THE IMPACT OF WORKING CAPITAL MANAGEMENT COMPONENTS ON THE PROFITABILITY OF BASIC MATERIALS INDUSTRY LISTED ON THE JOHANNESBURG STOCK EXCHANGE

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ABSTRACT

This study investigates the impact of working capital management components on the profitability of basic materials companies listed on the Johannesburg Stock Exchange for the period 2002 to 2013. It used a sample of twenty-one (21) basic materials firms and employed a fixed effect regression method to establish the causal relationship between working capital management components and profitability. A negative and statistically significant causal relationship was established between average inventory days, accounts receivable days, the cash conversion cycle, and the profitability of basic materials firms. A positive and statistically significant causal relationship existed between accounts payable days and profitability. Based on these findings, managers of basic materials firms are advised to be proactive in designing and implementing strategies that will reduce the operating cycle. Moreover, strategic managers are advised to build unshakable relationships with suppliers before negotiating longer payment periods. This practice will ensure that an organisation quickly unlocks funds previously tied up in working capital.

Keywords: Capital management components, basic materials.

INTRODUCTION

Throughout the years, working capital management (WCM) has been commonly understood in the field of financial management as an important area that focuses on management of the short term assets of a business (Firer, Ross, Westerfield and Jordan, 2012:552). Therefore, the manner in which WCM is exercised by senior management in any organisation has either a positive or negative influence on the cash outflows and inflows of the business. Excellent management of a business' short term assets enhances business continuity and reduces the possibility of functioning being interrupted. A large number of empirical studies have been carried out by different scholars across the globe in order to examine the extent to which business performance is affected by working capital management practices (Alavinasab and Davoudi, 2013; Ngwenya, 2010). The findings from these scholars indicate that working capital management plays a major role in both the profitability and liquidity of any business. Corporate managers are expected to protect and optimise the wealth of investors through excellent working capital management practices that ensure a balance between the liquidity and profitability of a firm (Alavinasab and Davoudi, 2013:3). According to Raheman and Mohamed (2007:280), a fair amount of focus

should be given to both profitability and liquidity, as too much focus on either one will result in the other suffering drastically. Naser, Nuseibeh and Al-Hadeya (2013:16) also point out that the requirements of working capital management will differ between companies due to the nature of each business. With this in mind, this study therefore focused only on companies listed in the basic materials industry on the Johannesburg Stock Exchange (JSE). Using a quantitative approach, it seeks to investigate the causal relationship between working capital management components and the profitability of the basic materials industry.

Background to the problem

The JSE, located in South Africa, surpasses all the other stock exchanges in Africa and is positioned at number nineteen (19) in the world by market capitalisation. Additionally, "it operates within two (2) equity markets, namely: (i) main board for large companies; and (ii) alternative exchange (AltX) for small and medium businesses" (KPMG, 2014:135). According to Anonymous1 (2009:1), the JSE reflects ten (10) industries, namely: Oil & Gas; Basic Materials; Industrials; Consumer Goods; Health Care; Consumer Services; Telecommunications; Utilities; Financials; Technology. These industries are classified according to the industry classification benchmark (ICB), with each represented by four levels: the 1st level represents the name of the industry; this is followed by super-sectors, sectors and sub-sectors. The ICB "refers to a definitive system categorising over 70 000 companies and 75 000 securities worldwide, enabling the comparison of companies across four levels of classification and national boundaries" (Anonymous 3, 2012:1). This study dealt with basic materials industry, and as indicated above four levels exist within this industry. The 1st level represents the name of the industry (Basic materials); this is follow by two super-sectors (basic resources and chemicals), four sectors (forestry and paper, mining, industrials metals and mining and chemicals sector) and twelve sub-sectors (Anonymous 2, 2009:1). According to (KPMG, 2014:135), as at 30 June 2014 this industry trailed behind the consumer goods industry and positioned at number two (2), with an estimated value of US$ 257 611.4 million on the JSE: this is 24.93% of the total equity market capitalisation at JSE (US$ 1033209.00). A total of 69 companies are listed in this industry, of which 63 are on the main board, with the balance being listed on the alternative exchange (AltX). The JSE confirmed that a total of approximately 394 companies were de-listed from the JSE between 2002 and 2013 (inclusive); the researcher confirmed that, of these 394 companies, 52 were from the basic materials industry. The issue of de-listing from the JSE is multi-faceted, e.g.: editors and staff writers (Carte, 2010; Cobbett, 2010; Esterhuizen, 2013; Greve, 2013; Kotze, 2014; Lazenby, 2013; Vanek, 2007) from Mining Weekly and Money web highlighted some of the issues in articles that led to the de-listing of some resources companies. These included: (i) scheme of arrangement; (ii) voluntary liquidation; (iii) voluntary winding up; (iv) non-compliance with JSE listing requirements; (v) no liquidation dividend; (vi) failure to inject assets that met the criteria for listing; (vii) conditions where companies' short term liabilities exceeded cash available. These causes for de-listing from the JSE highlight some serious issues underlying the policies of working capital management employed by de-listed companies and those that are still listed. For instance Alavinasab and Davoudi, (2013:1) linked bankruptcy to shortage of working capital in the business. Vijayakumar (2011:84) also shared similar view and argues that optimal liquidity and profitability in any business is achieve through better management of assets; and of which this practice enable the business to collect its cash due for credit sales timeously, pay its dues and use the remainder to maintain day to day operations. Moreover, he

warned that failure to adhere to good working capital management practices could lead to bankruptcy. Achieving effective working capital management practices requires that corporate seniors look at four (4) dynamic measures of working capital management, namely; inventory; accounts payable; accounts receivable; and the cash conversion cycle. With this in mind, this research aimed at investigating the causal relationships between these dynamic measures and the profitability of companies listed in the basic materials industry for the period 2002 to 2013. Researchers (Ncube, 2011 and Ngwenya, 2010) have conducted studies on the relationship between working capital management and the profitability of South African firms listed on the JSE. The findings from these studies indicate a definite relationship between working capital management and profitability. However, the challenge associated with these studies lies with the statistical techniques used to estimate the relationshinp between variables. For instance, there seems to be a trend of using the ordinary least square (OLS) method when estimating the relationship between variables. This method: not only ignores differences in terms of business practices and management style between the companies studied; but also fails to correct for factors in the macro-environment (national laws, international trade, production technologies), which may change over time which may yield a heterogeneity bias and inefficient statistical estimates, if they are not taken into consideration (Cameron and Trivedi, 2009:697; Frees, 2003:7; Mathuva, 2010:7 and Park, 2011:7). Another challenge with some of these studies lies with including all industries listed on the JSE at once; studying all industries undermine the fact that working capital management requirements levels differs from one industry to another, due to the nature of operations and other factors. Therefore each industry must be treated differently (Naser *et al.* 2013; Sunday and Small 2012 and Gill, 2011). According to Naser *et al.* (2013:20), the size of the firm plays a critical role in the business. For instance; mature firms operates at low cash cycle and show low leverage since they exert high influence "over creditors", which allows them to extend payment period in an effort to fund their operation. Moreover, they argue that "large" firms are more likely to achieve better bottom line results than "small" firms due to amount sales. Given the above circumstances, it can be argued that including all industries in one study ignores the relationship that exists between working capital management and type of industry. This view is supported by (Rimo and Panbunyuen, 2010:32), who pointed out that, 'by classifying companies according to their industry, results would show industry-related differences in their working capital management and also its factors'. Furthermore, as has been indicated, large companies experience: a low cash conversion cycle; higher sales growth and low leverage ratios. It is very likely that when the researcher collects the data for all industries at once, some of the data points for these variables could pose as extreme points (outliers) during data cleaning, thus making it difficult for the researcher to identify if those data points are attributed to error or industry type (Wegner, 2012:18). Similar studies have been conducted by different scholars outside the South African economy (Akoto, Awunyo-Vitor and Angmor, 2013; Alavinasab and Davoudi, 2013; Gill, Biger, Mathur, 2010; Mathuva, 2010 and Vijayakumar, 2011). However, findings from these studies tend to differ. For instance: Mathuva (2010) and Vijayakumar (2011) obtained a negative relationship between overall measure of working capital, which is the cash conversion cycle and profitability; whereas Gill *et al.* (2010) obtained a positive relationship. The difference in results could be attributed to working capital management practices that may vary from one economy to another (Gill, 2011:37). In addition, Omolade and Mukolu (2013:34) pointed out that "business operations in developing African countries are still much affected by: government regulations; political and economic instability; corruption; and power generation". Considering the similar studies conducted outside the South

African economy, it can be argued that the results obtained are applicable to that particular economy and cannot be generalised to other economies. Having identified the gaps associated with the previous studies through statistical methods employed, population used and geographical location, the researcher then: collected panel data for twenty-one (21) companies listed in the basic materials industry on the JSE for the period 2002-2013; used different methodologies to address these gaps. For instance,: statistical methods accounting for differences between companies were used; the study was conducted only on one industry, in order to take in consideration the levels of working capital management employed by this industry.

Research Problem

The de-listing of some companies from the basic materials industry (due to: no liquidation dividend; voluntary winding up; voluntary liquidation; and scheme of arrangement due to financial difficulties) signals some serious issues underlying working capital management practices employed by companies in this industry. Despite several studies having been conducted within and outside the borders of South Africa, in an effort to try to establish the relationship between working capital management and the profitability of firms, there is still no consensus on the extent that these two elements relate to one another. In other words: Is the relationship between working capital management components and profitability a positive or negative one? For instance, various studies (e.g., Mathuva (2010) and Vijayakumar (2011) reported a negative relationship between cash conversion cycle and profitability; whereas those conducted by Gill *et al.* (2010) reported positive relationship. The differences in the results obtained could be attributed to macro-economic policies, politics, and the markets of each economy, which in turn affect business operations. There are no known studies within the South African economy that pay special attention to the basic materials industry and try to determine the nature of the causal relationship between working capital management components and profitability. There seemed to be a trend in the use of OLS as a viable statistical technique when estimating the relationship between variables, including by Ncube (2011) and Ngwenya (2010). This statistical techique often yields bias and inefficient estimates due to heterogeneity between companies, which may lead to invalid statistical inferences (Cameron and Trivedi, 2005:697). With this in mind, it can be argued that strategic managers and other working capital policy makers have not gained much value from previous studies done. This study therefore tries to close the existing gaps by carefully employing statistical methods that will yield unbiased and efficient estimates to improve the level of decision making in the basic materials industry. In addition, the study aimed at suggesting strict policies associated with: inventory period; cash collection period for credit sales from debtors; and payment period to the supplier that will not tarnish the image of the organisation.

Research Questions and Hypothesis

The following research questions were derived in relation to research objectives. Furthermore, each research question was formulated as hypothesis (null and alternative) to help achieve the research objectives:
What is the causal relationship between working capital management components and average return on assets (ROA) of companies listed under basic materials industry on the JSE during 2002 to 2013?

1Hypothesis one:
Null: There is no relationship between working capital management components and average return on assets (ROA) of companies listed under basic materials industry on the JSE during 2002 to 2013.
Alternative: There is a relationship between working capital management components and average return on assets (ROA) of companies listed under basic materials industry on the JSE during 2002 to 2013. To what degree do the working capital management components influence the average return on equity (ROE) of companies listed under basic materials industry on the JSE during 2002 to 2013?

Hypothesis two:
Null: There is no relationship between working capital management components and average return on equity of companies listed under basic materials industry on the JSE during 2002 to 2013.
Alternative: There is a relationship between working capital management components and average return on equity of companies listed under basic materials industry on the JSE during 2002 to 2013. Is there a causal relationship between cash conversion cycle and average return on assets (ROA) of companies listed under basic materials industry on the JSE during 2002 to 2013?

Hypothesis three:
Null: There is no relationship between cash conversion cycle and average return on assets of companies listed under basic materials industry on the JSE during 2002 to 2013.
Alternative: There is a relationship between cash conversion cycle and average return on assets of companies listed under basic materials industry on the JSE during 2002 to 2013. What are possible recommended strategies in relation to working capital management that can be adopted by senior managers in order to enhance the profitability of companies listed under basic materials industry on the Johannesburg Stock Exchange?

Significance of the study

Unlike previous studies, which focused on all industries listed on the JSE in South Africa, this study focused on the basic materials industry; therefore it is expected to contribute significantly to this particular industry. Upon completion of this study, it is expected that creditors will be able determine suitable lending criteria and evaluate the level of commitment portrayed by companies (in the basic materials industry) in meeting their obligations. It is also expected that this study will give a clear indication regarding the working capital management and profitability of these firms and thus assist investors to check if it is worthwhile to invest in this industry. Senior managers who are entrusted to look after the wealth of shareholders through profit optimisation will benefit from this study, as it will shed some light on the importance of excellent working capital management practices. Furthermore, senior managers will be able to identify critical working capital management components and implement strict policies regarding these components. Lastly, the study is expected to contribute significantly to the existing literature on working capital management and profitability in the South African economy and prompt further research in the field.

LITERATURE REVIEW

The theoretical framework is focused on the concepts of working capital management, the determinants of working capital management, the importance of optimum working capital, and the components of working capital. Firer *et al.* (2012:4) define working capital management as, continuously management of current assets and current liabilities. They advise that, operational availability depends on adequate resources and daily monitoring thereof. Ashraf (2012:21) agrees with the above definition and add that working capital management relate to "investing" in current assets. The common phrase in these two definitions is the "management of current assets and liabilities"; therefore it be can argued that the life of any business depends strongly on sound management of a company's short-term assets.

Importance of optimum working capital management

Gill (2011) cited in Sandhar and Janglani (2013:2-3) explains that the attainment of favourable levels in dynamic measures of working capital is the ultimate goal of working capital management. Lamberg and Valming (2009:22) also support this view and argue that optimum working capital management can explain favourable levels in debtors, inventories and creditors; thus, it plays a crucial role in corporate finance. Moreover, working capital management enables the business to deal with the dynamics of its operations (Bhadoria, 2010:1). The above views confirmed that, a lack of balance in the dynamic measures of working capital management has serious repercussions in an organisation. For instance, Vijayakumar (2011:84) reveals that failure in managing cash availability for both long and short-term commitments puts the business under stress, as it is unable to collect what it is due on credit sales - and so to pay creditors timeously. Ebenezer and Asiedu (2013:25) also mention some of the risks associated with improper working capital management practices as being: (i) business continuity interruption due to a lack of funds and (ii) average business returns due to poor investment in assets. The above views suggest that optimisation of working capital management assures the business continuous operations with minimal interruption.

Determinants of working capital management

Barad, (2010:8-9) suggests that numerous factors influence the working capital requirements of an organisation including:

- The life cycle of the product in the market, where the introduction and the growth stages of the product reflects demands; and forces the business to operate at high levels of working capital.
- The type of business, companies specialising in tangible goods require large amount working capital as compare to those of intangible goods.
- The terms of sale and the time, it takes the business to sell and receive cash for goods sold on credit. This determines whether the company requires external funding for operations, or they will able to collect cash in time from debtors.
- The expected increase in the inflation of goods required for production, and if there is risk of price escalation companies may procure and keep large amount inventories.
- The existing relationship between the bank and the company as this determines the possibility of easily accessing funds required for the operation.
- The projects taking place around the business also stimulate business operations and increase the levels of working capital managements

- The "rate of growth" and "business size" also determines levels of working capital management.

Understanding of these determinants is crucial for the survival of the basic materials industry. Working capital management policy-makers must: have a thorough understanding of the environment in which a business operates; and set the levels of working capital as required, based on the above factors. Aminu (2012:58) indicates that a good grasp of the underlying factors that determine working capital enable an organisation to minimise risks of losing operation and improve productivity.

Dynamic measures of working capital management

The existence of any business depends on optimisation of its working capital management components. According to Agha, Mba and Mphil (2014:375), the success of the company depends on the business acumen skills of the financial managers. For instance, Alavinasab and Davoudi (2013:3) mention some of the factors that lead to poor working capital management practices as being: (i) inexperienced financial managers, who fail to attained the desired level of working capital management components; (ii) limited availability of information regarding the main drivers of working capital and (iii) inability to identify the link between a firm's working capital management components and business performance. Sandhar and Janglani (2013:3) explain that working capital management is evaluated using either static or dynamic measures. Static measures include: current ratio, quick ratio, current assets to total assets ratio, and total debts to total assets ration; whereas dynamic measures refers to accounts receivable days, accounts payable days, inventory days and the cash convention cycle. However, Vijayakumar (2011:85) argues that static measures are incapable of giving a true picture about the dynamics of business operations and advised the use of dynamic measures in evaluating working capital management. Consistent with Vijayakumar (2011), the researcher opted to discuss the theoretical framework associated with dynamic measures of working capital management.

Inventory management

Ebenezer and Asiedu (2013:27) define inventory management as, "the planning, coordinating and controlling activities related to the flow of inventory through and out of an organisation". Olsen and Wetz (2014:30) define it as, "planning, steering, classification and control of inventories and the actions and policies that influence the stock level". Both these definitions point to one thing, i.e. managing activities that help to control the levels of inventory. Aminu (2012:59) is supported by Rimo and Panbunyuen (2010:21) when he describes inventories as 'raw materials, work-in-progress, finished goods, extra material and consumption materials'. The availability of optimum inventories ensures: continuity of operations; minimising shortages that can upset customers; reduces risk of paying higher prices for credit purchases due to inflation; improvement of profitability and proper planning of procurement (Paramasivan and Subramanian, 2009:166). Naser *et al.* (2013:12) suggest that holding the optimum quantity of stock ensures business continuity and a reduction in the cost of raw materials. Moreover, they argue that firms the keep optimum levels of inventory reduce overall costs associated with high inventory levels. Aminu (2012:59) also share similar view and argues that, undesirable levels of inventory reduce profit margins; and suggest estimation of correct levels in inventory using predicted sales. These views suggest that, optimum levels of inventory reduce overall costs associated with the undesirable amount of inventories and thus improve the profitability of a firm. There is consensus among researchers that the effectiveness of a company's inventory

management can be evaluated by calculating the average time it takes the firm to sell its finished goods off the floor (Alipour, (2011:1095); Lamberg and Valming, (2009:24). To achieve this, the aformentioned scholars utilised the following formula, which is widely accepted in the field of corporate finance as being a measure of inventory period (Firer *et al.* 2012:556).

Management of accounts payable

Marshall, McManus and Viele (2011:253) define accounts payable as outstanding invoice occurred because of acquiring "good or services" from creditors. According to Bagachi (2013:30), account payables occur because an organisation procures goods and services from suppliers without immediate payment. These definitions indicate that most businesses use raw materials obtained from suppliers before they pay for it, which is another way of funding their operations. Uremadu, Egbide and Enyi (2012:87) explain that: the association between "accounts payable" and credit "purchases" is derived from the production output and firms must assess the impact of lengthening payment period and acceptance of discount from creditors to "profitability and liquidity". Ashraf (2012:22) also indicates that even though an extended payment period may look lucrative, as it allows the business to finance its operations using funds for suppliers and the opportunity to test the quality of raw material, its potential gains must be weighed against facilities such as discounts offered by creditors. Shakoor, Khan and Nawab (2012:563) point out that poor performance may creep in due to the inferior quality of raw materials received from creditors because of the extension in payment period. The above views outline the costs and benefits of having short and long accounts payable period. This requires financial managers to conduct extensive cost and benefit analysis study pertaining longer payment periods to the suppliers. Similar to inventory management, scholars believe that efficiency in accounts payable management can be evaluated by gauging the average time it takes a company to setlle its obligations (Akoto *et al.* 2013). The following formula has been adopted by many researchers when calculating accounts payable:

Accounts payable days (APD) = (APD / Credit purchases) * 365" … (2)

The above formula sums the accounts payable figures from the balance sheet for two consecutive periods and divides it by two. The average is then divided by credit purchases and multiplied by number of days per year, thus yielding the average number of days it takes a firm to settle its obligation. Firer *et al.* (2012:56) suggest that the cost of sales denominator in the above formula can be used instead of credit purchases, if there is no figure for opening stock. It can be argued that excessive payables days could mean the company is having difficulty in paying its suppliers and is at risk of liquidation and tarnishing its image amongst credit lenders.

Management of accounts receivable

Receivables or accounts receivable are short-term assets acquired as result of rendering goods or services on credit to customers (Olsen and Wetz, 2014:25). Bagachi (2013:31) suggest that the whole idea behind credit sales is to grant consumers an opportunity to experience the product before completing a transaction. Selling goods on credit to customers is a business practice used across the globe. This practice affords the business an opportunity to generate more revenue, as it is able to charge interest on goods sold for credit. The average time it takes a firm to collect its dues from customers can be used as a yardstick when evaluating the cash collection policies of the firm (Ashraf, 2012). Sunday and Small (2012:16) opine that taking longer to collect money from debtors results in either a cash flow crisis or some accounts being written off, and therefore

businesses should aim for a shorter collection period. According to Shakoor *et al.* (2012:563), decline in business earnings emanates from minimum amount of goods sold on credit and poor debt collection procedures. This means that even though firms generate high revenue from selling more goods on credit, strict credit collection policies (that minimise the debtors account) should be implemented and monitored at all times. Traditionally, in corporate finance, the efficiency in credit collection policies could be evaluated by calculating the average number of days it takes a company to collect monies due for goods sold on credit ((Firer *et al.* 2012:55). To achieve this, many researchers have adopted the following formula when evaluating efficiency of accounts receivable management, including Agha *et al.* (2014) and Alipour (2011):

"Accounts receivable days (ARD) = (Average accounts Receivables / Sales) * 365" … (3)
Similar to the calculation of accounts payable and inventory period, the above formula sums the accounts receivable figures for two consecutive periods and divides this figure by two to obtain the average. Assuming that a firm sells all goods on credit, the average is then divided by the net sales figure. It can be argued that a longer receivable period means more cash is still unpaid by customers, probably due to a poor credit collection policy; such a situation might force the business to obtain external funding in order to ensure it can support its day-to-day business activities.

Cash conversion cycle
Abbadi and Abbadi (2013:68) define the cash conversion cycle as the time difference between cash outflows and cash inflows in the business. Vijayakumar, (2011:85) explains the measure of cash conversion cycle as being the holistic approach to working capital management. This means that businesses can use this cycle as a tool to check how long it takes to unlock funds tied up in working capital. In addition, firms can reduce this cycle through effective credit collection policies, applying systems like just-in time, in order to maintain optimum inventory and negotiate a longer payment period with suppliers without tarnishing their image. These strategies allow the business to reduce its operating cycle and increase the payment period - hence reducing the cash conversion cycle. According to Ngwenya (2010:527), firms use the cash conversion cycle period to assess their effective use of short-term assets. This cycle results from all the dynamic measures of working capital; for instance, it measures the overall efficiency in inventory, receivables and payables management. This view is supported by Sunday and Small (2012:13), who suggest that low or negative values of CCC indicates best practice in terms of working capital management in a firm and therefore businesses should always strive for a low CCC. A low CCC merely indicates an effective credit collection system and best inventory management practice, which allows the business to operate using a shorter operating cycle, while enjoying a longer payable period from suppliers. With this view in mind, the following formula has been adopted by researchers in calculating the average time it takes a business to unlock tied up capital (Mathuva, (2010) and Vijayakumar, (2011):

CCC = Account receivable days + Average inventory days - Accounts payable days ... (4)
As illustrated, the CCC results from other dynamic measures of working capital and the above formula sums the total number of days the inventory is on the floor with the average time it takes the company to collect its monies for goods sold on credit. This gives the total operating cycle of the company; one then subtracts the accounts payable from this cycle to obtain the cash conversion cycle. The figure 2.1 below depicts the calculation of cash conversion cycle.

According Sunday and Small (2012:13), companies with a longer operating cycle and shorter payment period yield a positive cash conversion cycle. More precisely, taking longer to sell inventory and collecting cash for credit sales within a shorter payment period yields undesirable positive cash conversion cycle.

Defining Profitability
According to Sandhar and Janglani (2013:5), profitability is all about using the short-term assets of the firm efficiently throughout the operations in an effort to earn good returns. Sunday and Small (2012:7) define profitability as "the relationship of income to some balance sheet measure, which indicates the ability to earn income on assets". This means that the future of any business depends on how operational managers continuously allocate available resources throughout the business activities in an effort to sustain the firm. Aminu (2012:60) identifies two measures of profitability, namely: (i) profit margin and (ii) rate of return ratios. The profit margin uses ratios like net and gross profit margin to calculate the income earned from every rand of revenue. While of rate of return measures look at how firm uses assets to earned income and employ ratios like return on equity and return on assets to quantify the generated profit from every rand of equity or assets. This means that firms can evaluate how well they are performing in terms of sales or allocation of available resources throughout the business activities. For instance, rate of return ratios enable the business to check how well it is using assets on hand to earned income (Firer *et al.* 2012:56).

Measures of organizational profitability using rate of return ratios
According to Firer *et al.* (2012:56-57), return on assets (ROA) and return on equity (ROE) are generally accepted as measures of the effective use of short-term assets in an organisation. This view has been supported by many scholars, who used similar ratios when evaluating the effective use of assets in the business (Akoto *et al.* 2013; Sandhar and Janglani, 2013). Below is a detailed discussion of these profitability measures.

Return on Assets (ROA)
Uremadu *et al.* (2012:91) supported by Firer *et al.* (2012:58) point out that, ROA determines how efficiently the firm uses "every rand of assets" to earned income. This means that, firms can use this ratio to check if they have employed available assets throughout operations to the fullest capacity. To calculate the ROA, the following formula is widely accepted in the field of corporate finance:

Return on Assets (ROA) = (EBIT/ Average Total Assets) x 100 … (5)
Where, EBIT = Earnings before interest and taxes.
The rationale for having EBIT, as a numerator in the above formula instead of net profit is twofold: to ensure the financing decisions taken by financial managers do not distract the plant performance and to eliminate the effect corporate tax rate imposed by national government. This view is supported by Marshal *et al.* (2009:426), who argue that ROA measures the operating activities of the firm - thus operational managers cannot be held accountable for: taxes, as this is beyond their control; interest on expense, as this has to do with financing decisions made by senior financial managers. Other scholars, who have shared a similar view and used EBIT as a numerator in the calculation of ROA, include: Sandhar and Janglani, 2013; Sunday and Small, 2012 and Uremadu *et al.* 2012. In essence, this means that it does not make any sense to take

into consideration corporate taxes and finance costs when evaluating asset effectiveness, as operational managers have no control over these matters.

Return on Equity (ROE)
Hough, Thompson JR, Strickland III and Gamble (2011:111) point out that: this ratio indicates the profits earned by investors from their shares; ROE above 10% and continuously growing is satisfactory. Marshall *et al.* (2011:81) support this view and highlight that most American companies have (in the past) shown an average ROE of 10 to 15%. In addition, they point out that ROE indicates the proportion of shareholder's shares from the assets of the company and therefore its rate of return is of particular importance to shareholders of an organisation. The widely accepted formula to calculate the ROE is as follows:

ROE = (Profit after tax and interest / Average shareholders' equity x 100 … (6)
The operating efficiencies in an organisation measured by ROA and ROE can only be obtained if working capital management components are at a favourable level. For instance, Firer et al (2012:558) explains that a reduction of inventories and receivables will reduce total assets, thus improving ROA. In an attempt to study the causal relationship between working capital management and profitability, the researcher used ROA and ROE as proxies for profitability.

Empirical review related to working capital management components versus profitability
Working capital management plays a significant role in the sustainability of an organisation, since it directly affects profitability. Scholars across the globe have done numerous studies in an attempt to establish the relationship between working capital management and profitability. Most of these studies confirm that a relationship exists between working capital management and the profitability of an organisation. To identify the areas that needed further research, the researcher reviewed findings from the past similar studies conducted within and outside South African economy. In Africa, Ngwenya (2010) conducted a research to investigate the relationship between working capital management measured and profitability. He used a sample of 758 South African firms listed on the Johannesburg Stock Exchange (JSE) for a period of 10 years (1998 to 2008). Using the multiple regression and Pearson correlation matrix to analyse the data, he found that the cash conversion cycle and accounts receivable period negatively relate to gross operating profit. He further revealed that firms that keeps high levels of inventory and take longer to pay suppliers improve profit margin ratios. Ebenezer and Asiedu (2013) performed a similar research on the impact of working capital management on profitability for manufacturing companies in Ghana. They used a sample of manufacturing firms listed on the Ghana Stock Exchange for a period of five years (2007 to 2011). They used inventory days, payable days and cash conversion cycle to evaluate the working capital management and net operating profit as a proxy for profitability. After using regression analysis, the empirical results showed that inventory days and accounts payable negatively relate to net operating profit (profitability). They further confirmed that the cash conversion cycle positively relates to net operating profit. However, their findings, contradict similar research carried out by Ngwenya (2010), who revealed that the cash conversion cycle relates negatively to profitability and that accounts payable period and inventory days relates positively to profitability. The difference in findings between researchers may be due to the different economic policies and working capital management practices of the two countries. Makori and Jagongo (2013) undertook a similar study and collected the balanced panel data for ten companies (five manufacturing firms and five construction firms) listed on the

Nairobi Stock Exchange for the period 2003 to 2012. Using parametric tests, such as the Pearson correlation matrix and regression models, their findings revealed that: inventory days and accounts payable relate positively to profitability; whereas cash conversion cycle and accounts receivable relate negatively to profitability. These findings were: contrary to those of Ebenezer and Asiedu (2013); but in line with those of Ngwenya (2010). Based on their findings, they suggested that managers should aim to raise inventories to an optimum level, negotiate longer payment terms with suppliers without straining the relationship, and reduce the cash cycle through the proper management of assets, in order to improve profitability. Mathuva (2010) did a similar study on working capital management versus profitability using same stock exchange as Makori and Jagongo (2013) but targeted different population, used different and longer period and triangulated his financial data results with expert from companies under his study. He collected data for the period 1993 to 2008 on 30 firms and used panel regression models (such as ordinary least squares (OLS) and the fixed effect model (FEM)). His results agreed with those of Makori and Jagongo (2013) and Ngwenya (2010), indicating that: accounts receivable days and the cash conversion cycle negatively relate to profitability; inventory days and accounts payable positively related to profitability. He suggested that firms on the Nairobi Stock Exchange kept high levels of inventory to alleviate raw material costs associated with inflation and to prevent any costly production stoppages that could occur because of raw material shortages. Akoto *et al.* (2013) carried out the study of working capital management versus profitability on the listed manufacturing firms at Ghana stock exchange for the period 2005 to 2009. Using financial panel data from 13 firms and with the help of ordinary least square (LOS) regressions, they found out that accounts collection period negatively relates to profitability whereas cash conversion cycle and accounts payable were positively relate to profitability.

CONCLUSION

The theoretical framework and empirical review pertaining to the study provide a strong foundation for the current study. The empirical literature review has provided an in-depth understanding of working capital management components and the profitability of an organisation. Furthermore, the literature review has revealed consensus among scholars that working capital management affects the profitability of a firm. However, views regarding the direction (negative or positive) of the relationship between working capital management components and profitability ratios differ among scholars, which may be due to different working capital policies employed in each industry. The literature also shows very few studies regarding the relationship between working capital management and profitability done within the South African economy, therefore the researcher aims at doing similar study tailored to a specific industry in South Africa.

RESEARCH METHODOLOGY

Leedy and Ormrod (2001) (cited in Williams (2007:66)) define research methodology as, "a general approach the researcher takes in carrying out the research project". According to Creswell (2003:18), researcher can conduct his or her study using one of the three approaches, namely; qualitative, quantitative and mixed methods (which is a combination of qualitative and quantitative research)". Kothari (2004:5) explains that, quantitative research involves compilation of numerical data followed by analysis using relevant techniques. All these three

quantitative definitions stress the collection of numerical data followed by analysis using relevant statistics method. This implies that studies that employ a large data set in the form of numbers and seek to make sense of data collected through proper statistics do so via a quantitative approach. A qualitative research approach refers to "a holistic approach that involves discovery" (Williams, 2007:67). The research approach adopted to study the causal relationship between working capital management components and the profitability of the basic materials firms was quantitative in nature. The use of this approach deemed appropriate as it enabled the researcher to: collect quantitative data, develop hypothesis, and use formal statistical methods to estimate the causal relationship between variables. Sykes (1992:1) asserts that the estimation of a relationship between variables requires the researcher to gather data on variables of interest and analyse these using statistical methods such as regression. Hence, the quantitave approach was more than approapriate to investigate this relationship.

The Research Design
Research design defines the path followed during research, it articulates data collection procedure and technique required to answer research questions or hypothesis. (Bertram and Christiansen, 2014:40). This means that it act as guide for the researcher during execution of the particular study. Saunders, Lewis and Thornhill (2009:139) divides business research design into three types, namely; (i) Descriptive research, which involves describing the relationship of elements through data gathering and without going into much detail or establishing statistical relationships; (ii) Exploratory research acts as a preliminary study for the main research, as it involves gathering more information on a problem that exists and is not yet fully understood; (iii) Causal research involves manipulation of independent variables to establish causal effect relationships between variables. In this study, a causal research design was adopted to estimate the causal relationship between working capital management components and the profitability of the basic materials firms. It is important to note that the data used for the study was taken from archival records and no manipulation of independent variables was possible - hence the study used non-experimental data. Frees (2003:19) identifies three requirements for "establishing causality" between dependent and independent variable namely: (i) the relationship must exist between dependent and independent variables, (ii) extraneous variables must be controlled in order to obtain net relationship between dependent and indepenedent variables and (iii) the data should be collected over time. This type of research design was considered appropriate, as the study employed longitudinal panel data from archival records generated over time and used proper statistical methods to control unobserved effects that often affect the relationship between dependent and independent variables.

Research Philosphy
According to Wahyuni (2012:68) research paradigm channels the researcher's action through provision of basic principles and "beliefs" emanating from interaction with the surrounding environment. Weaver and Olson (2006:460) define it as "patterns of beliefs and practices that regulate inquiry within a discipline by providing lenses, frames, and process through which investigation is accomplished". This means that reseachers within a particular field may employ various methodgies when conducting research, due to different beliefs emanating from how they interact with their surroundings. However, the research paradigm articulates principles necessary to channel the researcher's beliefs. Antwi and Hamza (2015:219) identify two broad epistemological positions, namely: (i) positivism - often associated with a quantitative approach

and relying on empirical facts rather than human views to explain circumstances; and (ii) Interpretivism - often associated with qualitative research and relying on interaction with humans to explain phenomena not governed by the laws of science. This research used secondary data, developed hypotheses and tested them using statistical methods in an effort to estimate the causal relationships between variables. Moreover, the researcher did not interact with any individuals from any basic materials companies, instead relied soley on statistical methods to explain the phenomena and generalise findings. With this in mind, the positivist philosophy was considered more appropriate for the study.

Research Strategy
Saunders *et al.* (2009: 141) mention various strategies that could be adopted when conducting research, namely: experiment; survey; case study; action research; grounded theory; ethnography; and archival research. They stress that researchers should select strategies that are suitable to answer research questions/hypotheses and objectives. In order to estimate the causal relationship between working capital management and the profitability of the basic materials industry for the period 2002 to 2013, this study employed an archival research strategy. This type of strategy was considered appropriate as the study collected data generated over time from archival records to answer the research hypothesis and meet the research objectives.

Target Population
Target population refers to a group of individuals that posess the characterics required for the study and from which the sample for the study will be drawn (Bertram and Christiansen, 2014:206). The target population for this study was companies listed in the basic materials industry on the JSE: there were 63 companies listed on the JSE as at 31 December 2013. However, only 32 (50.79%) companies consistently listed on the JSE for the period of 2002 – 2013 (JSE, 2014). The target population comprises four sectors namely: mining, chemicals, forestry and paper, and industrials metals and mining (Anonymous1, 2009:1). The list of 32 companies consistently listed during the period 2002 to 2013 was then used to create a sampling frame.

Population and Sampling
Saunders *et al.* (2009:213) identifies two kinds of sampling namely: (i) probability sampling where all individuals have equal chance of being selected and form part of the sample and (ii) non-probability sampling where the likehood of each individual being selected is unknown. Under the umbrella of non-probability there is convenience sampling; judgement sampling; quota sampling and snowball sampling (Zikmund, Babin, Carr and Griffin 2009:396). Whereas probability sampling includes simple random sampling; systematic sampling; stratified sampling and cluster sampling (Lohr, 2010:26).

Sampling Strategy
The selection of a sampling strategy is a very important stage during research, since it determines whether or not the results of the study can be generalised to the wider population; therefore it is vital to ensure that the chosen sampling strategy grants the researcher an opportunity to generalise the results to a wider population (Welman, Kruger and Mitchell 2005:55). With this in mind, the researcher adopted the probability sampling technique called proportional stratified sampling for purposes of selection of companies listed on the Johannesburg Stock Exchange in

the basic materials industry. This method involves the sub-division of the population into stratum using certain variables, such as industrial sector or gender and randomly selecting each individual within a particular stratum (Kothari, 2004:62). The stratified sampling technique considered appropriate for the study since: the sub-division of the targeted population into four sectors, as per the JSE, seemed to indicate an element of heterogeneity between the sectors. Moreover, the stratified sampling method enabled the researcher to attain a representative sample, since each sector (stratum) in the sample had the same proportion as in the wider population. Lastly, random selection reduces the selectivity bias, giving companies an equal chance to be in the study and minimising sampling standard error (Frees, 2003:20). The probability sampling technique called systematic or simple random sampling was not appropriate for the study. For instance, forestry and paper and industrials metals and mining sector had two and three companies respectively, and if the researcher used simple random there was a high chance of missing companies in these two sectors. Moreover, this method could have only selected companies under mining and chemical sectors, as they appeared in numbers, hence the sample size selected not viewed as good representative of the studied population (Welman *et al.* 2005:62).

Data collection instruments
The procedure followed by the reseacher to obtain data for the reseacrh project is termed data collection method (Bertram Christiansen, 2014:41). According to Kothari (2004:95), researchers must decide on the "type of data" required to answer research hypothesis and meet objectives for instance; they can opt to collect primary data which is the original data or use secondary data that has already been collected by someone else other than a researcher. Saunders *et al.* (2009: 258) further divide secondary data into three catergories namely; (i) the documentary secondary data; (ii) the survey-based data and (iii) the multiple sources that deals with gathering data from different individuals and form uniform data suitable for the stud. De Vaus, (2001:10) identifies various methods of data collection including questionnare; structured and semi structured interviews, observation, analysis of document and unobtrusive method. In this study, multi-source secondary data was collected using documentary analysis. This category of secondary data was chosen because twenty one (21) financials statements from different companies for over a period of 12 years were grouped together to form data needed for the study. Additionally, these statements were thoroughly analysed to extract data needed for calculation of variables.

Panel data collection procedure
Panel data also known as pooled data refers to the collected data of same individuals followed for a certain period of time (Gujarati, 2004:649). In this study, the researcher collected twelve-year period of data for each company, hence data collected termed balance panel data (Greene, 2012:388). The researchers who use balance panel data gain: (i) the better understanding in dynamics of relationships between variables over time; (ii) their estimated models have accepted levels of multi-collinearity and (iii) they are able to study the net relationship between dependent and independent variables (Gujarati and Porter (2008:592). To obtain the data, the researcher extracted audited annual financial reports for each company from official companies' website, and BFA McGregor as published database (2013). Other scholars who used BFA McGregor database as source of data were (Ncube, 2011 and Ngwenya, 2010). The rationale of obtaining financial statements from both channels emanates from various reasons including the following:
- Verification of extracted data to ensure accurateness

- Trade payables figures on BF McGregor database include short-term provisions for liabilities and of which these items must not be included during the calculation of accounts payable days.
- Trade receivables figures on BF McGregor includes derivatives, investments, current portion of other non-current assets also need to be excluded when calculating accounts receivable days.

Sometimes McGregor databases reports gross revenue instead of net revenue required to calculate accounts receivable days, hence net revenue could only be obtain on the annual reports extracted from official companies' website. Financial statements were then analysed and data needed for calculation of variables successfully extracted. The researcher then calculated variables of interest using widely accepted formulas in corporate finance. After all the variables were calculated for each company, they were then grouped together to form uniform data for analysis.

Pre-checking of collected panel data

Park (2011:5) provides some useful guidelines to be follow when checking the characteristics of the collected panel data. For instance; checking the existence of unobserved and random effects; ensuring data is indeed longitudinal; checking for any mergers or spin offs within entities; Consistency in measurement methods; Optimum amount of data collection to avoid the trap of finding relationships that don't exist between variables ("type II error") and incomplete data. In this study, all companies with incomplete data were eliminated to ensure the study remained with balance panel data; large companies listed on the JSE are expected to prepare their financial statements in accordance with international financial reporting standard (IFRS), that ensures standard measurements and reporting practice (JSE, 2011). Collected financial statements checked and found to be prepared in accordance with IFRS. Lastly, estimated regression models where checked for panel effects (presence of fixed or random effects) using various formal statistical tests.

Data analysis

According to Zikmund *et al.* (2009:70), data analysis involves employing relevant statistical tools to facilitate decision making about the data collected for the study. To estimate the causal relationship between working capital management and profitability of basic materials firms listed on the JSE, the researcher used Stata 13 statistical software for analysis of the collected data. The descriptive statistics, multiple panel regression analysis and several diagnostic tests were the main statistical tools to analyse the data.

Multiple panel regression analysis: The study employed multiple panel regression analysis, rather than simple regression analysis, simply because it involves more than two independent variables to estimate the relationships (Alexander, 2008:161). According to Park (2011:46), goodness of fit measures and coefficients with their standard errors are normally reported after performing the panel regression. The following discussion highlights the parameters reported for the study. In order to get a true estimate for the population, the adjusted R^2 is preferred over R^2 when reporting the variation in the dependent variable caused by independent variables of the model (Cohen, Manion and Morrison 2006:538). A similar view are shared by Gujarati and Porter (2008:202) who argue that, R^2 associated with a large number of independent variables tends to be over-estimated and fail to give a true picture of the population.

Reliability and Validity
Reliability: Cohen *et al.* (2007:146) relate reliability in quantitative research to "dependability, consistency, and replicability across time, over instruments and over groups of respondents". This means that other researchers should obtain similar results if they were to conduct the same study using the same companies and the same data. Saunders *et al.* (2009:274) assert that with secondary data reliability can be confirmed by checking the "reputation" of the organisation that collected it. In addition, Saunders *et al.* (2009:276) suggest checking the collection methods used to collect secondary data. The researcher used financial statements extracted from BFA McGregor database to obtain secondary data. The financial statements for companies listed on the JSE and available on the BFA McGregor database or official companies' website are prepared by world recognise auditing companies such as (KPMG; Ernst and Young; Price house Water Coopers (PWC); and Deloitte). These big four (4) auditing companies follow strict reporting rule required by JSE, which is: the financial reporting framework that is applicable and in accordance with international financial reporting standard (IFRS). Gitman and Zutter (2012:58) point out that, companies that follow IFRS procedures when preparing their financial statements ensure that information contained is "understandable, reliable, comparable and accurate". The researcher also performed data cleaning by: means of 5% winsorising on some extreme data points and complete removal of companies that had numerous data points that did not make economic sense. Cohen *et al.* (2006:148) support this practice, suggesting that elimination of extreme values from the data set enhance the reliability of research.

Validity: Zikmund *et al.* (2009:307-308) define validity as the "accuracy of a measure or the extent to which a score truthfully represents a concept". According to Marczyk, DeMatteo and Festinger (2005:67), there are three types of validity: (i) internal validity, which refers to the extent that the variation in the dependent variable is indeed explained by the independent variables of the study; (ii) external validity, which refers to the degree that results obtained from the sample are applicable to wider populations; and (iii) construct validity, which refers to the ability of the study to use correct variables when evaluating the constructs. In this study, internal validity was achieved through proper selection of statistical methods that ensure the elimination of bias from estimated coefficients, e.g.: models that account for heterogeneity bias to ensure there is indeed a causal relationship and diagnostic tests that checks the nature of error term in a model to facilitate the selection of correct robust standard errors. This view is supported by Llaudet (2010:2) who suggested that, studies that produced models that are consistent, "efficient" and with acceptable confidence level achieve internal validity. Welman *et al.* (2005:107) pointed out that internal validity can be improved by ensuring there is a true causal relationship. This means that controlling other variables that correlate with variables of interest improves internal vailidity. The construct validity achieved by choosing variables that are widely used in the field of corporate finance measure the concept of working capital management and profitability. Concerning external validity or generalisabilty, the study only focused on the basic materials industry and used stratified and simple random techniques to ensure the sample was representative of the population and that companies had an equal chance to be part of the study. The results of the study can therefore be generalised beyond the sample to a wider population of organisations in the basic materials industry (Welman *et al.* 2005:55).

Limitations of the study

- The suggested views from the study emanates from theoretical perspective of finance and as such they may lack practical aspects or subjected to criticism as the researcher does not specialise or work in the field of corporate finance.
- Study used multi-source secondary data collected by someone else and this might affect analysis in some way, as the errors could have been committed when collecting and preparing data and some information on the financial statements is likely to be manipulated to attract the investors.
- Incomplete information on financial statements at some period led to a removal of few companies and thus the sample size significantly reduced.
- Fixed effects model assume similar average effects (same slope) across firms and disregard the fact that firms are always at competition, employing different strategies to achieve unique results.

Delimitations of the study

- The study conducted only on the JSE firms listed under basic materials industry and therefore, the findings and recommendations from the study were only applicable for this industry.
- The researcher analysed numerical data from financial statements using statistical methods to infer the causal relationship between working capital management components and profitability of basic materials industry; and did not seek any practical views from financial managers of these companies. The results obtained may therefore lack the element of practicability.
- The period chosen for the study excluded basic materials company listed on the alternative exchange (ALTX) at the JSE, as this part of stock exchange only implemented in 2003. Therefore, the results obtained may not be applicable for companies listed under ALTX.

Elimination of Bias

- The researcher obtained financial statements from two channels namely; BFA McGregor as published database (2013) and companies' official website in order to make comparison on figures used for calculation of variables under the study (Zikmund *et al.* 2009:181)
- The researcher used fixed effect model to account for individual and time fixed effects in longitudinal panel data thus eliminating the heterogeneity bias.

Ethical considerations

Welman *et al.* (2005:181) insist that, researchers should demonstrate unbiased attitude throughout the research process. Lodico, Spaulding and Voegtle (2006:147) identifies main ethical areas that the researcher must take into consideration when conducting the study namely: informed consent and protection of participants from danger including their privacy. Below is the brief discussion of each ethical area that was taken into consideration during research.

Ensuring participants have given informed consent: According to Marczyk, *et al.* (2005:40), some of the responsibilities of the researcher are to make sure that those who participate in the study clearly understand the following: (i) the costs and benefits, (ii) the protocols associated

with study and (iii) that they will participate in the study out of their free will. This study did not involve any active participants since it relied mainly on secondary data, which is publicly available on official companies' website. The above procedure of informed consent considered not appropriate for the study.

Ensuring no harm come to participants: According to Zikmund, *et al.* (2009:94), it is the responsibility of the researcher to make sure that participants are free from any danger during research. This study relied on secondary data, therefore no active participants.

Ensuring confidentiality and anonymity: Saunders *et al.* (2009:194) suggest that, researchers should put strict access measures to raw data and information of the study. The raw data collected for basic material firms listed on the JSE are publicly available and require no privacy. However, the researcher kept analysed data and the results in a secure digital place.

Ensuring that permission is obtained: Cohen *et al.* (2007:59) advice that, a researcher must ensure that relevant authorities provide valid approval before conducting the study. The researcher requested a list of all companies listed in the basic material industry on the JSE for the period 2002 to 2013. This request afforded the researcher an opportunity to explain the purpose of the requested data to the Market data centre authorities at the JSE. However, the financial reports used to conduct the study are publicly available for consumption and requires no permission to use.

RESULTS

On average the basic material industries earned an ROA of 13.35% with a standard deviation of 11.80%. Moreover, the ROA varied from a minimum of -18.37% to a maximum of 40.47%. The ROE ranged from -23.69% to 49.83% with an average of 14.35% and standard deviation of 14.42%. On average, it took basic materials firms approximately 74 days to sell inventory from the floor and a standard deviation of 38 days. The credit collection period ranged from a minimum of 26 days to a maximum of 165 days, and averaging to 54 days with each data point dispersed 26 days around the mean. The creditors waited at-least 82 days to receive payment for credit purchases from basic materials firms, ranging from 5 days to 220 days at a standard deviation of 28 days. The average number of days it took basic materials firms to unlock funds tied up in working capital was approximately 44 days with a standard deviation of 50 days. The leverage as measured by debt to assets ratio (DAR) averaged to 45.95% with a standard deviation of 15.08%, and varied from a minimum of 11.82% to a maximum of 94.27%. The current liabilities on average for basic materials firms are covered 1.73 times as indicated by current ratio (CR) with a standard deviation of 0.815 times. Lastly, the average sales growth for basic materials firms was 10.20% with a standard deviation of 24.24%, and ranging from a minimum of -54.33% to a maximum of 94.03.

DISCUSSION OF FINDINGS
Average inventory days and Profitability
The statistical significance of average inventory days in model one and two indicated that this variable is of particular important when management of companies in the basic materials industry seeks to improve profitability. Moreover, it is the duty of management to ensure that;

sufficient inventory is available for the operation; no additional holding costs of inventory incur and the inventory does not become obsolete. In essence, the managers must ensure inventories do not sit long on the floor before sold and at the same time sufficient to meet the demands of the business. It is important to note that, three types of inventory exist namely: raw materials; work in progress and finished goods and with this in mind it is imperative to focus mostly on the work-in progress as this type of inventory cannot be converted into cash easily like raw materials and finished goods (Firer *et al.*, 2012:603).

Accounts recievable days and Profitability
The contribution of accounts receivable period in model one and two was also found to be statistical significant. This means that accounts receivable period plays a critical role in determining the profitability of the firm and must be taken into account when considering factors that promote growth in a firm. Moreover, this finding suggests strict collection policies for goods sold on credit that will enable the firm to timely collect the monies owed by customers. The sub-hypothesis tests for model one and two invalidated the null hypothesis; and confirmed a negative and statistical significant causal relationship between accounts receivable days and profitability of basic materials industry. This implies that, taking longer time to collect funds owed by debtors for goods sold on credit will results in lower profitability. This finding is consistent with (Gill *et al.*, 2010; Mathuva, 2010; Ngwenya, 2010; Vijayakumar, 2011) who did similar studies and found a negative relationship between accounts receivable period and profitability. Morover, lower profitability due to longer collection period could be linked to the fact that, more cash necessary for daily operations and other profitable investment is sitting with with debtors while it could have been invested somewhere else. In addition, allowing cutomers to take longer in settling their debt could force the firm to request external funding from banking institutions in order finance their daily operations, and in doing so they are obliged to pay interest on expense that cuts on profit margins. It is worth mentioning that most of the studies reviewed support this finding and all scholars agree that firms must collect funds for good sold on credit as early as possible from customers in order to improve their profitability.

Accounts payable days and Profitability
Another critical factor to take into consideration when evaluating factors that improve the profitability is the time it takes the company to pay its suppliers for credit purchases. This idea is supported by statistical significance of accounts payable days in model one and two; and of which this means that this variable is the greatest contributor of profitability. This finding suggest that, senior managers should negotitate for longer payment plans with suppliers but at the same time ensure that the reputation of the firm is not at risk with the creditors. A positive and statistical significant causal relationship was established between accounts payable days and profitability of basic materials industry. This means that firms that takes longer to pay their creditors are at a position of improving their profitability.

Cash conversion cycle and Profitability
The cash conversion cycle computed from three dynamic measures of working capital management also came out as statistical significant contributor in profitability of basic materials industry. This means that holding up optimum inventory; efficient and effective collection policies for goods sold on credit and negotiation of better payment with the suppliers will enhace the profitability of basic materials firms. A negative and stastical significant causal relationship

obtained between cash conversion cycle and profitability of basic materials firms measured by return on assets. This finding suggest that, making sure that cash required by the organisation to conduct daily operations is not tied up too long in the working capital will put a company in a position to improve profitability. This is achieved by ensuring that inventories do not sit long on the floor before they are sold, ensuring that customers settle their debtors account on stipulated times and where possible promise discounts for early settlement of debtors account and conducting comprehensive cost and benefit analysis study before engaging on longer payment period with the creditors. In short, reduction of operating cycle and cautious increase of creditors payment period will enhance companies' profitability.

Overall working capital managements and profitability
The overall significance of model one, two, and three showed that working capital management components indeed have impact on the profitability of basic materials companies listed on the Johannesburg stock exchange. Moreover, individual statistical significance of each dynamic measure of working capital management further proved that they are the significant contributors of profitability, and must be taken into consideration when evaluating factors that improve profitability.

CONCLUSIONS AND RECOMMENDATIONS

The first objective of this research was to investigate the causal relationship between working capital management components and average return on assets (ROA) of basic materials firms listed on the JSE. To achieve this, a research hypothesis relating to this objective was stated and statistically validated using F-test. The null findings from this hypothesis showed that working capital management components statistically and significantly explain the profitability of basic materials firms. Moreover, three sub-hypothesis derived from hypothesis-one also validated by checking individual regression coefficients of each component of working capital management using p-value approach. The findings showed that both the inventory period and accounts receivable period have negative and statistical significant causal relationship with average return on assets, while accounts payable period shared a positive and statistical significant relationship with average return on assets. These findings supported the theory covered in the literature review suggesting that, optimum levels of working capital management components significantly contribute to the performance of the firm. In overall, the findings mean that shorter inventory and collection period coupled with delaying payments for credit purchases will improve the profitability of basic materials firms. The second objective of this research aimed at estimating the causal relationship between working capital management components and average return on equity of basic materials industry listed on the JSE. Likewise, a second hypothesis in relation to this objective also stated and statisticaly validated. The findings from the second hypothesis showed that working capital management components are significant contributors in improving the average return on equity. Furthemore, statistical significance for each coefficient of working capital management components teste using three sub-hypothesis derived from the second hypothesis. The findings were similar to those attained from first hypothesis and showed that both average inventory days and accounts receivable days shared a negative and statistical significant causal relationship with average return on equity while accounts payable period shared a positive one. These findings suggest that these components work in tendon and managers from basic materials firms cannot simply focus on either one of them but rather

concentrate on all of them when optimising working capital management. Morover, the results imply that low levels of inventory, shorter collection period for receivables and extension of payment period with regard to credit purchases will significantly improve the profitability of the basic materials companies. The third objective was to establish the causal relationship between cash conversion cycle and average return on assets of basic materials industry listed on the JSE. The measure of cash conversion cycle described in literature review as the holistic approach to working capital management. In addition, it is derived from the other three working capital management components and it is for this reason why it was not included in the same equation with other three components as this: would have results in high levels of collinearity between independent variables thus making it difficult to estimate the relationship. To answer the third objective, hypothesis in relation to this objective was developed and statistically tested. The statistical significance of the overall model suggest that cash conversion cycle is the significant contributer of the average return on assets. After checking the statistical significance of individual regression in model three, a negative and statistical significant causal relationship was established between cash conversion cycle and average return on assets of basic materials firms. This finding suggest that shorter time lag between cash outflow for purchasing of raw materials and cash-inflow for goods that was sold on credit bolster the profitability of basic materials firms. In other words, the profitability of basic materials companies can be improve by: (i) maintaining optimum inventory levels; (ii) implementation of efficient and effective collection policies for goods sold on credit to ensure that customers settle their debtors account on stipulated times and (iii) negotiating longer payment period with suppliers without denting the image of the firm.

CONCLUSIONS

The overall statistical significance of all models proved that working capital management as whole requires much focus when evaluating measures that affect profitability of the firm. Furthemore, the statistical significance for each coefficient of independent variables also signify that all components of working capital management contribute significantly in the profitability of basic materials firms. It is worth mentioning that, within the business environmnet there are other measures of working capital management (current ratio and quick ratio know as static ratios) however, these are incapable of determining business dynamics within the operation. The managers of basic materials firms should therefore, pay special attention to dynamic measures of working capital management. Obviously, optimisation in dynamic measures automatically improve static measures as well.

RECOMMENDATIONS

The success of any business depends on how short term assets are being managed to realise long term goals of an organisation. The unfortunate circumstances such as bankruptcy, poor profitability results, operational difficulties, continuous decline of market share and contrains in working capital can only be avoided if basic materials firms formulate and implement effective working capital management practices. The managers of basic materials firms need to be aware of challenges associated with allocation of short terms for operatinal needs, and be pro-active in dealing with them effectively and efficiently. With regard to inventory: the managers from the production, financial, purchasing and marketing department must have the common purpose and

aim at optimum levels of stock that meet the demands of the organisations. By this, the researcher means maintaining levels of inventories that minimise the risks of running out of stock and business interruptions. This practice will enable these managers to reduce the overal costs associated with undesirable high levels of inventory which are: (i) damaged costs due to handling of large amounts of goods; insurance costs, (ii) quality costs and (iii) the risk of obsolete stock and theft (Firer *et al.* 2012:602). The production managers must improve process efficiencies and team up with purchasing department to implement processes such as just in time (JIT); especially when procuring raw materials, consumables and spares needed for production (Firer *et al.* 2012:610). The improvements in process efficiencies and implementation of JIT also results in zero or minimum level of work-in progress as this type of inventory holds no value for the organisation and accumulation poses risk of scrap costs due to damages that may occur. Finally, the sales and marketing teams must be pro-active and continuously check on the stability; consumption and demands of firm's product in the market, as this will ensure that orders that get accepted from customers and go through the production lines do not stay long on the floor before being sold. A negative and statistical significant relationship established between accounts receivable days and profitability implies that, collecting money early for goods sold on credit enhances profitability of basic materials firms. With this in mind, the financial managers from basic material firms are advised to take drastic measures and find optimum credit period that will benefit the business. To achieve this, financial managers must first understand terms of sale pertaining credit period, discounts and credit instruments. With reference to credit period, managers are advised to find out the operating cycle of the debtors, and use this time lag as a guide line to set the maximum collection period for the business. Moreover, strategic managers are advised to conduct informative studies on the firms's product in order to: (i) gain understanding of its demand in the markets, (ii) the credit risk associated with it, (iii) its price, (iv) the rate at which it sells, and (v) the kinds of interested customers. This practice will also facilitates the creation of effective credit collection policies. Other means of reducing credit collection period includes: (i) implemention of effective credit instruments that binds the customer to settle their debtors account on stipulated times, (ii) attractive and cautiously discounts that accelarate the rate early settlement accounts and (iii) thourough cost and benefit analysis study before granting longer credit period to customers in an effort to increase revenues (Firer *et al.* 2012: 590). On accounts payable, a positive and statistically significant causal relationship with profitability was established. This means that delaying payments to the creditors put the basic materials firms at advantage of improving profitability. Based on this finding management from basic materials firms are advised to take further steps and build strong relationship with the suppliers in an effort to negotiate for longer payment period. However, during these negotiations they must ensure firms relationship with the creditors remain in tact. The longer payment period enable the firm to less rely on external funding and investment cash elsewhere prior making payments to the suppliers. Other means of lenghtening credit payment period is to use companies' credit card when parchasing small spares parts or other consumables necessary for manufacturing. The rationale for this is that banks institution normally stipulates the minimum instalment on credit cards and sometimes provide interest free period on some credit cards for a period of up to ninety days (Bank of America- Merrill Lynch, 2012:4).

CONCLUSIONS
This study has shown that working capital management components greatly impact the profitability of firms listed under basic materials industry on the Johannesburg stock exchange.

However, fixed effect model (FEM) that assume same slope across all firms was used to establish this type of causal relationship. This means that, the model assume that different strategies employed by basic material firms will lead to similar effect (same slope) and in practice firms employ different strategies and achieve different results. Moreover, the FEM is capable of identifying the differences that exists across individuals in panel data but fails to incorporate and estimate the effect of these fixed effects in the model. With this in mind, a similar study that takes into consideration the effect of fixed effects and differences across firms can be conducted in future by means of different statistical technique. In other words, future researchers can employ a statistical technique that estimate unique coefficients and intercepts for each firm, and by doing so they will be able to determine which firms execute better strategies. Studies that focus on different exchange across Southern Africa are still lacking. For instance; similar studies incorporating all stock exchange in Southern African countries can be conducted; and in doing so researchers will be able to see countries that exercise better working capital management practices and recommend these practices to struggling firms.

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