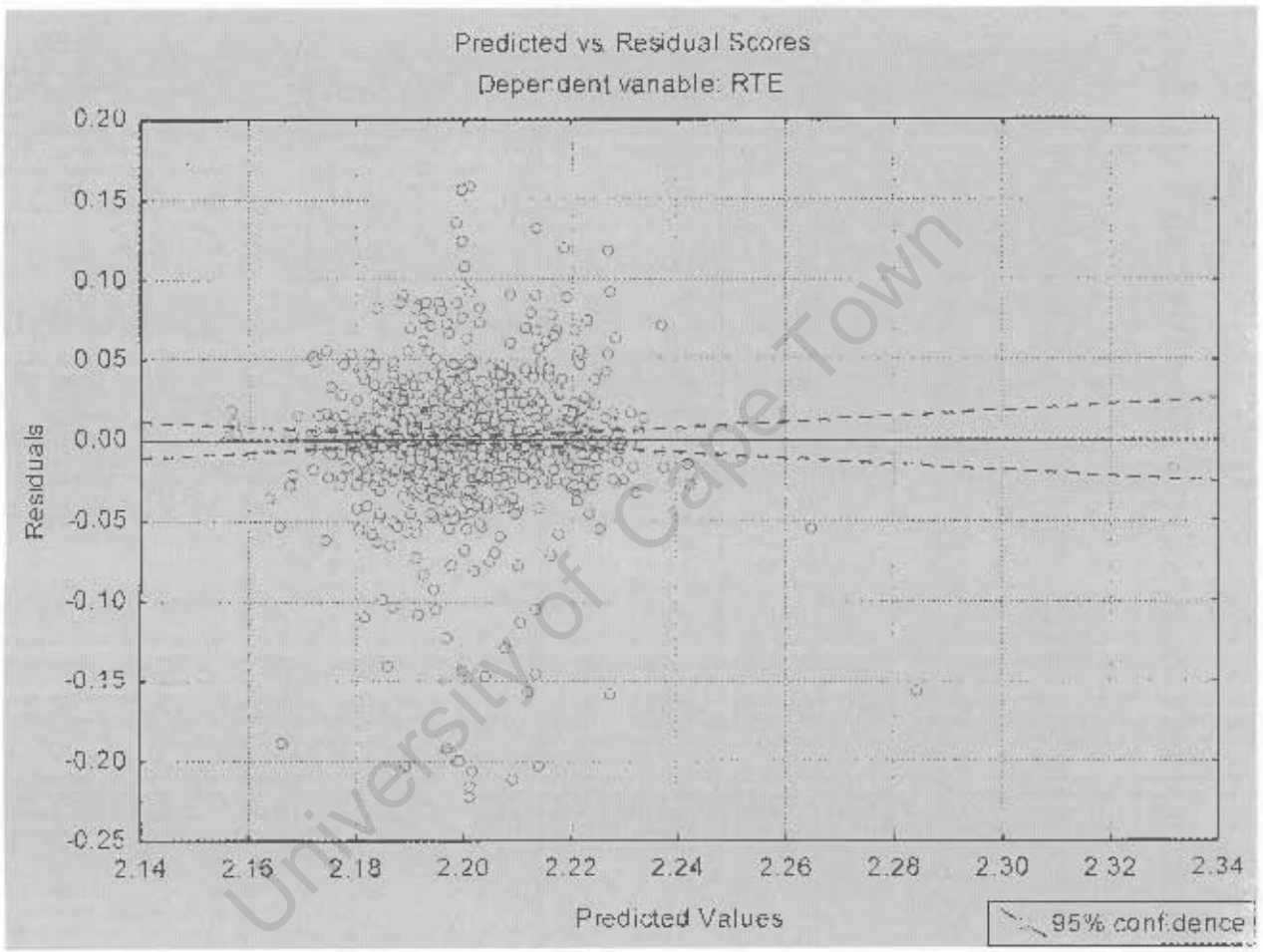

Table 3.1- SKEWNESS AND KURTOSIS FOR ALL VARIABLES

	Valid N	Mean	Minimum	Maximum	Std.Dev.	Skewness	Kurtosis
NTC T	894	13.07548	5.8267	18.0760	1.86965	-0.00707	0.2952
CCC T	894	13.84615	5.7169	19.0546	2.06951	-0.33426	0.9285
ROA T	894	1.18176	1.0504	1.3022	0.03276	-0.11435	1.2614
RTE	894	2.20001	1.9778	2.3588	0.04430	-1.03264	5.7316
SIZE	894	13.64508	8.2319	17.5520	1.84026	-0.19881	-0.6000
(DTA)	894	0.49226	0.0400	0.9100	0.17732	-0.18858	-0.3197
SALG	894	19.20470	-81.0000	889.0000	47.15987	10.76705	166.6418
DR T	894	7.59560	0.7347	14.6894	2.06273	-0.33670	0.7192
DI T	894	7.23586	1.0000	16.6038	2.58282	-0.03404	0.3561
DP T	894	8.61982	3.7069	14.9173	1.63465	0.53056	0.6168

3.3 RESEARCH METHOD

3.3.1 HYPOTHESIS ONE

Both the Spearman's rank correlation coefficient and the regression analysis will be used to test the first hypothesis. To conduct the regression analysis the independent variables (CCC and NTC) will be regressed to the dependent variables (ROA and RTE) one at a time. In addition to the above independent variables: Size (Natural Logarithm of sales), Debt Ratio (Total Debt/ Total Assets), Sales Growth ((Current Year Sales – Previous Year Sales) / Previous Year Sales), nine Year dummies and four Industry dummies are included in the regression model as control variables.

Hence the regression equations of this research can be expressed as follows:

$ROA = B_0 + B_1 (NTC) + B_2 (DTA) + B_3 (SIZE) + B_4 (SALES\ GROWTH) + B_5 (YEAR\ DUMMIES) + B_6 (INDUSTRY\ DUMMIES)$

$RTE = B_0 + B_1 (NTC) + B_2 (DTA) + B_3 (SIZE) + B_4 (SALES\ GROWTH) + B_5 (YEAR\ DUMMIES) + B_6 (INDUSTRY\ DUMMIES)$

$ROA = B_0 + B_1 (CCC) + B_2 (DTA) + B_3 (SIZE) + B_4 (SALES\ GROWTH) + B_5 (YEAR\ DUMMIES) + B_6 (INDUSTRY\ DUMMIES)$

$RTE = B_0 + B_1 (CCC) + B_2 (DTA) + B_3 (SIZE) + B_4 (SALES\ GROWTH) + B_5 (YEAR\ DUMMIES) + B_6 (INDUSTRY\ DUMMIES)$

Table 3.2 presents the number of firms included in each industry. The classification of each firm to its respective industry is made based on the BFA data base classifications. Since certain industries are represented by too few firms, all industries except for Retail, Building and construction, Electrical and electronic equipment and Food industry are classified under one group as "others", which leave us with five industry groups: Retail, Electrical and electronic equipment, Food, Building and construction and others. These industry differences are included in the model by using four industry dummies.

TABLE 3.2- NUMBER OF FIRMS IN EACH INDUSTRY

INDUSTRY	NUMBER OF FIRMS
RETAIL	19
BUILDING AND CONSTRUCTION	11
FOOD	10
ELECTRICAL EQUIPMENT	8
CHEMICAL AND OIL	3
FORESTRY AND PAPER	3
TRANSPORT	5
SUPPORT SERVICES	7
STEEL	2
AUTOMOBILE AND PARTS	5
DIVERSIFIED INDUSTRIES	2
HOUSE HOLD GOODS AND TEXTILE	7
BEVERAGES	3
HEALTH CARE	4
HOTELS AND LEAISURES	5
ENGINEERING AND MACHINERY	1
MEDIA AND ENTERTAINMENT	3
TOTAL	98

3.3.2 HYPOTHESIS TWO

The non-parametric statistical measure, the Kruskal-Wallis test, will be used to test the second hypothesis. This hypothesis investigates the sector effect on working capital management of industrial firms listed on the JSE. The appropriate parametric measure for this analysis is the one-way analysis of variance (ANOVA) which provides a technique for testing whether several levels of a given treatment result in a different mean response for some variable under that treatment (Summers and Peters, 1973). But parametric measures are sensitive to sample sizes and as stated above certain industries in this study are represented by too few firms. Summers and Peters (1973) state that if the assumptions of normality and homogeneity of variance applicable to the F-test are met, the Kruskal-Wallis test has an efficiency of 0.995 relative to the F-test but for marked departures from these assumptions, the Kruskal-Wallis test is to be preferred to the F-test. Hence it is decided to use the Kruskal-Wallis test.

3.4 MEASURMENT OF VARIABLES

3.4.1 MEASUREMENT OF WORKING CAPITAL

The most widely used traditional measures of liquidity are the current and quick ratios. Logue and Merville (1972) in their empirical study of CAPM used the current ratio as a measure of liquidity and state that in addition to being widely understood by investors, the current ratio is more perceptive than other measures, such as short term assets divided by total assets.

To the contrary, Jose, Lancaster and Stevens (1996) state that traditional measures of liquidity including the current ratio, quick ratio, net working capital and the ratio of net working capital to current liabilities do not provide a meaningful measure of liquidity. As these measures are based on static balance sheet entries and static ratios which measure the ability of a firm to meet its maturing obligations if default occurs, are not efficient indicators from a cash flow standpoint.

Shin and Soenen (1998) also state that liquidity for the ongoing firm is not dependent on the liquidation value of its assets but rather on the operating cash flow generated by those assets and thus traditional measures such as the current and quick ratios are not adequate measures of liquidity. In addition many other authors such as Emery (1984) and Kamath (1989) have questioned the adequacy of the Current and quick ratios as measures of liquidity. Furthermore Gallinger (1997) recommended to drop those traditional measures of liquidity and to use the Cash Conversion Cycle (CCC).

Gitman (1974) introduced the cash conversion cycle concept, which measures the time lag between the cash expenditure made to purchase inventory and the time that cash is collected from the sale of the finished product. The cash conversion cycle recognizes the dynamic nature of circulating capital and facilitates the analysis of its individual components (Schilling, 1996). Kamath (1989) empirically tested the relationship between CCC, current ratio and quick ratio and profitability and found that:

- Current ratio and quick ratio are negatively correlated with CCC.
- Current and quick ratios are not negatively correlated with profitability.
- Cash conversion cycle and Net Trade Cycle (NTC) are negatively correlated with profitability.

These findings indicate that traditional measures of liquidity measure working capital differently from the recently developed measures of liquidity such as CCC and NTC. Kamath also examined whether NTC, which indicates the number of "day's sales" the company has to finance its working capital, is a good approximation of CCC and concluded that NTC provides the same information as the CCC. NTC measures liquidity cycle and enhances simplicity by using sales instead of cost of goods sold and purchases to calculate inventory days and accounts payables days respectively.

The CCC and NTC focus only on the length of time funds are tied up in the cycle and don't take into consideration the amount of funds committed to a product as it moves through the operating cycle (Gentry, Vaidyanathan and Lee, 1990). In order to overcome this weakness Gentry, *et al.* (1990) developed the concept of Weighted Cash Conversion Cycle (WCCC) which measures the weighted number of days funds are tied up in receivables, inventories and payables, less the weighted number of day's cash payments are deferred to suppliers. Although WCCC provides a better insight to the liquidity flow, due to the unavailability of information regarding the breakdown of inventories into the three main components needed to calculate WCCC, only the NTC and CCC will be used as measures of working capital efficiency.

3.4.2 MEASUREMENT OF PROFITABILITY

Profitability can be measured by using accounting or market measures. Hirschey and Wichern (1984) state that accounting measures can be justified on the grounds that they are the best available data. However, they fail to reflect opportunity cost, risk and differences in accounting practices across industries. In addition Fisher and McGowan (1983) argued that since true rates of return fundamentally depend upon the time shape of individual project revenues and costs, only by the merest chance will accounting measures be insightful and concluded that firm level accounting measures are meaningless and that it is advisable to use market value measures of profitability. Lindeberg and Ross (1981) also state that market value measures of profitability provide a new and useful insight on the magnitude and sources of profitability. On the other hand Ross (1993) state that measures developed from both sources offer potentially unique but imperfect measures of profitability and that the comparison of accounting and market data is highly valuable.

Even though the use of both accounting and market measures of profitability would be beneficial, using market measures of profitability in this research would mean

considering both share splits and thin trading which results in the elimination of many participating firms. Therefore in order to measure the relationship between working capital management and profitability, only the accounting measures of profitability- Return on Assets (ROA) and Return on Equity (RTE) will be used as measures of profitability.

The variables that are used to measure working capital and profitability and their respective calculation bases are presented in the following table.

TABLE 3.3- CALCULATION BASES FOR ALL VARIABLES

VARIABLES	DEFINITION
Days in Receivables (DR)	Accounts Receivable*365 / Sales
Days in Inventory (DI)	Inventory* 365/ Cost of Goods Sold
Days in Payables (DP)	Accounts Payables* 365/ Cost of Good Sold
Cash Conversion Cycle (CCC)	DR + DI - DP
Net Trade Cycle (NTC)	(Accounts Receivables + Inventory - Accounts Payables)*365/ Sales
Return On Assets (ROA)	EBIT / Total Assets
Return On Equity (RTE)	Profit attributable to Ordinary Shareholders - Inflation adjusted depreciation on fixed assets/ Shareholders capital + Shareholders and directors loans + Inflation adjusted depreciation on other fixed assets.

3.5 RESEARCH POPULATION AND SAMPLE SIZE

The research population includes all industrial firms listed on the JSE covering a time period of 10 years from 1993-2002. Currently a total of 197 industrial firms are listed on the JSE. But in order to make the data comparable from one time period to the other all firms with missing year-data as well as firms that were not in business for the whole period of 10 years are excluded from the study. In addition pyramid firms are also excluded from the study in order to minimize the inclusion of data twice. Hence after the exclusion of pyramid firms and firms with missing year-data a total of 98 sample firms are included in the study.

3.6 DATA COLLECTION AND LIMITATIONS

The main source of data in this study is the McGregors data base station (BFA) at the University of Cape Town. The standardized Income Statement, standardized Balance Sheet and standardized Ratios are used to collect the necessary data.

The main limitations of the data are:

- The data includes only large industrial firms listed on the JSE and excludes unlisted firms and firms that were out of business during the research period. It is obvious that troubled firms are also excluded from this research. As a result this research might not be pertinent to the working capital management of small and failing firms.

- The second limitation is that most firms don't provide information regarding their cost of good sold, as it is not required by the Companies Act. But Trading Profit, which is the profit of the company before including investment income, profit and loss of an extraordinary nature and expenses, Auditor's remuneration and costs and management and other services, is available. Hence Cost of Goods Sold is approximated as follows:

Cost of Goods Sold (CGS) = Sales - Trading Profit.

- The distribution of the firms in each industry varies from 19 firms in the retail industry to one in the engineering and machinery industry and this might influence the research results as the data is dominated by a few industries.

CHAPTER FOUR

DATA PRESENTATION AND ANALYSIS

4.1 *INTRODUCTION*

This chapter will provide the results of the Spearman's rank order correlation and the regression analysis that are conducted to identify the relationship between measures of working capital and profitability. Followed by the results of the Kruskal-Wallis test, which is conducted to test the sector effect on the working capital management of South African industrial firms. CCC and NTC are used as measures of working capital and RTE and ROA are used as measures of profitability.

Summary statistics for the measures of working capital and profitability after the exclusion of outliers are given in Table 4.1. The lowest mean values of NTC and CCC are found in the building industry with eight and three days respectively and the highest are found in the retail industry with NTC of 75 days and CCC of 78 days. In addition the lowest mean value of days of inventories and the highest mean value of day of accounts payable are found in the retail industry and the highest mean value of days of accounts payables and the lowest mean value of inventories are found in the building industry. Without going further, the above findings indicate that the investment in working capital is different among the different industries.

The mean value of the NTC and CCC after the exclusion of outliers for the overall sample of the industrial companies listed on the JSE is 47 and 43 days respectively. Generally, compared to the US industrial firms which have a NTC of 90 Days (Shin and Soenen, 1998) the mean of value of industrial firms listed on the JSE is very low.

TABLE 4.1- SUMMARY STATISTICS FOR THE MEASURES OF PROFITABILITY AND WORKING CAPITAL MANAGEMENT

SECTOR		(RTE)	(DTA)	NTC	DR	DI	DP	CCC	ROA	SIZE
BUILDING	MEAN	15.55	0.55	8	53	46	96	3	0.11	13.7
	STD	13.87	0.19	34	25	27	32	37	0.07	1.19
	MAX	56.06	0.88	83	106	121	180	87	0.31	16.4
	MIN	-47.98	0.23	-82	5	1	14	-87	-0.06	11.8
ELECTRICITY	MEAN	23.75	0.53	54	68	72	88	53	0.17	13.7
	STAD	18.35	0.12	29	20	32	30	34	0.08	1.41
	MAX	78.37	0.87	135	170	181	223	141	0.34	16.1
	MIN	-43.36	0.28	0	33	17	30	-6	-12	11.2
FOOD	MEAN	13.31	0.38	45	57	59	73	43	0.12	13.4
	STAD	16.24	0.18	36	26	44	34	39	0.09	2.48
	MAX	78.97	0.89	178	141	275	208	191	0.33	16.8
	MIN	-29.35	0.05	-59	10	8	27	-47	-0.15	8.53
RETAIL	MEAN	17.94	0.53	75	64	76	62	78	0.13	13.9
	STAD	14.68	0.2	64	46	42	18	67	0.07	1.69
	MAX	85.46	0.91	199	216	196	130	198	0.34	17.39
	MIN	-46.26	0.15	-60	1	22	18	-62	-0.12	1.69
OTHERS	MEAN	15.31	0.48	45	63	52	77	39	0.13	13.6
	STAD	15.35	0.16	45	27	37	29	55	0.08	1.9
	MAX	84.48	0.91	194	164	216	190	210	0.43	17.6
	MIN	-47.99	0.04	-94	10	0	24	-120	-0.16	8.23
OVERALL	MEAN	16.29	0.5	47	62	58	77	43	0.13	13.7
	STD	15.65	0.18	49	31	39	30	56	0.077	1.84
	MAX	85.46	0.91	199	216	275	223	210	0.37	17.55
	MIN	-47.99	0.04	-94	1	0	14	-120	-0.16	1.84

The Spearman's correlation analysis and regression analysis are conducted on the overall sample as well as on the separate industry groupings. The results and the respective analyses are provided below.

4.2 DATA ANALYSIS FOR THE OVERALL SAMPLE

4.2.1 SPEARMAN'S RANK ORDER CORRELATION

The Spearman rank order correlation for the overall sample of industrial firms (Table 4.2) shows that:

- NTC and CCC are positively correlated with ROA.
- NTC and CCC are negatively correlated with RTE
- DTA ratio is negatively correlated with ROA, CCC and NTC but positively correlated with RTE.

Table 4.2 also indicates that inventories are the main derivers of the NTC and CCC. In addition, even though it is not significant ROA is positively correlated only with inventories, that is, the relationship between ROA and days of receivables and payables is negative. Hence the positive relationship between ROA and the working capital measures of profitability is mainly as a result of the positive relationship between the days of inventories and ROA

TABLE 4.2- Spearman rank order correlation for the overall sample

Marked correlations are significant at p <.05000

	(RTE)	(DTA)	SIZE	NTC T	CCC T	ROA T
(RTE)	1.000000	**0.261635**	**0.219956**	**-0.115308**	**-0.115909**	**0.820418**
(DTA)	**0.261635**	1.000000	**0.124013**	**-0.258961**	**-0.247543**	**-0.104602**
(CRA)	0.007414	**-0.476940**	**-0.123128**	**0.625622**	**0.631058**	**0.170936**
SALG	**0.361862**	**0.130017**	0.024778	0.003448	-0.006218	**0.286906**
SIZE	**0.219956**	**0.124013**	1.000000	**-0.255323**	**-0.242270**	**0.142418**
NTC T	**-0.115308**	**-0.258961**	**-0.255323**	1.000000	**0.993918**	**0.080359**
DR T	**-0.101660**	-0.033685	**-0.237784**	**0.578857**	**0.524037**	-0.028087
DI T	**-0.066769**	**-0.098346**	**-0.075654**	**0.750166**	**0.770634**	0.006006
DP T	**0.081270**	**0.246686**	**0.138215**	**-0.250161**	**-0.288938**	-0.049184
CCC T	**-0.115909**	**-0.247543**	**-0.242270**	**0.993918**	1.000000	**0.066500**
ROA T	**0.820418**	**-0.104602**	**0.142418**	**0.080359**	**0.066500**	1.000000

It is also found that size is positively correlated with DTA ratio, RTE, ROA but negatively correlated with NTC and CCC. This shows that larger firms are associated with higher profit, higher debt and lower CCC and NTC. Hence the correlation that is found between CCC and NTC and the measures of profitability might be as a result of size and other factors that affect profitability. Therefore in order to control these independent variables that affect profitability a multiple regression analysis is used and the results are given below.

4.2.2 REGRESSION ANALYSIS

After including sales growth, size, debt to asset ratio, nine year dummy variables and four industry dummy variables as independent variables, the results of the forward stepwise regression analysis (TABLE 4.3-4.6) confirmed that:

- NTC and ROA are positively correlated
- CCC and RTE are negatively correlated

Generally, it is found that increasing the investment in working capital management increases the return on assets but decreases the return to equity of the South African industrial firms listed on the JSE. Therefore the null hypothesis that states that there is no significant relationship between working capital management and profitability is rejected and the alternative hypothesis that states that there is a negative relationship between working capital measures and profitability is partially accepted. These findings indicate that working capital management has both asset management and finance influence on the profitability of the South African firms.

The difference between ROA and RTE is that ROA measures operating profit while RTE measures both operating and financing profit. Penman (2004) states that RTE can be calculated as:

RTE= ROA + (FINANCIAL LEVERAGE* (ROA- BORROWING COST))

Hence the three main drivers of RTE are:

- Return on operating assets
- Financial leverage

- The marginal difference between the return on operating assets and borrowing costs.

Therefore, the firm's RTE will be equal to its ROA if the firm finances all its assets using shareholders equity and it will be greater if the firm has financial leverage and the marginal difference between the ROA and the borrowing cost is positive. Hence if a firm has financial leverage the difference between its RTE and ROA is explained by the amount of financial leverage and the difference between the return on operating assets and cost of debt. Financial leverage generates higher return for shareholders if the firm earns more on its operating assets than its borrowing costs but it decreases shareholders return if the involved borrowing costs are higher than the return on operating assets (Penman, 2004).

Therefore the conflicting relationship between the measures of working capital and ROA and RTE is due to financial leverage. Even though higher investment in working capital increases the ROA of South African industrial firms it is associated with higher financing costs that consequently decrease the RTE.

As Paulo (1992) states the South African industrial firms hardly use cost of capital when managing their working capital and this might be the reason for their higher financing costs. Therefore in order to maximize the overall value of their business organizations, South African industrial firms should consider cost of capital and finance their investment in working capital in a way that will lead to the lowest weighted average cost of capital (WACC).

TABLE 4.3- Regression analysis for the overall sample using the dependent variable- ROA and the independent variable - NTC

Regression Summary for Dependent Variable: ROA T (data 1993-2002)

R= .30509223 R^2= .09308127 Adjusted R^2= .07863660

F(14,879)=6.4440 p<.00000 Std.Error of estimate: .03145

	Beta	Std.Err.	B	Std.Err.	t(879)	p-level
Intercept			**1.130806**	**0.013516**	**83.66631**	**0.000000**
SIZE	**0.191405**	**0.033833**	**0.003408**	**0.000602**	**5.65730**	**0.000000**
SALG	**0.124005**	**0.032511**	**0.000086**	**0.000023**	**3.81430**	**0.000146**
(DTA)	**-0.109930**	**0.034938**	**-0.020312**	**0.006456**	**-3.14638**	**0.001709**
NTC T	0.069264	0.036621	0.001214	0.000642	1.89139	0.058900

TABLE 4.4- Regression analysis for the overall sample using the dependent variable-ROA and the independent variable- CCC

Regression Summary for Dependent Variable: ROA T (data 1993-2002)

R= .30218814 R^2= .09131767 Adjusted R^2= .07684492

F(14,879)=6.3096 p<.00000 Std.Error of estimate: .03148

	Beta	Std.Err.	B	Std.Err.	t(879)	p-level
Intercept			**1.146921**	**0.008795**	130.4090	**0.000000**
SIZE	**0.187289**	**0.033790**	**0.003334**	**0.000602**	**5.5427**	**0.000000**
SALG	**0.124857**	**0.032536**	**0.000087**	**0.000023**	**3.8375**	**0.000133**
(DTA)	**-0.114937**	**0.034842**	**-0.021237**	**0.006438**	**-3.2988**	**0.001010**
CCC	0.049715	0.036410	0.000029	0.000021	1.3654	0.172462

TABLE 4.5-Regression analysis for the overall sample using the dependent variable- RTE and the independent variable- NTC

Regression Summary for Dependent Variable: RTE (log) (data 1993-2002)

R= .33207303 R^2= .11027250 Adjusted R^2= .09610164

F(14,879)=7.7816 p<.00000 Std.Error of estimate: .04211

	Beta	Std.Err.	B	Std.Err.	t(879)	p-level
Intercept			**2.146301**	**0.018074**	**118.7495**	**0.000000**
SIZE	**0.168737**	**0.033613**	**0.004062**	**0.000809**	**5.0201**	**0.000001**
SALG	**0.165278**	**0.032245**	**0.000155**	**0.000030**	**5.1257**	**0.000000**
(DTA)	**0.103168**	**0.034149**	**0.025773**	**0.008531**	**3.0211**	**0.002591**
NTC T	-0.057776	0.036262	-0.001369	0.000859	-1.5933	0.111459

TABLE 4.6- Regression analysis for the overall sample using the dependent variable-RTE and the independent variable-CCC

Regression Summary for Dependent Variable: RTE (data 1993-2002)
R= .33260529 R^2= .11062628 Adjusted R^2 .09646105
F(14,879)=7.8097 p<.00000 Std.Error of estimate: .04211

	Beta	Std.Err.	B	Std.Err.	t(879)	p-level
Intercept			**2.130362**	**0.011808**	**180.4128**	**0.000000**
SIZE	**0.168730**	**0.033526**	**0.004061**	**0.000807**	**5.0328**	**0.000001**
SALG	**0.164815**	**0.032231**	**0.000155**	**0.000030**	**5.1136**	**0.000000**
(DTA)	**0.103100**	**0.034043**	**0.025756**	**0.008504**	**3.0285**	**0.002529**
CCC	-0.061266	0.036044	-0.000048	0.000028	-1.6998	0.089530

4.3 DATA PRESENTATION AND ANALYSIS FOR THE RETAIL INDUSTRY

4.3.1 SPEARMAN RANK ORDER CORRELATION

The Spearman's rank order correlation for the retail industry (Table 4.7) shows that:

- Higher investment in working capital is associated with higher return on assets and lower return to equity.
- Highly levered firms are associated with lower return on assets and shorter CCC and NTC.
- The larger the firms are the higher the debt and the lower the working capital investment.

Even though the Spearman rank order correlation shows that there is a positive relationship between the measures of working capital and profitability it doesn't incorporate the effect of size and capital structure on the length of the NTC and CCC.

TABLE 4.7- Spearman rank order correlation for the retail industry

Marked correlations are significant at p <.05000

	(DTA)	SIZE	NTC	CCC	ROA T	RTE L
(DTA)	1.000000	**0.210996**	**-0.621809**	**-0.631884**	**-0.200844**	**0.474782**
SALG	0.134353	0.028149	-0.082441	-0.086859	**0.330721**	**0.316379**
SIZE	**0.210996**	1.000000	**-0.545935**	**-0.559036**	0.053325	**0.275607**
NTC T	**-0.621809**	**-0.545935**	1.000000	**0.996684**	**0.163718**	**-0.426413**
DR T	**-0.337563**	**-0.368135**	**0.802127**	**0.770609**	**0.158284**	**-0.283198**
DI T	**-0.672067**	**-0.446246**	**0.713240**	**0.737387**	**0.217076**	**-0.325045**
DP T	**0.267178**	**0.281203**	-0.145732	**-0.161031**	**0.244826**	**0.288705**
CCC T	**-0.631884**	**-0.559036**	**0.996684**	1.000000	**0.168222**	**-0.425815**
ROA T	**-0.200844**	0.053325	**0.163718**	**0.168222**	1.000000	**0.566076**
RTE L	**0.474782**	**0.275607**	**-0.426413**	**-0.425815**	**0.566076**	1.000000

4.3.2 REGRESSION ANALYSIS

As can be seen from Table 4.7 there is a strong correlation between DTA ratio and NTC and CCC which indicates the presence of multicolinearity between the variables. When two or more variables in a regression analysis are correlated to each other they contribute redundant information even though each independent variable contributes information for explaining and predicting the dependent variable (Bowerman and O' Connell, 1990). As a result the independent variable DTA ratio is removed from the regression equation.

TABLE 4.8- Regression analysis for the retail industry using the dependent variable- ROA and the independent variable- NTC

R= .37296477 R^2= .13910272 Adjusted R^2= .09838461

F(7,148)=3.4162 p<.00205 Std.Error of estimate: .02641

	Beta	Std.Err.	B	Std.Err.	t(148)	p-level
Intercept			**1.115823**	**0.022434**	**49.73889**	**0.000000**
SALG	0.143755	0.078735	0.000056	0.000030	1.82582	0.069893
NTC	**0.259411**	**0.089857**	**0.000113**	**0.000039**	**2.88695**	**0.004473**
SIZE	**0.233604**	**0.090262**	**0.003843**	**0.001485**	**2.58806**	**0.010613**

TABLE 4.9- Regression analysis for the retail industry using the dependent variable- ROA and the independent variable- CCC

Regression Summary for Dependent Variable: ROA T (RETAIL INDUSTRY)

R= .37984322 R^2= .14428087 Adjusted R^2= .10380767

F(7,148)=3.5648 p<.00143 Std.Error of estimate: .02633

	Beta	Std.Err.	B	Std.Err.	t(148)	p-level
Intercept			**1.113108**	**0.022498**	**49.47494**	**0.000000**
SALG	0.145371	0.078478	0.000056	0.000030	1.85239	0.065961
CCC	**0.274452**	**0.090091**	**0.000113**	**0.000037**	**3.04639**	**0.002743**
SIZE	**0.243968**	**0.090557**	**0.004013**	**0.001490**	**2.69409**	**0.007874**

After including size and sales growth as independent variables in the regression analysis (Table 4.8-4.11) it is confirmed that higher investment in working capital is associated with higher return on assets and lower return on equity in the retail industry. In addition as can be seen from Table 4.12-4.13 it is found that the investment in trade credit is associated with higher return to equity and return to assets which might be as a result of the industry's lower investment in trade credit (Table 4.1). This indicates that firms in the retail industry can still use trade credit as a source of financing and enjoy the fruits without hurting their relationship with their suppliers. It is also found that the benefit of higher return on assets comes mainly from the investment in inventories and payables.

TABLE 4.10-Regerssion analysis for the retail industry using the dependent variable- RTE and the independent variable- NTC

Regression Summary for Dependent Variable: RTE L (RETAIL INDUSTRY)

R= .40852159 R^2= .16688989 Adjusted R^2= .10324953

F(4,144)=2.6224 p<.00444 Std.Error of estimate: .09407

	Beta	Std.Err.	B	Std.Err.	t(144)	p-level
Intercept			**1.781855**	**0.080665**	**22.08950**	**0.000000**
NTC	**-0.178884**	**0.089868**	**-0.000278**	**0.000140**	**-1.99052**	**0.048426**
SALG	**0.206857**	**0.078556**	**0.000286**	**0.000108**	2.63323	**0.009381**
SIZE	0.149576	0.090882	0.008787	0.005339	1.64582	0.101982

TABLE 4.11-Regression analysis for the retail industry using the dependent variable- RTE and the independent variable- CCC

R= .40434427 R^2= .16349429 Adjusted R^2= .09959455

F(11,144)=2.5586 p<.00548 Std.Error of estimate: .09427

	Beta	Std.Err.	B	Std.Err.	t(144)	p-level
Intercept			**1.776141**	**0.081360**	**21.83065**	**0.000000**
CCC	**-0.166009**	0.090544	-0.000245	0.000133	-1.83346	0.068799
SALG	**0.205192**	**0.078696**	**0.000283**	**0.000109**	**2.60740**	**0.010084**
SIZE	0.154352	0.091759	0.009068	0.005391	1.68215	0.094707

TABLE 4.12-Regeression analysis using the dependent variable- ROA and the independent variables- DP, DI and DR.

R= .45811157 R^2= .20986621 Adjusted R^2= .13141321

F(14,141)=2.6751 p<.00169 Std.Error of estimate: .02593

	Beta	Std.Err.	B	Std.Err.	t(141)	p-level
Intercept			**1.052315**	**0.029732**	**35.39379**	**0.000000**
DP T	**0.192852**	**0.086717**	**0.004654**	**0.002093**	**2.22392**	**0.027744**
DI T	**0.236211**	**0.087702**	**0.002841**	**0.001055**	**2.69333**	**0.007933**
SIZE	**0.216806**	**0.098813**	**0.003567**	**0.001626**	**2.19410**	**0.029866**
DR T	0.153461	0.084367	0.001388	0.000763	1.81898	0.071036
SALG	0.067932	0.081512	0.000026	0.000032	0.83340	0.406028

TABLE 4.13- Regression analysis for the retail industry using the dependent variable- RTE and the independent variables- DP, DI and DR

R= .45447995 R^2= .20655202 Adjusted R^2= .12776996

F(14,141)=2.6218 p<.00208 Std.Error of estimate: .09278

	Beta	Std.Err.	B	Std.Err.	t(141)	p-level
Intercept			**1.676185**	**0.106400**	**15.75364**	**0.000000**
SIZE	0.094885	0.099020	0.005574	0.005817	0.95824	0.339580
DR T	**-0.176909**	**0.084543**	**-0.005713**	**0.002730**	**-2.09252**	**0.038184**
DI T	-0.009689	0.087886	-0.000416	0.003774	-0.11024	0.912372
DP T	**0.256396**	**0.086899**	**0.022099**	**0.007490**	**2.95051**	**0.003716**
SALG	0.138024	0.081683	0.000191	0.000113	1.68976	0.093283

4.4 DATA PRESENTATION AND ANALYSIS FOR THE CONSTRUCTION AND BUILDING MATERIALS INDUSTRY

4.4.1 SPEARMAN'S RANK ORDER CORRELATION

The Spearman's correlation for the building industry (Table 4.12) also shows that higher investment in working capital is associated with higher return on assets and lower return to equity. In addition it is also found that there is a significant negative correlation between days of accounts payables and ROA both before and after controlling for size and sales growth. Deloof (2003) found a negative correlation between days of accounts payables and gross operating profit and stated that it is because less profitable firms wait longer to pay their bills not because the level of accounts payables affects profitability. Hence this might also be the reason here as the lowest mean values of ROA and the highest mean value of accounts payables is found in this industry.

TABLE 4.14- Spearman rank order correlation for the building and construction industry

Marked correlations are significant at p <.05000

	(RTE)	(DTA)	SIZE	NTC	CCC	ROA T
(RTE)	1.000000	0.001084	-0.023704	**-0.212074**	**-0.254211**	**0.674518**
(DTA)	0.001084	1.000000	**0.339369**	**-0.744788**	**-0.663395**	**-0.603853**
SALG	**0.520071**	-0.045410	-0.094652	0.003532	-0.044025	**0.389957**
SIZE	-0.023704	**0.339369**	1.000000	**-0.223637**	-0.174580	**-0.244443**
NTC	**-0.212074**	**-0.744788**	**-0.223637**	1.000000	**0.983900**	**0.375897**
DR	-0.168289	-0.013192	**0.248735**	-0.053753	-0.119697	-0.143604
DI	-0.134539	**-0.297355**	**-0.249886**	**0.513332**	**0.539892**	0.167769
DP	0.100944	**0.492372**	**0.247792**	**-0.732490**	**-0.783662**	**-0.265291**
CCC	**-0.254211**	**-0.663395**	-0.174580	**0.983900**	1.000000	**0.296413**
ROA	**0.674518**	**-0.603853**	**-0.244443**	**0.375897**	**0.296413**	1.000000

4.4.2 REGRESSION ANALYSIS

The regression analysis for the building industry (Table 4.15-4.16) shows that

- There is a significant positive relationship between NTC and CCC and ROA even after controlling for size and sales growth.
- But there is no significant relationship between RTE and CCC and NTC.
- There is significant negative relationship between size and profitability.

The above findings indicate that firms in the construction and building materials industry can increase their return on assets by increasing their investment in working capital. This might be as a result of the industry's low investment in working capital.

TABLE 4.15-Regression analysis for the building industry using the dependent variable- ROA and the independent variable-NTC

R= .53924319 R^2= .29078321 Adjusted R^2= .19827668

F(12,92)=3.1434 p<.00088 Std.Error of estimate: .02759

	Beta	Std.Err.	B	Std.Err.	t(92)	p-level
NTC	**0.369677**	**0.094459**	**0.000331**	**0.000085**	**3.91361**	**0.000174**
SIZE	-0.181589	0.092993	-0.004650	0.002381	-1.95272	0.053893
SALG	0.076357	0.091707	0.000066	0.000079	0.83262	0.407216

TABLE 4.16- Regression analysis for the building industry using the dependent variable- ROA and the independent variable- CCC

R= .49481975 R^2= .24484658 Adjusted R^2= .14634831

F(12,92)=2.4858 p<.00725 Std.Error of estimate: .02847

	Beta	Std.Err.	B	Std.Err.	t(92)	p-level
Intercept			**1.184763**	**0.036084**	**32.83358**	**0.000000**
CCC	**0.290994**	**0.098160**	**0.000241**	**0.000081**	**2.96449**	**0.003861**
SIZE	**-0.203154**	**0.095544**	**-0.005202**	**0.002446**	**-2.12628**	**0.036157**
SALG	0.074162	0.094664	0.000064	0.000081	0.78343	0.435389

4.5 DATA PRESENTATION AND ANALYSIS FOR THE FOOD AND ELECTRONIC AND ELECTRICAL EQUIPMENT INDUSTRIES

4.5.1 SPEARMAN'S RANK ORDER CORRELATION

The Spearman's rank order correlation for the food industry (Table 4.17) shows that:

- Highly levered firms are associated with long CCC and NTC and high return on assets.
- Increasing the investment in accounts receivables increases the return on assets of the firms in this industry.
- There is a positive relationship between the measures of working capital and profitability but is not statistically significant at 5%.

Generally it is found that there is a trend of positive relationship between the measures of working capital and profitability in the food industry.

TABLE 4.17-Spearman rank order correlation for the food industry

MD pair wise deleted

Marked correlations are significant at p <.05000

	(RTE)	(DTA)	SIZE	NTC	CCC	ROA
(RTE)	1.000000	**0.341803**	**0.483722**	0.155399	0.128256	**0.962954**
(DTA)	**0.341803**	1.000000	**0.486888**	**0.421969**	**0.410379**	**0.288420**
SALG	**0.405793**	0.170436	0.083896	0.063049	0.055917	**0.420858**
SIZE	**0.483722**	**0.486888**	1.000000	0.130629	0.130209	**0.404449**
NTC	0.155399	**0.421969**	0.130629	1.000000	**0.992716**	0.162317
DR	**0.229002**	**0.440209**	0.168462	**0.775990**	**0.734400**	**0.201682**
DI	0.135838	**0.352552**	0.115762	**0.828473**	**0.813199**	0.111137
DP	**0.227794**	**0.340880**	0.116061	**0.392444**	**0.343950**	0.102971
CCC	0.128256	**0.410379**	0.130209	**0.992716**	1.000000	0.142282
ROA	**0.962954**	**0.288420**	**0.404449**	0.162317	0.142282	1.000000

On the other hand the Spearman rank order correlation for the electronic and electrical equipment industry (Table 4.18) shows that:

- There is negative correlation between the measures of working capital and profitability but the relationship is not significant at 5%.
- Increasing the investment in receivables decreases the industry's return on assets which might be as a result of the industry's highest investment in accounts receivables (Table 4.1).

TABLE 4.18-Spearman rank order correlation for the electrical equipment industry

MD pair wise deleted

Marked correlations are significant at p <.05000

	(DTA)	SIZE	NTC	CCC	ROA	(RTE)
(DTA)	1.000000	-0.179028	-0.214457	-0.228938	-0.124519	**0.396650**
SALG	0.066233	**-0.074774**	**0.240929**	**0.243630**	-0.037549	0.128405
SIZE	-0.179028	1.000000	**-0.535851**	**-0.527243**	0.163581	0.053159
NTC	-0.214457	**-0.535851**	1.000000	**0.994940**	-0.038535	-0.124306
DR	0.112956	**-0.315686**	**0.343114**	**0.285481**	**-0.282642**	-0.089288
DI	-0.009401	**-0.359095**	**0.799611**	**0.783290**	0.001049	0.028292
DP	**0.287121**	**0.283845**	-0.202610	**-0.247717**	-0.027737	**0.233679**
CCC	-0.228938	**-0.527243**	**0.994940**	1.000000	-0.033845	-0.134055
ROA	-0.124519	0.163581	-0.038535	-0.033845	1.000000	**0.759225**
(RTE)	**0.396650**	0.053159	-0.124306	-0.134055	**0.759225**	1.000000

4.5.2 REGRESSION ANALYSIS

After including sales growth, debt to asset ratio and size as independent variables in the regression equation, no significant relationship is found between the working capital and profitability measures for both industries.

4.6 DATA PRESENTATION AND ANALYSIS FOR ALL OTHER INDUSTRIES

4.6.1 SPEARMAN'S RANK ORDER CORRELATION

The Spearman's rank order correlation for all other industries grouped as one which is presented in Table 4.19 shows that:

- There is no significant correlation between CCC and NTC and ROA as well as between NTC and CCC and RTE
- But there is a statistically significant negative correlation between days of receivables, inventories and accounts payables and RTE and ROA.

TABLE 4.19- Spearman rank order correlation for all other industries grouped as "others"

Marked correlations are significant at p <.05000

	(RTE)	(DTA)	SIZE	NTC	CCC	ROA
(RTE)	1.000000	**0.159520**	**0.189577**	-0.090393	**-0.091730**	**0.894749**
(DTA)	**0.159520**	1.000000	-0.007644	**-0.119662**	**-0.122723**	-0.060372
SALG	**0.386033**	**0.165268**	0.060112	-0.024979	-0.035046	**0.289937**
SIZE	**0.189577**	-0.007644	1.000000	**-0.238886**	**-0.227461**	**0.156737**
NTC	-0.090393	**-0.119662**	**-0.238886**	1.000000	**0.993339**	-0.044821
DR	**-0.120815**	-0.010884	**-0.332509**	**0.588390**	**0.529185**	**-0.155949**
DI	**-0.113688**	0.032963	0.003772	**0.800984**	**0.820592**	**-0.135970**
DP	-0.031674	**0.160073**	**0.138806**	**-0.229795**	**-0.274699**	**-0.142664**
CCC	**-0.091730**	**-0.122723**	**-0.227461**	**0.993339**	1.000000	-0.047878
ROA	**0.894749**	-0.060372	**0.156737**	-0.044821	-0.047878	1.000000

4.6.2 REGESSION ANALYSIS

No significant relationship is found between the measures of working capital and the measures of profitability after controlling size, debt to asset ratio and sales growth but the direction of the relationship is still negative. In addition as can be seen from Table 4.20 there is a statistically significant negative correlation only between days of accounts payables and ROA after including size, sales growth and debt to asset ratio as independent variables in the regression equation. Hence this indicates that higher investment in trade credit decreases the ROA of the firms in this group. As a result they might benefit by paying their bills and lowering their investment in trade credit.

TABLE 4.20- Regression analysis for the "others" industry using the dependent variable- ROA and the independent variables- DR, DP and DI

R= .24984396 R^2= .06242201 Adjusted R^2= .03521550
F(13.448)=2.2944 p<.00608 Std.Error of estimate: .07530

	Beta	Std.Err.	B	Std.Err.	t(448)	p-level
Intercept			**0.099481**	**0.034360**	**2.89526**	**0.003974**
DR	-0.059564	0.054732	-0.000170	0.000156	-1.08828	0.277056
SIZE	**0.142695**	**0.051381**	**0.005742**	**0.002068**	**2.77722**	**0.005713**
DP	**-0.120138**	**0.050726**	**-0.000321**	**0.000136**	**-2.36837**	**0.018290**
SALG	0.079513	0.046954	0.000136	0.000080	1.69343	0.091070
(DTA)	-0.051245	0.047519	-0.024437	0.022660	-1.07842	0.281426
DI	-0.042820	0.048305	-0.000089	0.000100	-0.88645	0.375849

4.7 COMPARISION OF THE RESULTS WITH SIMILAR RESEARCH

Shin and Soenen (1998) found a significant negative correlation between NTC and profitability in their study of large US industrial firms. In addition Jose, Lancaster and Stevens (1996) found a significant negative correlation between CCC and ROA and RTE for a large cross section of US firms. To the contrary Lyroudi and Lazaridis (2000) found a positive relationship between CCC and ROA and net operating profit margin in the food industry. On the other hand Deloof (2003) found no significant relationship between CCC and gross operating profit.

As stated before a significant negative relationship is found between RTE and CCC for the overall sample of industrial firms listed on the JSE which is similar to the findings of Jose *et al.* At the same time a significant positive relationship is found between NTC and ROA which is similar to the findings of Lyroudi and Lazaridis but contradictory to the findings of Shin and Seonen and Jose *et al.*

The mean value of NTC for the overall sample of firms included in the study by Shin and Soenen is 90 days and the mean value of the CCC for the overall sample firms included in the study by Jose *et al* is 164 days which is very high compared to the 47 days of NTC and 43 days of CCC of this study. Hence the reason for the positive correlation between the NTC and CCC and ROA of the sample of South African industrial firms listed on the JSE might be due to their lower investment in working capital compared to US firms. On the other hand this positive correlation could also be due to the highest number of participant firms in the retail industry which might dominate the result for the overall sample. As can be seen from table 4.8- 4.11 a significant positive relationship is found between CCC and NTC and ROA in the retail industry.

4.8 SECTOR EFFECT ON WORKING CAPITAL MANAGEMENT

In order to test the sector effect on working capital management of industrial firms listed on the JSE a non-parametric measure, the Kruskal-Wallis test, is conducted on the sample of South African industrial firms. As can be seen from Tables 4.21 and 4.22 a total of 894 firm years after the exclusion of outliers are included in the test. Both CCC and NTC are used as measures of working capital management and as is presented in Tables 4.21 and 4.22 the Kruskal-Wallis test indicates that there is a significant sector effect on the working capital management of South African industrial firms. Moreover the test indicates that there is almost a 0% probability of no significant sector effect.

TABLE 4.21-Kruskal Wallis test for the overall sample using the dependent variable- NTC

Kruskal-Wallis ANOVA by Ranks; NTC (INDUSTRY DATA)
Independent (grouping) variable: INDUSTRY SECTOR
Kruskal-Wallis test: H (16, N= 894) =289.4960 p =0.000

	Code	Valid	Sum of
CHEMICALS	101	30	14228.00
CONSTRACTION & BUILDING	102	105	24866.00
FORESTRY & PAPER	103	30	12981.00
STEEL AND OTHER MATERIALS	104	20	10602.00
DIVERSIFIED	105	20	8954.00
ELECTRONIC AND ELECTRIACL EQUIPMENT	106	75	38311.00
ENGINEERING AND MACHINERY	107	9	6588.00
AUTOMOBILES & PARTS	108	48	19424.00
HOUSEHOLD & APPLIENCES	109	58	42751.00
BEVERAGES	110	29	12514.00
FOOD	111	96	42999.00
HEALTH	112	35	20125.00
RETAILERS	113	156	87168.00
LEISURE & HOTELS	114	45	7247.00
MEDIA	115	18	7293.00
SUPPORT SERVICES	116	70	32250.00
TANSPORT	117	50	11764.00

TABLE 4.22-Kruskal-Wallis test for the overall sample using the dependent variable- CCC

Kruskal-Wallis ANOVA by Ranks; CCC (INDUSTRY DATA)
Independent (grouping) variable: INDUSTRY SECTOR
Kruskal-Wallis test: H (16, N= 894) =306.1229 p =0.000

	Code	Valid	Sum of
CHEMICALS	101	30	13499.00
CONSTRACTION & BUILDING	102	105	25898.00
FORESTRY & PAPER	103	30	12769.00
STEEL AND OTHER MATERIALS	104	20	10935.00
DIVERSIFIED	105	20	9010.00
ELECTRONIC AND ELECTRIACL EQUIPMENT	106	75	38325.00
ENGINEERING AND MACHINERY	107	9	6601.00
AUTOMOBILES & PARTS	108	48	20253.00
HOUSEHOLD & APPLIENCES	109	58	42731.00
BEVERAGES	110	29	12614.00
FOOD	111	96	43480.00
HEALTH	112	35	19254.00
RETAILERS	113	156	89131.00
LEISURE & HOTELS	114	45	6313.00
MEDIA	115	18	6887.00
SUPPORT SERVICES	116	70	32117.00
TRANSPORT	117	50	10248.00

The Spearman's correlation and regression analysis conducted in the different industries also indicate that there is a significant disparity in the working capital management practice of the different industries. In confirmation with this a South African study by Hoffman (1997) indicates that working capital ratios are significantly influenced by the nature of the firm's operations. To the contrary Smith (1998) concluded that the sector effect on working capital management of South African industrial firms might not be as significant as that advanced in previous local and international research findings.

Smith used 13 measures of working capital which include nine traditional measures of working capital, such as the current and the quick ratio, and four more recently developed measures of working capital such as the CCC and NTC. When the CCC and NTC are used as measures of working capital the null hypothesis of no significance is rejected by almost 100%. But since out of the total 13 working capital measures included only 6 measures have rejected the null hypothesis of no significance, Smith concluded that there is no significant sector effect.

But many authors such as Emery (1984), Kamath (1989) and Jose *et al* (1996) have questioned the adequacy of traditional measures such as the current and the quick ratio as measures of liquidity. Shin and Soenen (1998) also state that current ratio measures working capital management differently from NTC. In addition they also state that traditional liquidity measures have deficiencies in measuring the efficiency of the firm's working capital management. Hence Smith's conflicting view might be due to the inefficiency of the traditional measures of working capital management.

4.9 SUMMARY OF THE FINDINGS

In general the Spearman rank order correlation and the regression analysis for the overall sample of South African industrial firms indicate that higher investment in working capital increases the ROA but decreases the RTE of South African industrial firms. In addition the results for the individual industries: Retail industry, Building industry, Electrical and electronics industry, Food industry and all other industries grouped as one indicate that:

- There is a significant positive relationship between the measures of working capital and ROA and a significant negative relationship between the measures of working capital and RTE both before and after controlling for size and sales growth in the Retail industry.

- There is a significant positive relationship between NTC and CCC and ROA and no significant relationship between NTC and CCC and RTE after controlling for size and sales growth in the Building industry. But a significant negative relationship is found between NTC and CCC and RTE before controlling for size and sales growth.

- There is no significant relationship between the measures of working capital and profitability after and before controlling for size, sales growth and debt to asset ratio in the Food industry, Electronics and electrical industry and in all the other industries grouped as one. But a significant negative relation is found between the days of receivables, inventories and payables and ROA and RTE in all the other industries grouped as one, even though a significant negative relationship is found only between days of payables and ROA and RTE after controlling for size, sales growth and debt to asset ratio.

The above results indicate that different industries employ different working capital management strategies. In confirmation, the Kruskal-Wallis test that is conducted to test the significance of sector effect indicate that there is a significant sector effect on working capital management of South African industrial firms listed on the JSE.

CHAPTER FIVE

CONCLUSIONS AND RECOMMENDATIONS

5.1 CONCLUSIONS

This study examines the relationship between working capital management efficiency and profitability and the significance of the sector effect on working capital management of South African industrial firms listed on the JSE. To measure the relationship between the measures of working capital, CCC and NTC, and the measures of profitability, ROA and RTE, both the Spearman's rank order correlation and forward stepwise regression analysis are conducted on a sample of 98 South African industrial firms listed on the JSE.

Even though there are exceptions to the general finding for specific industries, the results for the overall sample of South African industrial firms indicate that there is a positive relationship between the measures of working capital and ROA and a negative relationship between the measures of working capital and RTE. Any difference between ROA and RTE is due to financial leverage. Hence the above findings indicate that higher investment in working capital is associated with higher financing costs that consequently decrease the RTE, even though it is associated with higher ROA. Therefore in order to maximize the overall wealth of their business organization, the South African industrial firms should consider cost of capital and finance their investment in working capital in a way that will lead to the lowest weighted average cost of capital.

A Spearman's rank order correlation and regression analysis are also conducted individually for the retail industry, electronic and electrical equipment industry, food producers and processors industry and for all other industries grouped as one and the following results are found:

- A significant positive relationship between CCC and NTC and ROA and a significant negative relationship between CCC and NTC and RTE is found in the retail industry.

- A significant negative relationship between CCC and NTC and ROA but no significant relationship is found between CCC and NTC and RTE after controlling for size and sales growth in the construction and building materials industry.

- No significant relationship is found between the measures of working capital and profitability in the electronics and electrical equipment industry, food industry and in all the other industries grouped as one.

Even though the above findings indicate that different industries utilize different working capital management practices, a Kruskal-Wallis test was also conducted to test the sector effect on the working capital management of the sample industrial firms. In this test the CCC and NTC were also used as measures of working capital management and it is found that there is a significant sector effect on the working capital management of South African sample industrial firms at a probability level of almost 100%. This finding is therefore in confirmation with the financial management theory that states different industries which are exposed to different products and markets, level of technology and competition employ different working capital management strategies.

5.2 RECOMMENADTION FOR FUTURE RESEARCH

Generally there is a positive relationship between ROA and NTC and CCC and a negative relationship between RTE and CCC and NTC for the overall sample of South African industrial firms but it is not identified whether working capital is affecting profitability or it is profitability which is affecting working capital. As Deloof (2003) states the positive relationship between ROA and CCC and NTC might be to some extent as a consequence of profitability affecting working capital management and not vice versa. Hence it is suggested for further research to conduct causality test in order to investigate whether working capital management affects profitability or vice versa.

In addition, the influence of the working capital management on the capital structure and overall value of South African firms can be investigated by using WACC and other measures of profitability that consider cost of capital such as the Economic Value Added (EVA).

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APPENDIX 1

List of companies included in the study

CHEMICAL AND OIL

AFRICAN OXYGEN LTD

AECI LTD

SPANJAARD LTD

BUILDING AND CONSTRACTION

CERAMIC INDUSTRIES LTD

MASONITE (AFRICA) LTD

PRETORIA PORTLAND CEMENT COMPANY LTD

BASIL READ HOLDINGS LTD

CONCOR LTD

ELB GROUP LTD

GROUP FIVE LTD

MURRAY AND ROBERTS HOLDINGS LTD

WILSON BAYLY HOLMES-OVCON LTD

ITALTILE LTD

CASHBUILD LTD

FORESTRY AND PAPER

YORK TIMBER ORGANISATION LTD

CANADIAN OVERSEAS PACKAGING INDUSTRIES LTD

SAPPI LTD

SUPPORT SERVIECES

ALEX WHITE HOLDINGS LTD

BOWLER METCALF LTD

BIDVEST GROUP LTD

NAMPAK LTD

TRANSPACO LTD

JHONNIC COMMUNICATIONS LTD

ADCORP HOLDINGS LTD

STEEL

HIGHVELD STEEL AND VANADIUM CORPORATION LTD

ISCOR LTD

ATOMOBILE AND PARTS

METAIR INVESTMENTS LTD

TIGER WHEELS LTD

COMBINED MOTOR HOLDINGS LTD

MCCARTHY LTD

VAALAUTO LTD

TRANSPORT

CARGO CARRIERS LTD

PUTCO LTD

UNITRANS LTD

GRINDROD LTD

TRENCOR LTD

DIVERSIFIED INDUSTRIES

IMPERIAL HOLDINGS LTD

BARLOWORLD LTD

ELECTRICAL EQUIPMENT

DELTA ELECTRICAL INDUSTRIES LTD

PASDEC RESOURCES SA LTD

REUNNERT LTD

ALLIED TECHNOLOGIES LTD

ALLIED ELECTRONICS CORPORATION LTD

CONTROL INSTRUMENTS GROUP LTD

GRINTTEK LTD

JASCO ELECTRONICS HOLDING LTD

HOUSE HOLD GOODS AND TEXTILE

RICHEMONT SECURITIES AG

PALS HOLDINGS LTD

SEARDEL INVESTMENT CORPORATION LTD

GLODINA HOLDINGS LTD

NU-WORLD HOLDINGS LTD

ANBEECO INVESTMENTS HOLDINGS LTD

VENTER LEISURE AND COMMERCIAL TRAILERS LTD

BEVERAGES BREWERS

SABMILLER PLC

DISTELL GROUP LTD

AMALGATED BEVERAGES INDUSTRIES LTD

FOOD PRODUCERS AND PROCESSORS

CONAFEX HOLDING SOCIETE ANONYME

CROOKERS BROTHERS LTD

NAMIBIAN SEA PRODUCTS LTD

OCEANA GROUP LTD

RAINBOW CHICKEN LTD

W B HOLDINGS LTD

AVI LTD

ILLOVO SUGAR LTD

TIGER BRANDS LTD

TONGAAT- HULETT GROUP LTD

HEALTH CARE

MEDI- CLINIC CORPORATION LTD

AFROX HEALTHCARE HOLDINGS LTD

ASPEN PHARMACARE HOLDINGS LTD

FORIM HOLDINGS LTD

ENGINERING AND MECHINERY

HUDACO INDUSTRIES LTD

RETAIL

METRO CASH AND CARRY LTD

BRANDCORP HOLDINGS LTD

BEARING MAN LTD

ELLERINE HOLDINGS LTD

INMINS LTD

NITCUS LTD

RELYANT RETAIL LTD

WINHOLD LTD

WOOLTRU LTD

AFRICAN AND OVERSEAS ENTERPRISES LTD

EDGARDS CONSOLIDATED STORES LTD

FOSCHINI LTD

FASHION AFRICA LTD

LA GROUP LTD

NEW CLICS HOLDINGS LTD

REX TRUEFORM CLOTHING COMPANY LTD

MR PRICE GROUP LTD

PICK N PAY STORES LTD

SHOPRITE HOLDINGS LTD

HOTELS AND LEISURE

CITY LODGE HOTELS LTD

DON GROUP LTD

SUN INTERNATIONAL (SOUTH AFRICA) LTD

CULLINAN HOLDINGS LTD

KERSAF INVESTMENTS LTD

MEDIA AND INTERTAINMENT

ELECTRONIC MEDIA NETWORK AND SUPERSPORT

JOHNNIC COMMUNICATIONS LTD

CAXTON PUBLISHERS AND PRINTERS LTD