

Determinants of Working Capital Investment Levels in the Manufacturing and Construction Firms Listed at Nairobi Securities Exchange

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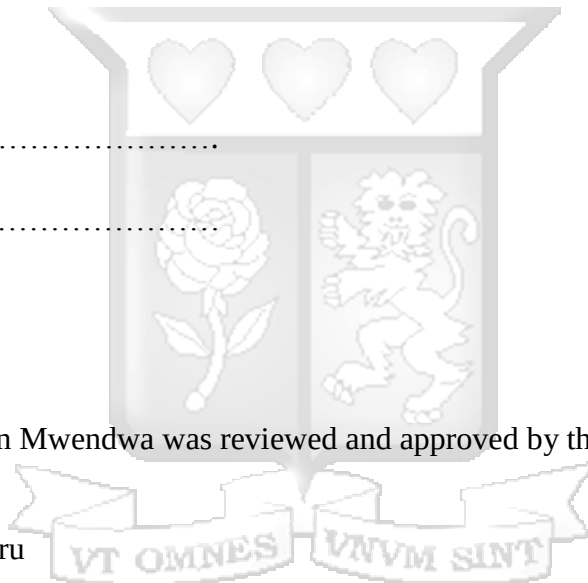
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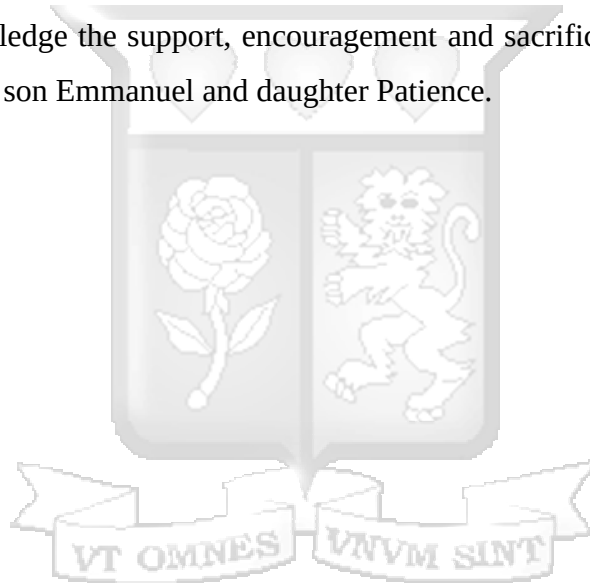


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ABSTRACT

This study examined the determinants of working capital investment levels in the manufacturing and construction firms because there is no unanimity on its drivers despite the importance of working capital. Three objectives were identified: to investigate the managers' perceptions on the determinants of working capital investment levels; to establish the manager's opinion target working capital investment level; and to interrogate empirically, the influence of determinants of working capital on working capital investment levels in the manufacturing and construction firms listed at NSE. A questionnaire was used to solicit manager's opinion and regression analysis was used to establish the influence of determinants of working capital on working investment levels.

The findings were that managers monitor working capital investment levels on a daily basis; use current ratios and net working capital to total assets as indicators of capital and they suggested a target current ratio of 2:1. It was the managers' opinion that the six variables, cash conversion cycle, operating cash flow, debt ratio, firm size, return on assets and sales are factors to consider in setting working capital investment levels. However size is a lowly ranked determinant. Regression results show that when current ratio is used as proxy of working capital investment level and simple regression model is run; cash conversation cycle, return on assets and size do not individually explain variations in current ratio [working capital investment levels]. However debt capital ratio and sales explain variations in current ratio. When net working capital is used as a proxy of working capital investment level and a simple regression model is run; cash conversion cycle, debt capital ratio, size and sales individually explains variations in this ratio. However cash from operations and returns from assets do not explain variations in working capital investment levels. When multiple regression models are run, a higher percentage of variations in working capital investment levels are explained by the variables. However, the fact that sales are negatively related to working capital investment level remains to be a puzzle.

Therefore, managers ought to be clear on this important issue of working capital by specifying a target working capital investment level. The target working capital investment level can then be used to evaluate the efficacy of managers in carrying out their working capital functions. This information should be disclosed in annual report. Secondly, firms should develop a composite working capital index that is useful in predicting working capital investment levels.

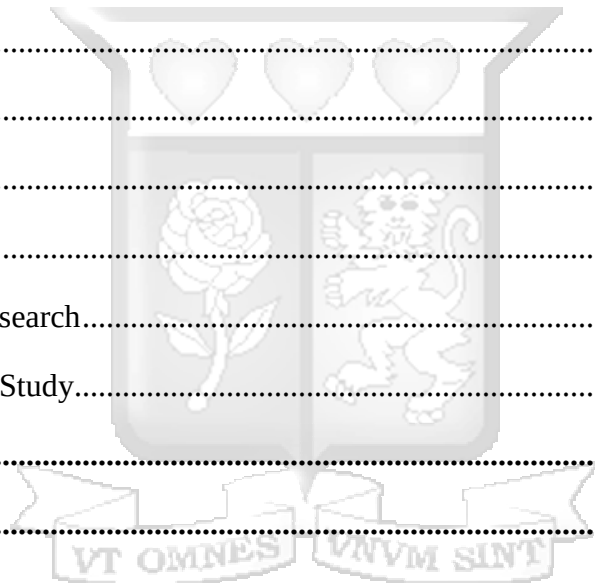
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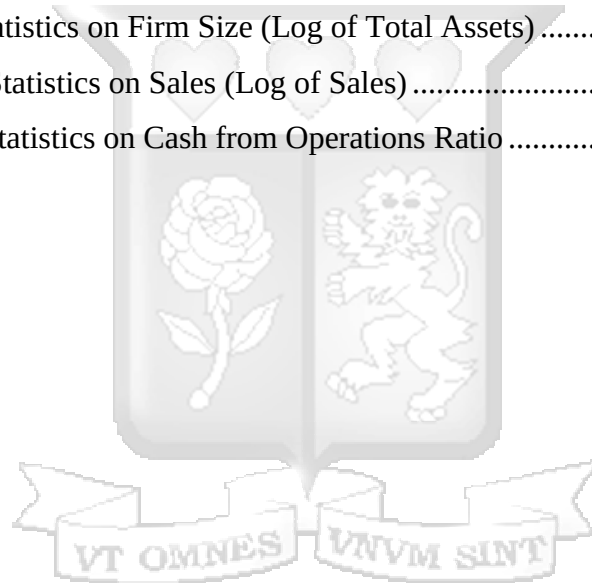
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ABBREVIATIONS

ANOVA	-	Analysis of Variances
CCC	-	Cash Conversion Cycle
NWCR	-	Net Working Capital Ratio
NSE	-	Nairobi Securities Exchange
OCF	-	Operating Cash Flow
ROA	-	Return on Assets
WCM	-	Working Capital Management
CR	-	Current Ratio
WCR	-	Working Capital Ratio



CHAPTER ONE:

INTRODUCTION

1.1 Background

Working capital investment involves the short term investment by a firm in its current assets and current liabilities and is an aspect of financial management. Berk and De Marzo (2011) held that financial management is about the acquisition, financing, and management of a firm's assets to ensure that the assets of the firms generate sufficient returns. A key aspect of maximization of shareholders wealth is proper management of the firm's assets (Van Horne and Wachowicz, 2005).

From an operation perspective and effective management of assets, managers classify a firm's assets as long-term assets (mainly property, plant, and equipment) and short term assets (current assets or working capital); and decompose assets management into working capital management and capital budgeting (Suleiman & Rasha, 2013). In manufacturing companies, long term assets are usually illiquid and the capital tied in them is substantial, furthermore the frequency of investments in such assets is low when compared to investments in short term assets (Shleifer and Vishny, 1992). The short term assets described as working capital are liquid investments that are monitored on a daily basis or on hourly basis due to their immediate impact on a firm's liquidity, profitability (i.e. risk and return) and value (Smith, 1980); and this make management of working capital critical if a firm is to avoid financial distress (Narendre, Menon and Shewtha, 2009). Working capital also refers to funds invested in current assets (Gallinger and Healey, 1991; Costantini, 2006) and measures operating liquidity available to a business at a given point in time, and is calculated as current assets less current liabilities or in a standardized form as net working capital as a percentage of total assets (Friend, 2010).

The two concepts of working capital are gross working capital and net working capital. The gross working capital is the total of all current assets that include inventories, accounts receivables, bills receivables, short term investments, cash and bank balances. Net working capital is the difference between current assets and current liabilities (Brealey, Myers and Allen, 2006). Current liabilities include accounts payables, bank overdraft, bills payable, trade advances, short term borrowings

and accrued expenses. Hence working capital is the capital required to support the day-to-day operations or transactions of the business concern (Olufemi & Olubanjo, 2009). Current liabilities are firm's debts or obligations that are due within one year and it is recommended that they are settled by current assets or by the creation of new current liabilities.

According to Nazir and Afza (2009), the main objective of working capital management is to maintain an optimal balance among each of the working capital components since different components attract different costs and benefits. In finance literature, the major components of working capital are described as current assets and current liabilities and normally summarized in a ratio form, namely current ratio (Wasiuzzaman and Arumugam, 2013). Intuitively, it is important examining factors, also described as determinants, which drive working capital ratios (levels), in order to increase knowledge about corporate finance decision-making. The assumption is that if managers can identify the determinants of amount invested in their firm's working capital they can prioritize on such factors to minimize liquidity problem thus improving the firm's value.

1.1.1 Working Capital Policy

Working capital management involve the management of the firm's current assets, namely, cash and marketable securities, accounts receivables, and inventory and the financing (especially, accounts payables) needed to support current assets (Van Horne and Wachowicz, 2005). The concern of working capital policy is to keep costs under control and to keep risk at appropriate levels. It encompasses managing the level and financing of working capital investment. Determining the optimum level of working capital requires balancing risk and return; and increased profitability is only possible with the addition of risk (Van Horne and Wachowicz, 2005).

From Brealey, Myers, and Allen (2008) it is suggested that the profitability and risk associated with current assets is defined by the level, composition, and financing of these assets; such that as the level of current assets increases (conservative working capital strategy), the riskiness of the firm generally decreases but, so too does the firm's profitability, and as current asset decreases the riskiness of the firm generally increases (aggressive working capital strategy) and so is the firm's profitability. In between aggressive and conservative working capital policy is the moderate working capital policy that result into moderate risk and moderate return. Therefore an

understanding of working capital investment levels is necessary, if a firm is to manage working capital efficiently.

1.1.2 Determinants of Working Capital Investment Level

The determinants of working capital investment level can be classified as either internal or external to the firm and include: seasonal fluctuations, production policy, taxation, depreciation policy, reserve policy, dividend policy, credit policy, growth and expansion, price level changes, operating efficiency, profit margin and profit appropriation, nature and size of the business (Nazir and Afza, 2009). Establishing the level of investment in working capital begin with the identification of the factors (determinants) which drive it (Chiou, Cheng and Wu, 2006). Therefore, financial executives must identify the basic working capital drivers (Lamberson, 1995). Good understandings of the determinants of working capital might help managers ascertain the optimum level of working capital.

Researchers are not in agreement on determinants of working capital investment levels as the findings vary from country to country and from one researcher to another. Abbadi and Abbadi (2013) suggest that cash conversion cycle, operating cash flow, leverage, firm size, return on assets, interest rate on loans, and rate at which the economy is growing power working capital requirements; while Moussawi, Laplante and Kieschnick (2006) identify growth rate of sales, the presence of independent directors, the compensation of executives, directors, and ownership of shares by Chief Executive Officers as influencing working capital investment level. Hill, Kelly, and Highfield (2010) identify the amount of sales, growth in sales, cost of capital (interest rates) and the ease at which individual firms can access capital markets as factors influencing amount invested in working capital. Therefore there is a need to test them empirically.

From the studies and research work done by the different authors, various factors have been identified as influencing Working capital investment levels. These include Cash Conversion cycle, Cash flow from operating activities, leverage, firm size, Return on Assets (ROA) and Sales (Turnover). Cash conversion cycle is the length of time, in days, that it takes for a company to convert resource inputs into cash inflows, and it indicates the amount of time each net input shilling is tied up in the production and sales process before it is converted into cash through sales to customers (Brigham and Gapenski, 1994). The cash conversion cycle is a determinant of working capital because it captures how long a firm will be deprived of cash (Mongrut,

Fuenzalida, Cubillas and Cubillas, 2010). The longer this time lag, the larger the investment in working capital (Deloof, 2003). A longer cash conversion cycle might increase profitability because it leads to higher sales; however, corporate profitability might also decrease with the cash conversion cycle, if the costs of higher investment in working capital rise faster than the benefits of holding more inventories and/or granting more trade credit to customers.

The other determinant is cash flow from operating activities. This is the amount of cash a business generates after paying its costs (Brealey, Myers and Allen, 2008). Operating cash flow is cash generated from operations less taxation and interest paid and investment income received less dividends paid (International Accounting Standards Committee, International Accounting Standards 7, 2007; KPMG, 2005).

Leverage that is the amount of debt capital in the firm is suggested as impacting on working capital. Chiou, Cheng and Wu (2006) suggested that debt ratio and operating cash flow affected the working capital of companies. Narendre, Menon, and Shwetha, (2009) point out that that firms that keep on borrowing experience difficulties in managing their working capital.

Firms can be classified as small or large, and can be expressed in terms of market value of equity and debt capital of a firm or total assets or turnover or number of employees (Correa, 1999). Mercedes (2007), assert that Kirchhoff and Norton (1992) compared the three measures (employment, assets and sales) and showed that they are interchangeable because they produce the same results when tested over a seven year period; but add that in some instances 'each variable can paint a different picture of the firm'. Firm size as a variable might explain financing decisions such as the levels of managerial compensation (Jensen and Murphy (1990), and required rate of returns (Banz, 1981). The size of firm acts more as insurance such that large firms can access capital from large markets at a cheaper rate than small firms can invest fewer amounts in working capital. Pandey and Perera (1977) found that the size of the firm is one of the major influences of working capital policy.

Return on assets (ROA) tells us how many shillings of earnings a firm derives from each shilling of assets under their control (Bodie, Kane and Marcus, 2004). Financial analysts use ROA to compare performance of companies in the same industry. The expectation is that due to risk differential return on assets will vary widely across different industries. An aspect of it is that it

measures the rate at which assets are being used to generate sales. It expected that profitable firm will require substantial amount of working capital.

1.1.3 Current Ratio and Net Working Capital

This study focused on determinants of working capital investment levels of selected firms at NSE. The two proxies of working capital investment level used in earlier studies are net working capital and current ratio (Lamberson, 1995; Nazir and Afza, 2008; Abadi and Abbadi, 2013). Working capital in absolute terms is the difference between current assets and current liabilities. If current assets exceed current liabilities then net working capital is positive otherwise it is negative, in which case there is a working capital deficit (Van Horne and Wachowicz, 2005). In other words, working capital is amount invested in current assets; and is a measure of a firm's solvency, its ability to make large purchases and take advantage of discount, and attract customers by offering advantageous terms. Networking Capital can be standardized by deflating it using total assets i.e. Net working capital to total assets ratio (NWCR), which is a measure of net liquid assets of the firm relative to its capitalization.

Working capital investment can also be captured in ratio form, i.e. current ratio (CR). Current ratio which is a relative indicator of liquidity and often used for inter firm comparisons captures the liquidity position of the firm and suggests the extent to which the firm can meet its short term financial obligation out of current assets. Besides measuring the company's liquidity, current ratio also indicate the margin of safety that management maintains in order to allow for the inevitable unevenness in the flow of funds through the current asset and liability accounts (Anthony at el., 2010). Hence current ratio is the true indicator of liquidity since it considers the overall magnitude of each fund (Gitman, 2005). The aim of working capital management is to make sure that a firm's current assets and liabilities in a way that a satisfactory level of working capital is maintained. Therefore, managers monitor their firm's current ratio to know whether there exist enough short term assets to cover its short term obligations; in addition suppliers and lenders monitor current ratios of firms that they transact with in order to avoid supplying goods and services to firms unlikely to honor financial obligations. A current ratio of 2:1 and above is considered acceptable (Pandey, 2010). But, acceptable current ratio depends on the nature of the business the firm is in and the nature of its current assets and liabilities. The minimum acceptable current ratio is 1:1, but that level of current ratio is considered risky in that failure to honor current obligations can send a firm to financial distress (Beaver, 1966).

Therefore the current ratio and the other indicator of working capital investment level, net working capital to total assets ratio (NWCR), which is a measure of net liquid assets of the firm relative to its capitalization (Altman, 1968); and the standardization facilitates comparison of these ratios across companies. The importance of these ratios as indicators of working capital investment level is traced to known researchers that used them to predict company bankruptcy (Beaver, 1966; Tamari 1966; Altman 1968; and Altman, Haldeman and Narayanan, 1977).

1.1.4 Target Working Capital Investment Level

Working capital is a measure of operating liquidity available to a business at a given point in time, and is calculated as current assets less current liabilities or working capital as a percentage of total assets. It is also important that the amount invested in current assets must adequately cover current liabilities. The implication is that managers can increase the value of the firm by reducing the working capital investment to its optimal level (Rahman and Nasr 2007). The assumption is that managers set working capital investment levels based on the trade-off between risk and return. In which case it is important that managers are aware of their firm target working capital investment level.

1.1.5 Working Capital Management of Manufacturing and Construction Firms Listed at NSE

This study focused on manufacturing and construction companies listed at the NSE. The manufacturing sector was chosen because it contributes much to the progress of the economy. Manufacturing activities provide people with different goods, as well as, employment. In addition manufacturing companies contribute to the country's income through the taxes being paid by them. From working capital perspective, manufacturing companies invest heavily in the components of working capital, namely inventories and accounts receivables. In this study the critical reason for choosing manufacturing industries was that, compared to more liquid financial and commercial companies they have to invest heavily in raw materials, work in progress and finished goods.

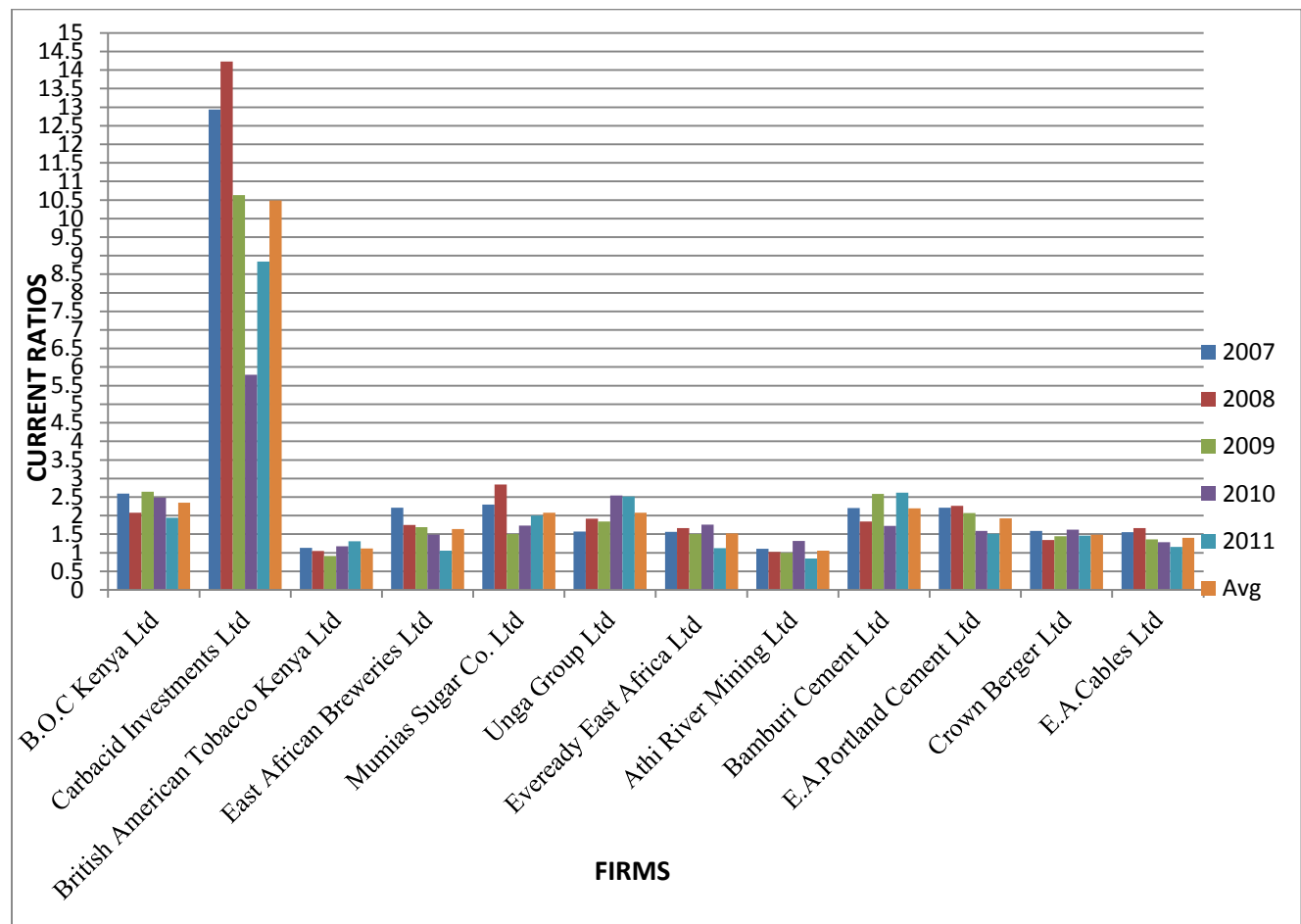
The stock exchange was chosen because it mirrors the economy, and in addition it measures how well the companies listed in the stock market are doing. Therefore, one can infer working capital management practices in an economy by studying the companies listed at the exchange; and this explain why stock exchange is a key player in developing corporate governance codes

(Christiansen and Koldertsova, 2009). This explains why earlier studies on working capital are based at NSE. The studies include Ochieng (2006) who studied relationship between working capital and economic activity of firms listed in the NSE; Ndunge (2008) studied the relationship between working capital management and profitability of listed companies in the NSE; Mathuva (2010) examined the influence of working capital management on corporate profitability.

The NSE is an exchange market for securities such as shares and bonds of listed companies. As at 13th October, 2013 the NSE was constituted by 62 companies: 7 in Agricultural sector, 9 in Commercial and service sector, 2 in Telecommunication and technology, 4 in Automobile and accessories, 11 in Banking, 6 in Insurance, 3 in Investment, 9 in Manufacturing, 5 in Construction, 5 in Energy and petroleum and 1 in Enterprise market segment. Firms in manufacturing and construction industry formed 23% of Kenyan companies listed at NSE.

On examining the hand book published by NSE, there was evidence that over the period 1990 to 2012 some companies listed at NSE had bank overdrafts suggesting liquidity shortcomings and therefore the possibility of working capital management problems. Analysis of Current ratio which is a static indicator used by managers to reflect the structure of the balance sheet (Bolek, 2013) and also a standardized financial ratios that indicates whether or not a firm has enough resources to pay its debts over the next 12 months, there are variations in manufacturing and construction firms (see Figure 1.1). Though industry difference explain part of variations, some capital levels appeared to be too high while others appeared to be too low. One would for instance expect the current ratios of Athi-River Mining Limited and Bamburi Cement Company Limited, because they are in the same industry to be close yet the evidence is that over the period 2007 to 2011 they are significantly different.

Figure 1.1: Current Ratios* of Manufacturing and Construction Firms Listed at NSE



***Current ratio used as an indicator of level of investment in working capital.**

Source: Nairobi Securities Exchange Handbook (2012)

Figure 1.1 is an analysis of Current ratio for the firms in the Manufacturing and Construction industry. It reflects working capital investment levels as indicated by capital ratio for the period 2007 to 2011 and an average for the five years. The firm's current ratio for most of the firms is either below or above the widely accepted standard of 2:1. In some years the current ratio of the firms shoots beyond 2 and in other years drop. British American Tobacco and Athi-River Mining has ratio which almost 1:1 with 8 out of the 12 Companies recording ratios below 2. There seems to be no consistency of the investment in working capital as indicated by the current ratio for the different years.

1.2 Problem Statement

The goal of working capital management is to ensure that the firm is solvent, liquid, and profitable to enhance the wealth of the shareholders (Jeng-Ren, Li & Han-Wen, 2006). For a firm to be solvent, liquid, and profitable; amount invested in current assets must adequately cover current liabilities. However, there is still little knowledge about the target liquidity level that supports maximization of shareholders' wealth (Brealey, Myers and Allen, 2008 and Dhar and Kasturi, 2012). The search for theories that support working capital is on and the issue of management of working capital becomes even critical when researchers suggest that many businesses have failed due to the inability of financial managers to plan and control level of investment in working capital. In addition, in developing economies like Kenya, the problems of efficient utilization of resources persist and need to be addressed

It is expected that a number of determinants (internal and external factors) influence the working capital investment levels of the firm; and the factors are of different significance and their impact might change for the firm over time. The debate on the importance of determinants of working capital is not concluded and four identified determinants of working capital investment levels included cash, inventory, accounts receivable, and debt. However Gill (2011) is emphatic that lack of clarity about determinants of working capital investment levels coupled with the lack of managements' ability to plan and control its components may lead to insolvency and bankruptcy.

Studies on the determinants of working capital give varying results, such that there is no agreement on them. Studies have found out that debt ratio and operating cash flow significantly influence the amount invested in working capital of firms, while factors such as business cycle, industry effect, company growth, firm performance and company size are irrelevant; yet in other studies operating cycle, leverage, ROA and Tobins'Q had a significant impact on working capital requirements. In Latin American companies, the industry cash conversion cycle, the company market power, future sales and country risk have an influence on the way companies manage their working capital, and that there are significant differences among countries in the region (Mongrut, Fuenzalida, Cubillas, and Cubillas, 2010). According to Wasiuzzman and Arumugam (2013) in a study on Malaysian firms, firm-specific factors such as leverage, growth, asset tangibility, age, firm size, profitability, operating cash flows, revenue volatility and asymmetric information significantly influence the investment in operating working capital. The conclusion is that there is

no consensus on the issue of determinants of working capital such that further research is needed to confirm or refute the determinants on working capital investment levels.

Furthermore, the lack of synchronization in working capital investment level as indicated by current ratios within manufacturing and construction companies in Kenyan point to the need to examine working capital investment levels. The generally recommended value of current ratio, which is an indicator of working capital investment level, is 2:1, yet a number of firm's exhibit ratios outside this range. Therefore, this study interrogates determinants expected to individually or jointly influence working capital investment levels in manufacturing and construction firms in Kenyan context. In addition it is expected that firms have target working capital investment levels and therefore, the study seeks to establish managers concern for optimum (target) Working capital investment levels. This is to give insights on specific factors that managers might consider important in managing investment in working capital.

1.3 Objectives of this Study

The objective of this study was to examine the determinants of working capital investment levels for firms in manufacturing and construction firms listed at NSE.

1.3.1 Specific Objectives

1. To investigate the managers' perceptions on the determinants of working capital investment levels in the manufacturing and construction firms listed at NSE.
2. To establish the manager's opinion target working capital investment level for manufacturing and construction firms listed at NSE.
3. To interrogate, empirically, the influence of determinants of working capital on working capital investment levels in the manufacturing and construction firms listed at NSE.

1.4 Significance of the Study

The findings of a study like this are useful to other researchers, managers, financial analyst and policy makers.

1.4.1 Researchers

The findings add to the existing literature by explaining the determinants of working capital and the extent to which the determinants in Kenya are different from those in other countries. After identifying the determinants of working capital, researcher can help in developing appropriate working capital model.

1.4.2 Management

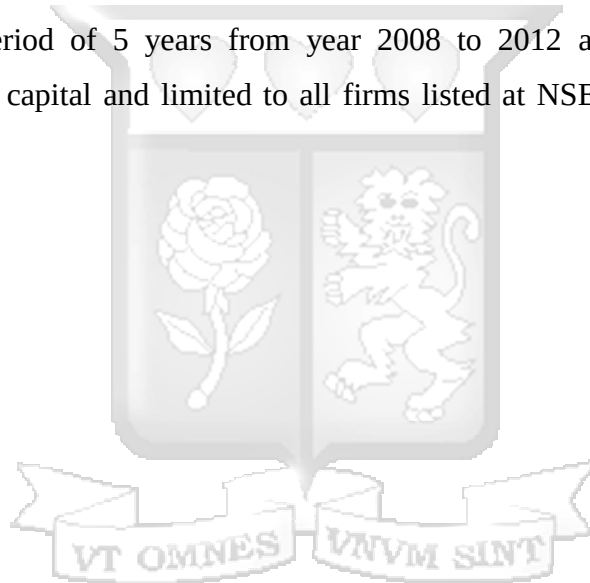
The findings are useful to managers interested in knowing and managing the specific determinants of working capital. After identify the determinants of working capital investment level, then there will be need to model the best way of managing them to contribute with the corporate finance knowledge of short term decisions and company's better decisions

1.4.3 Investors and Financial Analysts

Financial analysts will be able to identify firms that are not able to efficiently manage their working capital thus discounting the same information in share prices.

1.5 Scope of the Study

The study covered a period of 5 years from year 2008 to 2012 and is strictly on selected determinants of working capital and limited to all firms listed at NSE under the Manufacturing and Construction sector.



CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This study is to provide insights on working capital management by examining internal variables that significantly impact on working capital investment levels. This chapter provides a detailed and critical review of the literature on working capital. It is divided into six sections, namely: importance of working capital; theoretical framework of working capital management; working capital management practices and empirical studies related to determinants of working capital investment levels; a review of determinants of working capital investment levels; indicators or proxies of working capital investment levels and target working capital investment levels.

2.1 Importance of Working Capital

Though many studies in corporate finance focus on long-term investment, in real life, financial managers devote significant amounts of time and effort, on a daily basis managing working capital (Bolek, 2013). This is to determine whether or not a firm has enough resources to pay its debts over the next 12 months. The managers evaluate working capital in terms of amount invested in current assets, the determinants of working capital, and the appropriate mix of short-term and long-term financing required to finance current assets.

The significance of working capital is traced to its effect on profitability and that poor working capital management practices can lead to financial distress and bankruptcy (Smith, 1973). In Belgian, Deloof (2003), found a significant relationship between indicators of working capital and profitability. In Athens Lazaridis and Tryfonidis (2006) report a significant relationship between working capital management and profitability.

Chowdhury and Amin (2007) observe that ‘Among all the problems of financial management, the problems of working capital management have probably been recognized as the most crucial one. It is because of the fact that working capital always helps a business concern to gain vitality and life strength.’ However, proper management of working capital ensures financial returns to the shareholders of the firm. Mathuva (2010) conclude that firms gain competitive advantage through a careful reduction of cash conversion cycle.

2.2 Theoretical framework

The genesis of theory of working capital is in Sagan (1955), who realized the need to build up a theory of working capital management, suggesting that lack of attention to working capital could significantly affect the health of the company. Nakamura and Palombini (2011) after carrying an overview of literature on corporate finance conclude that there are no robust and widely accepted theories explaining the working capital management. Researchers have discussed working capital using different theories namely, trade-off theory, agency theory, stakeholder theory and pecking order theory among others. The relevant theories for purposes of this study are trade-off theory, agency theory, stakeholder theory and the pecking order theory.

2.2.1 Trade-off Theory

Walker (1964) made a ground-breaking study to develop a theory of working capital management by empirically testing risk-return trade-off of working capital and reported that the relationship between the level of working capital and the rate of return is negative. Walker (1964) hypothesis is that a firm's profitability is determined in part by the way its working capital is managed. The conclusion is that too large an investment in working capital lowers the firm's profitability without a corresponding reduction in risk, while too small investment of working capital could also lower profitability due to stock outs and too few credit sales. Weston and Brigham (1972) posits that firms hold short-term marketable securities only if there were excess funds and that current assets holding should be expanded to the point where marginal returns on current assets would equal the marginal cost of capital required to finance current.

Under working capital management concept, any working capital policy to be adopted is guided by the trade-off between liquidity (risk) and profitability (return) (Rehn, 2012). The result are three working capital management approaches, namely, conservative policy, moderate policy and aggressive policy, the target of each policy is optimum investment in working capital (Dhar and Kasturi, 2012; Ashraf, 2012). These policies differ because each requires different amounts of current assets to support any given level of a firms sales (Brigham and Gapenski, 1994).

2.2.1.1 Conservative Policy

The assumption in conservative working capital strategy is that as the level of investment in current assets increases, the liquidity increases such that the riskiness of the firm generally decreases. From Van Horne and Wachowicz, (2005), we learn that the benefits of conservative

policy include less worry in refinancing short-term obligations and less uncertainty regarding future interest costs, while the disadvantages are borrowing more than what is necessary (Weinraub and Visscher, 1998). Practically under the conservative policy the manager accepts less expected profits in exchange for less risk.

2.2.1.2 Moderate Working Capital Policy

In the moderate working capital strategy there is an average amount tied in current assets that translate into average liquidity, that carry with it average risk and average return. This is a compromise between the conservative strategy and the aggressive strategy, i.e. the middle of the road policy (Brigham and Gapenski, 1994). Under moderate approach, also known as maturity strategy, the firm finances fixed and permanent current assets with long term funds and temporary current assets with short term funds.

2.2.1.3 Aggressive Working Capital Policy

The aggressive working capital strategy is the opposite of conservative policy in the sense that firms that follow this policy accepts greater expected profits in exchange for taking greater risk by investing relatively less amount in working capital. Managers using this approach are aware that they are increasing risks by using a larger proportion of short-term financing. Under this strategy the benefits accrue from the policy of financing long-term needs with a lower interest cost short-term debt and borrowing only what is necessary. The risk associated with this strategy includes refinancing short-term obligations in the future and uncertain future interest costs or refinancing risk (Van Horne and Wachowicz, 2005). Wang (2002) suggest that if the inventory levels are reduced too much, the firm risks losing sales and customers.

2.2.2 Agency Theory

Jensen and Meckling (1976) developed a theory of the firm based on agency theory. Agency theory is a branch of economics relating to the behavior of principals and their agents. The essence of the agency problem is the separation of ownership and control (Shleifer and Vishny, 1997). The agency theory frame work is an attempt to reconcile conflicts between owners and managers of a corporation. Principals must provide incentives, monitoring mechanisms and instruments so that management acts in the principals' best interests and then monitor results. Incentives can be in the form of executive director shareholding or board compensation system

(Jensen and Meckling, 1976). Inclusion of outside directors in the board can improve monitoring (Fama, 1980; Fama and Jensen, 1983)

Agency explanations are given for a wide range of phenomena's in financial management literature. These include explanations relating to organizational design and management of assets that include current assets, to add value to the wealth of the shareholders. Jensen (1986), assertion is that managers with substantial free cash flow have incentives to engage in uncalled for expenses. In any case, the justification of financial models, that include modeling working capital, is to condition what managers do. The proposition is that firms with serious agency problems are likely to have unnecessary investment in working capital (Wasiuzzaman and Arumugam, 2013).

2.2.3 Stakeholder Theory

This theory addresses morals and values in managing an organization. Stakeholder theory argues that there are other parties such as employees, suppliers, creditors, trade unions, and even competitors interested in the success of the firm (Miles, 2012). The stakeholder view of strategy incorporates both a resource-based view and a market-based view, and expands on the concepts by including a socio-political level. This view of the firm is used to define the specific stakeholders of a firm (the normative theory of stakeholder identification) as well as scrutinize the conditions under which these parties should be treated as stakeholders (the descriptive theory of stakeholder salience) (Donaldson, and Preston, 1995).

The resource-based view (RBV) as a basis for the competitive advantage require the proper management of a assets at the firm's, relative to what competitors do as suggested in Hoopes, Madsen, and Walker (2003) to guarantee above average returns. There is strong evidence that supports the RBV in Crook et al., (2008) and that the activities of a firm are then analyzed in terms of resource and capabilities. The market based view model focuses on the firm's inherited market power.

2.2.4 Pecking Order Theory

The pecking order theory says that the firm will borrow, rather than issuing equity, when internal cash flow is not sufficient to fund capital expenditures. The pecking order theory is attributed to Myers and Majluf (1984) and Myers (1984) who analyzed how firms finance additional growth. They argued that due to information asymmetry, firm should exhaust internal financing before resorting to external financing. From working capital perspective, the pecking order theory would

imply that well known and less opaque firms will have low investment in working capital because they can quickly and cost effectively access funds from the capital markets. Since external financing is more costly than internal financing; a firm with high rising debt ratio would pay more attention to their working capital to release capital for investment in more profitable projects (Nazir and Afza, 2009). According to Wasiuzzaman and Arumugam (2013), the argument of the pecking order theory implies that there is a very strong relationship between the level of investment in working capital and information asymmetry. As such, firms with different characteristics, such as growth opportunities, size, asset tangibility etc., would result in different investment policies in working capital depending on the roles played by these characteristics in aggravating and/or reducing the problem of asymmetric information and the costs associated with the level of asymmetric information.

2.3 Working Capital Management Practices and Empirical Studies related to Working Capital Investment Levels

García-Teruel, Solano and Caballero (2009) inform us that ‘despite the importance of working capital management for the profitability of the firm there has been little work on the empirical determinants of the working capital management’. On examination of the literature on working capital theories, it is apparent that the overall theory that guides the objective of working capital management is that firms exist to maximize the wealth of shareholders; and this explains why a number of studies concentrate on the relationship between working capital management practices and profitability (Smith 1980, Wang, 2002; Deloof, 2003; Olufemi and Olubanjo, 2009; Afza and Nazir, 2009; Mathuva, 2010; Aminu, 2012). The majority of these studies report a significant relationship between working capital and firm performance.

In the US, Weinraub and Visscher (1998) using quarterly data for the period 1984-93 of the US firms find that companies in the sample exhibited significant stability in terms of working management practice but, whether a particular company adopted an aggressive policy or conservative policy depend on the industry the company is in. Their study finds that firms adopting an aggressive working capital policy tend to opt for conservative working capital financial policies. In another study in US by Jose, Lancaster and Stevens (1996), the findings show a significant negative relationship between the Cash Conversion Cycle (CCC) and profitability.

In Belgium, a study by Deloof (2003) find that firms improve on their profitability by keeping low inventories and reducing number of days accounts receivable are outstanding; those findings are confirmed by Garcia-Teruel and Martinez-Solano, (2007) who in addition conclude that a reduced CCC improve the firms' profitability. In Pakistan, Afza and Nazir (2009) found significant differences among their working capital investment and financing policies across different industries. It is possible that a firm may lose several profitable investment opportunities or suffer a liquidity problem if the working capital is too low or it is improperly managed (Narender, Menon and Shewtha, 2009). In conclusion García-Teruel, Solano and Caballero (2009) find that firms have a target investment in working capital.

One could however fault the studies in emerging economies on the ground that they rely on accounting measures of performance (such as return on assets (ROA)) as opposed to market measures of performance. The standard practice in finance is to evaluate managerial decisions in terms of their impact on share prices, and that financial managers should only recommend those actions that are expected to increase the share price (Van Horne and Wachowicz, 2005). This is because share prices represent owners' wealth in the firm and therefore maximizing the share price will maximize shareholders wealth. Nearly all these studies use regression analysis and this study borrows the model from them in predicting the determinants of working capital Investment levels. In addition the studies use balance sheet data together with aggregate economic data in some instances.

The other strand of studies is on the determinants of working capital. This arose from the hypothesis that an efficient working capital management strategy balance current assets against current liabilities as a way of avoiding insolvency. The two major components of a working capital management strategy are current assets and current liabilities. The components of current assets are cash and bank balances, accounts receivables and inventory. Positive cash balances suggest that there is more cash coming in than is going out or that management is keeping idle cash and thus compromising returns to shareholders. Accounts receivables must be collected as first as possible, and the amount tied in inventories must be optimized. The major component of current liability is accounts payable.

Some studies on determinants of working capital use inventory as dependent variable, suggesting the importance of inventory as a working capital variable; and then proceed to select a battery of

factors as independent variables. For example, turnover (sales) is considered an accelerator of inventory levels and is therefore an independent variable. The reason is that in manufacturing industries where management of working capital is critical inventory accounts for largest proportion of current assets. The studies are anchored on Metzler (1941) acceleration principle, i.e. firms set the level and the amount to invest in inventories in relation to a given level of sales.

Shin and Soenen (1998) report a negative relationship between cash conversion cycle and profitability, in addition negative relationship between cash conversion cycle and the operational income of sales and operational cash flow was reported. In India Prakash (1970) examined the influence of structural changes (using as output to sales, capacity utilization, short-term rate of interest, money supply, foreign exchange availability, price index, size and time trend proxies of structural change) in the size and composition of inventories in manufacturing firms and conclude that the impact of price index is present but insignificant, while foreign exchange and money supply are irrelevant, but rate of interest and time trend have some impact. Cost of borrowing proxy, namely rate of interest, has influence on level of inventories, i.e. on working capital investment levels (Irvine, 1981).

Chiou, Cheng and Wu (2006) analyzed the influence of business indicators, industry effect, operating cash flows, growth opportunity for a firm, firm performance, and size of the firm, and conclude that business indicator, industry effect, growth opportunities, firm performance, and size of the firm do not decisively predict capital requirements of firms. Chiou, Cheng and Wu (2006) found out that debt ratio and operating cash flow significantly influence the amount invested in working capital of firms, but in the same study, factors such as business cycle, industry effect, company growth, firm performance and company size are irrelevant; yet in Pakistan Nazir and Afza (2008) found that operating cycle, leverage, ROA and Tobins'Q had a significant impact on working capital requirements. In Latin American companies, the industry cash conversion cycle, the company market power, future sales and country risk have an influence on the way companies manage their working capital, and that there are significant differences among countries in the region (Mongrut, Fuenzalida, Cubillas, and Cubillas,2010). Looking at components of current liabilities, accounts payable are one of their main sources of external finance for firms that encounter difficulties in obtaining funding from capital markets (Petersen and Rajan, 1997)

While studies have explored the extent to which various components of working capital such as inventory are determined, not much has been done to study the significance of factors influencing the level investment in total working capital. Furthermore, studies on working capital emphasize on the importance of efficient working capital management by analyzing the working capital management policies, in addition to explaining variations in working capital management amongst companies (Filbeck and Krueger, 2005).

2.4 Determinants of Working Capital Investment level and hypothesis

Modelling working capital investment levels should help identify working capital variables that managers should expend effort on to effectively manage working capital, i.e. to avoid situations where working capital impact negatively on the value of the firm. Factors external and internal to the firm are hypothesized to drive working capital investment levels and include cash conversion cycle, operating cash flow, leverage, firm size, return on assets, interest rate on loans, and economic growth rate (Abbadi and Abbadi, 2013). Additional factors suggested as influencing working capital investment levels are growth rate of sales, the presence of independent directors, the compensation of executives, directors, and ownership of shares by Chief Executive Officers (Moussawi, Laplante and Kieschnick, 2006). It is hypothesized that sales and growth in sales, cost of capital (interest rates) and the ease of assessing capital markets influence working capital investment levels (Hill, Kelly, and Highfield, 2009).

In working capital management factors cited as influencing working capital are many, but in this study the factors whose effect on working capital investment levels are to be examined are internal to the firm and include cash conversion cycle, operating cash flow, returns on asset, sales (turnover), firm size and debt capital. A summary of related studies relied on in selecting variables of this study are in Appendix II. Below is a discussion of individual drivers of capital investment levels.

2.4.1 Cash Conversion Cycle

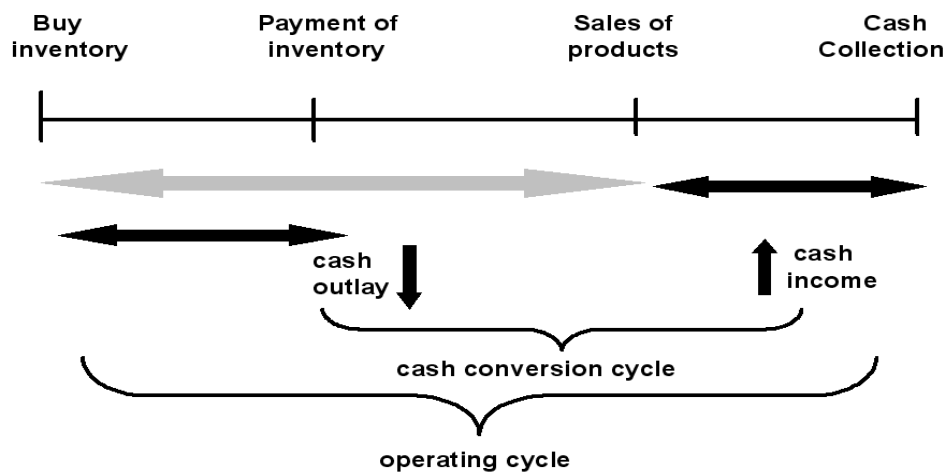
The cash conversion cycle (CCC) is the interval of time (days) required to convert a shilling invested in current assets in cash. It is used to analyze the effectiveness of working capital management (Van Horne and Wachowicz, 2005). CCC is calculated by adding the average period to collect accounts receivable to the average inventory period and subtracting the average period of payment.

Lambrix and Singhvi (1979) suggested that investment in working capital could be optimized by reducing the time frame of the physical flow from receipt of raw material to shipment of finished goods, i.e. inventory management, and by improving the terms on which a firm sells goods as well as collect cash from accounts receivables; and the improvement can be enhanced further by improving the terms on which firms bought goods. The longer the period the higher the amount to be tied in current assets, the higher the cost of capital and the lower the rate of return. CCC is therefore an indicator of a firm's liquidity and profitability. Lengthier cycles might lead companies to bankruptcy (Soenen, 1993). CCC is the most popular measures of working capital investment levels used in previous studies (García-Teruel, Solano and Caballero, 2009).

In a study by Mongrut, Fuenzalida, Cubillas, and Cubillas, (2010) and Soenen, (1993), are explicit on the importance of CCC when they remark that 'to understand how important it is to have good liquidity management one may refer to two North American supermarkets: Walmart and Kmart' (Shin and Soenen, 1998). These two companies had similar capital structures in 1994; however, Kmart had a cash conversion cycle (CCC) of 61days while Walmart had a CCC of 40 days. As a consequence of this difference Kmart faced additional financial costs in the order of US\$ 200 million per year. Clearly, this situation was not sustainable because poor working capital management eventually contributed to Kmart's bankruptcy. This example illustrates how working capital management, a key variable for an efficient management of liquidity, could lead the firm to bankruptcy when it is poorly handled. CCC helps managers to establish why and how the business needs more cash to operate and whether it has the capacity to meet its short term obligations. Mongrut, *et al* (2010) concludes that a firm can generate losses during a number of different periods, but no firm can go on indefinitely with poor CCC management due to its impact on Working capital investment levels. From above the first hypothesis is:

(H₁): Cash Conversion Cycle (CCC) has a significant positive influence on the firm's working capital investment levels.

Figure 2.1: Operating and cash conversion cycle



Source: KPMG (2005)

2.4.2 Operating Cash Flow

Operating cash flow (OCF) is the amount of cash a firm generates from the goods and services that it offers to its customers (Brigham and Gapenski, 1994). Firms with positive cash flows can use the excess cash to finance working capital and therefore, unlike firms with negative cash from operations, can adopt conservative operating working capital strategy.

In Thailand, Ranjith's (2008) found that operating cash flow have impact on working capital investment levels. Hill, Kelly, and Highfield. (2010), using regression analysis, report a significant positive relationship between working capital ratio and operating cash flows. Therefore, the second hypothesis is:

(H₂): Operating Cash Flow (OCF) Ratio has a significant negative influence on the firm's working capital investment levels.

2.4.3 Returns on Asset (ROA)

ROA indicates how profitable a company is, by comparing its income to its total assets; it tells us how efficient management is in using assets (Brealey, Myers and Allen, 2008). ROA for public companies is highly dependent on the industry. It expected that firms exhibiting a good ROA ratio are able to adopt an aggressive working capital strategy because they can use the earnings, in line with the pecking order theory, they generate to fund substantial portion of their working capital. Nazir and Afza (2009) found that ROA has significant influence on working capital investment

level; and this finding is confirmed in Palestine by Abbadi and Abbadi (2013). Therefore the third hypothesis is:

(H₃): Return on Assets (ROA) has a significant positive influence on the firm's working capital Investment levels.

2.4.4 Sales (Turnover)

Sales or turnover are revenues generated by a company and it is an increase in owners' equity accompanied either by an increase in assets or a reduction in liabilities. The theory that anchors the influence of sales on working capital is anchored on Walkers's (1964) first principle which states that if working capital is varied relative to sales, the amount of risk that a firm assumes is varied and the opportunity for gain or loss is increased. A firm that is planning for growth in sales and therefore revenue is expected to increase its investment in current assets, to support the expected increase in inventories, accounts receivables and related expenses such as advertisement to induce increased sales (Nunn, 1981).

In a recent study by Hill, Kelly, and Highfield (2010) the working capital ratio is found to be negatively related to the rate of growth in sales and unexpected demand for a firm's product and services. However, Chiou and Cheng (2006) find no effect of firm growth on working capital. García-Teruel, Solano and Caballero (2009) found out that sale in firms that increase investment in working capital increase. Therefore the fourth hypothesis is:

(H₄): Sales or sales growth has a significant positive influence on the firm's working capital investment levels.

2.4.5 Firm Size

Mongrut, *et al* (2010), found that the size of the company is an important variable in formulating a working capital policy, and that in principle large companies ought to have a greater working capital given their higher sales. In addition to this, Shin and Soenen (1998) found a positive relationship between working capital investment levels and firm size. However, large companies because of their high credit rating can have lower amounts tied in working capital given that they can source capital from the capital market at short notice at affordable cost. Small companies with low credit rating find it difficult raising capital and are therefore expected to have substantial amount tied in current assets.

In a study in Mauritania it is reported that though working capital is of concern to small firms and large firms, the concern in small firms is more pronounced than in large firms due to liquidity and other risks associated with small firms (Padachi, 2006); and in England, Howorth and Westhead (2003) report similar findings. Moussawi, Laplante and Kieschnick (2006) confirm size as a variable that affect working capital, but the most interesting aspect of their finding is that large companies are inefficient in their management of working capital. However, Chiou and Cheng (2006) and Abbadi and Abbadi (2013) find no effect of firm size on working capital. It is these contradicting findings that open a window for further research. García-Teruel, Solano and Caballero (2009) find that working capital management depends on bargaining power and other financial factors such as the availability of internal finance, cost of financing and access to capital markets. Furthermore, Heyman, Deloof and Ooghe, (2003) assert that differences in ownership structure, flexibility and taxes explains the variations in financing option and approaches between small and large firms. Therefore the fifth hypothesis is:

(H₅): Firm Size has a significant positive influence on the firm's working capital investment levels.

2.4.6 Debt Capital

Debt capital is the amount borrowed by the firm, while debt ratio measures the extent to which a firm's assets are financed with borrowed funds. The related issue is whether financing of working capital add value to the firm or not as opposed to that famous proposition by Modigliani and Miller (1958) that, under perfect and frictionless capital markets, the choice between debt and equity financing has no effects on a firm's value and that if inconsistencies exists the arbitrage process will come into play. However, 'Given the differences in costs and risks between the various sources of finance available to firms, the way in which a firm finances its working capital requirement might affect its performance' (Caballero, Teruel, & Solano, 2012).

Firms borrow to fund their working capital if they are not generating enough cash from operations and it is not surprising that Nazir and Afza (2008) conclude that companies with substantial amount of debt in capital structure try hard to manage working capital more efficiently than the ones with less debt in their capital structure. This is to avoid raising additional capital by issuing new debt and shares. In a related study Chiou and Cheng (2006) report an inverse relationship between capital structure and working capital ratio.

Abbadi and Abbadi (2013) report that leverage of the firms is significantly and negatively correlated to the working capital management and working capital investment levels of the firm, suggesting that the higher the leverage, the more likely the firms will strive to reduce capital that is tied to current assets; therefore firms with higher debt in capital structure are efficiently managing their working capital. Therefore the sixth hypothesis is:

(H₆): Debt capital has a significant positive influence on the firm's working capital investment levels.

2.5 Indicators of Working Capital Investment Levels

The aim of working capital management is to maintain an optimal balance between a firm's risk and return, and this requires continuous monitoring of working capital investment levels given that factors that influence working capital could change over time (Abbadi and Abbadi 2013). Furthermore, managers are concerned about the levels of working capital because they want to minimize non-cash working capital (Frankel, 2005).

This study focused on determinants of working capital investment levels of selected firms at NSE. Working capital in absolute terms is the difference between current assets and current liabilities. However, working capital is also captured in ratio form, i.e. current ratio (CR). Managers monitor their firm's current ratio to know whether there exist enough short-term assets to cover its short-term obligations; in addition, suppliers and lenders are known to monitor current ratios of firms that they transact with. The other indicator of working capital investment level is net working capital to total assets ratio (NWCR), which is a measure of net liquid assets of the firm relative to its capitalization (Altman, 1968); and the standardization facilitates comparison of this ratio across companies. The importance of these ratios as indicators of working capital investment level is traced to known researchers that used them to predict company bankruptcy (Beaver, 1966; Altman 1968; and Altman, Haldeman and Narayanan (1977). Chiou, Chang and Wu (2006) and Nazir and Afza (2008) used working capital as a proxy for working capital requirement levels; but Lamberson (1995) used a series of working capital indicators that include current ratio, quick ratio, inventory/assets ratio, and current asset/assets ratio.

2.6 Target Working Capital Investment Level

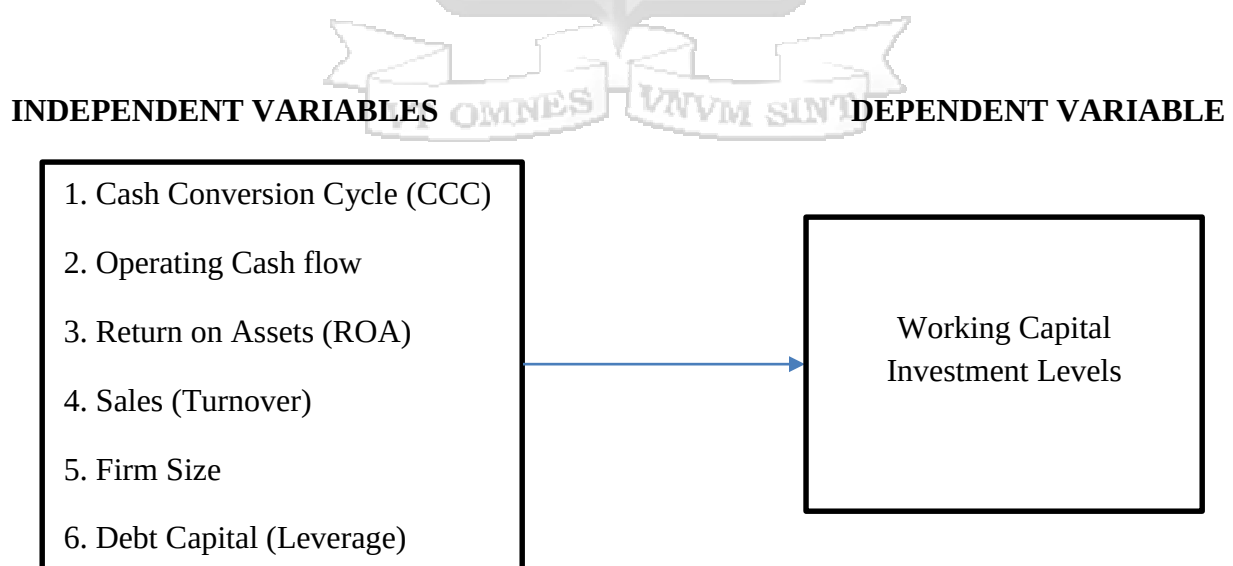
Working capital management involves planning and controlling current assets and current liabilities so as to eliminate the risk of defaulting on short-term obligations and control excessive

investment in these assets (Rahman and Nasr 2007). Given the importance of working capital management, it is a reasonable assumption that firms have a target working capital investment level. From an operational and market risk perspective, it is important that firms maintain optimum levels of investment in working capital, for example, a firm can release capital tied in working capital for long term investments (Nazir and Afza, 2009; Madhou, Ramiah, and Moosa, 2011). Efficient working capital management involves planning and controlling current assets and current liabilities in such a manner that eliminates the risk of inability to meet short-term obligations and avoids excessive investment in these assets (Eljelly, 2004). The target level should be the optimum working capital (Rahman and Nasr 2007). However the target could vary depending on variations in the economy (Yadav, Kamath and Manjreka, 2009).

2.7 Conceptual Framework

The variables are defined at two levels; the first level is whether the variable is dependent or independent variables. The dependent variable, also known as response variable denotes the output or effect, or is tested to see if it is the effect; while the independent variables also known as predictor variables, represent the inputs or causes, or are tested to see if they are the cause (Dodge 2003).

Figure 2.2: Conceptual diagram on the determinants of working capital investment level



2.8 Operationalization of variables

2.8.1 The Dependent Variable (Working Capital Investment Level)

Working capital investment level is the dependent variable. In absolute terms, it is the difference between current assets and current liabilities. Working capital information is also captured in ratio form, i.e. current ratio. The two indicators of working capital investment levels are:

CR = Current Assets to Current Liabilities

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

2.8.2 Independent Variables

Six independent variables will be included in the regression model. These will be:

2.8.2.1 Cash Conversion Cycle (CCC)

Cash conversion cycle is defined as the number of days it takes a firm to convert its purchases from raw materials to finished product and sell it and convert accounts receivables into cash and is computed as follows:

$CCC = \text{Average collection period} + \text{inventory turnover in days} - \text{Average payment period}$

2.8.2.2 Operating Cash Flow (OCF) Ratio

Operating cash flow (OCF) refers to the amount of cash a firm generates from its revenues, i.e. it is the cash the firm will obtain from its operations. Firms with positive cash flows can use the excess cash to finance working capital and therefore, unlike firms with negative cash from operations, afford to adopt conservative operating working capital strategy. To calculate cash generated from operations, one must calculate cash generated from customers and cash paid to suppliers. The difference between the two reflects cash generated from operations. Again to facilitate comparison amongst the listed companies the cash from operation is divided by total assets i.e.:

$\text{Ratio} = OCF / \text{Total Assets}$

2.8.2.3 Return on Assets (ROA)

ROA as a performance indicator is calculated by dividing a company's annual earnings by its total assets, ROA are displayed as a percentage; some other refer to it as return on investment. It is calculated as:

$$\frac{\text{Net Income}}{\text{Total Assets}}$$

2.8.2.4 Sales (Turnover)

Growth in sales require computing percentage change in sales within two consecutive years

2.8.2.5 Firm Size

Indicators of firm size could be a firm's total assets or annual turnover. Of the two, total assets as a measure of Size is more stable than turnover and secondly total assets is a direct measure of the amount the investors have risked in the firm.

2.8.2.6 Debt Ratio (Leverage)

Debt Ratio indicates the percentage of a company's assets that are financed using debt. In this study it is measured as follows:

$$\frac{\text{Total Debt}}{\text{Total Assets}}$$

2.9 Model specification

2.9.1 Influence of independent factors on working capital investment level

The third objective, which is to interrogate, empirically, the influence of determinants of working capital investment levels employ regression analysis. The analysis starts by running a simple ordinary regression of each individual predictor variable on current asset ratio and net working capital ratio as dependent variables. Thereafter a multiple regression is run as below:

$$Y_{it} = \beta_0 + \beta_1 CCC + \beta_2 CFratio + \beta_3 ROA + \beta_4 Sales + \beta_5 Size + \beta_6 Dratio + u_{it}$$

Y_{it} = Working capital investment level

CCC = Cash conversion cycle

CFratio = Operating cash flow

ROA = Returns on asset

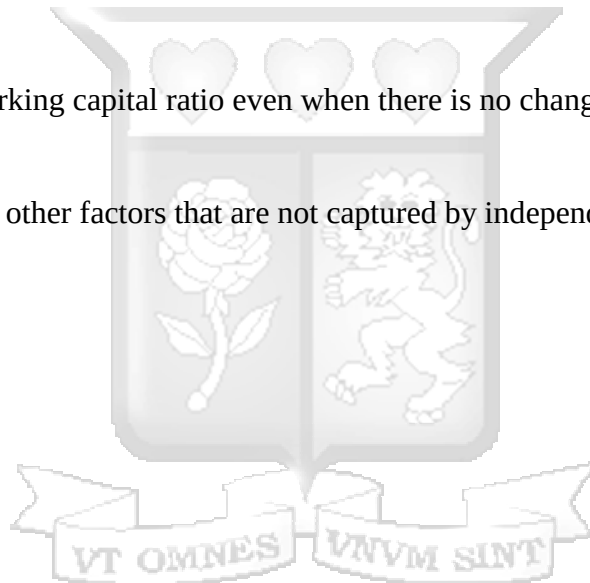
Sales = Sales (turnover)

Size = Firm size

Dratio = Debt capital

β_0 = Change in working capital ratio even when there is no change in other predictor variables

u_{it} = error term i.e. other factors that are not captured by independent variables and control variables.



CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

The previous chapters reviewed literature with the intention of examining the specific drivers of working capital investment levels at NSE. In this chapter, the following are presented: research design, population of the study, data and data analysis.

3.2 Research Design

The research design varies according to the objective addressed. To address the first and second objective, cross sectional survey is used. In the third objective the study aimed at looking for evidence that in Kenya, the selected variables explain working capital investment levels; therefore confirmatory research design is more appropriate. Accordingly, a result is accepted as significant if it is highly unlikely to have been observed by chance (Rosenbaum, 2009).

3.3 Target Population of the Study

The target population and units of study were all the fifteen (15) companies listed at NSE under manufacturing and construction sector as at 31st December 2012. In addition the Companies must have been listed over the past 5 years, from 2008 to 2012.

The manufacturing and construction sector was chosen because it contributes much to the progress of the economy given that manufacturing and construction activities provide people with different goods, as well as, employment. From working capital perspective, manufacturing companies invest heavily in the components of working capital especially inventories and accounts receivables. This was critical because these components as determinants of working capital investment level account for largest proportion of current assets. The companies listed at NSE also prepare financial statements, made available to the public, according to International Accounting Standards and have the financial statements audit, a procedure that add credibility to information contained in such statements.

3.4 Data Collection

The study used both secondary and primary data. In collecting the primary data the target respondents were the finance managers of the sampled companies. This is because finance

managers understand the dynamics of working capital management and are bestowed with the responsibility of making major financial decision for the Company. The primary data required the use of a questionnaire to seek managers' opinion on factors that influence the level of working capital (see appendix II). One questionnaire accompanied by a cover letter explaining what was required was delivered to the Finance Manager of the targeted companies to fill the required information. The questionnaires were collected a week later.

Secondary data relating to working capital Investment levels and the determinants of working capital was extracted from the annual reports of companies listed at NSE. The annual reports were accessed at NSE and Capital Markets Authority libraries.

3.5 Data Analysis

3.5.1 Regression Equation

The appropriate tool of analysis used for detecting cause and effect was both simple and multiple regression analysis. This is because the concern in this study was parameter estimating rather than the statistics of model testing. The assumption was that least square estimates are unbiased, consistent and efficient (Pindyck and Rubinfeld, 1991).

3.5.2 Verification of Regression Output

The regression analysis was used to generate an equation to describe the statistical relationship between independent variables (predictor) variables and the response variable in this case working levels i.e. Current ratio and Net working capital ratio. After fitting a regression model, there was need to verify the fit by checking the residual plots to interpret the results. The interpretation of the co-efficient of predictor variable, the P-Values, t- value and F-Value, and R-Squared in linear regression analysis was then done.

Regression coefficients for each predictor variable represented the mean change in the response variable for one unit of change in the predictor variable while holding other predictors in the model constant. The regression coefficient is important because it isolates the role of one variable from all of the others in the model (Bails and Peppers, 1993). The test was whether the value of the independent co-efficient generated by regression is zero, a value of zero would mean that the independent co-efficient is not useful in predicting the independent variables (Bails and Peppers, 1993)

3.6 Analysis of the Questionnaire

The questionnaire was subjected to descriptive analysis, i.e. frequencies, mean and standard deviations will be calculated.

3.7 Ethical Considerations

The data collected is treated confidentially and will only be used for the research purposes. In no way is the data manipulated as to get the “desired” outcome.



CHAPTER FOUR

FINDINGS AND DISCUSSION OF FINDINGS

4.1 Introduction

The study identified three objectives, namely, to establish managers perceptions on the determinants of working capital investment levels in the manufacturing and construction firms listed at NSE; to establish the target working capital investment level, from managers perspectives for manufacturing and construction firms listed at NSE; and to interrogate, empirically, the influence of determinants of working capital investment levels in the manufacturing and construction firms listed at NSE.

The results of the analysis are presented in this chapter and are split in two sections. Section A presents the results based on responses collected from the managers with regard to their position on the working capital investment levels and the related variables. The section gives insights on managers' perception on selected working capital items, specifically on factors expected to influence working capital investment levels. It also captures manager's opinion on what they consider to be the target levels of current ratio for firms in the manufacturing and construction industry. In the second section, Section B, are the result of regression analysis on the relationship between working capital investment level and its predictor variables, specifically, the level of influence that each of the predictor variables and all the predictor variables together (cash conversion cycle (CCC); return on assets (ROA); debt ratio (Dratio); size (total assets); sales; and cash from operations ratios (CFRatio) has on working capital investment levels (current asset ratio (CAratio) and net working capital ratio (NWCRatio)).

4.2 Section A: Managers Perception on Working capital Investment levels and its determinants

This section relates to managers opinion on working capital management and specifically working capital investment levels and its determinants.

To achieve the objectives, primary data was collected from the managers through a questionnaire, which was administered to each manager through drop and pick. All the 15 Finance Managers for

firms in the Manufacturing and Construction industry were targeted for interview. However, only 11 responded to the interviews, representing a successful response rate of 73%.

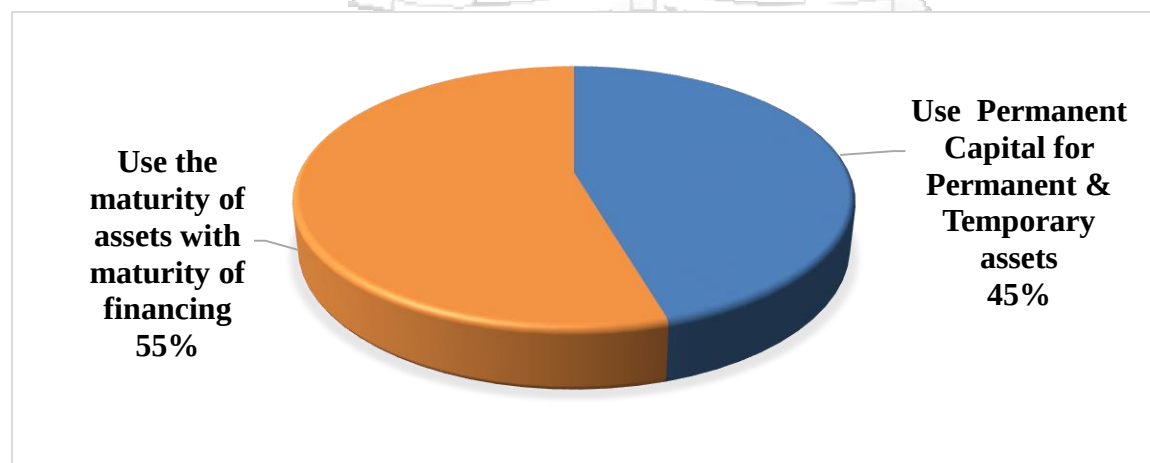
4.3 Overview on Working capital investment levels

Information geared towards providing background on the target population and insight on Working capital investment levels of the companies was sought. The findings based on analysis of the questionnaire (see appendix 1) are presented below and also summarized under table 4.1.

4.3.1 Financing policies adopted by the companies

Firms are expected to choose from three working capital management approaches, namely, conservative policy, moderate policy and aggressive policy, the target of each policy is optimum investment in working capital (Dhar and Kasturi, 2012; Ashraf, 2012). Managers' opinions on these approaches were sought and the results are represented in figure 4.1. The managers were asked which amongst the options given best described their company's financing policy. The response varied. This question was to establish whether a company follows moderate, aggressive or conservative financing policy. The results show that 55% of companies follow a conservative financing policy i.e. match the maturity of asset with the maturity of financing while 45% follow moderate financing policy i.e. use permanent capital for permanent and temporary assets. None of the managers stated that they use aggressive working capital policy.

Figure 4.1: Financing policies adopted by Companies



4.3.2 Responsibility of overseeing working capital management

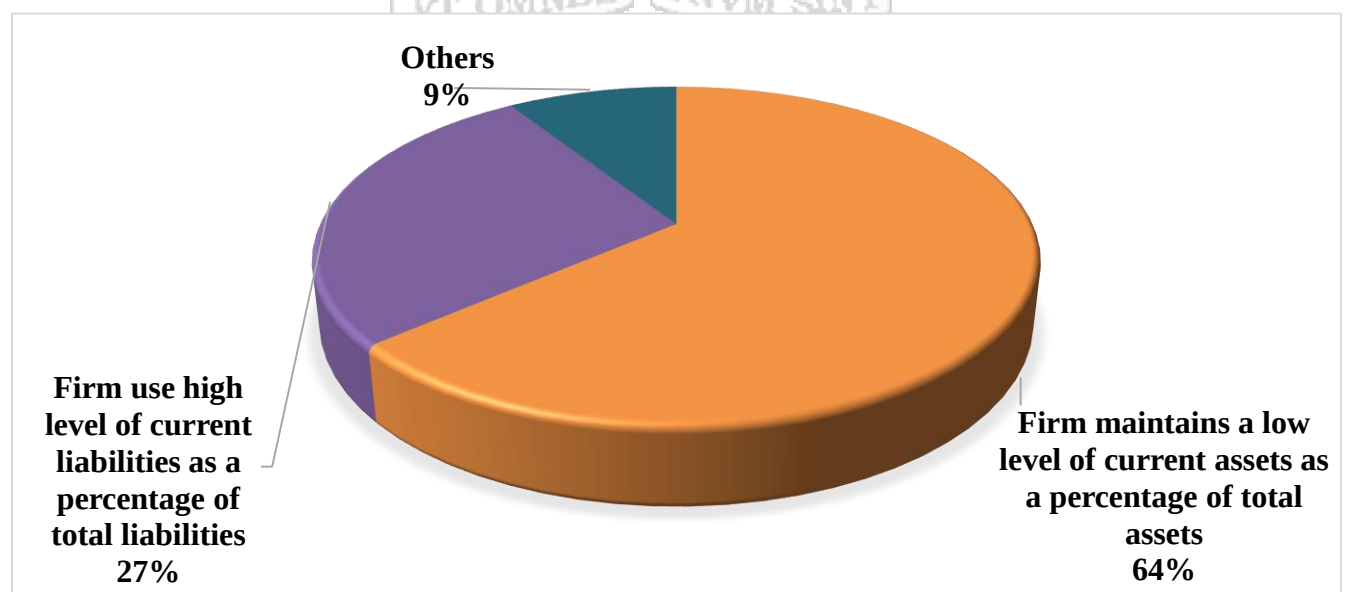
The second question is: "Who oversees working capital management in your firm?" was to establish the importance attached to working capital investment levels by establishing the

seniority of the corporate officer in charge. The respondents were asked to choose from CEO, Finance Manager, Board of Governors, with an option to specify any other. A mean and mode score of 2 and standard deviation of zero tell us that in all firms sampled, the respondents agree that the Finance Manager oversees management of working capital. That working capital is overseen by such a senior management mean that it is an important function within the firms sampled.

4.3.3 Working capital management policies

To find out firms working capital policies, managers were asked to describe working capital management policy of their firm and the results are in Table 4.1 below, and highlighted in figure 4.2. Firms can adopt an aggressive working capital management policy with a low level of current assets as percentage of total assets, or choose financing decisions in the form of high level of current liabilities as percentage of total liabilities (Afza and Nazir, 2009). Majority of managers, sixty four percent (64%), are of the opinion that their firms follow a policy of a low level of current assets as percentage of total assets, and by interpolation avoid using high level of current liabilities as percentage of total liabilities. Twenty seven percent (27%) say that their firm use high level of current liabilities as a percentage of total liabilities. One firm was specific that they do not use current ratio in managing working capital. The results suggest that the firms use more of long term finance to short term finance.

Figure 4.2: Working capital management policies



4.3.4 Monitoring Frequency of Working Capital Investment Levels

To establish how frequent working capital investment levels are monitored, the respondent were asked state hoe frequent their company monitors working capital investment levels by comparing the investment in working capital to total assets?” Sixty four (64%) percent of respondents monitor working capital investment level every time while 18% do it occasionally and another 18% almost every time. The implication is that working capital to total assets is an indicator of working capital investment levels. Results presented in figure 4.3.

We get similar results when the question is “How frequently does your company monitor working company levels by calculating current assets ratio?” sixty four percent (64%) of respondents say every time they are monitoring working capital investment level they use current asset ratio. Twenty seven (27%) said they do it almost every time and 9% occasionally. Results as presented in figure 4.4.

Figure 4.3: Indication of working capital investment level using Working capital to Total assets

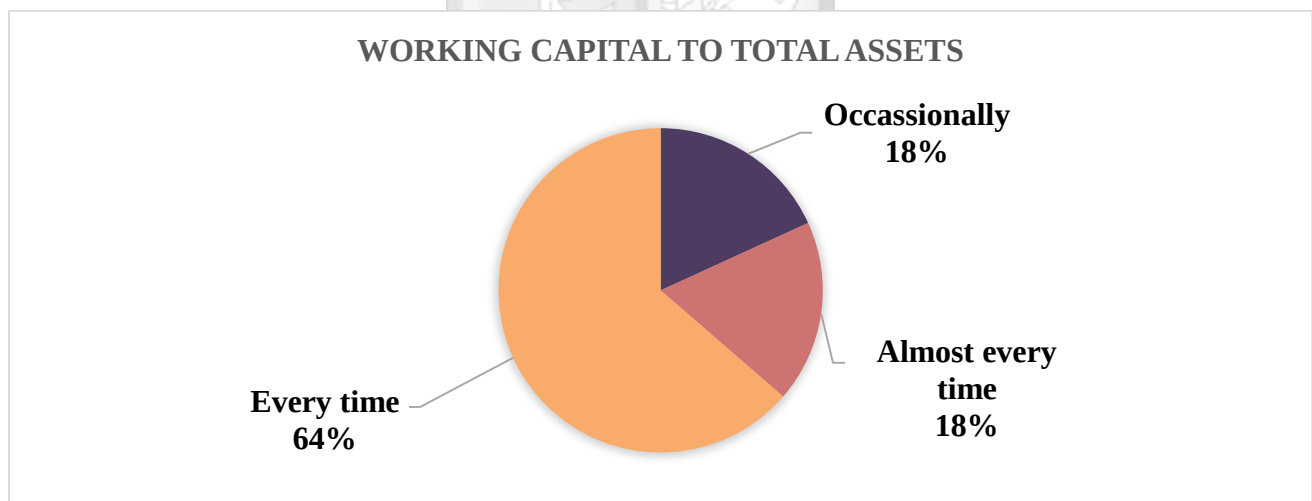
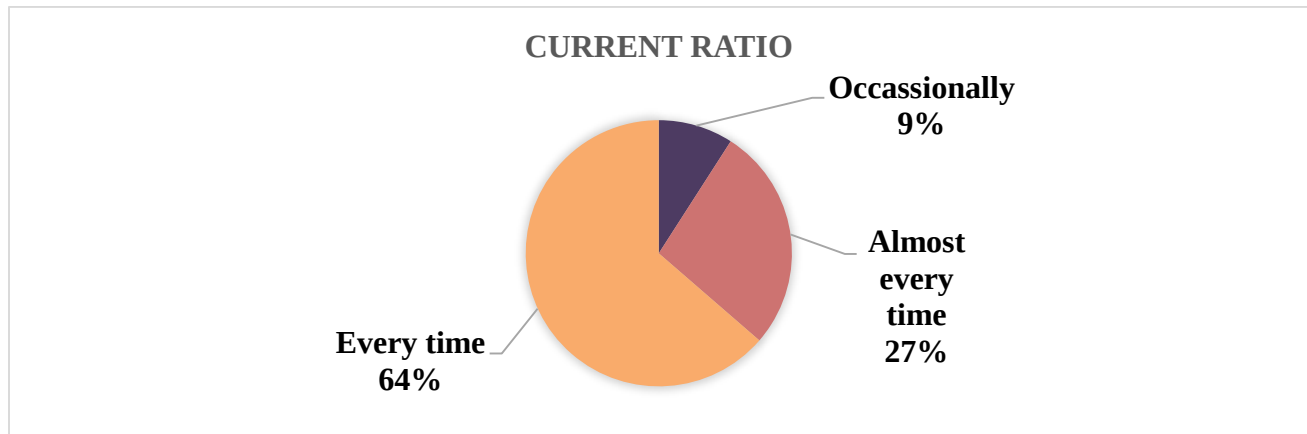


Figure 4.4: Indication of working capital investment level using Current ratio



4.3.5 Overview of Working Capital Management

In table 4.1 are a summary of managers' response on working capital management. The first stated as "Which of the following best describes your company?" was to allow managers give an opinion on their companies financing policy. This was a closed ended question and the mean score of 2 indicate that on average managers use short term financing to finance permanent assets, while the mode of 3 indicates that the most common financial policy followed by most firms is to match the maturity of assets with maturity of financing. The Standard deviation in table 4.1 measured the level of agreement among the respondents. Standard deviation that is greater than 0 mean lack of total agreement amongst the respondents, for example standard deviation of question 1 is 1.04 suggesting that the firms sampled though in the same industry follow different financial policies and practices.

Table 4.1: Summary of Managers Views

Questions	N Valid	Missing	Mean	Mode	Std. Dev
Q1.Which of the following best describes your company?	11	0	2	3	1.04
Q2. Who oversees Working capital management in your firm?	11	0	2	2	0.00
Q3. Which of the following best describe working capital management policy in your firm?	10	1	1	1	0.70
Q4. Does your firm have a target range for your current ratio?	11	0	4	4	0.47
Q5. How frequently does your company monitor working capital investment levels by comparing amount invested in working Capital to Total Assets?	11	0	5	5	0.67
Q6. How frequently does your company monitor working capital investment levels by calculating current assets ratio?	11	0	5	5	0.69
Q7. In your company how important are the following variable in determining working capital investment level?					
Cash conversion cycle	11	0	5	5	0.67
Operating Cash Flow	11	0	5	5	0.30
Debt Ratio	11	0	5	5	0.67
Firm size	11	0	4	5	1.10
Return on assets	11	0	5	5	0.47
Sales (Turnover)	11	0	5	5	0.30
Q8What is the target current ratio for your company, i.e. current assets to current liabilities?	11	0	3	3	0.50

The table above is a summary of managers' response to questions in the questionnaire in appendix I and presented in section 4.2, 4.3 and 4.4. Mode in the table represents the most common response among respondents, whereas the standard deviation is a measures of the level of agreements among respondents on a particular question, e.g. question 1 refer to section 4.2.1 above and question 2 refers to 4.2.2 above.

4.4 Managers Opinions on Variables influencing Working Capital Investment Levels

Objective one of the research was to find out, through a questionnaire, factors that managers think influence working capital investment levels in their firms. The respondent's responses are summarized in table 4.1 above and table 4.2 below. The managers were asked to rank the importance of six competing working capital determinants that included cash conversion cycle

operating cash flow, debt ratio, firm size, return on assets, and sales (turnover). Manager's opinion was that all of these variables are important drivers of working capital investment levels. However the standard deviation of 1.10 (greater than 1) show lack of agreement on the importance of variables across companies, specifically there is lack of agreements amongst managers on firm size as driver of working capital.

Managers agree that operating cash flow and sales very highly influence their working capital investment levels. This is because ninety one percent (91%) of the managers felt that these are extremely important variables. This implies that many managers expend a lot of effort in ensuring that their firm maintain quite a significant cash flow and ensure the sales are high in an effort to manage their working capital. Abbadi and Abbadi (2013) confirms that operating cash flow has a significant influence on working capital investment level while a study by Mathew, Kelly and Highfield (2009) is in agreement that sales growth have a significant positive influence on working capital investment level.

However, 73% of the managers interviewed were of the view that cash conversion cycle, debt ratio and return on Assets are extremely important while 18% and 9% respectively indicated that these variables are very important and moderately important. According to the managers, firm size though extremely important it ranks last relative to the other variables. Only 64% of the managers felt that it was an extremely important.

Table 4.2: Frequency table – Variables determining working capital investment levels

Variable		NI	SI	MI	VI	EI	Total	Mean	Mode	StDv
Cash conversion cycle	Frequency	0	0	1	2	8	11	5	5	0.67
	Percent	0	0	9	18	73	100			
Operating Cash Flow	Frequency	0	0	0	1	10	11	5	5	0.30
	Percent	0	0	0	9	91	100			
Debt Ratio	Frequency	0	0	1	2	8	11	5	5	0.67
	Percent	0	0	9	18	73	100			
Firm size	Frequency	0	1	2	1	7	11	4	5	1.10
	Percent	0	9	18	9	64	100			
Return on assets	Frequency	0	0	0	3	8	11	5	5	0.47
	Percent	0	0	0	27	73	100			
Sales (Turnover)	Frequency	0	0	0	1	10	11	5	5	0.30
	Percent	0	0	0	9	91	100			

EI = Extremely Important; VI = Very Important; MI = Moderately Important; SI = Slightly Important and NI = Not Important

4.5 Target Working Capital Investment Levels

This section relate to objective two, that is, to establish the managers opinion on target working capital investment level for manufacturing and construction firms listed at NSE. The assumption is that either low or high working capital is not good for business, and that managers strive towards optimum working capital investment level, by identifying a target. Again the optimum level of working capital is the level expected to maximize shareholder wealth. This objective is addressed and summarised in table 4.1 and table 4.2.

To establish the existence of target working level, it was important to find out whether the sampled firms have target range for working capital investment level. The specific question was: Does your firm have a target range for your current ratio? The mean score of 4 and the mode score of 4, and a low standard deviation of 0.47, for this question suggest that majority of firms set somewhat tight target range of current ratio.

It is not good enough setting tight target range for current ratio, but management must monitor the working capital investment levels by ensuring adherence to target range of current ratio. To gauge manager's adherence to a target current ratio the respondents were asked to state how frequent their company monitor working capital investment levels by comparing the amount invested in working capital to total assets and also by calculating current asset ratio. The finding is that most firms monitor working capital investment levels every time (mean score of 5 and mode of 5). These questions also sought to establish whether managers are aware that amount invested in working capital to total assets and current asset ratios are indicators used in monitoring working capital investment levels. From the answers it is clear that the managers are aware of these ratios. This confirm that managers have target working levels.

The question on what the respondents consider as the target current ratio for their company, that is current assets to current liabilities, majority of the respondents (64%) chose a ratio of 2 to1 as the target one (See table 4.1, mode = 3), though two respondents suggested that a ratio of 1:5 to 1 would be target for manufacturing companies. The findings in table 4.2 confirm that the majority of the firms prefer the ratio of 2:1, a mode of 3.

4.6 Section B: Regression Results of Influence of Determinants of Working Capital on Working Capital Investment Levels

This section addresses the third objective. Of the 15 companies in the target population, data for 13 companies was obtained which represents 86.7%. Two (2) companies' data was not available because one company is suspended and the other one's financial statements were not available.

The response variable is working capital investment levels whose proxies are: current ratio and net working capital to total assets, and the predictor variables are cash conversion cycle, operating cash flow, debt ratio, firm size, return on assets, and sales (turnover). The findings are presented below.

4.7 Descriptive Statistics on Working Capital Investment Levels and its Determinants

The Descriptive analysis was done to give overview of data used in this study and is presented in various tables. Table 4.3 shows the descriptive statistics of all the variables analyzed and summary statistics for all companies. For each company 5 year data is used in computing current asset and net working capital ratios as response variables. The six predictor variables used in this study are cash conversion cycle (CCC); return on assets (ROA); debt ratio (Dratio); size (total assets); sales; and cash from operations ratios (CFRatio).

Table 4.3: Descriptive Statistics for All Variables

Variable	N	Mean	StDev	Min	Max	Q1	Q3
CAratio	65	2.241	2.227	0.699	14.231	1.209	2.42
NWCRatio	65	0.194	0.159	-0.137	0.513	0.073	0.291
CCC	65	73.670	75.400	-125.750	229.300	30.200	120.760
ROA	65	0.147	0.114	-0.068	0.592	0.078	0.233
Dratio	65	0.393	0.235	0.026	1.394	0.260	0.474
Size	65	6.297	0.725	4.220	7.427	6.069	6.767
Sales	65	6.542	0.780	4.439	7.771	6.138	7.069
CFRatio	65	0.119	0.110	-0.111	0.449	0.040	0.174

In the table above, N stand for the number of observations, such that 65 observations or 65 data points were used in this study, i.e. 5 years data for each of 13 companies. The average current ratio for all companies is 2.241 to 1, with some firms in some years reporting current ratio as low ratio of 0.699:1 and as high as 14.231. This is an erratic ratio across firms and over years given

its high standard deviation of 2.227. Net working capital on average equal 19.39% of total assets, and is negative in some cases -13.69%, but can be as high as 51.33%, and relatively stable (standard deviation of 0.1593). The average cash collection cycle is 73.670 days in a year, and this works out almost to 2.5 months in a year as the period it takes to convert inventory into cash; but the wide range between minimum value -125.75 days and maximum value of 229.30 days is in line with the high standard deviation of 75.4, suggesting lack of industry effect for this variable. Managers should be aware that shortening the cash conversion cycle could harm the firm's operations and reduces profitability, because a firm could face inventory shortages; when reducing the receivable collection period a firm could lose its good credit customers; and delaying paying customers could harm a firm's credit reputation.

The average return on assets (ROA) is 14.7% and a low standard deviation of 0.114, while a company posted a loss of 6.8% another posted a return of 59.2%. The range between minimum debt ratio (Dratio) of 2.63% and maximum 139.37% is large but the average debt ratio is 39.3%. Total assets and turnover are skewed and it would be less meaningful generating mean and standard deviation, therefore they are converted into log to push them close to normal distribution. The cash flow ratio is cash from operations to total assets, i.e. the rate at which a firm generate cash from assets, and the data show that on average cash from operating activities amount to 11.9 percent of total assets.

4.7.1 Working capital Investment levels (Dependent) Variables analysis

The statistics of two proxies for working capital investment levels, namely current ratio and net working capital ratio are in tables 4.4 and 4.5 below.

4.7.1.1 Current Asset Ratio

In table 4.4 below, company number 11 has highest mean current ratio of 8.75 and also exhibits the highest variation in current ratio (3.95). Such a company ties substantial amount in current assets relative to amount in current liabilities by comparable companies. Company 3 has the lowest mean current ratio of 1.082 over the period and one of the lowest variations in current ratio suggesting that it follows a policy of investing fewer amounts in current asset. Out of the thirteen companies five maintain a current ratio of above 2:1; four maintain a current ratio of 1.5 to 1 and four companies have a current ratio of 1:1 which appear to be a very tight policy.

Table 4.4: Descriptive Statistics Analysis of the Current Asset Ratio

Company	No	Mean	StDev	Min	Max	Q1	Q3	Rank Mean	Rank StDev
1	5	1.146	0.430	0.699	1.691	0.751	1.588	11	3
2	5	2.244	0.300	1.940	2.641	2.009	2.560	4	7
3	5	1.082	0.190	0.842	1.322	0.923	1.271	13	11
4	5	1.333	0.299	1.161	1.660	1.179	1.511	10	10
5	5	1.461	0.266	1.125	1.756	1.192	1.709	9	9
6	5	2.224	0.417	1.723	2.620	1.784	2.602	5	4
7	5	2.285	0.294	1.838	2.544	1.998	2.534	3	8
8	5	1.465	0.447	0.838	2.004	1.046	1.866	8	2
9	5	1.476	0.400	1.085	2.070	1.107	1.828	7	5
10	5	1.137	0.126	0.979	1.307	1.015	1.242	12	12
11	5	8.750	3.950	4.260	14.23	5.020	12.43	1	1
12	5	1.478	0.107	1.336	1.620	1.386	1.578	6	13
13	5	3.057	0.391	2.545	3.459	2.689	3.442	2	6

In the table above and subsequent tables, while financial data was available for thirteen companies, only eleven companies responded to the questionnaire, such that triangulating financial data from annual financial reports and questionnaires is not possible. Triangulation might also not add much value because the managers who earlier set the working capital management practice may not necessarily be the ones who responded to the questionnaire, and that working capital policies are not static. In relation to the problem at hand this ratio tell us that, in contrast to what managers told us above adopt all the three working capital management policies, for example company 11, with a current ratio of 9.58 follow conservative working policy, company 6 with a current ratio of 2.24 seem to follow moderate working capital policy, while company 3, with a current ratio of 1.082 follow aggressive working policy

4.7.1.2 Net Working Capital Ratio

The net working capital ratio compares the amount of net working capital (current assets less current liabilities) to total assets of a firm. From the analysis in table 4.5 below, only one company has almost 50% of its total assets as net working capital. This is a case of heavy investment in current assets. More than half of the companies have 20% of their current assets in terms of net working capital. At one point or another 3 companies underinvested in working capital i.e. the current assets were less than current liabilities; such companies have problems in their working capital investment levels and are exposing themselves to financial distress.

However in terms of amount held as net working capital as a percentage of total assets the low standard deviation (less than 1) show consistency and imply existence of target level for this ratio.

Table 4.5: Descriptive statistics Analysis of the Net Working Capital Ratio

Company	No	Mean	StDev	Min	Max	Q1	Q3	Rank Mean	Rank StDev
1	5	0.027	0.141	-0.137	0.189	-0.109	0.169	12	1
2	5	0.281	0.026	0.237	0.303	0.261	0.299	4	13
3	5	0.018	0.040	-0.034	0.062	-0.017	0.058	13	11
4	5	0.124	0.078	0.067	0.258	0.073	0.193	8	5
5	5	0.248	0.135	0.081	0.431	0.119	0.367	5	2
6	5	0.204	0.039	0.162	0.244	0.162	0.238	7	12
7	5	0.403	0.051	0.314	0.441	0.362	0.437	2	6
8	5	0.078	0.081	-0.050	0.149	0.001	0.145	9	4
9	5	0.068	0.049	0.018	0.135	0.019	0.112	10	8
10	5	0.055	0.050	-0.009	0.119	0.007	0.101	11	7
11	5	0.309	0.124	0.206	0.465	0.208	0.442	3	3
12	5	0.230	0.040	0.178	0.287	0.197	0.266	6	9
13	5	0.475	0.040	0.408	0.513	0.444	0.501	1	10

In tables 4.4 and 4.5, the standard deviation trace the changes in the working capital Investment levels over five years for each individual company and tells us how erratic or stable the current ratio for each individual company is over the period of study.

Given that current asset ratio (CAratio) and net working capital ratio (NWCRatio) are used as indicators of working capital investment levels, it is important determining whether they tell the same story. To establish this it is necessary calculating the correlation between the two variables, namely current asset ratio and net working capital ratio. The correlation is a measure of the degree of linear relationship between two variables. The correlation coefficient measures a value between -1 to +1. If one variable tends to increase as the other decreases the correlation coefficient is negative. Conversely if the two variables tend to increase together the correlation coefficient is positive. In this case, the correlation between ratio and net working capital ratio is 0.48, i.e. positive. The p-value of the hypothesis test is 0.000 and since this is smaller than 0.01 (cut off) there is sufficient evidence that the correlation is not zero and that there is commonness between the two ratios. However the commonness is be below 50 percent.

4.7.2 Analysis of the Predictor Variables of Working capital Investment levels

The six predictor variables used in this study are cash conversion cycle (CCC); return on assets (ROA); debt ratio (Dratio); size (total assets); sales; and cash from operations ratios (CFRatio). These variables are summarized on table 4.6 to 4.11.

4.7.2.1 Cash Conversion Cycle (CCC)

This is the number of days between disbursing cash and collecting cash in connection with a firm undertaking discrete unit of operations. In summary it is inventory conversion period plus (+) receivables conversion period minus (-) payables conversion period. It is about the average period that cash is tied in working capital and that the longer the cycle the higher the working capital level (Morgut, Feunzelida, Cubullas and Soenen (1988).

Table 4.6: Cash Conversion Cycle Summary Descriptive Statistics per Company

Company	N	Mean	StDev	Min	Max	Q1	Q3
1	5	-43.5	18.32	-63.8	-13.7	-56.0	-28.8
2	5	-41.9	65.2	-126.0	49.0	-101.0	15.5
3	5	92.6	16.9	76.7	115.9	77.2	109.6
4	5	148.7	41.9	88.2	189.6	110.8	188.2
5	5	142.6	21.4	119.2	169.0	120.8	161.8
6	5	62.6	33.6	17.5	98.1	30	94.6
7	5	64.3	8.53	54.4	76.4	57.4	72.7
8	5	59.4	52.1	16.2	147.9	23.7	104.8
9	5	34.6	17.8	24.5	66.3	25.2	47.7
10	5	39.4	19.6	16.1	69.7	24.5	56.7
11	5	78.9	31.7	40.8	125.5	51.7	107.7
12	5	104.6	23.6	82.5	143.8	87.1	125.2
13	5	215.4	12.5	200.9	229.3	202.4	226.9
<i>Average</i>		<i>73.7</i>	<i>27.94</i>				

An analysis of the different components for CCC is done and presented in Appendix IV. The industry average for accounts payable is 96.89 days yet a company takes as long as 169.65 days on average to meet its short term obligations (See Appendix IV, table 1). This implies that the sampled manufacturing and construction companies receive credit for three months (90 days) on average. The standard deviation of accounts payable (21.77) suggest large variations in account payables days amongst the sampled companies. The longer the accounts payable days the lesser the amount tied in working capital.

The other component of CCC is account receivable days (Appendix IV, table 2). It tells us how long it takes to collect cash from our customers. A too long accounts receivable days point to substantial investment in accounts receivables, the possibility of some accounts becoming uncollectible and higher Working capital investment levels. The average collection period for the sampled firms is 69 days which translates to around two months. If you compare this period to that of accounts payable we see that these firms while following a tight credit policy, overstretch their suppliers. Only one firm extends credit for not more than one month. The majority seem to be extending credit for more than two months.

Inventory days is the other variable that is used in calculating CCC whose statistics are in Appendix IV, table 3. Given that inventory days are the period it takes before inventory is dispatched to customers, longer inventory period ties up money in working capital. The average inventory period is 101 days which appear to be too long given that most successful firms operate just in time inventory systems.

4.7.2.2 Return on Assets (ROA)

The statistics in this ratio are in table 4.7. This is one ratio that shows industry effect in the sense that variations in this ratio (as measured by standard deviation of 0.063562) are low. The industry mean ROA is 14.71%.

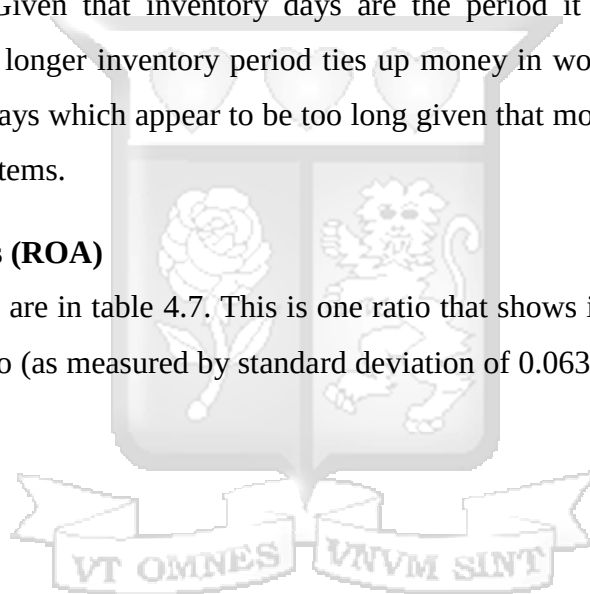


Table 4.7: Descriptive Statistics Return on Assets (ROA)

Company	N	Mean	StDev	Min	Max	Q1	Q3
1	5	0.301	0.049	0.244	0.363	0.252	0.344
2	5	0.095	0.031	0.041	0.117	0.068	0.117
3	5	0.096	0.032	0.080	0.153	0.080	0.118
4	5	0.143	0.070	0.067	0.255	0.091	0.204
5	5	0.171	0.236	0.043	0.592	0.052	0.341
6	5	0.226	0.052	0.173	0.299	0.176	0.274
7	5	0.080	0.022	0.054	0.113	0.062	0.098
8	5	0.059	0.077	0.068	0.140	0.001	0.110
9	5	0.046	0.107	0.040	0.233	0.020	0.127
10	5	0.290	0.072	0.211	0.387	0.230	0.363
11	5	0.225	0.033	0.188	0.261	0.191	0.254
12	5	0.099	0.023	0.063	0.125	0.081	0.116
13	5	0.082	0.024	0.041	0.100	0.062	0.099
<i>Average</i>		<i>0.147</i>	<i>0.064</i>				

4.7.2.3 Debt Ratio

The debt capital ratio used in the study is total borrowings divided by total assets. The statistics for this ratio are in table 4.8. The mean of debt ratio is 39.31%. Some companies, e.g. company number 5 are heavily relying on borrowed funds.

Table 4.8: Descriptive Statistics on Debt Capital Ratio (DRatio)

Company	N	Mean	StDev	Min	Max	Q1	Q3
1	5	0.508	0.257	0.273	0.793	0.289	0.786
2	5	0.233	0.038	0.185	0.266	0.192	0.265
3	5	0.585	0.055	0.513	0.652	0.531	0.632
4	5	0.448	0.041	0.399	0.512	0.416	0.481
5	5	0.908	0.344	0.548	1.394	0.580	1.223
6	5	0.214	0.068	0.161	0.314	0.161	0.285
7	5	0.326	0.058	0.266	0.399	0.275	0.387
8	5	0.327	0.063	0.244	0.420	0.280	0.375
9	5	0.383	0.021	0.352	0.405	0.361	0.401
10	5	0.411	0.035	0.369	0.459	0.379	0.443
11	5	0.045	0.019	0.026	0.075	0.029	0.061
12	5	0.486	0.029	0.458	0.529	0.461	0.513
13	5	0.238	0.037	0.196	0.281	0.200	0.273
<i>Average</i>		<i>0.393</i>	<i>0.082</i>				

4.7.2.4 Firm Size

The summary statistics for predictor variables size transformed into log are in table 4.9 below:

Table 4.9: Descriptive statistics on Firm Size (Log of Total Assets)

Company	N	Mean	StDev	Min	Max	Q1	Q3
1	5	7.20	0.25	6.93	7.43	6.93	7.40
2	5	6.16	0.05	6.12	6.19	6.14	6.18
3	5	6.65	0.20	6.33	6.85	6.47	6.81
4	5	6.31	0.13	6.14	6.47	6.18	6.41
5	5	5.55	0.07	5.45	5.61	5.50	5.60
6	5	4.35	0.10	4.22	4.49	4.27	4.44
7	5	6.57	0.06	6.50	6.65	6.51	6.63
8	5	7.11	0.08	7.00	7.20	7.02	7.18
9	5	6.77	0.06	6.68	6.85	6.72	6.82
10	5	6.75	0.08	6.67	6.85	6.68	6.83
11	5	6.12	0.08	6.01	6.22	6.05	6.19
12	5	5.98	0.07	5.91	6.07	5.92	6.05
13	5	6.35	0.02	6.33	6.37	6.33	6.36
<i>Average</i>		<i>6.30</i>	<i>0.09</i>				

4.7.2.5 Sales

In table 4.10 is a summary of statistics of sales expressed in log form.

Table 4.10: Descriptive Statistics on Sales (Log of Sales)

Company	N	Mean	StDev	Min	Max	Q1	Q3
1	5	7.658	0.100	7.537	7.771	7.562	7.758
2	5	6.095	0.022	6.063	6.112	6.072	6.111
3	5	6.824	0.160	6.665	7.057	6.688	6.985
4	5	6.586	0.092	6.449	6.697	6.503	6.665
5	5	6.191	0.050	6.138	6.249	6.138	6.233
6	5	4.499	0.062	4.439	4.574	4.444	4.564
7	5	7.130	0.069	7.062	7.204	7.064	7.201
8	5	7.147	0.066	7.072	7.199	7.075	7.196
9	5	6.958	0.038	6.909	7.007	6.922	6.991
10	5	7.156	0.135	7.012	7.304	7.029	7.296
11	5	5.770	0.135	5.588	5.965	5.665	5.879
12	5	6.501	0.115	6.378	6.647	6.392	6.616
13	5	6.537	0.045	6.481	6.598	6.498	6.582
<i>Average</i>		<i>6.542</i>	<i>0.084</i>				

4.7.2.6 Cash from Operations Ratio

In table 4.11 below are the ratios of cash from operations to total assets. On average cash flows are 11.9% of total assets. This ratio compared to others appear to be relatively stable, standard deviation is low.

Table 4.11: Descriptive statistics on Cash from Operations Ratio

Company	N	Mean	StDev	Min	Max	Q1	Q3
1	5	0.209	0.066	0.117	0.269	0.140	0.260
2	5	0.112	0.072	0.010	0.175	0.056	0.160
3	5	0.052	0.030	0.015	0.099	0.030	0.076
4	5	0.136	0.109	0.060	0.326	0.070	0.224
5	5	0.053	0.227	.109	0.449	0.085	0.240
6	5	0.204	0.062	0.147	0.279	0.154	0.271
7	5	0.045	0.053	0.024	0.103	0.001	0.098
8	5	0.092	0.021	0.078	0.130	0.081	0.107
9	5	0.036	0.041	0.013	0.098	0.003	0.071
10	5	0.235	0.065	0.150	0.312	0.174	0.297
11	5	0.206	0.063	0.119	0.284	0.144	0.258
12	5	0.131	0.143	0.111	0.273	0.018	0.223
13	5	0.042	0.049	0.025	0.112	0.005	0.083
<i>Average</i>		<i>0.119</i>	<i>0.077</i>				

4.8 Modelling working capital investment levels

To address the third objective, which is to analyze the extent to which the determinants of working capital impact working capital investment levels, regression analysis is used to model the relationship between working capital investment levels (indicated by current asset ratio or net working capital ratio) and the determinants.

The first stage of analysis involved using one predictor variables to test the relationship between working capital investment level and its determinants. A simple regression analysis is employed.

4.8.1 Simple Linear Regression Analysis

Under a simple regression there is only one predictor variable, regressions 1 to 2 and then 4 to 14 are simple regression outputs.

Regression 1: Relationship between Current Asset Ratio and Cash Conversion Cycle (CARatio vs CCC)

The first regression is on hypothesis: Cash conversion cycle (CCC) has a significant positive influence on the firm's working capital investment levels (current asset ratio). The regression equation is:

$$\text{CARatio} = 2.03 + 0.00289 \text{ CCC}$$

Predictor	Coef	SE Coef	T	P
Constant	2.02870	0.3888	5.22	0.000
CCC	0.00289	0.0037	0.78	0.439
S = 2.234 R-Sq = 1.0% R-Sq (adj) = 0.0%				

This regression (regression 1) has the current asset ratio (CARatio) as the response variable and Cash Conversion Cycle (CCC) as the predictor variable and the output indicates a positive CCC (0.00289), the implication is that as CCC increases the current asset ratio increase, however the coefficient is not statistically significant given its t value of 0.78 and a p-value of 0.439 (sig. = 0.439). The p-value is actually more than the cut off 0.05, and the conclusion is that there is sufficient evidence that the coefficient is zero and therefore contains no information. The R-square which is the proportion of variability in current ratio accounted for by variation in CCC is 1% and is low, implying that CCC on its own do not explain variations in current ratio. At this point, such a finding is inconsistent with that of Lazaridis and Tryfonidis (2006) who found that this variable influence working capital investment levels. It also contradicts Lambrix and Singhvi (1979) who suggested that investment in working capital could be optimized by CCC.

Regression 2: Relationship between Net Working Capital Ratio and CCC (NWCRatio vs CCC)

The second regression below test the hypothesis that cash conversion cycle (CCC) has a significant positive influence on the firm's working capital investment levels (net working capital ratio), i.e. net working capital to total assets as the response variable (as an indicator of level of working capital).

The regression equation is: $NWCRatio = 0.138 + 0.000761 CCC$

Predictor	Coef	SE Coef	T	P
Constant	0.13791	0.02607	5.29	0.000
CCC	0.00076	0.00025	3.06	0.003
S = 0.1498 R-Sq = 13.0% R-Sq (adj) = 11.6%				

It is possible that managers set their working capital investment level relative to investments in fixed (long) assets. This explains why the CCC coefficient in the equation of 0.00076 is statistically significant ($t=3.06$ $p=0.003$ and R-sq. of 13.0%). A low r-square indicate that independent variables explains none of the variation in independent variable. The implication is that CCC on its own does explain variations in net working capital ratio. At this point, such a finding is consistent with that of Lazaridis and Tryfonidis (2006) who found that this variable influence working capital investment levels. The puzzle is why CCC is related to net working capital ratio, and not current ratio.

Regression 3: Relationship between Current Asset Ratio (CAratio) and Return on Assets (ROA)

The third regression test the hypothesis that return on assets (ROA) has a significant positive influence on the firm's working capital investment levels (current ratio).

The regression equation is: $CAratio = 1.94 + 2.04 ROA$

Predictor	Coef	SE Coef	T	P
Constant	1.941	0.455	4.27	0.000
ROA	2.042	2.455	0.83	0.409
S = 2.232 R-Sq = 1.1% R-Sq (adj) = 0.0%				

From the results, ROA with a coefficient of 2.042, suggesting that as ROA increases the current asset ratio too increases, however, the t-value of 0.83 and a p-value of 0.409 shows that the variable is not statistically significant and therefore has no predictive power. Again this finding contradicts Nazir and Afza (2009) and Abbadi and Abbadi (2013) who found out that ROA impact on working capital investment levels.

Regression 4: Relationship between Net Working Capital Ratio (NWC ratio) and ROA

The fourth regression test the hypothesis that return on assets (ROA) has a significant positive influence on the firm's working capital investment levels (net working capital ratio) i.e. Return on assets (ROA) is used to predict net working capital ratio (NWCRatio) .

The regression equation is: $NWCRatio = 0.223 - 0.199 ROA$

Predictor	Coef	SE Coef	T	P
Constant	0.2232	0.0324	6.89	0.000
ROA	-0.1986	0.1748	-1.14	0.260

$S = 0.1589$ $R-Sq = 2.0\%$ $R-Sq(adj) = 0.5\%$

The results show that as ROA increases (coefficient -0.1986) the Current asset ratio decreases, but t-value of -1.14 and a p- value of 0.260 shows that this variable on its own has no predictive power; and the hypothesis of ROA effect on Current asset ratio is rejected. The results are same as preceeding findings,

Regression 5: Relationship between Current Asset Ratio (CAratio) vs Debt ratio (Dratio)

The fifth regression test if debt capital has a significant positive influence on the firm's working capital investment levels (Current Asset Ratio).

The regression equation is: $CAratio = 4.17 - 4.90 Dratio$

Predictor	Coef	SE Coef	T	P
Constant	4.169	0.468	8.91	0.000
Dratio	-4.903	1.024	-4.79	0.000

$S = 1.922$ $R-Sq = 26.7\%$ $R-Sq (adj) = 25.5\%$

The results show that debt ratio on its own predict changes in Current asset ratio, and is confirmed by t-value of -4.79 and p value 0.00. The negative coefficient of debt ratio (-4.90) indicate that as more debt is used in financing assets the working capital investment level indicated by Current asset ratio declined. This finding is consistent with Chiou and Cheng (2006) who also report an inverse relationship between capital structure and working capital ratio. Abbadi and Abbadi (2013) concluded that leverage of the firms is significantly and negatively correlated to the working capital management and working capital investment levels.

Regression 6: Relationship between Net Working Capital Ratio (NWCRatio) and Debt ratio (Dratio)

The sixth regression test if debt capital has a significant positive influence on the firm's working capital investment levels (net working capital ratio)

The regression equation is: $NWCRatio = 0.296 - 0.260 \text{ Dratio}$

Predictor	Coef	SE Coef	T	P
Constant	0.2961	0.0361	8.20	0.000
Dratio	-0.2598	0.0790	-3.29	0.002

$S = 0.1483$ $R\text{-Sq} = 14.6\%$ $R\text{-Sq (adj)} = 13.3\%$

The results show that debt ratio explain variations in working capital investment levels decreases, t- value of -3.29 and p-value of 0.002 confirms the statistical significance of this variable in explaining variations in net working capital ratio. The results are same as proceeding findings,

Regression 7: Relationship between Current Asset Ratio (CAratio) and Size

The seventh regression test size has a significant positive influence on the firm's working capital investment levels (current asset ratio)

The regression equation is: $CAratio = 5.32 - 0.489 \text{ Size}$

Predictor	Coef	SE Coef	T	P
Constant	5.321	2.420	2.20	0.032
Size	-0.489	0.382	-1.28	0.205

$S = 2.216$ $R\text{-Sq} = 2.5\%$ $R\text{-Sq (adj)} = 1.0\%$

The output of the regression used log of total assets as a predictor variable and though the coefficient for size [-0.489] indicates that the Current asset ratio of large firms lead Current asset ratio to be lower, the coefficient is not statistically significant [p-value=0.205]. Again these findings contradict Mongrut, *et al* (2010), found that the size an important variable in formulating a working capital policy, and Shin and Soenen (1998) found a positive relationship between working capital investment levels and firm size.

Regression 8: Relationship between Net Working Capital Ratio and Size

The eighth regression test if size has a significant positive influence on the firm's working capital investment levels (net working capital ratio)

The regression equation is: $NWCRatio = 0.603 - 0.0650 \text{ Size}$

Predictor	Coef	SE Coef	T	P
Constant	0.6035	0.1675	3.60	0.001
Size	-0.0650	0.0264	-2.46	0.017

S = 0.1534 R-Sq = 8.8% R-Sq(adj) = 7.3%

The coefficient of the variable size is -0.06504 and statistically significant suggesting that large firm exhibit low net working capital ratio, i.e. invest less in working capital. The results are same as proceeding findings,

Regression 9: Relationship between Current Asset Ratio (CAratio) and Sales

The ninth regression test if size sales has a significant positive influence on the firm's working capital investment levels (current asset ratio)

The regression equation is: $CAratio = 9.06 - 1.04 \text{ Sales}$

Predictor	Coef	SE Coef	T	P
Constant	9.057	2.208	4.10	0.000
Sales	-1.042	0.335	-3.11	0.003

S = 2.090 R-Sq = 13.3% R-Sq (adj) = 11.9%

The response variables is current asset ratio and predictor variable is log of sales; and the results show that as sales increases the Current asset ratio decreases [coefficient-1.04,t-3.11,p-value0.003] and is statistically significant. This is in line with Hill, Kelly, and Highfield (2010) findings that working capital ratio is negatively related to the rate of growth in sales and unexpected demand for a firm's product and services. However, contradicts Chiou and Cheng (2006) find no effect of sales growth on working capital.

Regression 10: Relationship between Net Working Capital Ratio (NWCRatio) and Sales

The tenth regression test if sales has a significant positive influence on the firm's working capital investment levels (net working capital ratio)

The regression equation is: $NWC\text{Ratio} = 0.611 - 0.0637 \text{ Sales}$

Predictor	Coef	SE Coef	T	P
Constant	0.611	0.161	3.79	0.000
Sales	-0.064	0.025	-2.61	0.011

$S = 0.1525$ $R\text{-Sq} = 9.7\%$ $R\text{-Sq}(\text{adj}) = 8.3\%$

The results indicate that as sales increases the net working capital ratio decline [coefficient-0.064, $t = -2.6$, $p\text{-value} 0.011$]. This is in line with Hill, Kelly, and Highfield (2010) findings that working capital ratio is negatively related to the rate of growth in sales and unexpected demand for a firm's product and services. However, contradicts Chiou and Cheng (2006) find no effect of sales growth on working capital.

Regression 11: Relationship between CAratio and Cash from operations Ratio (CFRatio)

The eleventh regression test if cash from operations ratio has no significant positive influence on the firm's working capital investment levels (current assets ratio)

The regression equation is: $CA\text{ratio} = 1.99 + 2.14 \text{ CFRatio}$

Predictor	Coef	SE Coef	T	P
Constant	1.986	0.410	4.85	0.000
CFRatio	2.138	2.530	0.85	0.401

$S = 2.232$ $R\text{-Sq} = 1.1\%$ $R\text{-Sq}(\text{adj}) = 0.0\%$

The results show that ($t = 0.85$, and $p\text{ value} = 0.401$) one cannot use cash from operations ratio to predict Current Asset Ratio. The findings contradict Ranjith's (2008) who found that operating cash flow have impact on working capital investment levels; and also contradict Hill, Kelly, and Highfield (2010), who report a significant positive relationship between working capital ratio and operating cash flows.

Regression 12: Relationship between Net Working Capital Ratio and Cash from Operations (NWCRatio versus CFRatio)

The twelfth regression test if cash from operations ratio has no significant positive influence on the firm's working capital investment levels (net working capital ratio)

The regression equation is: $NWCRatio = 0.209 - 0.127 CFRatio$

Predictor	Coef	SE Coef	T	P
Constant	0.2091	0.0294	7.12	0.000
CFRatio	-0.1270	0.1813	-0.70	0.486

$S = 0.1599$ $R\text{-Sq} = 0.8\%$ $R\text{-Sq}(\text{adj}) = 0.0\%$

The result is that cash flow from operations on its own does not explain variations in Current asset ratio ($t = -0.70$, $p=0.486$). Again the findings contradict Ranjith's (2008) who found that operating cash flow have impact on working capital investment levels; and also contradict Hill, Kelly, and Highfield (2010), who report a significant positive relationship between working capital ratio and operating cash flows.

4.8.2 Modelling working capital investment level using all the determinants

The analysis above focused on one independent variable at a time in order to establish if a variable on its own (e.g. size) predict changes in working capital investment level (current ratio or net working capital ratio) i.e. bivariate regression is used. In the next section, multiple regressions are used to examine how all the variables act together to affect the working capital investment levels (current assets or net working capital). The results are in regressions 13 and 14. The idea in regression 13 and 14 is to establish the net strength of a particular independent variable e.g. debt ratio to the dependent variable above and beyond relationships of other independent variables i.e. each coefficient is interpreted as the predicted change in the value of dependent variable (current ratio) for a one unit change in the independent variable after accounting for effects of other independent variables.

Regression 13: Relationship between CAratio and CCC, CFRatio, ROA, Dratio, Size and Sales

The regression below examines how all the variables together impact the working capital investment levels (current assets ratio).

The regression equation is:

$$\text{CAratio} = 4.79 + 0.0062 \text{ CCC} - 2.11 \text{ CFRatio} + 5.49 \text{ ROA} - 3.18 \text{ Dratio} + 3.01 \text{ Size} - 3.25 \text{ Sales}$$

Predictor	Coef	SE Coef	T	P
Constant	4.791	2.158	2.22	0.030
CCC	0.006	0.003	1.97	0.054
CFRatio	-2.107	2.450	-0.86	0.393
ROA	5.486	2.290	2.40	0.020
Dratio	-3.176	1.387	-2.29	0.026
Size	3.009	1.078	2.79	0.007
Sales	-3.249	1.037	-3.13	0.003

S = 1.703 R-Sq = 47.0% R-Sq(adj) = 41.5%

Analysis of Variance (ANOVA)

Source	DF	SS	MS	F	P
Regression	6	149.182	24.864	8.58	0.000
Residual Error	58	168.126	2.999		
Total	64	317.308			

Source	DF	Seq SS
CCC	1	3.031
CFRatio	1	6.372
ROA	1	2.077
Dratio	1	107.719
Size	1	1.526
Sales	1	28.459

In regression 13 four questions are addressed. First do these predictor variables (CCC, ROA etc) together predict the values of current ratio (working capital investment level)? What is the nature of the relationships? Are the relationships statistically significant? And how powerful is the model in explaining the variations in working capital investment levels in the sampled firms.

To answer these questions we look at analysis of variance (ANOVA) table. The F-value is 8.58 while the p-value is 0.000, therefore the model is highly significant and we conclude that the six (6) independent variables together predict changes in working capital investment levels. The next question is whether they uniquely predict the relationships in the direction that was hypothesized; and this require that we examine the coefficients table.

Regression 13 addresses the specific hypothesis when the response variable is current ratio. Hypothesis 1 stated that *Cash Conversion Cycle (CCC) has a significant positive influence on the firm's working capital investment levels*. This hypothesis is marginally supported. The CCC regression coefficient is positive (0.00618) indicating that the longer the CCC the higher the current ratio. The relationship is statistically significant. However the coefficient is larger than it was in bivarait regression model (0.00289) because multiple variable document the unique effect of CCC after accounting for other variables in the model.

Hypothesis 2: *operating cash flow ratio (CFRatio) has a significant negative influence on the firm's working capital investment levels*. Although the regression coefficient is negative (-2.107), the relationship is not statistically significant (0.393). There is a lack of support for the thesis that cash rich firm invest less in working capital.

Hypothesis 3 predicts *return on assets (ROA) has a significant positive influence on the firm's working capital investment levels*. Return on assets (ROA) has a significant positive influence on a firms working capital investment level (current ratio) because the regression coefficient of ROA is positive (+5.486) and the relationship is statistically significant, t- value =2.40, and p value =0.020). We find support that profitable firm invest in working capital, the conclusion is that the higher the ROA the higher the working capital investment level.

Hypothesis 4 posits that *sales or sales growth has a significant positive influence on the firm's working capital investment levels*. The negative coefficient (-3.25) for sales show a relationship opposite to the one predicted but it is statistically significant (sig=0.003). This indicates that as sales increase the working capital investment levels decrease.

Hypothesis 5 state that *firm size has a significant positive influence on the firm's working capital investment levels*. The coefficient for size is positive (+3.01) and the relationship is statistically significant (sig=0.003) and the hypothesis is supported.

Hypothesis 6 states *Debt capital has a significant positive influence on the firm's working capital investment levels*. The coefficient for debt ratio is negative (-3.18) and statistically significant (sig=0.026). Suggesting that firm that borrow exhibit lower current ratio.

This model suggests that CCC and CFRatio are not important in determining work capital levels.

The adjusted r squares is used to determine how good the model is in regression 14, the r square is 41.5% indicating that the variation in current ratio is attributed to debt capital in their capital structure follow a restrictive policy in their working capital management. Overall the model has information that could support decision making.

Regression 14: Relationship between NWCRatio and CCC, CFRatio, ROA, Dratio, Size and Sales

The regression below examines how all the variables together impact the working capital investment levels (net working capital ratio assets ratio).

The regression equation is:

$$\text{NWCRatio} = 0.597 + 0.000713 \text{ CCC} + 0.158 \text{ ROA} - 0.507 \text{ Dratio} - 0.234 \text{ Size} + 0.189 \text{ Sales} - 0.347 \text{ CFRatio}$$

Predictor	Coef	SE Coef	T	P
Constant	0.5966	0.1588	3.76	0.000
CCC	0.0007	0.0002	3.08	0.003
ROA	0.1578	0.1685	0.94	0.353
Dratio	-0.5066	0.1021	-4.96	0.000
Size	-0.2341	0.0793	-2.95	0.005
Sales	0.1889	0.0763	2.48	0.016
CFRatio	-0.3469	0.1802	-1.92	0.059

S = 0.1253 R-Sq = 44.0% R-Sq (adj) = 38.2%

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	6	0.71391	0.11899	7.58	0.000
Residual Error	58	0.91015	0.01569		
Total	64	1.62407			

Source	DF	Seq SS
CCC	1	0.21048
ROA	1	0.00533
Dratio	1	0.31063
Size	1	0.05632
Sales	1	0.07300
CFRatio	1	0.05815

Regression 14 addresses specific hypothesis, when the response variable is net working capital ratio.

Hypothesis 1 stated that *Cash Conversion Cycle (CCC) has a significant positive influence on the firm's working capital investment levels*. This hypothesis is supported. The CCC regression coefficient is positive (+0.000713), the t-value =3.08 and p =0.003 value indicating that the longer the CCC the higher the net working capital ratio.

Hypothesis 2 *operating cash flow ratio (CFRatio) has a significant negative influence on the firm's working capital investment levels*. Although the regression coefficient is negative (-0.347), the relationship is not statistically significant (t value = -1.92, p value= 0.059). There is a lack of support for the theses that cash rich firm invest less in working capital.

Hypothesis 3 predicts *return on assets (ROA) has a significant positive influence on the firm's working capital investment levels*. Return on assets (ROA) does not have significant positive influence on a firms working capital investment level (current ratio) though the regression coefficient of ROA is positive (+0.1578) and the relationship is statistically insignificant, (t- value =0.94, and p value =0.353). We find no support that the higher the ROA the higher the working capital investment level.

Hypothesis 4 posits that *sales or sales growth has a significant positive influence on the firm's working capital investment levels*. The positive coefficient (0.18898) for sales support the hypothesized relationship is statistically significant (t- value =2.48, and p value =0.016). This indicates that as sales increase the working capital investment levels decrease.

Hypothesis 5 state that *firm size has a significant positive influence on the firm's working capital investment levels*. The coefficient for size is negative (-0.23412) and the relationship is statistically significant (t- value =-2.95, and p value =0.005) and the hypothesis is not supported.

Hypothesis 6 states *Debt capital has a significant positive influence on the firm's working capital investment levels*. The coefficient for debt ratio is negative (-0.5066) and statistically significant (t- value = -4.96, and p value =0.000). Suggesting that firm can borrow exhibit lower current ratio.

The adjusted r squares is used to determine how good the model is in regression 16, the r square is 38.2 % indicating that the variation in current ratio is attributed to debt capital in their capital structure follow a restrictive policy in their working capital management. Overall the model has information that could support decision making.

The findings do not agree with Soenen (1993) who found out that CCC is the most popular measure of working capital investment levels. It also conflicts with Lambrix and Singhvi (1979) findings that suggest that working capital can be optimized by reducing cash flow cycle. However when looked along with other variables CCC tend to explain variations in working capital investment levels. On other hand when net working capital is used as indicator of working capital investment level then CCC is a useful predictor and the finding is in line with those of Mongrut el al (2010) and Lambrix and Singhvi (1979) .

The findings also reflect that operating cash flows do not have impact on working capital as opposed to findings by Ranjith (2008) and Hill Kelly and Highfield who found a significant positive relationship between working capital ratio and operating cash flows.

As far as size is concerned the sign of coefficient depend on the response variable employed. When current ratio is used the coefficient is positive but changes to negative when net working capital is used. This is puzzling. The negative coefficient is as predicted by Moussani; Laplante and Kieschnick that large firms tend to invest less in working capital while the positive coefficient is as in Shin and Soenen (1998) who found a positive relationship between working capital investment levels and size of the firm. However Chiou and Cheng (2006) find no effect of firm size on working capital.

Debt capital is a factor in managing working capital and this is in line with Chiou and Cheng [2006] and who report an inverse relationship between capital structure and working capital ratio. In the literature it suggested that working capital is varied to sales and this study support Hill, Kelly and Highfield [2010] finding that working capital ratio is negatively related to growth in sales. It conflicts with Wunn (1981) finding that additional working capital is required to support increased sales.

The findings indicate that when Current Asset ratio is used as a proxy of working capital investment level and Return on Asset is looked along other variables, it has a significant positive influence. This is in line with Nazir and Afza (2009) and Abbadi and Abbadi (2013). On the contrary when it is looked against net working capital ratio it has a negative effect.

When the multiple regression is run with Current asset ratio as the proxy, Sales (turnover) is a predictor of working capital investment level. This is consistent with García-Teruel, Solano and Caballero (2009) who found out that as sales in firms increase investment in working capital increase. The hypothesis of sales having a positive influence on working capital investment level is however not supported when working capital ratio is used in line with a recent study by Hill, Kelly, and Highfield (2010) that working capital ratio is found to be negatively related to the rate of growth in sales and unexpected demand for a firm's product and services. Same finding was given by Chiou and Cheng (2006).

4.9 Summary of Findings

The findings are presented at three levels: as under managers' opinion on elements of working capital policy and the determinants of working capital investment levels; managers opinion on target working capital investment level; and on the influence of determinants of working capital investment level.

It appears that given a chance, most of the managers would ignore an aggressive working capital policy, but choose between conservative working capital policy and moderate working capital policy. However what the managers choose is not in tandem with what the data analyzed tell us, which is that some companies, e.g. company 3 referred to above exhibit a current ratio of 1.082 thus follow aggressive working capital policy.

The managers rank highly working capital management function. This is confirmed by manager's assertion that they monitor working capital investment levels on a daily basis and that the working

capital function is under the docket of one of the most senior officers, namely, Finance Manager. That working capital is monitored on a daily basis confirms that working capital is very critical for the business.

The managers agree that their firms have a target working capital ratio and that they use both current ratio and net working capital to total assets ratio as indicators of working capital investment levels. The majority of the firms prefer the widely accepted current ratio of 2:1.

It is the managers' opinion that operating cash flow, sales, cash conversion cycle, debt ratio and return on assets are critical to determination of working capital investment levels, but the size of the firm, though important is lowly rated as a factor by managers. However, there is conflict between managers emphasis on determinants.

In terms of data analysis, the results show that the standard deviations of both current asset ratio and net working capital ratio vary widely across the firms sampled and over time. This could indicate absence of industry factor among the firms sampled or that firm change their working capital policy over time. Otherwise, this contradicts the apparent suggestion by managers that their firms have a target current ratio.

On interrogation of working capital determinants, the regression analysis using one predictor variable confirm that, cash conversation cycle, return on assets and size do not individually explain variations in current asset ratio [working capital investment levels]. However debt capital ratio and sales explain variations in current asset ratio. When net working capital is used as a proxy of working capital and a simple regression is run, cash conversion cycle, debt capital ratio, size and sales individually explains variations in this ratio. However cash from operations and returns from assets do not explain variations in working capital investment levels. When multiple regressions is run a higher percentage of variations in working capital investment levels are explained by the variables used in this study and conclude that the model as a whole predicts working capital investment levels [see regressions13 and 14].

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMENDATIONS

5.1 Introduction

The purpose of this chapter is to summarize the findings of the study and finally give conclusions and recommendations for improvement or practice. The study identified three objectives, namely, to investigate the managers' perceptions on the determinants of Working capital investment levels in the manufacturing and construction firms listed at NSE; to establish the opinion target working capital investment level for manufacturing and construction firms listed at NSE; to interrogate, empirically, the influence of determinants of working capital on working capital Investment levels in the manufacturing and construction firms listed at NSE.

This study emphasis is on the importance of six variables namely cash conversion, operating cash flow, debt ratio, firm size, return on assets and sales in determining the working capital investment levels for firms listed at NSE. It also looked at manager's perception on working capital investment levels, specifically the indicators of working capital investment levels and their determinants.

5.2 Summary

The managers prefer conservative working capital policy or moderate working capital policy to aggressive working capital policy; they monitor working capital investment levels on a daily basis; use current ratios and net working capital to total assets as indicators of capital; suggest a target current ratio of 2:1. It is the managers' opinion that the six variables, cash conversion, operating cash flow, debt ratio, firm size, return on assets and sales are factors to consider in setting working capital investment levels. However size is a lowly ranked determinant.

In relation to the third objective, this study established that the variables taken together largely explain variation in working capital investment levels, regardless of the indicator used. But this is not the case when each determinant is individually used to predict working capital investment level. It emerged that the average current ratio for the firms sampled is 2.24 but a high standard deviation current ratio of 2.23 suggest that the firms though in the same industries set different working capital investment level. The average net working capital ratio for the industry is 0.19 i.e. 19% of total assets are in the form of net working capital. A current ratio of 2.23 to 1 is close to

the widely accepted and finance books ratio of 2:1 suggested that managers could belong to the same school of thought. However, the data confirms that managers do not regularly attain the ratio they desire, and this could be due to failure to identify a correct model for working capital.

Firms with substantial debt capital in their capital structure follow a restrictive policy in their working capital management. Managers when monitoring current ratio consider the return on assets but they do not look at this ratio in determining net working capital ratio. Sales is a factor that propels working capital investment levels. However, managers as far as the evidence (from the financial data) in this study confirm, set current ratio and net working capital ratio independent of cash from operations, a surprising result though, given that managers are of the opinion that this variable influence working capital investment levels.

5.3 Conclusion

As much as the managers suggest a target current ratio of 2:1, the data tell a different story. This tells us that firm current ratio varies from firm to firm and that managers of individual firms could be following totally different policies, to the detriment of shareholders. Therefore managers need to reconcile (rethink) the apparent divergence between the current ratio they consider optimal and the actual one depicted by the data.

It is established from the managers, and as confirmed in a number of studies reviewed in the literature review, that the variables that impact on working capital investment levels are cash conversion, operating cash flow, debt ratio, firm size, return on assets, sales and the size of the firm.

Though the result of regression analysis confirm that, all variables put together in a multiple regression influence working capital investment levels some of them on their own, as independent variable has no significant influence on working capital investment level. The implication is that firms should develop a composite working capital index (a discriminant analysis function) to be used in monitoring working capital investment levels, i.e. the managers should rethink how they manage working capital. However the coefficients of the variables show that the influence of each variable (see regression 13 and 14) are of different magnitudes and managers should take this into account when setting working capital investment levels.

5.4 Recommendations

Arising from the findings above the below recommendations can be made:

- (a) To ensure that companies are able to operate optimally and create value for shareholders, managers should rethink on the target working capital ratio given that there is a disconnect between what managers want and what is happening so that as they set their working capital investment levels the industry factor is visible. Further, in order to help the managers put emphasis on the determinants with the highest impact and also help them reconcile their opinions with the analysis from the data and adopt the best determinants, it is recommended that managers have a policy on what they consider as an indicator of working capital investment level because the use of different indicators give varying results.
- (b) Policy makers should consider which of the indicators of working capital investment level would best fit their firm and/or the industry and firms should develop a composite working capital index that is useful in predicting working capital Investment levels. This because when different ratios are used as proxy of working capital investment level and simple regression runs some variables do not individually explain variations in working capital investment levels.
- (c) The target working capital investment level can be used to evaluate the efficacy of managers in carrying out their working capital functions and financial analysts will be able to identify firms that are not able to efficiently manage their working capital thus discounting the same information in share prices. This information should also be disclosed in annual report.

5.5 Areas of further research

The findings of this study raise a number of issues that can be addressed in further research. First it would be important reconciling the predictions between current ratio and net working capital ratio given that they are both indicators of working capital investment levels. For example while cash conversion cycle explain variations in net working capital ratio fails to explain variations in current ratio. While one would expect managers to consider cash from operations in setting working capital investment levels, the model tells us that this variable is irrelevant and this is contrary to expectation. This could be due to misstatements in annual report data or the limitation in linear regression model i.e. the relationship might not be linear. There is also a need to study the impact of external factors on working capital investment level.

5.6 Limitations of the Study

The limitation which arose in this research was on response rate. The study did not achieve the 100% response rate for the questionnaire despite a lot of effort being put to ensure all targeted managers responded. 11 managers out of the 15 companies responded representing a rate of 73% which is a significant portion of the target population hence sufficient to draw valuable and reliable conclusions although a 100% response would have given even more comprehensive results



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APPENDICES

Appendix I: Questionnaire

SURVEY ON DETERMINANTS OF WORKING CAPITAL INVESTMENT LEVELS

1. Which of the following best describes your company?

(Tick the correct answer)

- Use permanent capital for permanent and temporary assets ☐
- Use short time financing to finance permanent assets ☐
- Match the maturity of assets with maturity of financing ☐

2. Who oversees Working capital management in your firm?

- CEO ☐
- Finance Manager ☐
- Board of directors ☐
- Any other (name) ☐

3. Which of the following best describe working capital management policy in your firm?
(tick the correct answer)

- a. Our firm maintains a low level of current assets as percentage of total assets
- b. Our firm use high level of current liabilities as percentage of total liabilities
- c. Any other.....

4. Does your firm have a target range for your current ratio:

- No target range ☐
- Flexible target range ☐
- Somewhat tight target range ☐
- Strict target range ☐

5. How frequently does your company monitor Working capital Investment levels by comparing the amount invested in working capital to total assets?

- Never ☐
- Almost Never ☐
- Occasionally/Sometimes ☐
- Almost every time ☐
- Every time ☐

6. How frequently does your company monitor Working capital Investment levels by calculating current assets ratio?

- Never ☐
- Almost Never ☐
- Occasionally/Sometimes ☐
- Almost every time ☐
- Every time ☐

7. In your company how important are the following variables in determining working capital investment level (please tick your choice)

	Extremely Important (5)	Very Important (4)	Moderately Important (3)	Slightly Important (2)	Not Important (1)
Cash conversion cycle					
Operating cash flow					
Debt ratio					
Firm size					
Return on assets					
Sales (Turnover)					
Others Factors:					
1.					
2.					
3.					

8. What is the target current ratio for your company, i.e. current assets to current liabilities?

- A Ratio of: 1:1 ☐
- A Ratio of: 1.5:1 ☐
- A Ratio of: 2:1 ☐
- A Ratio of: 2.5:1 ☐
- A Ratio of: 3:1 ☐
- A Ratio of: 4:1 ☐

Any other.....

Appendix II: A Summary of studies related to Determinants of Working capital Investment levels

Authors	Dependent variables	Independent variables	Hypothesized coefficient sign	Findings - Coefficient signs
Lamberson (1995)	Current ratio Quick ratio Inventory/assets Current asset/assets	Economic indicators Economic indicators Economic indicators Economic indicators	- - + +	+ not significant + not significant - Significant - Not significant
Chiou, Cheng and Wu (2006)	Working capital requirement / Total assets	Business indicator measured by business cycle during recession. Business indicator measured by business cycle. Industry effect Debt ratio Operating cash flow Growth opportunity Company age Company performance Company size	+ - Significant differences - - - + - +	-significant -significant No evidence found -significant -significant -not significant +Significant +significant +significant
Nazir and Afza (2008)	Working capital requirements Total assets	Operating cycle (ccc) Operating cash flows Level of economic activity Sales growth of the company Return on assets Tobins q Financial leverage Company size industry	+ - Various + + + - - -	+significant +not significant +not significant +not significant +significant +significant -significant +not significant +significant
Shaista Wasiuzzaman (2013)	Net working capital rates	Leverage Growth Asymmetric information Size Asset tangibility Revenue volatility Age Profitability Operating cash flows Board characteristics Board independence		-significant +significant -significant -significant -significant -significant -significant Not significant +significant Not significant Not significant

Authors	Dependent variables	Independent variables	Hypothesized coefficient sign	Findings - Coefficient signs
Rimo Alexandra and Nilsson Hans (2010)	Cash conversion cycle	Profitability Operating cash flow Company size Sale growth Current ratio Quick ratio Debt ratio Industry Time	- - - - + + + Dummy Dummy	+not significant -significant -significant -significant +not significant ?? + not significant
Mongrut, Fuenzalida, Cubillas and Cubillas (2011)	Cash conversion cycle	Average industry CCC Firm size Tangible assets Future growth sales Firms sales/ industry total assets Country risk		+significant -significant -significant -but varies from country to country -not significant -not significant
Suleiman .M. Abadi and Rasha .T. Abbadi (2013)	Working capital ratio	Cash conversion cycle Operating cash flows Size ROA Leverage GDP growth rate Interest rate on loans and advances	+ - - +/- + + +/-	+significant +significant -not significant +significant -not significant +not significant +not significant
Asmawi Noor and Saarani Fridah Shahadan (2012)	Working capital requirement	Growth Profitability Debt Size Industry	- + - + +	Found that these determinants factors is valid for testing
Mathew, Kelly and Highfield (2009)	Working capital requirement to sales ratio	Growth in sale Gross profit margin Sales volatility Operating cash flows Market to book ratio Firm size Market share Distress		-significant -not significant -significant +significant -significant +significant +not significant -significant

Appendix III: Manufacturing and Construction Firms listed at NSE

1. B.O.C Kenya Ltd
2. British American Tobacco Kenya Ltd
3. Carbacid Investments Ltd
4. East African Breweries Ltd
5. Mumias Sugar Co. Ltd
6. Unga Group Ltd
7. Eveready East Africa Ltd
8. Kenya Orchards Ltd
9. A.Baumann CO Ltd
10. Athi River Mining Ltd
11. Bamburi Cement Ltd
12. Crown Berger Ltd
13. E.A. Cables Ltd
14. E.A.Portland Cement Ltd
15. Sameer Industries Ltd



Appendix IV: Descriptive Data Analysis for Components of CCC

Table 1: Descriptive Analysis of Accounts Payable Days (AcPdays)

Company	N	Mean	StDev	Min	Max	Q1	Q3
1	5	169.7	6.9	158.7	177.3	163.7	175.2
2	5	272.1	52.6	204.9	339.7	228.1	324.0
3	5	115.6	11.3	97.4	125.3	105.8	125.0
4	5	91.5	44.5	49.3	167.2	62.3	126.5
5	5	63.9	13.7	49.7	80.8	49.9	76.1
6	5	83.7	18.7	57.5	103.1	66.7	101.7
7	5	23.6	6.0	16.9	29.8	17.2	28.5
8	5	72.4	20.5	39.4	90.6	53.1	88.2
9	5	57.3	29.8	6.8	80.5	33.1	79.5
10	5	119.1	26.8	83.1	156.7	95.7	140.2
11	5	72.5	29.5	44.1	113.4	44.7	101.0
12	5	83.5	9.3	75.8	93.7	75.9	93.6
13	5	34.7	13.4	15.9	53.1	23.5	45.8
<i>Average</i>		96.89	21.77				

Table 2: Descriptive Analysis of Accounts Receivable Days (AcRdays)

Company	N	Mean	StDev	Min	Max	Q1	Q3
1	5	45.1	4.1	39.3	50.6	41.4	48.5
2	5	93.0	15.3	69.7	106.1	77.4	104.5
3	5	85.4	18.7	61.8	109.4	68.5	103.6
4	5	127.3	27.8	104.2	174.4	107.2	150.6
5	5	47.9	5.7	38.9	54.4	42.9	52.2
6	5	52.7	8.9	43.8	66.5	44.8	60.5
7	5	30.0	7.1	22.0	40.5	23.5	36.2
8	5	93.0	26.8	76.3	139.9	76.6	115.3
9	5	28.5	7.0	24.1	40.9	24.2	33.8
10	5	44.6	12.1	29.9	61.6	34.0	55.9
11	5	84.0	15.4	63.1	100.2	68.0	96.9
12	5	67.9	12.3	58.1	88.9	59.1	78.0
13	5	98.8	13.2	79.9	115.7	86.7	109.6
<i>Average</i>		69.10	13.4				

Table 3: Descriptive Analysis of Inventory Days (InvDays)

Company	N	Mean	StDev	Min	Max	Q1	Q3
1	5	81.07	19.4	62.9	113.2	66.1	97.3
2	5	137.2	19.8	112.9	162.9	120.0	156.9
3	5	122.7	20.7	98.8	155.7	107.4	139.3
4	5	112.9	29.3	81.0	151.9	89.6	143.3
5	5	158.6	29.5	122.5	182.1	126.5	181.9
6	5	93.6	27.7	69.8	131.9	72.3	123.1
7	5	57.9	9.0	49.5	71.4	50.0	66.4
8	5	38.8	6.3	29.9	47.3	33.9	44.0
9	5	63.4	11.5	49.0	80.9	54.5	72.5
10	5	114.0	16.2	96.9	134.8	99.4	130.8
11	5	67.4	18.5	46.7	91.1	48.9	84.2
12	5	120.1	20.0	100.2	148.4	104.5	140.8
13	5	151.4	18.0	133.6	179.7	135.9	166.6
	<i>Average</i>	<i>101.5</i>	<i>18.90</i>				

