An investigation of the impact of working capital management on the bottom line of an organisation

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ABSTRACT

This study examines the influence of working capital management components on the profitability of South African firms listed on the Johannesburg Stock Exchange (JSE). The study uses secondary data from annual financial statements obtained from both ShareData Online and Nasdaq for 156 organisations across 14 different sectors from 2011 to 2017. The Analysis of Variance (ANOVA) method was used to determine if any relationship exists between the profitability variable and the independent variables in the study. Furthermore, descriptive statistics and correlation matrices were used to determine if there is a negative relationship between profitability and various components of working capital. The current ratios for the organisation's tests was all found to be in the healthy range of 1 to 2, with trends being visible across certain industries. Oil and Gas have shown to have the lowest current ratio while Capital Goods have shown to have the highest current ratio. This may be related to the fact that organisations in the capital goods industry tend to keep very little (if any) stock on hand, due to the high value thereof thus maintaining a very favourable current ratio. Oil and Gas companies on the other side need first to find the natural resources to produce and sell their related products, thus tying up larger amounts of capital in work-in-progress and stock. A negative relationship is evident between the time a firm incurs costs for the purchase of products and/or services and the ultimate recovery of cash receipts from sales to customers (cash conversion cycle) and profitability. A significant negative relationship was visible between days sales outstanding (DSO) and profitability, across all of the industries reviewed. Though, trends per industry were not visible with regards to days inventory outstanding (DIO) and days payables outstanding (DPO). The cash conversion cycle (CCC) may differ from sector to sector but sound working capital principles can be applied across all sectors and management can add shareholder value by efficiently managing working capital.

Keywords: JSE, capital management, bottom line, South Africa

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JSE	Johannesburg Stock Exchange
DSO	Days Sales Outstanding
DPO	Days Payables Outstanding
DIO	Days Inventory Outstanding
CCC	Cash Conversion Cycle
ANOVA	Analysis of Variance
CR	Current Ratio
DTE	Debt to Equity Ratio
OPM	Operating Profit Margin

CHAPTER 1: NATURE AND SCOPE OF THE STUDY

1.1 Introduction

The literature on both capital structure and working capital management is rich in as far as explaining how these two corporate finance areas directly affect organisations profitability and liquidity (Lemke, 1970; Kaveri, 1985; Hamlin and Heathfield, 1991; Deloof, 2003; Lazaridis and Tryfonidis, 2006; Biger et al., 2010).

In their respective studies of working capital management, Deloof (2003:573-587) and Nasr and Raheman (2007:279-300) found the current assets of a typical organisation account for more than fifty percent of the total assets and the high levels of current assets within an organisation may directly affect its liquidity and profitability. In the same vein, Demirgunes and Samiloglu (2008:44-50) stated that an organisation that has excessive levels of working capital could result in a substandard return on investments, inconsiderable levels may result in shortages and difficulties in maintaining day-to-day operations.

Laughlin and Richards (1980:32-38) hold the same view that an organisation that doesn't pay attention to working capital management, which essentially reflects the organisation's liquidity position, may cause severe difficulties and losses due to adverse short-run developments even for the organisation with favourable long-run prospects. The upside of the preceding is that incorrect evaluation of liquidity implications of an organisation's working capital needs may result in unanticipated risks of company failure.

Maximising profit or shareholder value is the ultimate objectives for a company, however, preserving liquidity is important too. A company needs to manage their bottom line for their continuity, but at the same time, a company needs to focus on liquidity to prevent insolvency or bankruptcy. This presents a trade-off between these two objectives, focusing on profit maximisation should not be to the detriment of liquidity, and calls for effective working capital management (Raheman and Nasr, 2007:279-300). All the same, the authors did not specify what the most efficient method of managing work-

ing capital is, or speculate for each sector. The question of the level of effective working capital management rises because it is not clear what exactly efficiency means for a company. Is it efficient to grant more favourable credit terms to customers and increase sales or rather apply a stricter credit policy to reduce the levels of trade receivables to an acceptable level; to prevent a shortfall of cash in the cash conversion cycle (CCC)? Is it more effective to have higher inventory levels to prevent stock shortages or is it more effective to keep lower levels of inventories and thus reducing the amount of working capital needed? Will it be more effective to defer the payment to suppliers to as late as possible without damaging the company's reputation or the working relationship with the supplier?

The ideal level of current assets and current liabilities a company should have is unclear in the financial literature (Lowies, Smith, Gitman, Hall, Strydom, Marx and Van der Merwe 2010). The ideal amount of net working capital has not yet been established because different sectors have different features, where the nature of operations differs, and thereby the responses differ as well (Wu, Cheng and Chiou 2006:149-155).

The current assets of a company consist of trade receivables, cash, inventory and short-term investments. Current liabilities consist of accruals, trade and other payables and short-term borrowings. Current assets less current liabilities equal the net current assets of a company (also known as net working capital).

While current ratio does not form part of the cash conversion cycle, the dissertation explores its impact on profitability precisely because it is one of the key measures of liquidity. Lemke (1970:47-77) asserts then that current ratio has been almost venerated by accountants and other financial decision-makers as a prime criterion of liquidity. Similarly, Laughlin and Richards (1980:32-38) concur and state that financial analysts traditionally have viewed the current ratio as a key indicator of an organisation's liquidity position.

1.2 Problem statement

Deloof (2003:573-587) and Biger et al. (2010:10) state that the longer the cash conversion cycle is, the more profitable the organisation become given that it leads to increased revenue, largely as a result of generous credit terms that allow customers access to products and services before paying for them, as well as reducing the risk of stock shortages, which essentially reduces the risk of interruptions in daily operating activities. It is however not inconceivable that corporate profitability may decrease as cash conversion cycle elongates, particularly if the costs of higher investment in working capital rise faster than the benefits of holding more inventory and/or granting more trade credit to customers.

Although numerous studies have been carried out on working capital management by various researchers such as Lazaridis and Tryfonidis (2006:26-35), Demirgunes and Samiloglu (2008:44-50), and Biger et al. (2010:10), it is noteworthy that there is still ambivalence regarding the exact variables and in which amount, that represent the ideal working capital management solution. This study will investigate the following working capital management variables: (1) cash conversion cycle (CCC), (2) days sales in inventory (DIO), (3) days sales in receivables (DSO), (4) days payable outstanding (DPO), (5) current ratio (CR) and (6) capital structure. Previous studies provide no clear-cut direction of the relationship between any of the variables above an organisation's profitability.

While a considerable amount of research on working capital management has been undertaken by some researchers (for example, Lazaridis and Tryfonidis, 2006; Demirgunes and Samiloglu, 2008 and Mathuva, 2010), their studies are primarily on companies in geographic jurisdictions other than South Africa. Much of the currently available empirical literature on working capital management is focused on its impact on

organisations in developed countries/regions such as the United States of America (U.S.) and Europe.

This dissertation focuses on South African organisations where only limited research has been conducted. Similarly, there is very little proof available about the effect of an organisation's capital structure on the profitability of listed entities in South Africa. This study attempts to bridge this gap by examining the effect of capital structure on profitability of quoted organisations in South Africa.

1.3 Objectives of the study

1.3.1 Primary objective

The primary objective of this dissertation is to examine if working capital management components, namely: cash conversion cycle (CCC), days sales outstanding (DSO), days inventory outstanding (DIO), days payables outstanding (DPO) and current ratio impact on the profitability of South African listed organisations.

1.3.2 Secondary objectives

The secondary objectives are:

i.) To determine if the impact between working capital components and the profitability of companies differ among sectors and
ii.) To determine if the cash conversion cycle is different across various industries.

The underlying reason for this investigation of the impact in different sectors is that relative to the rest of the companies in the other sectors, companies in the industrial sector (which comprise manufacturing and production led organisations) have significantly higher levels of current assets (which form part of working capital) on their respective balance sheets. Thus, the objective is to examine if there is a difference in

the direction and extent of the impact on profitability if working capital levels change from significantly high levels to relatively low levels.

1.4 Research questions

The key questions to be investigated in this study are as follows:

i.) Does efficient working capital management impact on the profitability of South African organisations listed on the JSE? Where working capital management efficiency will be defined as the CCC. The cash conversion cycle will then be split up into its various components, which are DPO, DIO and DSO to determine which of these have the most significant effect on profitability.

ii.) If the effect is statistically significant, what is the direction of the impact of each variable; i.e. is it a negative or a positive relationship?

iii.) Does liquidity affect the profitability of companies within the industrial sector and the rest of the sectors?

1.5 Research methodology

The study conducted has both quantitative and qualitative elements. Quantitative in the regard that statistics and numbers are attached to the analysis and qualitative whereby the study attempts to look for themes and/or trends in the data as to why it behaves in a certain manner. The research methodology followed in this study comprises two phases:

1.5.1. Literature/Theoretical study

Consists of a literature review of earlier work undertaken on working capital management and how it has affected the profitability of organisations in other geographic jurisdictions.

1.5.2. Empirical study

The data used in the study is solely accounting based data in the form of organisational annual financial statements which were obtained using registering with online service providers, ShareData Online and Nasdaq.

The data collected is then analysed using the following methods:

I.) Descriptive statistical analysis wherein a description of features of the data in the study such as mean and standard deviation of each variable is presented. Also, it shows the minimum and maximum values of each respective variable which essentially indicates how wide-ranging each respective variable can be;

II.) Correlation matrix, which measures the degree of association between all the variables under consideration. In essence, the matrix explores whether or not the relationship between the variables is positive or negative, in addition to determining the degree of the association between variables under consideration; and

III.) Analysis of variance (ANOVA) will be used as an analysis tool to determine if there is a causal relationship between the profitability variable and the independent variables (CCC, DSO, DIO and DPO) in the study.

ANOVA is a collection of statistical models used to analyse the differences among group means and their associated procedures (such as "variation" among and between groups). In its simplest form, ANOVA provides a statistical test of whether or not the means of several groups are equal, and therefore generalises the t-test to more than two groups. ANOVAs are useful for comparing (testing) three or more means (groups or variables) for statistical significance. It is conceptually similar to multiple two-sample t-tests, but is more conservative and is therefore suited to a wide range of practical problems.

ANOVA is considered to be a special case of linear regression (Montgomery, 2001:34-38) which in turn is a special case of the general linear model (Howell, 2002). All consider the observations to be the sum of a model (fit) and a residual (error) to be minimised.

ANOVA is used to investigate the impact of working capital management on the bottom line of organisations. This statistical technique for estimating changes in a dependent variable (such as profitability) which is in a linear relationship with one or more independent variables (DPO, DIO, DSO and CCC).1

1.6 Outline of the study

Chapter 1 introduces the subject of working capital management and describes how this study intends to analyse the impact it can have on the profitability of an organisation.

Chapter 2 presents a literature review on earlier work undertaken on working capital management and how it affects the profitability of organisations in other geographic jurisdictions. The study will address the literature gap that the researcher found during the literature review.

Chapter 3 presents and discusses the results of the empirical study to determine if there is a relationship between efficient working capital management and profitability based on the analysis performed.

Chapter 4 presents the conclusion reached after the analysis has been performed and makes recommendations for future research.

In the following chapter a literature review of research conducted by others from various fields is reviewed to determine what trends have been identified from past research, potential pitfalls encountered and how this may impact the study in a South African context for organisations listed locally on the Johannesburg Stock Exchange (JSE).

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

The concept of working capital management describes the process by which organisations manages their short-term capital, while the objective of effective working capital management is to develop a satisfying liquidity and profitability ratio but also adding shareholders' value (Lemke, 1970). Working capital management is the ability to effectively control the current assets and current liabilities in a manner that provides the organisation with the best possible return on its assets invested but also minimising the repayments of its liabilities. Most businesses all over the world have had it tough to grapple with the management of working capital. Profitable businesses have collapsed, wind up or liquidated for lack of working capital. The importance thereof is evident and has been the topic of much research done across the globe (Lemke, 1970; Kaveri, 1985; Hamlin and Heathfield, 1991; Deloof, 2003; Lazaridis and Tryfonidis, 2006; Biger et al., 2010).

2.2 Definition of key terms and concepts

Working Capital

The term "working capital" refers to the investment in current assets which are required to carry on the operations of the business (Firer *et al.*, 2008:4-9). Managing the organisation's working capital requirements is a never-ending process to ensure the organisation has sufficient resources to continue with its revenue producing activities and avoid costly service delivery interruptions.

Trade Credit

Trade credit is an arrangement to buy goods or services on credit, that is, without making immediate cash payment. In its wider sense, it refers to both trade dues (sundry creditors or trade payables) and trade receivables/sundry debtors (Bhole and Mahakud, 2004:1277-1278). For many businesses, trade credit is an essential tool for financing growth. Trade credit is the credit extended to you by suppliers who let you buy now and

pay later. Any time you take delivery of materials, equipment or other valuables without paying cash on the spot, you're using trade credit.

Components of Working Capital Management

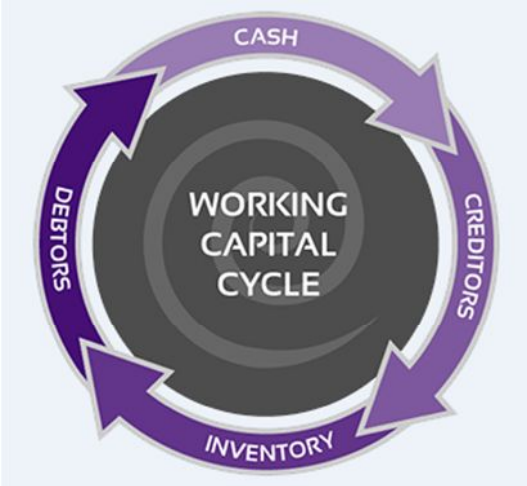
Biger *et al.* (2010:10) refer to working capital management as the 'cash conversion cycle' (CCC) which is calculated as 'days sales are outstanding' (DSO), plus 'day's inventory is outstanding' (DIO) minus 'days payable outstanding' (DPO). This cycle essentially denotes the number of days a company's cash is tied up by its current operating cycle (Fried et al., 2003:124).

Capital Structure

Firer et al. (2010:4-9) refer to the capital structure as the specific mixture of long-term debt and equity the organisation uses to finance its operations. The problem of how organisations choose and adjust their strategic financial mix has drawn interest in corporate literature primarily because of the mix of the funds (leverage ratio), the cost and availability of capital and thus the organisation's investment decisions (Salawu, 2009:121-129). Graphically presented, the working capital cycle looks like Figure 2.1 below.

Figure 2.1

Working Capital Cycle



Source: Improving Working Capital Management (Watson & Head, 2010:2)

Working capital can be statistically viewed as the balance between current assets and current liabilities, for example by comparing the balance sheet amounts for inventory, trade receivables, cash and cash equivalents and trade payables. Alternatively, working capital can be seen as equilibrium between the revenue generating and resource activities of an organisation (Pass and Pike, 1984:1-11). It is the common term for what accountants classify as net current assets. The elements of an organisation's working capital consist of two broad categories which are current assets and current liabilities. Inventories, trade receivables and cash and cash equivalents are the main categories of current assets. Trade payables and accrued expenses form the main categories of current liabilities. Efficient management of an organisation's working capital is extremely important. Holding too much working capital is inefficient, holding too little is risky to the continuity of the organisation. The importance of management of working capital effectively is what Vedarinayagam Ganesan called in the River Academic Journal that "even though organisations traditionally are focused on long-term capital budgeting and capital structure, the recent trend is that many companies across different industries focus on working capital management efficiency"(Vedarinyagam, 2002:15-20).

Short-term capital refers to the capital organisations use in their day to day operations and comprises their current assets and current liabilities. Well managed working capital contributes and promotes to the wellbeing of the organisation on the market regarding liquidity and also contributes positively towards the growth of shareholders' value (Jeng-Ren, Li & Han-Wen, 2006:49-155).

Effective working capital management plays a vital role in the overall corporate strategy of an organisation as it can drive and sustain growth and expansion phases of an organisation. Working capital can be seen as the period between when the organisation purchases raw materials and services to sell in its revenue earning activities and the collection of monies owed from customers. The effectiveness of reducing the length of the cash conversion cycle can have a direct impact on both the liquidity and profitability of the company (Soenen and Shin, 1998:37-45). The main objective of any organisation is to maximise profitability but maintaining the liquidity of the organisation should be a

of the company (Soenen and Shin, 1998:37-45). The main objective of any organisation is to maximise profitability but maintaining the liquidity of the organisation should be a close second. By doing so, they can take advantage of any potential opportunities that may arise in the normal course of business, without having to borrow money to do so. Increasing profits at the cost of liquidity can bring serious problems to the organisation. Thus, the strategy of an organisation should always strive to reach an acceptable balance between these two objectives. The dilemma faced in effective working capital management is to achieve the desired tradeoff between profitability and liquidity (Smith, 1980:45-48; Raheman and Nasr, 2007:279-300).

Referring to the theory of risk and return, investments with higher associated risks will generate a higher return. Accordingly, organisations with highly liquid levels of working capital may have lower risk and lower profitability. The flip side of that is that organisations with low liquidity in their working capital face higher risk which results in higher profitability.

The dilemma with the management of working capital is that it cannot be done in isolation. While trying to reduce it, operational compromises will have to be made, and this cannot be done without involving all facets of the organisation. From the procurement department that must only order when they have a signed order from a customer to managing a Just-in-Time inventory system, to communicating to the customer how long their order will take. The ideal would be for the organisation to reduce their working capital requirements to a minimum but not to the detriment of sales and operations. For example, decreasing the repayment period and applying a too stringent credit policy, may result in difficulties meeting sales targets. Customers appreciate and prefer a lengthier repayment period, as they too are aiming to reduce their working capital requirements. By reducing inventory levels, an organisation may not be able to take advantage of a sudden surge in demand and miss out on bulk discounts offered by their suppliers. Also by deferring payments, the organisation can risk being charged interest on outstanding amounts or miss out on discounts granted for early payment. These key performance indicators may be very industry specific, as in some industries the cash

conversion cycles are shorter (for example retail) while in other industries (for example manufacturing) the cycle can be much longer, thus tying up more working capital in operations.

Another facet to consider with large amounts of working capital required, is financing it. An organisation can generally either finance its working capital requirements with short-term liabilities and shareholders' equity, or it can depend on long-term, external financing. Liabilities owing to banks will attract interest payments and are dependent on the company's credit rating, can be significant while shareholders equity attracts dividend payments. The choice of financing will depend on how the company will want to be leveraged and the size of the organisation.

2.3 Existing and relevant literature

Working capital management is the management of current assets (resources in cash or easily converted into cash) and current liabilities (organisational commitments which soon require cash) (Hill et al., 2010:783-805). It is about maintaining an optimal balance between the individual working capital components: receivables, inventory and payables (Nazir and Afza, 2009:19-30). Successfully managing these components largely influences the performance of a company (Raheman et al., 2010; Filbeck and Krueger, 2005). According to Deloof (2003:73-587) efficient working capital management, trying to maintain an optimal level of working capital is a fundamental part of maximising shareholder value. If working capital management is efficient, it can ultimately increase the profitability of a company (Raheman and Nasr, 2007:279-300).

There have been countless research done and articles written about the importance of effective working capital management and how it affects the profitability of an organisation (Deloof, 2003; Garcia-Tereul and Martinez- Solano, 2007; Mathuva, 2009; Dong and Su, 2010; Shin and Soenen, 1998; Raheman and Nasr, 2007). Numerous authors have researched in various countries on how to employ effective working capital management favourabluy to positively affect profitability. They all have different results and interpretations on how the working capital components are related to the profitability of an organisation.

Deloof (2003:573-587), who conducted his study on Belgian organisations, suggests that working capital management has a vital effect on the profitability of an organisation. He also states that organisations have to make a trade-off between liquidity and profitability.

Similarly, Raheman and Nasr (2007:279-300) offer that a company has to determine the equilibrium between liquidity and profitability because increasing profits at the expense of the liquidity of the organisation can be harmful regarding insolvency and bankruptcy of the organisation. Accordingly, the three components of the cash conversion cycle are each managed in different ways to improve the profitability. This is due to organisation specific (industry-wise) different characteristics. Each of the researchers that have conducted case studies in different countries found different results on how the profitability of an organisation is related to the cash conversion cycle and its three components. According to Hill et al. (2010:783-805), Nazir and Afza (2009:19-30) the optimal level of working capital is the one that ensures a balance between risk and efficiency. This requires a constant monitoring of the working capital components to maintain a suitable level. On the one hand, higher sales might be generated with a large inventory and a generous trade credit since the chance of a stock-out is limited. The effects of working capital management on the Shaskia G. Soekhoe profitability of Dutch listed organisations reduced and customers can assess the quality of a product before paying. On the other hand, large inventories and trade credit keep cash locked up in working capital. The same dilemma counts for accounts payable.

Delaying payments presents companies with a possible flexible and inexpensive source of financing, and it offers the possibility to assess the quality of the products bought (Deloof, 2003:573-587). Concerning an optimal level of working capital, Hill et al. (2010:783-805) highlighted the need to consider financial characteristics besides industry affiliation when examining working capital levels for optimality. This author also did not outline what optimal management is.

Numerous researchers have focused on the relationship between profitability and working capital management. Most of these studies support the conclusion that there is a negative relation between profitability and working capital management measures, like the average collection period, inventory turnover in days, and cash conversion cycle.

The results for the relationship between profitability and average payment period are inconclusive (Binti Mohamad and Binti Mohd Saad, 2010; Dong and Su, 2010; Garcia-Tereul and Martinez- Solano, 2007; Raheman en Nasr, 2007; Deloof, 2003; Shin and Soenen, 1998; Jose et al., 1996). Jose et al. (1996:33-46) examined the relationship between profitability and aggressive working capital management in US companies. With the cash conversion cycle as a measure for working capital management, they found a significant negative relationship between the cash conversion cycle and profitability. More precisely they found that a shorter cash conversion cycle, in other words, a more aggressive style of working capital management, leads to higher profitability. Shin and Soenen (1998:37-45) examined the relationship between efficient working capital management and an organisation's profitability using the net-trade cycle as a measure of working capital management. The relationship was examined using correlation analysis and ANOVA (Analysis of Variances), by different industries.

Using a sample of 58,985 organisation years covering the period 1975–1994, in all cases, the authors found a strong negative relation between the length of the organisation's cash conversion cycle and its profitability. It was also found that a shorter cash conversion cycle was associated with higher risk returns.

Deloof (2003:573-587) investigated a sample of 1,009 Belgian organisations and found a significant negative relationship between profitability and the individual components of working capital, i.e. days sales outstanding, days inventory outstanding and days payables outstanding.

Deloof (2003:573-587) felt the negative relationship between the profitability and the number of days sales and inventory that were outstanding suggest that managers can increase shareholder value by reducing the number of days outstanding to a minimum. The negative relationship between profitability and accounts payable suggest that when organisations are not as profitable, they delay paying their suppliers.

Dong and Su (2010:49-67) investigated the relationship between the cash conversion cycle and profitability, measured through gross operating profit. Their research was based on a sample of 130 organisations listed on the Vietnam stock exchange between 2006 and 2008.

The cash conversion cycle had been split into the number of accounts receivable, a number of days accounts payable and the number of days inventory. With a correlation analysis and a multiple regression analysis in which they controlled the sales, debt ratio and fixed financial assets to total assets they conclude that there is a strong negative relationship between the number of days accounts receivable, the number of days inventories and cash conversion cycle with corporate profitability. A positive relationship was evident between the number of days payables were outstanding and profitability. The study suggested that managers can create value for their shareholders by waiting longer to pay their bills.

Padachi (2006:45-58) conducted a similar study on small Mauritian manufacturing organisations, from 1998 to 2003, and found that by increasing the number of days accounts payable were outstanding the profitability can be negatively impacted due to the discount for early payment to suppliers being forfeited. When revenues are down, organisations tend to postpone their repayment to creditors to rather pay their employees or revenue authorities, i.e. they would rather pay the most pressing expenses first. Using return on total assets as a gauge for profitability, the author discovered that the number of days accounts receivable were outstanding has a notable relationship with return on total assets.

This implies that an increase of one day in day's sales outstanding will result in lower profitability. Also, Padachi did not find any significant coefficient between inventories and the profitability of the organisations in the study.

Lazaridis and Tryfonidis (2007:26-35) studied the relationship between working capital management and profitability of listed companies on the Athens Stock Exchange. They noted that the shorter the period between production and final sale of the final product, the more profitable the organisation would be. According to their research, there is a tendency of less profitable organisations to decrease the days' sales are outstanding to lessen the gap in the cash conversion cycle. Holding too much inventory when revenues have decreased will lead to excessive working capital being tied up in stock while it could be used elsewhere in the organisation.

2.4 Summary

The positive takeaways of the literature review conducted above are that while working capital management components can impact the profitability of an organisation; there is uncertainty regarding the appropriate variables that might serve as key performance indicators for effective working capital management as well as the direction of the impact of these different components on profitability. As an example, in his research, Mathuva (2010:1-11) finds that there exists a highly significant positive relationship between the time it takes to convert inventories into revenue and profitability. This finding is contrary to that of Deloof (2003:573-587) whose findings concluded that there is a negative relationship between days of inventory outstanding and profitability. It, therefore, shows that there is no distinct direction of the relationships between any of the variables and an organisation's profitability. The differences in the direction of the variables and their impact on profitability could be attributed to any one of the following factors:

(1) Countries may have the same kind of industries, but their characteristics are influenced by their geographical locations,

(2) The nature of the industries selected in each of the studies may be different, and

(3) The economic conditions for the time frames selected may differ.

Two alternative strategies of working capital management are offered up by modern theory; Conservative working capital management policy and an aggressive working capital management policy.

A literature debate exists on the risk versus return trade-off among different working capital researchers (Moyer et al., 2005; Brigham and Ehrhardt, 2004; Gitman, 2005). While more aggressive working capital policies are associated with higher returns and risk, conservative working capital policies offer both lower risk and lower returns (Weinraub and Visscher, 1998; Gardner et al., 1986).

Numerous studies have used the cash conversion cycle as a measure of working capital management. The longer the cycle, the more cash is tied up in working capital. This situation can have two outcomes. It can have a positive effect on profitability if it leads to increased sales or, it can have a negative effect on profitability if the cost of tying up larger amounts of working capital increases faster than the ease of having more inventories or the satisfaction of having a returning customer base due to generous trade credit terms (Deloof, 2003:573-587).

In the following chapter, the data collected will be analysed and compared to the conclusions reached by past researchers to determine if there are any similarities and universal tendencies that cross geographical borders and time periods.

CHAPTER 3: EMPIRICAL STUDY

3.1 Introduction

This chapter describes the methodology that will be followed to address the research questions formulated in section 1.4. The data and data source will be set out in section 3.2 while the variables extracted from the data are explained in section 3.3 to understand why they were specifically selected.

The methods of analysis to which the data will be subjected are described in section 3.4. To ensure the data is of the correct quality to be useful; it will also be subjected to diagnostic tests which are explained in section 3.5. A summary closes off chapter 3 in section 3.6.

3.2 Data and data source

The data used in the study is solely accounting based data mainly contained in the organisation's financial statements. The financial statements are obtained from both ShareData Online and Nasdaq. The following ratios were then calculated:

(1) Days sales in inventory,
(2) Days sales of receivables,
(3) Days payables outstanding, and
(4) Current ratio.

The other variables such as cash conversion cycle and dummy variables were also calculated from the extracted data.

Consistent with Lazaridis and Tryfonidis (2006:26-35) and Mathuva (2010:1-11) who collected financial data of organisations listed on respective stock exchanges, this dissertation collects data exclusively on JSE listed organisations. The reason for the chosen market is primarily due to availability and reliability of the financial statements in that

they are subject to mandatory audit by recognised audit organisations. Furthermore, organisations listed on the stock exchange present true operational results in comparison with unlisted companies (Lazaridis and Tryfonidis, 2006).

Organisations from 14 different sectors of the JSE were selected, data from the periods 2011-2017 were used which totals 156 organisations. Under these 156 organisations, there are 624 organisation year observations for the six-year period starting in January 2011 to December 2017. This period was selected because of the convenience of obtaining the sample data.

3.3 Variables and how they are measured

As mentioned previously, the explanatory variables to be used as key performance indicators of effective working capital management are:

(1) Cash Conversion Cycle (CCC),
(2) Days Sales Outstanding (DSO),
(3) Days Inventory Outstanding (DIO),
(4) Days Payables Outstanding (DPO), and the
(5) Current ratio (CR).

While this dissertation explores the impact of the five variables above on profitability, it should be noted that the above mentioned selected variables are not exhaustive as there are some other liquidity and capital structure measures that may impact profitability. The choices of variables selected are based on the following factors:

i.) Alternative theories related to effective working capital management are enticing and deserve further exploration (For example, one theory stating that a longer cash conversion cycle increases organisation profitability because it leads to higher revenue, and the opposing theory stating that corporate profitability decreases as cash conversion cycle elongates, particularly if the

costs of higher investment in working capital rise faster than the benefits of holding more inventory and/or granting more trade credit to customers) and

ii.) Similar working capital management variables were used in previous studies conducted in other geographic jurisdictions such as Greece, Belgium, U.S., Kenya, and Turkey.

Table 3.1: Variables used in the study

Cash Conversion Cycle	CCC
Days Sales in Receivables	DSO
Days Inventory Outstanding	DIO
Days Payables Outstanding	DPO
Current Ratio	CR
Debt to Equity Ratio	DTE
Operating Profit Margin	OPM

Cash Conversion Cycle

The cash conversion cycle is used as a measure to measure profitability. It measures the period between when an organisation spends money on goods and services to ultimately resell a product to a customer and the ultimate recovery of monies owed from customers (Laughlin and Richards, 1980:32-38). It is measured as follows:

CCC = DSR + DSI – DPO (1)

The three components of the cycle are explained below.

- ***Days Sales of Receivables***

  Days' sales in receivables measure the number of days customers take from date of purchase to repay monies owed to the organisation. Fried et al. (2003:124) state those days' sales in receivables measure the effectiveness of

the organisation's credit policy. It indicates the level of investment of working capital needed in receivables to maintain the organisation's targeted revenue levels and is measured as follows:

DSO= (Trade Receivables / Sales) * 365 (2)

- ***Days Inventory Outstanding***

Days' sales inventory measure the number of days between when inventory is ready to be sold to customers and when they are actually sold. This is indicative of how long inventory sits in the warehouse or on the shelves (Fried et al., 2003:124) and is measured as follows:

DIO = (Inventory / Cost of Goods Sold) * 365 (3)

- ***Days Payables Outstanding***

Days payables outstanding measures the number of days an organisation takes to pay its suppliers. It also gives an important indication of how operating activities are financed, i.e. by cash received from customers or current liabilities. The ratio is measured as follows:

DPO = (Accounts Payable / Purchases) * 365 (4)

Where purchases are computed as cost of goods sold plus the change in Inventories.

Current ratio

The current ratio is the best-known and most widely used ratio that measures short-term liquidity. In essence, it ascertains the ability of the organisation to meet its short-term obligations. While it might be good for an organisation to have a high current ratio as it indicates liquidity, it can also indicate inefficient use of cash, cash equivalents and other short-term assets. This ratio is measured as follows:

Current Ratio = Current Assets / Current Liabilities (5)

Operating profit margin

Operating profit margin expresses how much of all the revenue generated is profit, i.e. how much of the money generated has fallen through as profit for shareholders/owners. This ratio is measured as follows:

Operating profit margin = Profit before tax x 100 / sales (6)

Variables predicted directions

Table 3.2 below summarises the theoretically predicted signs that each of the explanatory variables are expected to have on firm profitability. It shows that the relationship of each explanatory variable with profitability could either be positive or negative.

Table 3.2: Variables' predicted signs

Variable	Direction to move in
Current Ratio	Increase / Decrease
DSO	Increase / Decrease
DPO	Increase / Decrease
DIO	Increase / Decrease
CCC	Increase / Decrease

3.4 Methods of Analysis

To analyse the impact of working capital management on profitability, the study uses the following methods:

3.4.1 Descriptive Statistics

Table 3.3 below presents descriptive statistics of the collected variables. It shows the mean, median and standard deviation of the variables used in the study. Also, it shows the minimum and maximum values of each respective variable which essentially indicates how wide-ranging each respective variable can be.

Table 3.3: Descriptive Statistics

	No *(N)*	Minimum	Maximum	Mean	St. Dev
Current Ratio					
2013	29	0.35	5.09	1.68	1.12
2014	39	0.05	4.54	1.60	0.86
2015	39	0.07	7.39	1.62	1.16
2016	39	0.00	14.29	1.98	2.29
DSO					
2013	29	0.00	204.94	59.85	37.76
2014	39	0.00	818.58	109.87	176.95
2015	39	0.00	1246.23	118.55	220.57
2016	39	0.00	772.99	85.77	125.24
DPO					
2013	29	0.00	666.32	135.58	145.31
2014	39	-459.31	1188.23	161.05	269.77
2015	39	-213.21	2585.42	198.93	423.69
2016	39	-731.31	647.20	131.55	209.98
DIO					
2013	29	0.00	1302.68	127.11	243.30
2014	39	-4.26	1256.84	114.41	211.63
2015	39	-4.20	1284.51	105.83	213.28
2016	39	-25.04	1186.78	118.39	205.62

The current ratio is showing a negative trend as the maximum tends to increase from 5.09 in 2013 to 14.29 in 2016. Organisations under the study receive payment on sales after 59.85 days on average in 2013, escalating to 118.55 days in 2015 after which reducing to 85.77 days in 2016. The descriptive statistics show that it took about 127.11 days on average in 2013 to sell inventory, 114.41 in 2014, 105.83 in 2015, and finally, 118.39 in 2016. Organisations, in turn, took 135.58 days on average in 2013 to pay their suppliers, increasing to 161.05 days in 2014, 198.93 days in 2015, and then decreasing in 2016 to 131.55 days.

From the above, it is evident that organisations under the study CCCs were under more pressure from 2013 to 2015, while showing an improvement in 2016. This may be indicative of a general worsening of economic conditions during this period as the trend is present across all sectors in the study.

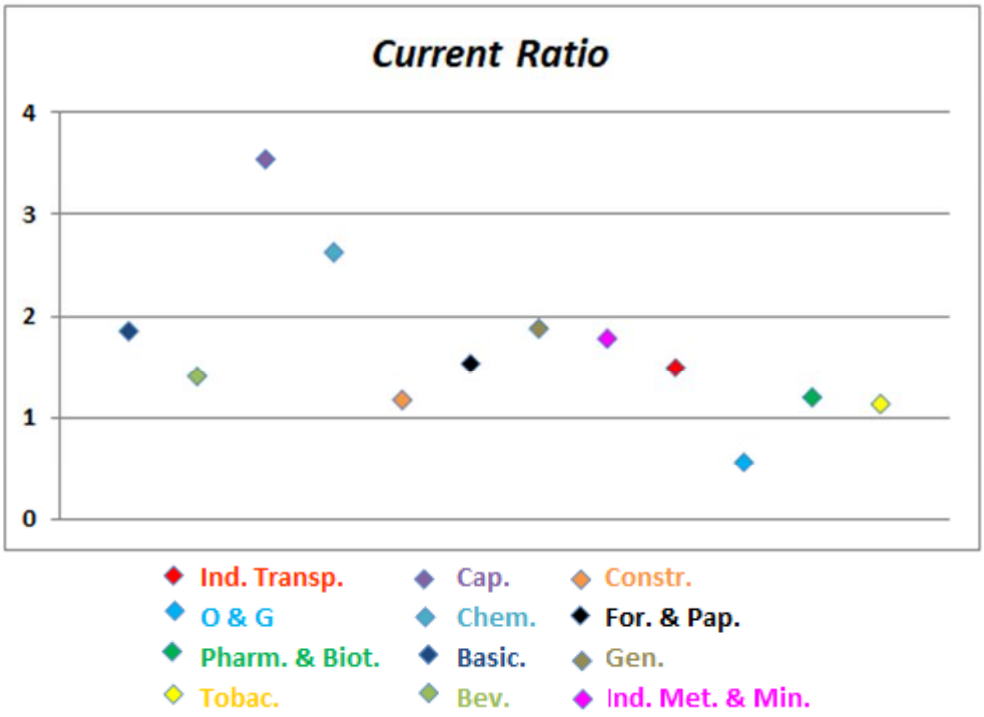
A traditional measure of liquidity (current ratio) shows that on average South African organisations keep current assets at 2.1 times current liabilities. The highest current ratio for a company in a particular year is 14.29 (2016) with the lowest at zero (in 2016 as well).

3.4.2 Industry specific trends

Below an Industry legend is visible which uses colour as a distinguishing factor to easily understand figures 3.1 to 3.4 that follow.

Figure 3.1

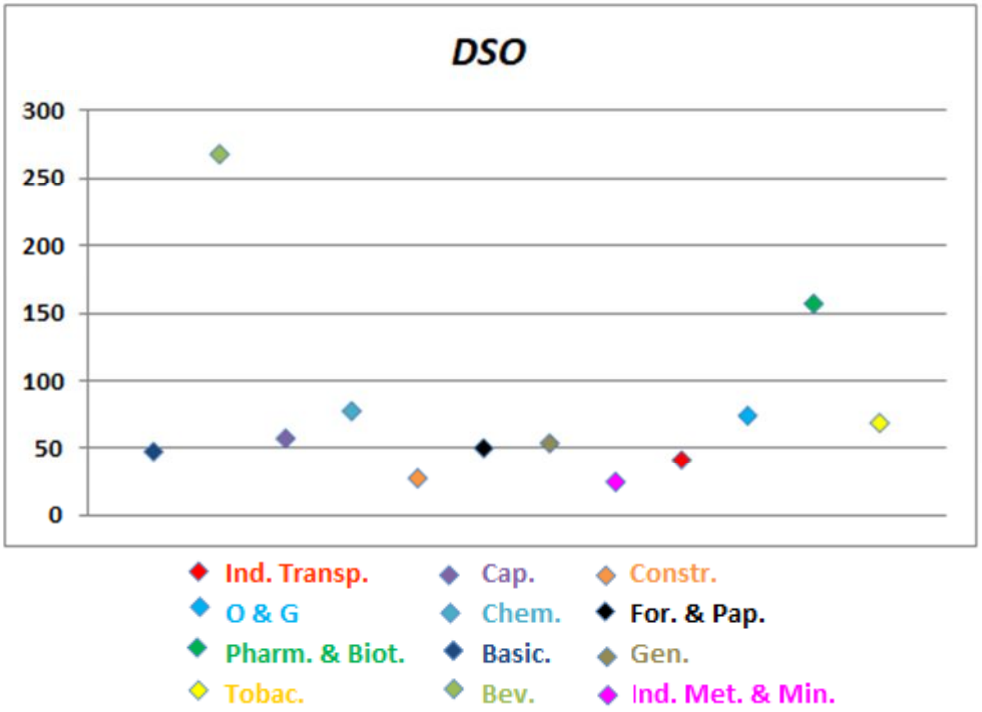
Current ratio across all Industries



From figure 3.1 it is evident that the majority of industries' current ratio is in the 1-2 range, which indicates the organisations are well-positioned to cover their current or short-term liabilities. Oil and Gas have the lowest current ratio (0.56) while Capital Goods have the highest current ratio (3.55). This may be related to the fact that organisations in the capital goods industry tend to keep very little (if any) stock on hand, due to the high value thereof thus maintaining a very favourable current ratio. Oil and Gas companies on the other side need first to find the natural resources to produce and sell their related products, thus tying up larger amounts of capital in work-in-progress and stock.

Figure 3.2

DSO across all Industries

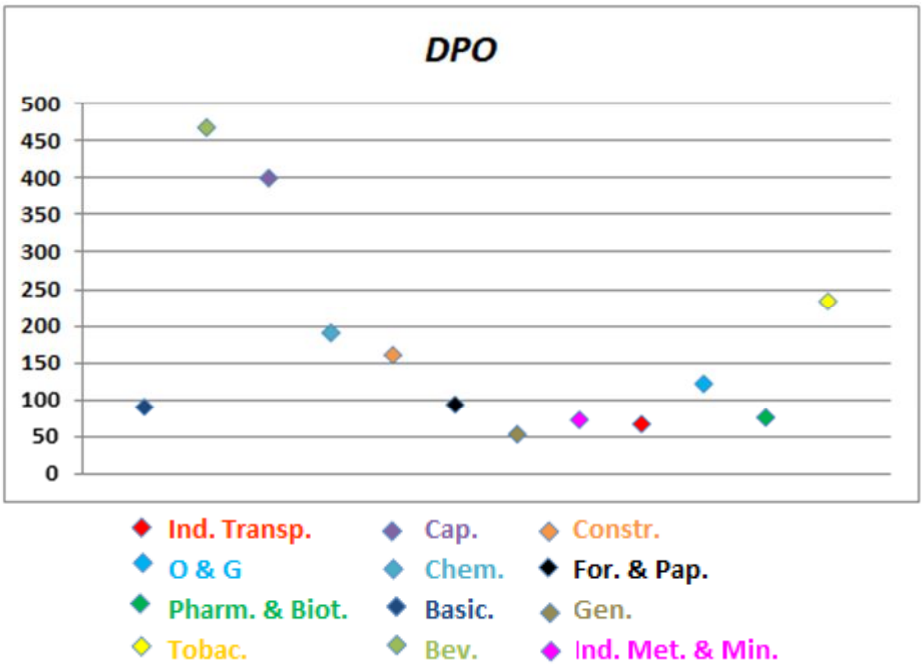


From figure 3.2 we can see that the majority of industries' DSO are in the 40-60 range, which may indicate that organisations from all industries are experiencing the same kind of collection issues and extend credit for around the same period (willing or unwillingly). The two exceptions visible in the above are Pharmaceuticals & Biotechnology (157 days) and Beverages (268 days).

A study performed by Ernst & Young in 2015 (Cash on Prescription, 2015:7) stated that increased sales on generic pharmaceuticals might account for the longer days sales outstanding, as these types of medicines have longer payment terms. This trend of higher DSO is visible across the pharmaceutical sector.

Figure 3.3

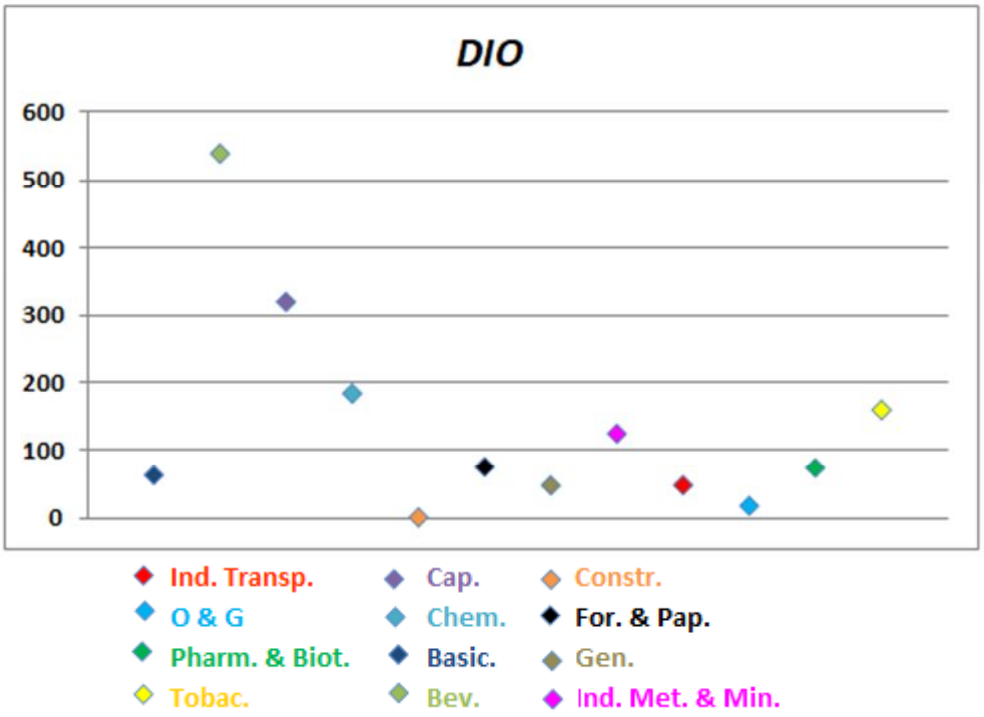
DPO across all Industries



From figure 3.3 we can see that the data for DPO is more scattered. Half of the industries tested DPO is in the range of 50-100 days. 25 % of the industries are in the 100-200 days range, and the remainder is more than 200 days. This may be more of an indication of the tougher economic conditions than efficient working capital management. When cash resources are low, the most urgent payments are made first like salaries and wages while other accounts are left to be paid at a later stage when there is another influx of cash (Deloof, 2003:573-587).

Figure 3.4

DIO across all Industries



From figure 3.4 we can see that the data for DIO is also more scattered. Some 58% of the industries tested DIO is below 100 days, with the remainder being more than 100 days. Exceptions are Beverages with 540 days.

3.4.2 Correlation matrix

The correlation matrix is used to measure the degree of association between the different variables under consideration. In this analysis, the relationship between the various components of working capital management and profitability will be assessed, and Spearman's rank correlation analysis will be used for this purpose.

Table 4 below represents the results of this analysis.

Table 3.4: Correlation Matrix – Coefficients

	Current Ratio	DSO	DPO	DIO	OPM
Current Ratio	1	0.216	0.193	.416**	-0.683**
DSO	0.216	1	.658**	.586**	-0.945**
DPO	0.193	.658**	1	.711**	-0.0128
DIO	.416**	.586**	.711**	1	-0.891**
OPM	-0.683**	-0.945**	-0.0128	-0.891**	1

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Table 3.4 presents the Spearman correlation coefficients for all the variables as mentioned. There is a negative relationship between the Operating profit margin (OPM) and the working capital components (days sales outstanding, days inventory outstanding, days payables outstanding and current ration).

This finding is consistent with the research of Deloof (2003:573-587) and Raheman and Nasr (2007:279-300). The result of the correlation analysis shows a significant negative coefficient (-0.891) between days inventory outstanding and OPM. This means that if the number of days stock is held before it is sold increases, it will decrease the profitability of the company.

The correlation results also indicate a negative coefficient (-0.945) between days sales outstanding and OPM. This demonstrates that the longer a company takes to collect on its outstanding accounts from customers, the less profitable the company is.

Furthermore, there is a significant coefficient (-0.0128) between AP (Accounts Payables) and OPM. A reasonable explanation according to Deloof (2003:573-587) is that organisations wait too long to pay their suppliers. Early payment to suppliers might increase the profitability of the company due to large discounts for punctual payments.

Spearman's correlation analysis shows the relationship between the variables;; it does not identify the causes from consequences (Shin and Soenen, 1998; Deloof, 2003; Ma-

, 2009; Dong and Su, 2010). According to Mathuva (2009:1-11), it is hard to determine whether a shorter accounts collection period leads to higher profitability or a higher profitability is as a result of the short accounts receivable period. Hence, a one-way analysis of variance (ANOVA) is carried out in the next section to determine the impact of working capital management on company profitability.

3.4.3 Analysis of variance

A one-way analysis of variance (ANOVA) was conducted to compare the effect of working capital management components, namely: days inventory outstanding, days sales outstanding, days payables outstanding and current ratio impact on the profitability of South African listed firms.

3.4.3.1 Days inventory outstanding

The analysis showed the effect of DIO on profitability was insignificant for all of the years tested.

Table 3.5: ANOVA for DIO

Year	Analysis results	Significant
2013	F(8, 20) = 0.796, p = .612	No
2014	F(9, 29) = 2.133, p = .059	No
2015	F(9, 29) = 1.147, p = .363	No
2016	F(9, 29) = 0.805, p = .615	No

3.4.3.2 Days sales outstanding

The analysis showed the effect of DSO on profitability was insignificant for all of the years tested, except 2013. Post hoc comparisons using the Tukey HSD test indicated that the mean score for the DSO in 2013 (M = 60, SD = 38) was significantly different than the DSO in 2014 (M = 109, SD = 177). This may be indicative that a lower DSO can contribute towards higher profitability.

Table 3.6: ANOVA for DSO

Year	Analysis results	Significant
2013	F(8, 20) = 6.002, p = .001	Yes
2014	F(9, 29) = 0.959, p = .492	No
2015	F(9, 29) = 0.970, p = .484	No
2016	F(9, 29) = 1.263, p = .298	No

5.4.3 Days payables outstanding

The analysis showed the effect of DPO on profitability was insignificant for all of the years tested.

Table 3.7: ANOVA for DPO

Year	Analysis results	Significant
2013	F(8, 20) = 0.834, p = .584	No
2014	F(9, 29) = 0.997, p = .464	No
2015	F(9, 29) = 1.232, p = .315	No
2016	F(9, 29) = 0.114, p = .999	No

5.4.4 Current Ratio

The analysis showed the effect of the current ratio on profitability was insignificant for all of the years tested.

Table 3.8: ANOVA for the current ratio

Year	Analysis results	Significant
2013	F(8, 20) = 0.693, p = .694	No
2014	F(9, 29) = 0.441, p = .901	No
2015	F(9, 29) = 0.500, p = .862	No
2016	F(9, 29) = 0.919, p = .523	No

3.5 Diagnostic tests

Diagnostic tests are robust statistical tests performed to verify if the data which was used, have met the assumptions underlying the analysis performed and where possible to remove problems associated with panel time series data. Some of the problems of panel time series data include heteroscedasticity, multicollinearity, and autocorrelation, among others. The diagnostic tests carried out in the study are detailed below.

3.5.1 Test for homogeneity

In statistics, when a usual one-way ANOVA is performed, it is assumed that the group variances are statistically equal. If this assumption is not valid, then the resulting F-test is invalid. When a usual one-way ANOVA is performed, it is assumed that the group variances are statistically equal.

Homogeneity of variance assumes that the variance within each of the populations is equal. This is an assumption of analysis of variance (ANOVA).

The Brown–Forsythe test is a statistical test for the equality of group variances based on performing an ANOVA on a transformation of the response variable. The Brown–Forsythe test statistic is the F statistic resulting from an ordinary one-way analysis of

variance on the absolute deviations from the median; it is a statistical test for the equality of group variances based on performing an ANOVA on a transformation of the response variable.

The transformed response variable is constructed to measure the spread in each group. Let

$$z_{ij} = |y_{ij} - \tilde{y}_j|$$

Where $\tilde{y}_j$ is the median of group ***j***. The Brown–Forsythe test statistic is the model F statistic from a one-way ANOVA on ***zij***.

$$F = \frac{(N-p)}{(p-1)} \frac{\sum_{j=1}^{p} n_j (\tilde{z}_{\cdot j} - \tilde{z}_{\cdot\cdot})^2}{\sum_{j=1}^{p} \sum_{i=1}^{n_j} (z_{ij} - \tilde{z}_{\cdot j})^2}$$

Where: ***p*** is the number of groups

nj is the number of observations in group j

N is the total number of observations

$\tilde{z}_{\cdot j}$ Are the group means of the z_{ij} and $\tilde{z}_{\cdot\cdot}$ is the overall mean of the z_{ij}.

If the variances are indeed heterogeneous, techniques that allow for this (such as the Welch one-way ANOVA) may be used instead of the usual ANOVA.

The Brown and Forsythe Test is a test for equal population variances. It is a robust test based on the absolute differences within each group from the group median. The Brown and Forsythe Test is better known as The Modified Levene Test. Levene had the idea to modify the data in such a way such that an F test on the new data will be a test for equal population variances.

Table 3.9: Brown and Forsythe Test (Modified Levene Test) on equality of variances

	Levene Statistic			
	2013	***2014***	***2015***	***2016***
Current Ratio	0.990	1.187	1.486	4.789
DSO	5.701	10.125	7.748	13.488
DPO	6.527	4.125	5.999	2.150
DIO	14.467	8.172	12.949	9.187

If the resulting p-value of Levene's test is less than some significance level (typically 0.05), the obtained differences in sample variances are unlikely to have occurred based on random sampling from a population with equal variances. Thus, the null hypothesis of equal variances is rejected, and it is concluded that there is a difference between the variances in the population. As can be seen from above, all of the data used passes this test as none is smaller than 0.05.

Comparison with Levene's test

Levene's test uses the mean instead of the median. Although the optimal choice depends on the underlying distribution, the definition based on the median is recommended as the choice that provides good robustness against many types of non-normal data while retaining good statistical power. If one knows the underlying distribution of the data, this may indicate using one of the other choices. Brown and Forsythe performed Monte Carlo studies that indicated that using the trimmed mean performed best when the underlying data followed a Cauchy distribution (a heavy-tailed distribution) and the median performed best when the underlying data followed a $\chi 2$ distribution with four degrees of freedom (a sharply skewed distribution). Using the mean provided the best power for symmetric, moderate-tailed, distributions.

4.5.2 Test for Multicollinearity

The data was tested for multicollinearity. The primary concern with multicollinearity is that, as the degree of multicollinearity increases, the model estimates of the coefficients become unstable and the standard errors for the coefficients can get inflated. The variance inflation factor (VIF) is used to detect whether one predictor has a strong linear association with the remaining predictors (the presence of multicollinearity). Lazaridis and Tryfonidis (2006:26-35) claim that VIF measures how much of the variance of an estimated coefficient increases if predictors are correlated. Montgomery and Peck (2007:34-38) suggest that when VIF is greater than 5-10, then the coefficients are poorly estimated. In this study, we used the VIF command when regressing profitability against the explanatory variables. The predictors had resultant variance inflation factors ranging between 1.4 and 3.7 across the model's specifications as shown in Table 10 below. The results indicate that there is the absence of multicollinearity between predictors in the model.

Table 3.10: Variance Inflation Factor

Variable	VIF	1/VIF
Current Ratio	3.13	0.3131
DSO	2.42	0.2422
DPO	0.42	0.0425
DIO	1.43	0.1429
OPM	3.73	0.3734
Mean VIF	***2.42***	

3.6 Summary

Table 3.11 illustrates the distribution of the sample selected across the various industries. The industry classification is ascribed according to ShareData Online.

Table 3.11: Industry Wise Sample Distribution for the Years 2011 – 2017

Industry	Number of firms	% Firms	Median CCC	Average CCC
Basic Industries	16	10.26%	39	106
Beverages	14	8.97%	(4)	200
Capital Goods	4	2.56%	(109)	(97)
Chemicals	16	10.26%	37	(159)
Construction	20	12.82%	10	2
Energy	3	1.92%	463	468
Forestry & Paper	12	7.69%	27	27
General Industries	28	17.95%	61	62
Industrial Metals & Mining	4	2.56%	45	49
Industrial Transportation	12	7.69%	29	177
Media	8	5.13%	(25)	(31)
Oil & Gas	4	2.56%	(123)	(185)
Pharmaceuticals & Biotech	11	7.05%	110	165
Tobacco	4	2.56%	5	6
TOTAL	***156***	***100.00%***		

It is worth mentioning that in table 3.11 not all industries have the appropriate percentage of representativeness because not all the organisations sampled had data for all of the years selected. For example, the energy sector only has three organisations in the sample. There is, therefore, a possibility that the results may not be representative of all the industries.

As stated earlier, CCC measures the period between when an organisation spends money on goods and services to reselling a product to a customer and the ultimate recovery of monies owed from customers. According to Melicher and Leach (2009:15-18), it also represents the period (days in this case) the operation must be externally financed. Table 11 shows that the majority of the industries have positive CCCs like basic industries have 106 days. This means that on average, the Basic Materials industry is externally financed for approximately 106 days and the Forestry and Paper industry for approximately 27 days (which is very low and profitable). Some industries like capital goods and chemicals have a negative CCC, which means these companies collect cash on an average of 97 and 159 days respectively before their suppliers are paid.

This is reflective of the fact that each industry has its policies on working capital management which is driven by the respective business model of each.

From the empirical study performed the majority of industries have shown to have positive cash conversion cycles with the number of days varying per industry.

In the following chapter, the conclusions drawn from the data analysis will be presented and discussed. Any possible gaps identified will then be recommended for future research in the field.

CHAPTER 4: CONCLUSIONS AND RECOMMENDATIONS

4.1 Introduction

A literature review of working capital management was performed in Chapter 2 after which the data collected for analysis in a South African context was analysed in Chapter 3. Any similarities between past and present research can now be assessed to determine if efficient working capital management can impact the bottom line of organisations.

4.2 Achievement of the objectives of the study

4.2.1 Primary Objective

The primary objective was to determine if working capital management components, namely: cash conversion cycle (CCC), days sales outstanding (DSO), days inventory outstanding (DIO), days payables outstanding (DPO) and current ratio impact on the profitability of South African listed organisations.

In line with findings by Deloof (2003), Garcia-Tereul and Martinez-Solano (2006), Lazaridis and Tryfonidis (2006), Mathuva (2010), Biger et al. (2010), empirical results of this study show a significant negative relationship between accounts receivables (days sales in receivables) and corporate profitability. This negative relationship indicates that slow collection of accounts receivables is correlated with low profitability. It suggests that corporate managers can improve profitability by reducing the credit period granted to their customers.

Contrary to findings by: (1) Biger et al. (2010:10) who did not find a statistically significant relationship between days payables outstanding and profitability and (2) Mathuva (2010:1-11) who found significant positive relationship between days payables

outstanding and profitability, this study finds that there exists a significant negative relationship between days payables outstanding and profitability of organisations. This finding is in line with findings by Deloof (2003:573-587) who analyses the relationship between Belgian organisations. The negative relationship can be explained by that, contrary to Mathuva (2010:1-11) who states that profitable companies withhold their payment to suppliers so as to take advantage of the cash available for their working capital needs, a decrease in the days payables outstanding leading to an increase in profitability is as a result of less profitable organisations waiting longer to pay their bills.

The difference in the relationship as shown by this study in contrast with findings by Mathuva (2010:1-11) and Biger et al. (2010:10) could be attributable to different characteristics of organisations operating in different geographic jurisdictions. For example, the difference could be as a result of the dissimilarity in different countries' costs and benefits of being granted credit. The costs of being granted credit may rise faster than the benefits of being granted credit in one country and slower than the benefits of being granted credit in another.

Although the study finds that there is no statistically significant relationship between days sales in inventory and profitability, the coefficient on this variable is negative and not consistent with findings by Mathuva (2010:1-11) who found a positive coefficient. It is however in line with the negative relationship found by Deloof (2003:573-587) and Lazaridis and Tryfonidis (2006:26-35). Whereas the negative relationship could suggest that maintaining inventory at high levels may result in substandard returns, the positive relationship infers that maintaining high levels of inventory reduces the cost of possible interruptions in the production process. Furthermore, it infers that maintaining high levels of inventory helps in reducing the cost of supplying the products and protects the organisation against price fluctuations particularly in environments with volatile price movements influenced by volatile exchange rates and/or other macroeconomic factors.

In this dissertation, the results show that there exists a significant negative relationship between the time lag from the expenditure for purchases (DPO) and the collection of

sales (DSO) and profitability. This result is in line with studies by Deloof (2003), Garcia-Tereul and Martinez-Solano (2006), Lazaridis and Tryfonidis (2006), Mathuva (2010), Biger et al. (2010). It can be explained by that minimising investment in current assets can help boost profits as liquid cash is not maintained in the business for too long and that it is used to generate more profits for the organisation.

Furthermore, and in line with findings by Nasr and Raheman (2007:279-300), results of the study show that current ratio has a negative relationship with profitability, showing that there exists an inverse relationship between liquidity and profitability of organisations. While the study shows that reducing current ratio increases the profitability of organisations, it is to be noted that disregarding liquidity may result in insolvency and bankruptcy. Thus, given the trade-off between profit maximisation and liquidity preservation, managers need to minimise current ratio to the extent that it maximizes profits without adversely affecting organisation solvency.

4.2.2 Secondary Objectives

The secondary objectives were:

i.) To determine if the impact between working capital components and the profitability of companies differ among sectors

Results of the study show that there is no significant difference. This finding implies that working capital management strategies that enhance profitability are effective across various sectors.

ii.) To determine if the cash conversion cycle is different across different industries.

From the empirical study performed the majority of industries have shown to have positive cash conversion cycles with the number of days varying per industry.

4.3 Conclusions

The objective of the dissertation was to determine the effect of working capital management on the profitability of organisations. This needs to be achieved by finding a balance between profitability and liquidity preservation. This balance is very delicate in that while increasing the length of the cash conversion cycle might increase organisation profitability given that it leads to higher sales. Primarily as a result of generous trade credit policy that allows customers access to product and/or services before paying, as well as a result of a reduction in risk of stock-out, which reduces the risk of business operations interruption organisation profitability may, however, decrease as the length of the cash conversion cycle increases particularly in instances where the costs of higher investment in working capital rise faster than the benefits of holding more inventory and/or granting more trade credit to customers.
Thus, in examining how South African organisations are impacted by working capital management components, operational managers will be better equipped in designing policies that ensure enhancement of organisation profitability.

Furthermore, knowing how the impact of working capital management components changes as macroeconomic conditions on the ground change is imperative in that, as proffered by Hamlin and Heathfield (1991:207-217). "The ability of managers to respond to rapidly changing economic circumstances is a vital aspect of their companies' competitiveness and that reacting quickly and appropriately to changing events and shocks gives an organisation competitive advantage over its rivals".

Based on the key findings of the dissertation, the following conclusions can be drawn:

4.3.1 Current Ratio

- Theory suggests that a traditional measure of liquidity (current ratio) shows that on average South African organisations keep current assets at 2.1 times current liabilities. The descriptive statistics gathered supports this claim. The majority of

industries' current ratio is in the 1-2 range, which indicates the organisations are well-positioned to cover their current or short-term liabilities. There are clear differences between industries, i.e. Oil and Gas have shown to have the lowest current ratio while Capital Goods have the highest current ratio. This may be related to the fact that organisations in the capital goods industry tend to keep very little (if any) stock on hand, due to the high value thereof thus maintaining a very favourable current ratio. Oil and Gas companies on the other side need first to find the natural resources to produce and sell their related products, thus tying up larger amounts of capital in work-in-progress and stock.

4.3.2 Days Sales Outstanding

- Descriptive statistics have highlighted the majority of industries' DSO is in the 40-60 range, which may indicate that organisations from all industries are experiencing the same kind of collection issues and extend credit for around the same period.

- The correlation results also indicate a negative relationship between DSO and OPM. This demonstrates that the longer a company takes to collect on its outstanding accounts from customers, the less profitable the company is.

- The ANOVA performed has also indicated the effect of DSO on profitability was significant for one of the years tested, which may be indicative that a lower DSO can contribute towards higher profitability. This is in line with the findings present from the correlation matrix.

4.3.3 Days Inventory Outstanding

- Correlation analysis has shown a significant negative relationship between DIO and OPM. This means that if the number of days stock is held before it is sold increases, it will decrease the profitability of the company. This finding is consistent with the research of Deloof (2003:573-587) and Raheman and Nasr (2007:279-300).

4.3.4 Days Payables Outstanding

- Furthermore, a significant negative relationship was evident between AP (Accounts Payables) and OPM. A reasonable explanation according to Deloof (2003:573-587) “is that organisations wait too long to pay their suppliers. Early payment to suppliers might increase the profitability of the company due to large discounts for punctual payments”.

4.3.5 General

- Descriptive statistics has shown that the DIO and DPO are not closely related across all industries, with Capital goods and Beverages proving to be the outliers in both cases. No clear reasons are immediately visible from the data obtained and may be an insightful subject for future research.

- It was also evident that organisations under the study of CCCs were under more pressure from 2013 to 2015, while showing an improvement in 2016. This may be indicative of a general worsening of economic conditions during this period as the trend is present across all sectors in the study.

Management of an organisation can thus create value for the shareholders by reducing:

i. the net time interval between actual cash expenditures on an organisation's purchase of productive resources and the ultimate recovery of cash receipts from product sales,
ii. the number of days accounts receivable,
iii. the current ratio to the extent that it does not adversely impact on the solvency of the organisation, and
iv. the days payables outstanding.

Management of an organisation can also create value for the shareholders by increasing the days sales in inventory to the extent that it reduces the cost of supplying the products as well as protecting the organisation against price fluctuations.

The direction that each explanatory variable has to take to increase profitability is depicted in Table 4.1 below.

Table 4.1: Directional impacts of the variables on profitability

Variable	Direction to move in	Direction of profitability
Current Ratio	Decrease	Increase
DSO	Decrease	Increase
DPO	Decrease	Increase
DIO	Decrease	Increase
CCC	Decrease	Increase

While acknowledging that working capital management components may be manipulated by organisations in boosting sales/earnings through, for example, extending more credit terms to boost sales, the primary focus of this paper is not to examine how working capital management components are vulnerable to manipulation by firms in boosting sales/earnings but to examine the relationship between various working capital management components and profitability of organisations.

4.4 Recommendations for future research

Future research should investigate how various working capital management components are manipulated by organisations at financial year end as to improve the balance sheet and subsequently the ratios that lending institutions and shareholders look at to judge the performance of the organisation as well as the effectiveness of management.

Another possible area for future research may be focused on capital trends per industry and what lessons learned from a specific industry can be applied to another.

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LIST OF APPENDICES

Appendix 1 - List of Companies used in the study

Symbol	Company	Sector
SSK	Stefanutti Stocks Holdings Ltd	Construction & Materials
TPC	Transpaco Limited	General Industrials
YRK	York Timber Holdings Limited	Forestry & Paper
SOL	Sasol Limited	Oil & Gas Producers
SHFF	Steinhoff Investment Holdings Ltd	Preference shares
SAP	Sappi Limited	Forestry & Paper
SCL	Sacoil Holdings Limited	Oil & Gas Producers
PPC	PPC Limited	Construction & Materials
SNV	Santova Limited	Industrial Transportation
GRF	Group Five Limited	Construction & Materials
IPL	Imperial Holdings Limited	General Retailers
OAO	Oando Plc	Oil & Gas Producers
MND	Mondi Limited	Forestry & Paper
NPN	Naspers Limited	Media
KAP	KAP Industrial Holdings Limited	General Industrials
OMN	Omnia Holdings Limited	Chemicals
ERN	Erin Energy Corporation	Oil & Gas Producers
BVT	The Bidvest Group Limited	General Industrials
CAT	Caxton CTP Publishers & Printers Ltd	Media
BTI	British American Tobacco Plc	Tobacco
CRG	Cargo Carriers Limited	Industrial Transportation
CVH	Capevin Holdings Limited	Beverages
EXG	Extract Group Limited	General Industries
DST	Distell Group Limited	Beverages
DTA	Delta EMD Limited	Electronic & Electrical Equipment
AIP	Adcock Ingram Holdings Limited	Pharmaceuticals & Biotechnology
ANH	Anheuser-Busch InBev SA/NV	Beverages
BAW	Barloworld Limited	Support Services
APN	Aspen Pharmacare Holdings Limited	Pharmaceuticals & Biotechnology
AWT	Awethu Breweries Limited	Food Producers
ASC	Ascendis Health Limited	Pharmaceuticals & Biotechnology

Symbol	Company	Sector
ART	Argent Industrial Limited	Support Services
BCF	Bowler Metcalf Limited	Chemicals
BSR	Basil Read Holdings Limited	Construction & Materials
AME	African Media Entertainment Limited	Media
ACL	Arcelormittal South Africa Limited	Industrial Metals & Mining
AFE	AECI Limited	Chemicals
AFT	Afrimat Limited	Construction & Materials
AFX	African Oxygen Limited	Chemicals

Appendix 2 - Descriptive Statistics

Descriptive Statistics[a]

	N	Minimum	Maximum	Mean	Std. Deviation
Current Ratio	1	0.320	0.320	0.320	
DSO	1	15.359	15.359	15.359	
DPO	1	1,318.608	1,318.608	1,318.608	
DIO	1	1,401.726	1,401.726	1,401.726	
Valid N (listwise)	1				

a. Variable = 2011

	N	Minimum	Maximum	Mean	Std. Deviation
Current Ratio	1	0.180	0.180	0.180	
DSO	1	73.865	73.865	73.865	
DPO	1	88.616	88.616	88.616	
DIO	1	7.375	7.375	7.375	
Valid N (listwise)	1				

a. Variable = 2012

	N	Minimum	Maximum	Mean	Std. Deviation
Current Ratio	29	0.350	5.090	1.678	1.119
DSO	29	-	204.939	59.848	37.761
DPO	29	-	666.323	135.583	145.313
DIO	29	-	1,302.680	127.107	243.296
Valid N (listwise)	29				

a. Variable = 2013

	N	Minimum	Maximum	Mean	Std. Deviation
Current Ratio	39	0.050	4.540	1.596	0.864
DSO	39	-	818.585	109.873	176.948
DPO	39	- 459.307	1,188.233	161.052	269.775
DIO	39	- 4.259	1,256.836	114.407	211.632
Valid N (listwise)	39				

a. Variable = 2014

	N	Minimum	Maximum	Mean	Std. Deviation
Current Ratio	39	0.070	7.390	1.623	1.158
DSO	39	-	1,246.227	118.555	220.572
DPO	39	- 213.209	2,585.417	198.935	423.688
DIO	39	- 4.198	1,284.513	105.829	213.278
Valid N (listwise)	39				

a. Variable = 2015

	N	Minimum	Maximum	Mean	Std. Deviation
Current Ratio	39	-	14.290	1.980	2.294
DSO	39	-	772.994	85.767	125.235
DPO	39	- 731.311	647.204	131.552	209.983
DIO	39	- 25.040	1,186.776	118.391	205.623
Valid N (listwise)	39				

a. Variable = 2016

	N	Minimum	Maximum	Mean	Std. Deviation
Current Ratio	8	0.950	2.380	1.540	0.565
DSO	8	0.683	623.862	125.981	203.784
DPO	8	2.932	383.122	127.839	113.652
DIO	8	2.329	164.079	50.628	53.621
Valid N (listwise)	8				

a. Variable = 2017

Appendix 3 - Nonparametric Correlations

Correlations

Variable				Current Ratio	DSO	DPO	DIO
.	Spearman's rho	Current Ratio	Correlation Coefficient				
			Sig. (2-tailed)				
			N	0	0	0	0
		DSO	Correlation Coefficient				
			Sig. (2-tailed)				
			N	0	0	0	0
		DPO	Correlation Coefficient				
			Sig. (2-tailed)				
			N	0	0	0	0
		DIO	Correlation Coefficient				
			Sig. (2-tailed)				
			N	0	0	0	0
2011	Spearman's rho	Current Ratio	Correlation Coefficient				
			Sig. (2-tailed)				
			N	1	1	1	1
		DSO	Correlation Coefficient				
			Sig. (2-tailed)				
			N	1	1	1	1
		DPO	Correlation Coefficient				
			Sig. (2-tailed)				
			N	1	1	1	1
		DIO	Correlation Coefficient				
			Sig. (2-tailed)				
			N	1	1	1	1
2012	Spearman's rho	Current Ratio	Correlation Coefficient				
			Sig. (2-tailed)				
			N	1	1	1	1
		DSO	Correlation Coefficient				
			Sig. (2-tailed)				
			N	1	1	1	1
		DPO	Correlation Coefficient				
			Sig. (2-tailed)				
			N	1	1	1	1
2013	Spearman's rho	Current Ratio	Correlation Coefficient	1.000	0.131	-0.029	.433*
			Sig. (2-tailed)		0.498	0.880	0.019
			N	29	29	29	29
		DSO	Correlation Coefficient	0.131	1.000	0.214	0.311
			Sig. (2-tailed)	0.498		0.265	0.100
			N	29	29	29	29
		DPO	Correlation Coefficient	-0.029	0.214	1.000	.601**
			Sig. (2-tailed)	0.880	0.265		0.001
			N	29	29	29	29
		DIO	Correlation Coefficient	.433*	0.311	.601**	1.000
			Sig. (2-tailed)	0.019	0.100	0.001	
			N	29	29	29	29

2014	Spearman's rho	Current Ratio	Correlation Coefficient	1.000	0.107	0.031	0.260
			Sig. (2-tailed)		0.515	0.850	0.110
			N	39	39	39	39
		DSO	Correlation Coefficient	0.107	1.000	0.164	0.289
			Sig. (2-tailed)	0.515		0.318	0.075
			N	39	39	39	39
		DPO	Correlation Coefficient	0.031	0.164	1.000	.543**
			Sig. (2-tailed)	0.850	0.318		0.000
			N	39	39	39	39
		DIO	Correlation Coefficient	0.260	0.289	.543**	1.000
			Sig. (2-tailed)	0.110	0.075	0.000	
			N	39	39	39	39
2015	Spearman's rho	Current Ratio	Correlation Coefficient	1.000	0.208	0.125	0.222
			Sig. (2-tailed)		0.203	0.447	0.174
			N	39	39	39	39
		DSO	Correlation Coefficient	0.208	1.000	0.015	0.066
			Sig. (2-tailed)	0.203		0.929	0.689
			N	39	39	39	39
		DPO	Correlation Coefficient	0.125	0.015	1.000	.521**
			Sig. (2-tailed)	0.447	0.929		0.001
			N	39	39	39	39
		DIO	Correlation Coefficient	0.222	0.066	.521**	1.000
			Sig. (2-tailed)	0.174	0.689	0.001	
			N	39	39	39	39
2016	Spearman's rho	Current Ratio	Correlation Coefficient	1.000	0.216	0.193	.416**
			Sig. (2-tailed)		0.186	0.239	0.008
			N	39	39	39	39
		DSO	Correlation Coefficient	0.216	1.000	.658**	.586**
			Sig. (2-tailed)	0.186		0.000	0.000
			N	39	39	39	39
		DPO	Correlation Coefficient	0.193	.658**	1.000	.711**
			Sig. (2-tailed)	0.239	0.000		0.000
			N	39	39	39	39
		DIO	Correlation Coefficient	.416**	.586**	.711**	1.000
			Sig. (2-tailed)	0.008	0.000	0.000	
			N	39	39	39	39
2017	Spearman's rho	Current Ratio	Correlation Coefficient	1.000	-0.084	0.371	-0.575
			Sig. (2-tailed)		0.844	0.365	0.136
			N	8	8	8	8
		DSO	Correlation Coefficient	-0.084	1.000	0.357	.810*
			Sig. (2-tailed)	0.844		0.385	0.015
			N	8	8	8	8
		DPO	Correlation Coefficient	0.371	0.357	1.000	0.095
			Sig. (2-tailed)	0.365	0.385		0.823
			N	8	8	8	8
		DIO	Correlation Coefficient	-0.575	.810*	0.095	1.000
			Sig. (2-tailed)	0.136	0.015	0.823	
			N	8	8	8	8

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Appendix 4 - ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Current Ratio	Between Groups	7.607	8.000	0.951	0.693	0.694
	Within Groups	27.445	20.000	1.372		
	Total	35.052	28.000			
DSO	Between Groups	28,184.991	8.000	3,523.124	6.002	0.001
	Within Groups	11,739.008	20.000	586.950		
	Total	39,923.999	28.000			
DPO	Between Groups	147,833.293	8.000	18,479.162	0.834	0.584
	Within Groups	443,407.601	20.000	22,170.380		
	Total	591,240.895	28.000			
DIO	Between Groups	400,393.038	8.000	50,049.130	0.796	0.612
	Within Groups	1,257,005.132	20.000	62,850.257		
	Total	1,657,398.170	28.000			
a. Year = 2013.00						
Current Ratio	Between Groups	3.419	9.000	0.380	0.441	0.901
	Within Groups	24.972	29.000	0.861		
	Total	28.391	38.000			
DSO	Between Groups	272,842.158	9.000	30,315.795	0.959	0.492
	Within Groups	916,955.877	29.000	31,619.168		
	Total	1,189,798.034	38.000			
DPO	Between Groups	653,717.510	9.000	72,635.279	0.997	0.464
	Within Groups	2,111,867.231	29.000	72,823.008		
	Total	2,765,584.740	38.000			
DIO	Between Groups	677,802.833	9.000	75,311.426	2.133	0.059
	Within Groups	1,024,147.537	29.000	35,315.432		
	Total	1,701,950.370	38.000			
a. Year = 2014.00						
Current Ratio	Between Groups	6.846	9.000	0.761	0.500	0.862
	Within Groups	44.137	29.000	1.522		
	Total	50.984	38.000			
DSO	Between Groups	427,776.111	9.000	47,530.679	0.970	0.484
	Within Groups	1,421,005.431	29.000	49,000.187		
	Total	1,848,781.541	38.000			
DPO	Between Groups	1,886,361.925	9.000	209,595.769	1.232	0.315
	Within Groups	4,935,076.897	29.000	170,175.065		
	Total	6,821,438.822	38.000			
DIO	Between Groups	453,846.658	9.000	50,427.406	1.147	0.363
	Within Groups	1,274,672.272	29.000	43,954.216		
	Total	1,728,518.930	38.000			
a. Year = 2015.00						

ANOVA[a]

		Sum of Squares	df	Mean Square	F	Sig.
Current Ratio	Between Groups	44.372	9.000	4.930	0.919	0.523
	Within Groups	155.530	29.000	5.363		
	Total	199.903	38.000			
DSO	Between Groups	167,823.894	9.000	18,647.099	1.263	0.298
	Within Groups	428,162.406	29.000	14,764.221		
	Total	595,986.300	38.000			
DPO	Between Groups	57,182.283	9.000	6,353.587	0.114	0.999
	Within Groups	1,618,347.436	29.000	55,805.084		
	Total	1,675,529.719	38.000			
DIO	Between Groups	321,252.779	9.000	35,694.753	0.805	0.615
	Within Groups	1,285,422.339	29.000	44,324.908		
	Total	1,606,675.118	38.000			

a. Year = 2016.00

		Sum of Squares	df	Mean Square	F	Sig.
Current Ratio	Between Groups	3.660	3.000	1.220	0.551	0.648
	Within Groups	314.329	142.000	2.214		
	Total	317.989	145.000			
DSO	Between Groups	69,325.107	3.000	23,108.369	0.893	0.446
	Within Groups	3,674,489.875	142.000	25,876.689		
	Total	3,743,814.982	145.000			
DPO	Between Groups	107,559.778	3.000	35,853.259	0.429	0.732
	Within Groups	11,853,794.176	142.000	83,477.424		
	Total	11,961,353.954	145.000			
DIO	Between Groups	7,920.758	3.000	2,640.253	0.056	0.983
	Within Groups	6,694,542.588	142.000	47,144.666		
	Total	6,702,463.345	145.000			

Appendix 5 - Test of Homogeneity of Variances

Test of Homogeneity of Variances[a]

	Levene Statistic	df1	df2	Sig.
Current Ratio	.990[b]	7.000	20.000	0.466
DSO	5.701[c]	7.000	20.000	0.001
DPO	6.527[d]	7.000	20.000	0.000
DIO	14.467[e]	7.000	20.000	0.000

a. Year = 2013.00

	Levene Statistic	df1	df2	Sig.
Current Ratio	1.187	9.000	29.000	0.340
DSO	10.125	9.000	29.000	0.000
DPO	4.125	9.000	29.000	0.002
DIO	8.172	9.000	29.000	0.000

a. Year = 2014.00

	Levene Statistic	df1	df2	Sig.
Current Ratio	1.486	9.000	29.000	0.200
DSO	7.748	9.000	29.000	0.000
DPO	5.999	9.000	29.000	0.000
DIO	12.949	9.000	29.000	0.000

a. Year = 2015.00

	Levene Statistic	df1	df2	Sig.
Current Ratio	4.789	9.000	29.000	0.001
DSO	13.488	9.000	29.000	0.000
DPO	2.150	9.000	29.000	0.057
DIO	9.187	9.000	29.000	0.000

a. Year = 2016.00

Appendix 6 – Confirmation letter of language editing

Dynamic Language & Translation Specialists

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Friday, 01 December 2017

To whom it may concern,

Re: Letter of confirmation of language editing

The dissertation **Investigation of the impact of working capital management on the bottom line of an organisation** by **J. Oberholzer (26608200)** was language edited. The referencing and sources were checked as per NWU referencing guidelines. Final corrections remain the responsibility of the author.

Antoinette Bisschoff

Officially approved language editor of the NWU since 1998
Member of SA Translators Institute (no. 100181)