THE RELATIONSHIP BETWEEN WORKING CAPITAL MANAGEMENT AND PROFITABILITY OF SUGAR PRODUCING COMPANIES IN KENYA

BY

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DECLARATION

This research project is my original work and has not been submitted for the award of a degree in any other University.

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

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DEDICATION

This study is dedicated to my late parents, Jonathan and Sela Alice Awiti Okungu who bequeathed me with excellent upbringing coupled with a good education foundation to ensure that I got a higher level of education. They indeed made great sacrifices to ensure that we all succeed in life.

It is also dedicated to my loving wife Sarah and children Jonathan and Ryan for their encouragement and patience during my long absence from home.

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ABSTRACT

Working Capital Management is an integral part of financial decision making as it directly affects the liquidity and profitability of a firm. Presently, there are no specific formulae used to establish working capital requirements of firms in different industries. Profitability is a reflection of good financial decisions taken by management which in return leads to an increase in a firm's value. A firm's value can be measured both in the short term and long term basis. Short term components are the working capital items and they include current assets and current liabilities.

The research design used was descriptive. The population studied were the licensed sugar producing companies in Kenya as at 31st December, 2013. The study was carried out using secondary data obtained from the financial statements of the company's annual report for a period of five years (2009 – 2013). The data collected was analysed using Microsoft Excel and SPSS. Pearson correlation and Regression analyses were used to establish the relationship between working capital management and profitability.

Findings of the study indicated that there is a positive relationship between working capital management and profitability of sugar producing companies. The level of leverage is however found not to directly influence the performance. An optimum ratio of total debts to total assets is recommended to increase profitability. The results proposed optimal inventory levels to be maintained and prompt debt collection measures to be put in place. This would increase cash inflows that will provide good liquidity for revenue generation resulting to increased profitability.

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LIST OF ABBREVIATIONS

AAI	Average Age of Inventory
ACP	Average Collection Period
APP	Average Payment Period
AP	Accounts Payable Outstanding Days
AR	Accounts Receivable Outstanding Days
CCC	Cash Conversion Cycle
CR	Current Ratio
DR	Debt Ratio
FATA	Financial Assets to Total assets
ROA	Return on Assets
ICP	Inventory Collection Period
IT	Information Technology
LOS	Natural Logarithm of Sales
LR	Liquidity Ratio
WCM	Working Capital Management

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

In Kenya sugar cane is mainly grown in the western part of the country and some parts of the former Coast province. It is the main cash crop that economically supports the livelihoods of most households which practice cane farming on either small scale or large scale basis. Harvested cane is delivered to factories that are located within the sugar belt for processing. The factories are not only processors but also engage in large scale farming of raw cane which supplements what farmers are able to deliver. They are mostly government owned and include South Nyanza Sugar Company (SONY), Nzoia Sugar Company Ltd, Chemelil Sugar Company Ltd and Muhoroni Sugar Company Ltd. There is only one public listed company that processes sugar and this is Mumias Sugar Company. The rest are privately owned and include Kibos Sugar & Allied Industries Ltd, Butali Sugar Company Ltd, Soin Sugar Company Ltd, West Kenya Sugar Company Ltd and Kwale International Sugar Company Ltd (www.kenyasugar.co.ke).

Apart from producing refined sugar for both domestic and industrial consumption, the sugar companies also generate electricity for internal and external use, ethanol, and water bottling. Sugar cane farming, processing, marketing and distribution is regulated by the government of Kenya through its agency known as the Kenya Sugar Board. This is because the government is not only a major player in the industry by way of financial investment it has but also is aware of the significant economic contribution by the industry in terms of employment, taxes and farmers welfare (www.kenyasugar.co.ke).

1.1.1 Working Capital Management

Horne and Wachowicz (2000) define working capital as the nerve centre and the life blood of any business. Working capital comprises current assets and current liabilities. These include cash, marketable securities, debtors, creditors and inventories. It is always being ignored in financial decision making since it involves investment and financing decision in the short term period. It also acts as a restraint in financial performance, given that it does not contribute to return on equity (Sanger, 2001). It is important to have the correct amount of working capital that is neither excess nor weak for a business to prosper.

Working capital management is important as it involves making decisions on the amount of the current assets required by a firm and the current liabilities to finance these assets. The objective of working capital management is the same as that for non-current asset and long-term financing decisions. This is typically the maximisation, or at least the enhancement, of the shareholders' wealth, and it can be achieved by optimising positive cash flows through striking an appropriate balance costs and revenues on the one hand, and risk on the other (McLaney, 2009).

According to Watson, et al (2007), net working capital is the term given to the difference between current assets and current liabilities. The level of current assets is a key factor in a company's liquidity position. The higher the level, the more liquid are the firm's and the higher is their ability to pay their debts. A company must have or be able to generate enough cash to meet its short-term needs if it is to continue in business. Therefore, working capital management is a key factor in the company's long-term success: without the 'oil' of working capital, the 'engine' of fixed assets will not function.

1.1.2 Profitability Measures

According to Nyaga (2007), one of the most important requirements of liquidity is profitability. Profitability ratios allow us to measure the ability of the firm to earn an adequate return on sales, total assets, and invested capital. Return on Sales (Profit Margin) Ratio – This ratio measures the profits after taxes on the year's sales. It shows a company's production efficiency, cost structure and pricing strategy. If it is high, it means a company is efficient and can withstand negative market conditions. Conversely, a low profit margin ratio indicates that there is inefficiency especially with regard to costs of production.

Return on Assets (ROA) Ratio – A business uses assets and the skills of its people to earn a profit. This ratio quantifies the success of that effort with respect to assets by stating net income as a percentage of total assets. A high percentage rate will tell you that the company is well run and management is efficient in using assets to generate earnings. Return on Equity (ROE) Ratio – It is the most fundamental profitability ratio. It states net income as a percentage of equity. ROE measures the firm's ability to earn a return on the owners' invested capital. It therefore, considers matters more specifically from the shareholders' viewpoint and the profit figure is that which the shareholders earn after all charges have been met. It is used to compare the profitability of firms in the same industry.

Net Profit Margin Ratio – It shows the relationship between net income and sales. The ratio describes what is left of sales revenue after all of the expenses of running the business for the period have been met. Gross Profit Margin Ratio – This ratio shows what percentage of the sales revenue remains after the expense of making the inventories available to the customers (or the direct cost of providing the service) is taken into account. Earnings Per Share Ratio – The earnings per share measure represents the number of shillings earned on behalf of each

outstanding share of common stock. The investing public closely watches EPS figures and considers them an important indicator of corporate success. It is obtained by dividing net income by the number of common stock outstanding and is a major component used in calculating price to earnings ratio (McLaney, 2009).

1.1.3 Effect of Working Capital Management on Profitability

Working capital management involves an analysis of key performance ratios and the management of the individual components of working capital. For a company to improve its performance and hence profitability, enforcement of an effective working capital management is necessary. This can be achieved by focusing on key areas such as cash, accounts receivable, accounts payable and inventories management (Eljelly, 2004).

Shin and Soenen (1998) highlighted that efficient Working Capital Management (WCM) was very important for creating value for shareholders. The way working capital was managed had a significant impact on both profitability and liquidity. The relationship between the length of Net Trading Cycle, corporate profitability and risk adjusted stock return was examined using correlation and regression analysis, by industry and capital intensity. They found a strong negative relationship between lengths of the firm's net trading cycle and its profitability. In addition, shorter net trade cycles were associated with higher risk adjusted stock returns.

Deloof (2003) conducted a study that had similar objective as the one done by Shin and Soenen (1998) on Belgian non-financial firms using a sample of 1009 for the period 1992-

1996. He used trade credit and inventory policies to measure number of days for accounts receivable, accounts payable and inventories and the cash conversion cycle as a comprehensive measure of working capital management. The study found a significant negative relation between gross operating income and the number of days of accounts receivable, inventories and accounts payable. He concluded that managers can create value for their stockholders by reducing the number of days for accounts receivable and inventories to a reasonable minimum. He also suggested that less profitable firms wait longer to pay their bills.

Profitability relies on the total amount of financial resources that a company has. Since these resources are always scarce, the larger the investment in current assets, the smaller will be the amount available for investment in other profitable areas according to the conservative approach. A correct balance between liquidity and profits is a very important aspect that management should consider as a firm's survival relies on profitability. There is a strong relationship between the firm's profitability and its working capital efficiency (Shin, 1998).

According to Kargar and Bluementhal (1994), bankruptcy may also be likely for firms that put inaccurate working capital management procedures into practice, even though their profitability is constantly positive. Efficient working capital management involves planning and controlling current assets and current liabilities in a way that eliminates the risk of inability to meet short term obligations due on one hand and avoiding excessive investment in these assets on the other hand (Eljelly, 2004).

According to Murali (2000), working capital management involves the relationship between a firm's short term assets and its short term liabilities. The goal of working capital management is to enable the firm continue with its operations by meeting its upcoming operational

expenses and short term debts. An optimal level of working capital is the one whereby a balance is obtained between risk and efficiency.

According to Winraub and Vissichier (1998), working capital management passed through control, optimization and value measurement stages. Working capital management originally started as a systematic approach of controlling the incoming, outgoing, remaining cash, receivables and inventories. At the control stage, misappropriation by the management for personal benefits is checked. At optimality stage, focus was on physical safety of the working capital assets, minimization of related costs and maximization of related income. Models were developed to check on liquidity problems. Under the control and optimality approaches, the profit aspect is taken care of as the main measure of efficiency by management.

1.1.4 Sugar Producing Companies in Kenya

According to the Kenya Sugar Board website, sugar cane is mainly grown in the western part of the country and some parts of the former Coast province. It is the main cash crop that economically supports the livelihoods of most households which practice cane farming on either small scale or large scale basis. Harvested cane is delivered to factories that are located within the sugar belt for processing. The factories are not only processors but also engage in large scale farming of raw cane which supplements what farmers are able to deliver. They are mostly government owned (parastatal) and include South Nyanza Sugar Company Ltd (SONY), Nzoia Sugar Company, Chemelil Sugar Company, Muhoroni Sugar Company Ltd. There is only one public listed company that processes sugar and this is Mumias Sugar Company. The rest are privately owned and include Kibos & Allied Sugar Company Ltd, Butali Sugar Company, Soin Sugar Company Ltd, West Kenya Sugar Company Ltd and Kwale International Sugar Company Ltd. Apart from producing refined sugar for both

domestic and industrial consumption, the sugar companies also generate electricity for internal and external use, ethanol and water bottling (www.mumias-sugar.com).

Sugar cane farming, processing, marketing and distribution are regulated by the government of Kenya through its agency known as the Kenya Sugar Board. The Board came into being through an Act of Parliament called the Sugar Act of 2001. The government is a major player in the industry having contributed huge initial capital. It is also keen to ensure smooth operations and keep away interests that may jeopardise the overall interest of farmers and the state. Regulation is therefore important to encourage growth of the industry and boost its contribution to the national economy through increased employment opportunities, taxes and better living standards (www.kenyasugar.co.ke).

1.2 Research Problem

The sugar industry in Kenya is one of the key sectors that contribute to the country's economic growth. Very few studies have been done on the relationship between working capital management and profitability of Sugar companies. Past studies have shown that decisions on working capital affect both profitability and liquidity. Excess of investments in working capital may result in low profitability and lower investments may result in poor liquidity. The optimal combination of the various working capital financing sources has been a controversial topic since its theoretical rise and the empirical investigations that have followed.

Numerous studies have investigated the working capital financing policies of firms in various sectors of the economy; such as manufacturing firms, electric-utility companies, non-profit hospitals and agricultural firms (Jensen and Lengemeier, 1996). One of the main conclusions of empirical studies is that industrial classification is an important determinant of working

capital financing. A continuing debate in corporate finance exists over the question of how firms make their working capital financing decisions, and the effect of these on the profitability of the organization.

A number of studies on the relationship between working capital management and profitability have been done in Kenya though very little research has been conducted on the Sugar industry. For instance, Mathuva (2010) conducted a study on working capital management components on corporate profitability of Kenyan listed firms in the NSE. Wainaina (2010) studied the relationship between profitability and working capital of small and medium enterprises in Kenya. Mathai (2010) conducted a study on the relationship between working capital management and profitability of retail supermarkets in Kenya. Muchiri (2012) studied the relationship between working capital management and profitability of the dairy industry in Kenya while Runyora (2012) conducted a study on the impact of working capital management on the profitability of the oil industry in Kenya and established that there exists a relationship between working capital management and profitability of retail oil companies in Kenya with leverage found to positively influence the level of profitability.

The relationship between working capital management and profitability of sugar producing companies, however, is still an unexplored area in the working capital management literature. Therefore, one of the major objectives is establishing the relationship between working capital management and profitability of sugar producing companies in Kenya. A number of questions require an answer. Whether total assets turnover affects profitability? Whether equity multiplier affects profitability? This study seeks to bridge this knowledge gap by determining whether there is a relationship between working capital management and profitability of sugar producing companies in Kenya?

1.3 Research Objective

To establish the relationship between working capital management and profitability of Sugar producing companies in Kenya.

1.4 Value of the Study

The study seeks to be of benefit to the following with its findings;

Finance managers of Sugar producing companies will be able to foresee financial challenges and opportunities thus act promptly and appropriately. This will help them maintain a favourable working capital level that will make their firms to have a better performance and an increase in profits which is their main objective.

The Government will use this knowledge acquired for the economic planners to develop policies that promote sound business and regulatory environment especially during hard economic times. Scholars and Researchers will use the study to obtain useful information that is critical to financial management especially on how to improve on working capital management.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter presents a review of literature on the relationship between working capital management and profitability. The chapter looks at studies undertaken by various scholars and theories that reflect the relationship between working capital management and profitability. The specific areas covered here are theories on working capital, determinants of profitability, empirical review and finally the conclusion.

2.2 Theoretical Review

Anand (2001) affirmed that an individual firms' investment in working capital will be related to the type of industry it operates in and the working capital policy that each firm adopts. Whereas financing decisions is about how investment in working capital should be financed, working capital investments decision is generally concerned with how the firm's resources should be invested. An optimal level should be observed by every firm bearing in mind its size, nature of industry, growth rate and risk attitude of the firm's management.

The theories of working capital management holds that if working capital is managed according to prescriptive theories, then it would be expected that firms would invest in working capital, finance working capital, monitor factors that affect working capital, manage cash, accounts receivable, inventory, accounts payable, the cash conversion cycle and measure the performance to ensure that non-current assets are utilized effectively and efficiently (McInnes, 2000).

2.2.1 The Cash Conversion Cycle Theory

In their seminal paper, Richards and Laughlin (1980) devised this method of working capital as part of a broader framework of analysis known as the working capital cycle. It suggests that the method is superior to other forms of working capital analysis that rely on ratio analysis. It represents the interaction between the components of working capital and the flow of cash within a company and can be used to determine the amount of cash needed for any sales level. It is the period of time between the outlay of cash on raw materials and the inflow of cash from the sale of finished goods and represents the number of days of operation for which financing is needed.

It is calculated by adding Inventory conversion period to Receivables collection period and subtracting Payables deferral period. The longer the cash conversion cycle, the greater the amount of investment required in working capital. It can be used by managers to show where they should focus their attention if they want to decrease the amount of cash tied up in current assets.

2.2.2 The Operating Cycle Theory

A firm's operating cycle measures the time that elapses from the firm's receipt of raw materials to its collection of cash from the sale of finished products. The theory encompasses two major short-term asset categories, inventory and accounts receivable. To measure the operating cycle, we use two ratios namely; average age of inventory (AAI) and the average collection period (ACP) then the two are summed up. If customers enjoy a longer credit period as per the firm's policy, then the reported profit is likely to be high but on the other hand, the firm is equally likely to face liquidity challenges as it will take long before the accounts receivable is converted to cash (Bhattacharya, 2009).

This theory however, ignores the inclusion of Accounts payables as a component of working capital. The longer a firm is able to hold cash without paying the creditors' immediately enables it to use the same funds to meet other current liabilities thereby improving its working capital position. The failure to incorporate Payables deferral period is what brought about the Cash Conversion Cycle (CCC) theory to improve on the Operating Cycle theory.

2.2.3 The Net Trade Cycle Theory

The net trade cycle uses the three components of receivables, inventory and payables in the same manner as Cash Conversion Cycle. However, the components are presented as a percentage of sales. Soenen (1993) investigated the relationship between the net trade as a measure of working capital and return on investment in the US firms. The results of Chi-square test indicated a negative relationship between the length of net trade cycle and return on assets. Moreover, this inverse relationship was found different across industry. Another study conducted by Shin and Soenen (1998) argued that the net trading cycle is a better working capital efficiency measure compared to the cash conversion cycle since it indicated the number of days sales that the company has to finance its working capital. Net trading cycle is helpful in estimating additional financing needs of working capital and can be arrived at using correlation and regression analysis.

2.3 Determinants of Profitability of Sugar Companies

Profit is the difference between the selling price and the costs incurred to produce a good or service. Profits will be realised as result of changes which include growth in population, differences in tastes and preferences, increase in demand, capital formation and advancement in technology. Other determinants may be the level of competition, inflation as well as the size of the firm (Goddard et al, 2005).

2.3.1 The Size of the Company

The size of a firm plays an important role in determining the kind of relationship the firm enjoys within and outside its normal operating environment. The larger a firm is, the greater the influence it has on its stakeholders. The growing influences of conglomerates and multinational corporations in today's global economy (and in local economies where they operate) are indicative of what role size plays within the corporate environment. Size has been considered as a fundamental variable in explaining firm profitability by researchers investigating the effects of size on firm profitability. According to the conclusions of various studies, the impacts of size on profitability can be negative or positive. Size may lead to advantages like economies of scale, greater bargaining power over suppliers and distributors and greater production capacity. On the contrary, it may have negative impact on profitability if it causes diseconomies of scale (Ravenscraft and Scherer, 1987).

2.3.2 The Location of the Company

Location is about the physical presence of a business enterprise. It is an important component in a firm's profitability since it will directly affect the costs of production. If a firm is located near the source of its raw materials, it will incur less transport costs as compared to that which is located far away. However, transporting the finished product to the market may also lead to increased distribution costs. A good balance is necessary for increased profitability (Madrid-Guijarro et al, 2007).

2.3.3 The Age of the Company

Age refers to how well a company is known. It is about the history or track record that the company has built over a period of time. Research has showed that firms that have been in existence for a longer time are able to raise capital much faster and easily from investors

who understand their history well. Similarly creditors would rely on their performance over time to assess their ability to honour their debt obligations. Companies that are not mature in age may on the other hand, have difficulty in convincing investors and creditors of their ability to honour financial obligations. This hindrance may impact on the performance of a firm either negatively or positively depending on the age of the firm (Lee, 2009).

2.3.4 The Information Technology (IT) investments of the Company

Investments in IT constitute a large part of firm's discretionary expenditures, corporate leaders need to understand the likely impacts and mechanisms to justify and realize value from their IT and related resource allocation processes. IT has a positive impact on profitability. A significant portion of IT's impact on firm profitability is accounted for by IT-enabled revenue growth but there is no evidence for the effect of IT on profitability through operating cost reduction. These findings suggest that firms have had greater success in achieving higher profitability through IT-enabled revenue growth than through IT-enabled cost reduction (Mithas et al, 2012).

2.4 Empirical Review.

Pandey and Parera (1997) studied working capital management policies and practices among private sector manufacturing companies in Sri Lanka. They collected information through questionnaires and direct interviews with the chief finance officers of a sample of manufacturing companies listed in Columbus Stock Exchange. The study concludes that most companies in Sri Lanka follow informal working capital policies whose nature and approach is affected by the size and profitability of a company.

Shin and Soenen (1998) studied the relationship between WCM and value creation for shareholders. They used the net trading cycle (inventory conversion period and receivable conversion period less payable conversion period) as a measure of working capital management. Based on their findings, they concluded that one possible way to create shareholder value is to reduce a firm's net trading cycle.

Eljelly (2004) empirically examined the relationship between profitability and liquidity, as measured by current ratio and CCC on a sample of 929 joint stock companies in Saudi Arabia. Using correlation and regression analysis, Eljelly found significant negative relationship between the firm's profitability and its liquidity level, as measured by current ratio. This relationship is more pronounced for firms with high current ratios and long cash conversion cycles. At the industry level, however, he found that the cash conversion cycle or the cash gap is of more importance as a measure of liquidity than current ratio that affects profitability. The firm size variable was also found to have significant effect on profitability at the industry level.

According to Padachi (2006) high investment in inventories is associated with lower profitability. He used return on total assets as a measure of profitability for a sample of 58 small manufacturing firms in Mauritius for the period 1998 – 2003. His findings reveal an increasing trend in the short-term component of working capital financing. Similar to most recent study by Christopher and Kamalavalli (2009), which focus on 14 corporate hospitals in India for the period 1996-97 to 2005 -06. Their correlation and regression analyses signifying that working capital component namely current ratio, cash turnover ratio, current assets to operating income and leverage negatively influence profitability.

Mathuva (2010) conducted a study on the influence of working capital management components on corporate profitability within the listed firms in Kenya. A total of 30 firms listed on the Nairobi Securities Exchange (NSE) were sampled for the periods 1993 to 2008. He used pooled Ordinary Least Squares Regression (OLS) and the fixed effects regression models to analyse his findings. The study showed that there exists a highly significant negative relationship between the accounts collection period and profitability thereby affirming that more profitable firms take the shortest time to collect cash from their debtors.

The study also revealed that there exists a highly significant positive relationship between the period taken for inventory to be converted into sales vis a vis profitability. This therefore, shows that firms which maintain sufficiently high inventory levels, reduced costs of possible interruptions in the production process and loss of business due to scarcity of products. This reduces supply costs and protects the firms against price fluctuations. There also exists a highly significant positive relationship between the time it takes the firm to pay its creditors and profitability. It implies that the longer a firm takes to pay its creditors, the more profitable it is as it has more funds at its disposal to increase inventory level for example.

Wainaina (2010) sought to establish the relationship between profitability and working capital of small and medium enterprises in Kenya. The study focused on a sample of 40 companies whose sales turnover was in the range of 10 million and 500 million shillings. Her study focused on companies in the ICT, General Trade and Construction industry sectors. The study revealed that there exists no relationship between cash conversion cycle and profitability for companies in the construction, ICT and transport sector. However, there was a positive relationship between profitability and cash conversion cycle for industries in the General Trade and Agricultural sectors. The study further revealed that there was a positive

relationship between profitability and inventory days in all the sectors of the study. The study concluded that higher inventory is needed to meet higher demand and thus inventory should be maintained at reasonable levels.

Mathai (2010) sought to establish the relationship between working capital management and profitability of retail supermarket chains in Kenya. Her study consisted of 6 retail supermarket chains in Kenya. The objective of the study was to determine whether there exists a relationship between WCM and profitability. The study showed that in the retail sector, WCM has a significant impact on profitability of firms and plays a big role in value creation for shareholders as longer cash conversion cycle and average collection period have a negative impact on net operating profitability of a firm. The CCC offers an easy and useful way to check the WCM efficiency of a company. The study also revealed that there exists a positive non-significant relationship between the financial debt ratio and profitability. Consequently, an increase in debt utilization, leads to a decrease in profitability. Thus, concluding that leverage negatively influences profitability.

Khalid et al, (2011) examined the relationship between working capital management and firm's profitability of 14 firms listed at Karachi Stock Exchange. The main objective of the study was to find whether financial ratios affect the performance of the firms in the special context of cement industry in Pakistan. The result concludes that there is a moderate relationship between working capital management and firm's profitability.

Muchiri (2012) conducted a study on the relationship between working capital and profitability of the dairy industry in Kenya. The study focused on the New KCC Ltd and used its financial statements 2008 – 2011. The study revealed that managers should maintain

optimal levels of working capital by reducing the CCC so long as it does not affect business operations and inventory should be optimal to meet the customers demand.

Runyora (2012) researched on the impact of working capital management on the profitability of the oil industry in Kenya. She obtained data from 30 oil marketing companies and used correlation and regression analysis to measure the effect of working capital management on net operating profitability. The study found that the coefficient of CCC, Average Collection Period, Inventory Turnover in days and Average Payment Period vary from positive to negative, Debt Ratio was found to vary on the positive having its highest coefficient thus highest effect on profitability of oil companies in Kenya. These findings contradict the findings of Myers and Majlof (1984), Rajan and Zingales (1995), Shin and Soenen (1998), Deloof (2003), who predicted a negative relationship between leverage and profitability. Her study concludes that there exists a relationship between WCM and Profitability of retail oil companies in Kenya and that leverage positively influences the profitability of oil companies in Kenya.

2.5 Summary of Literature Review

Working capital management is an important area of financial management and its proper handling can lead to a bright future for a business in terms of its profitability. Poor handling can also result in the business closing down. Empirical studies done on working capital management have confirmed that companies that pursue aggressive working capital policies are generally profitable.

The main objective of working capital management is to achieve the right balance between each of the working capital components. If the level is too low the company will be unable to respond to temporary capital demands and thus lose on short term investment benefits.

The above studies provide a solid base and important insights on working capital management. They also provide research conclusions on working capital management. This study seeks to provide additional insights and perhaps different evidence on the working capital management in an emerging capital market like Kenya.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter outlined the research methodology that was used to provide answers to the research objectives in this study as listed in chapter one. The following aspects of research methodology are discussed; research design, population, data collection procedure and data analysis.

3.2 Research Design

This study adopted a descriptive design in which data was gathered just once over the period 2009 to 2013. The study was conducted through the use of secondary data as contained in the annual financial reports of the Sugar Companies. Annual financial statements have the data concerning the independent variables which are the working capital ratios and the second variable which is profitability. The research design for this study was causal as it focused on establishing the relationship between working capital management and profitability of sugar producing companies in Kenya.

3.3 Population

It refers to the entire spectrum of the unit of analysis for which the results of the study can generally be expected to apply or hold. The target population of this study comprised of ten sugar producing companies in Kenya that are licenced by the Kenya Sugar Board and have been in operation for the duration of the study (2009-2013).

3.4 Data Collection Technique

Data was collected from secondary sources. This was from audited financial statements contained in the company's annual reports. Specifically the following was required; current assets (inventories, accounts receivable, cash and bank), current liabilities (accounts payable), net income, sales, cost of sales, total assets and total debt. Data collected was for 5 years from 2009 to 2013 which was the study period.

3.5 Data Analysis

Collected data was analysed using Statistical Package for Social Sciences (SPSS) version 17 and MS Excel package. The quantitative data analysis of working capital decisions using financial performance ratios was used. Correlation analysis was carried out to analyse the relationship between working capital management and profitability using Pearson correlation coefficient. Regression analysis was also used to determine the relationship between working capital management and profitability.

3.6 Analytical Model

For this study, the dependent variable was Return on Assets (ROA), which is a measure of profitability while the independent variables are the working capital ratios and were as listed in the model below. The model was also meant to establish whether the independent variables caused a movement in the dependent variable. Chi-square test was used to test the goodness of fit, test the significance of association between the dependent variable and independent variables and finally to test the significance of the population variance (Kothari, 1990; Mugenda & Mugenda, 1999). To evaluate the relationship among the variables, Significance of beta values at 5% was interpreted using the probability values (P – value).

The general conceptual model is modified from Teruel and Solano (2007) study on the relationship between working capital management and profitability of SME's in Spain.

The general conceptual model was:

ROA = f (ACP, ICP, APP, CCC, LOS, DR, FATA)

The above general model was converted into:

$ROA_{it} = \beta 0+\beta_1(ACP_{it})+\beta_2(ICP_{it})+\beta_3(APP_{it})+\beta_4(LOS_{it})+\beta_5(CCC_{it})+ \beta_6(DR_{it})+e \ldots 1$

ROA_{it}: Return on Asset of the firm i at time t; i = 1, 2 …10 firms obtained by dividing the net income by the total assets for each firm

$\beta 0$: The beta of the firm (intercept of the equation)

$\beta_1 \ldots \beta_6$: Coefficients of different independent variables for working capital management of firm i at time t

ACP: Average Collection Period i.e. total number of days that accounts receivable are turned into cash and calculated by dividing account receivables by sales and multiplying the result by 360 days.

ICP: Inventory Collection Period; obtained by dividing inventory by sales and multiplying the result by 360 days.

APP: Average Payment Period refers to the number of days it takes to settle accounts payable. It is computed by dividing the accounts payable by total purchases and multiplying the result by 360 days.

LOS: Natural Logarithm of the total Sales

DR: Debt Ratio i.e. Total Debt divided by Total Assets

t: Time = 1, 2, 3……5 years

e: The error term

FATA: Financial Assets to Total Assets

CCC: Cash Conversion Cycle i.e. length of time between when a firm makes payment and when the firm receives cash inflow. It is calculated as the number of Days Accounts Receivable (AR) minus the number of Days Accounts Payable (AP)

AR: Accounts Receivable Days i.e. the number of days that a customer invoice is outstanding before it is collected. It is obtained by dividing accounts receivable by annual revenue and multiplying the result by 360 days

AP: Accounts Payable Days i.e. the number of days that a company takes to pay its suppliers. It is obtained by dividing the accounts payable by cost of sales and multiplying the result by 360 days.

CR: Current Ratio i.e. Current Assets divided by Current Liabilities

CHAPTER FOUR

DATA ANALYSIS, RESULTS AND DISCUSSION

4.1 Introduction

This chapter presents the data analysis, findings and discussions on the relationship between working capital management and profitability. Inferential statistics applied were both correlation and regression analyses used to measure the effect of working capital management on Return on Assets (ROA). Data was presented using tables.

4.2 Descriptive Statistics of variables

Descriptive statistics were computed for both profitability measures and working capital management measures. The results (refer to table 4.1) show that the average ROA among the 10 sugar producing companies in Kenya is 0.04 i.e. 4% with a standard deviation of 0.15. The companies have an Average Collection Period (ACP) of 50.24 days with a standard deviation of 29.46. The average Inventory Collection Period (ICP) is 70.61 days while Average Payment Period for the firms is 242.74 days. The average Cash Conversion Cycle (CCC) is -222.73 days with a standard deviation of 302.09. The negative CCC shows that sugar producing companies get paid 222.73 days earlier by their customers before they pay their creditors. Debt Ratio is 0.85.

Table 4.1: Descriptive Statistics

Component	N	Mean	Std. Dev.	Min	Max
ROA: Return on Asset	30	0.04	0.15	-0.55	0.35
ACP: Average Collection Period	30	50.24	29.46	9.40	113.40
ICP: Inventory Collection Period	30	70.61	37.18	22.00	214.30
APP: Average Payment Period	30	242.74	207.78	66.14	792.69
LOS: Natural Logarithm of the total Sales	30	6.68	0.32	5.70	7.20
CCC	30	-222.73	302.09	-1138.20	41.90
DR: Debt Ratio	30	0.85	0.89	0.02	3.27

Source: Research Findings

4.2.1 Comparative means of various Working Capital Management (WCM) ratios and ROA for each of the Sugar firms

Table 4.2 below shows that apart from Muhoroni Sugar Company which had a negative mean for ROA of -0.09, all the others had positive Return on Assets. The best performing in this respect was Mumias Sugar Company (mean 0.12) while the least performing was Muhoroni Sugar Company (mean -0.09). Muhoroni Sugar Company had the least ACP of 40.62 days

while Mumias Sugar Company had the highest at 73.00 days. Muhoroni Sugar Company had the highest ICP of 98.08 days while Mumias Sugar Company had the lowest of 49.96 days. Mumias Sugar Company had the highest APP of 464.82 days while Muhoroni Sugar Company had the lowest of 152.15 days. Mumias Sugar Company had the most CCC of -507.72 days while Muhoroni Sugar Company had the least of -83.28 days. Test for fixed effects were carried out in subsequent sections.

Table 4.2: Comparative means of various Working Capital Management (WCM) ratios and ROA for each of the Sugar firms

Component	Mumias	Nzoia	Chemelil	Sony	Muhoroni	West Kenya
ROA	0.12	0.08	0.04	0.03	-0.09	0.04
ACP	73.00	47.32	51.12	47.00	40.62	42.40
ICP	49.96	70.30	66.66	67.80	98.08	70.88
APP	464.82	229.32	233.67	167.09	152.15	209.37
LOS	6.72	6.60	6.88	6.62	6.48	6.80
CCC	-507.72	-245.76	-176.70	-114.10	-83.28	-208.82
DR	0.62	1.04	0.92	1.00	0.32	1.19

Source: Research Findings

4.3 Comparative means of various Working Capital Management (WCM) ratios and ROA for the Years under Review.

The results in table 4.3 below, suggest that profitability across the six companies was highest in 2009 (mean 0.16) and lowest in 2013 (mean -0.06). ACP was high in 2009 at 76.18 days and fell steadily to 36.90 days in 2013. The highest ICP was in 2013 having 94.78 days while the lowest was in 2009 with 46.80 days. APP experienced a decline from a high of 486.26 days in 2009 to a low of 168.79 in the year 2011 but with an increase to 185.50 days in 2013. CCC was negative throughout the period of study though it fluctuated between -1 day and -574.78 days. DR maintained an average of 1 in the years of study. These findings suggest that the ratios are invariant with regard to time. This is verified in the next section using correlation analysis.

Table 4.3: Comparative means of various Working Capital Management (WCM) ratios and ROA for the Years under Review

Component	2009	2010	2011	2012	2013
ROA	0.16	0.05	0.03	0.02	-0.06
ACP	76.18	52.00	43.12	43.02	36.90
ICP	46.80	63.48	75.77	72.23	94.78
APP	486.26	202.45	168.79	170.69	185.50
LOS	6.65	6.87	6.72	6.38	6.80
CCC	-574.78	-162.58	-107.40	-101.85	-167.03
DR	1.04	1.05	0.71	0.43	1.02

Source: Research Findings

4.4 Correlation Analysis

This was done using Pearson's Correlation analysis to establish the nature and strength of the relationship between profitability of the sugar firms and the working capital management ratios. The results are as shown in table 4.4 below.

Note: All tests are done at 95% confidence level or 5% significant level.

Table 4.4: Correlation Analysis

	ROA	ACP	ICP	APP	CCC	DR	LOS
ROA	1						
ACP	0.808	1					
ICP	-0.946	-0.829	1				
APP	0.715	0.924	-0.689	1			
CCC	-0.750	-0.912	0.677	-0.982	1		
DR	0.084	-0.064	-0.080	-0.152	0.119	1	
LOS	0.072	0.085	-0.035	0.072	-0.092	0.124	1

Source: Research Findings

The above table 4.4 shows the Correlation coefficient matrix. In reference to the dependent variable - ROA, the ACP and APP have a strong positive correlation with ROA, (r =.808) and (r=.715) respectively. ICP and CCC on the other hand, have a strong negative correlation with ROA, (r =-.946) and (r =-.75) respectively while DR and LOS both have weak positive correlations of (r = .084) and (r = .072). In reference to the independent variables, ICP and CCC have strong negative correlation with ACP i.e. (r = -.829) and (r = -.912) respectively, APP has a strong positive correlation .i.e. (r = .924) while DR and LOS continue to depict weak correlations with the other independent variables. This scenario implies existence of multi-collinearity.

4.5 Regression Analysis

The study regressed Return on Assets (ROA) against Variables of the Working Capital Management. Using SPSS, to estimate the relationship between ROA as a measure of profitability and the WCM variables, the results were obtained as shown in table 4.5 below.

Table 4.5: Model Summary for the Years 2009-2013

Model	R	R-square	Adjusted R square	STD Error of the Estimate	P-value
1	.987	.974	.967	0.027	0.001

Source: Research Findings

The table 4.5 above shows the R^2, which is the coefficient of determination and the adjusted R^2, which is less biased and therefore gives the best estimate. The estimates are statistically significant ($p<0.05$). The coefficient of determination of .967 or 96.7% shows that up to 96.7% of variation in profitability (ROA) can be explained by the factors or variables of working capital management. However, 3.3% is due to other intervening factors. Since the model is statistically significant ($P<.05$), we can conclude that the model suitably describes the relationship between working capital management and profitability.

4.5.1 Analysis of Variance – ANOVA

	Df	SS	MS	F	Significance F
Regression	6	0.6653	0.111	136.9	.000
Residual	23	0.0186	0.001		
Total	29	0.68395			

Source: Research Findings

Since the results of the Analysis of Variance (ANOVA) are significant (Sig F<.05), we can conclude that the independent variables (ACP, ICP, APP, CCC, DR and LOS) are statistically acceptable as useful in predicting the Returns on Assets-ROA.

A multiple linear regression was done on the Average Collect Period, ACP; Inventory Collection Period, ICP; Average Payment Period, APP; Sales, LOS and Debt ratio, DR. The assumption is that, Returns on Assets changes as the values of independent variables decreases or increases.

To achieve this, the model was formulated as shown;

$$ROA = \beta 0 + \beta_1(ACP) + \beta_2(ICP) + \beta_3(APP) + \beta_4(LOS) + \beta_5(DR) + e$$

ROA: Return on Asset of the firms obtained by dividing the net income by the total assets for each firm

$\beta 0$: The beta of the firm (intercept of the equation)

$\beta_1 \ldots \beta_6$: Coefficients of different independent variables for working capital management of firms

ACP: Average Collection Period i.e. total number of days that accounts receivable are turned into cash and calculated by dividing account receivables by sales and multiplying the result by 360 days.

ICP: Inventory Collection Period; obtained by dividing inventory by sales and multiplying the result by 360 days.

APP: Average Payment Period i.e. the number of days it takes to settle accounts payable.

LOS: Natural Logarithm of the total Sales

DR: Debt Ratio i.e. Total Debt divided by Total Assets

e: The error term

Table 4.7: Regression Coefficients for the Years 2009-2013

	Coefficients	**Std Error**	**t-value**	**P-value**
Constant	.394	.1184	3.32	.003
ACP	-.002	.00065	-2.56	.017
ICP	-.004	.00028	-14.57	.000
APP	-.001	.00015	-4.94	.000
CCC	-.001	.00009	-7.33	.000
DR	-.001	.00638	-.16	.870
LOS	.006	.01712	.36	.721

Source: Research Findings

The model gave the equation below;

ROA =.394+006(LOS) -.002(ACP) -.004(ICP) -.001(APP) -.001(DR)-.001(CCC)

The results shows that the constant term is .394, implying that holding the variables under consideration to zero, there could be a return of .394 on Assets. This could be due to other factors not considered in this study.

The regression coefficient for the Average Collection Period is (-.002, $p<.05$), this indicated that holding other independent variables to zero, an increase in ACP by 1 unit results to a decrease of 0.002 units on returns. This implies that the number of days that AR is turned into cash should be minimized to increase profitability. The coefficient for the Inventory Collection Period is (-.004, $p<.05$), this indicated that holding other independent variables to zero, an increase in ICP by 1 unit results to a decrease of 0.004 units on returns. It implies that the total number of days taken before inventories are sold should be minimized to boost returns.

The coefficient for the Average payment Period is (.001, $p<.05$), this indicated that holding other independent variables to zero, an increase in APP by 1 unit results to an increase of 0.001 units on returns. It implies that the period taken to settle account payables should be longer to increase profitability of these firms. The coefficient for the CCC is (-.001, $p<.05$), this indicated that holding other independent variables to zero, an increase in CCC by 1 unit results to a decrease of 0.001 units on returns. The period taken to settle account payables should be increased to boost profitability. The coefficient for the Debt Ratio is (-.001, $p>.05$). However, the test is statistically insignificant. So we cannot conclude that the higher the debt ratio, the higher the returns or vice versa. Debts may impact either positively or negatively on overall performance of a firm. An optimum ratio of debts to assets should therefore, be established to enable the firms maintain the right balance of total debts to total assets.

4.6 Discussion of Findings

Descriptive statistics were used to measure both profitability (ROA) and working capital management variables (WCM). The study established that the ROA among sugar companies in Kenya is 0.04 (4%) with a standard deviation of 0.15. The firms have an ACP of 50.24 days with a standard deviation of 29.46. The average ICP is 70.61 days with a standard deviation of 37.18 while the APP is 242.74 days. The average CCC is -222.73 days with a standard deviation of 302.09. The negative CCC shows that the sugar firms on average get paid 222.73 days earlier by their customers before they pay their creditors. Debt Ratio is 0.85.

In terms of WCM ratios and ROA for the individual firms, apart from Muhoroni Sugar Company which had a negative mean for ROA of -0.09, all the others had positive Return on Assets. The best performing in this respect was Mumias Sugar Company (mean 0.12) while the least performing was Muhoroni Sugar Company (mean -0.09). Muhoroni Sugar Company had the least ACP of 40.62 days while Mumias Sugar Company had the highest at 73.00 days. Muhoroni Sugar Company had the highest ICP of 98.08 days while Mumias Sugar Company had the lowest of 49.96 days. Mumias Sugar Company had the highest APP of 464.82 days while Muhoroni Sugar Company had the lowest of 152.15 days. Mumias Sugar Company had the most CCC of -507.72 days while Muhoroni Sugar Company had the least of -83.28 days.

Profitability across the six companies was highest in 2009 (mean 0.16) and lowest in 2013 (mean -0.06). ACP was high in 2009 at 76.18 days and fell steadily to 36.90 days in 2013. The highest ICP was in 2013 having 94.78 days while the lowest was in 2009 with 46.80 days. APP experienced a decline from a high of 486.26 days in 2009 to a low of 168.79 in the year 2011 but with an increase to 185.50 days in 2013. CCC was negative throughout the period of study though it fluctuated between -1 day and -574.78 days. DR maintained an

average of 1 in the years of study. These findings suggest that the ratios are invariant with regard to time.

On correlation analysis, the dependent variable - ROA, the ACP and APP have a strong positive correlation with ROA, (r =.808) and (r=.715) respectively. ICP and CCC on the other hand, have a strong negative correlation with ROA, (r =-.946) and (r =-.75) respectively while DR and LOS both have weak positive correlations of (r = .084) and (r = .072). In reference to the independent variables, ICP and CCC have strong negative correlation with ACP i.e. (r = -.829) and (r = -.912) respectively, APP has a strong positive correlation .i.e. (r = .924) while DR and LOS continue to depict weak correlations with the other independent variables. This scenario implies the existence of multi-collinearity.

The coefficient of determination (R^2) of .974 or 97.4% shows that up to 97.4% of variation in profitability (ROA) can be explained by the factors or variables of working capital management. However, 3.3% is due to other intervening factors. Since the model is statistically significant ($P<.05$), we can conclude that the model suitably describes the relationship between working capital management and profitability.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter mainly focuses on the discussions drawn from the data findings that are analysed and presented in chapter four. The chapter is structured into summary, conclusions, recommendations for policy and practice, limitations of the study and recommendations for further study.

5.2 Summary

The study analysed the relationship between working capital management and profitability of sugar producing companies in Kenya. Return on Assets (ROA) was the dependent variable used to measure the firm's profitability while ACP, ICP, APP, CCC, LOS and DR were the independent variables representing working capital management measures. The research design used was descriptive in nature where data was obtained from the audited financial reports of the sugar companies over a five year period from 2009 – 2013.

The firms had a Return on Assets of 4% while the total number of days that accounts receivable were turned into cash on average (ACP) was 50.24 days. Inventory Collection Period (ICP) was 70.61 days on average when the number of days it took to settle accounts payable (APP) was 242.74 days. The Cash Conversion Cycle which is the period in days between when a firm makes payment and when it receives a payment was negative 222.73 days.

Pearson correlation analysis was undertaken through SPSS software to determine the nature and strength of the relationship between working capital management and profitability of sugar producing companies in Kenya. The study showed that there was a strong positive relationship between ACP, APP variables and ROA. ICP and CCC had a strong negative relationship with ROA. ICP and CCC had strong negative relationship with ACP while APP had a strong positive correlation with ACP. DR and LOS exhibited weak correlation with both ROA and other independent variables.

Using the same SPSS software, a regression analysis was done and a coefficient of determination (R^2) of 0.974 or 97.4% was obtained. This implies that 97.4% of variation in profitability (ROA) can be explained by the factors or variables of Working Capital Management. However, 2.6% is due to other intervening factors. Since the model is statistically significant ($P<.05$), we can conclude that the model suitably describes the relationship.

The results of regression coefficient showed that the constant term is .394, implying that when other variables under consideration are held to zero; there could be a return of .394 on Assets. This could be due to other factors not considered in this study. The regression coefficient for the Average Collection Period is (-.002, $p<.05$), this indicated that holding other independent variables to zero, an increase in ACP by 1 unit results to a decrease of 0.002 units on returns. The coefficient for the Inventory Collection Period is (-.004, $p<.05$), this indicates that holding other independent variables to zero, an increase in ICP by 1 unit results to a decrease of 0.004 units on returns.

The coefficient for the Average payment Period is (.001, $p<.05$), this indicates that holding other independent variables to zero, an increase in APP by 1 unit results to an increase of

0.001 units on returns. The coefficient for the CCC is (-.001, p<.05), this indicates that holding other independent variables to zero, an increase in CCC by 1 unit results to a decrease of 0.001 units on returns. The regression coefficient for Debt Ratio (DR) is (-.001, p<.05), this indicated that holding other independent variables to zero, an increase in DR by 1 unit results to a decrease of 0.001 units on returns.

5.3 Conclusions

The results of regression coefficient showed that the constant term is .394, implying that when other variables under consideration are held to zero; there could be a return of .394 on Assets. This could be due to other factors not considered in this study. The regression coefficient for the Average Collection Period is (-.002, p<.05), this indicated that holding other independent variables to zero, an increase in ACP by 1 unit results to a decrease of 0.002 units on returns. This implies that the number of days that AR is turned into cash should be minimized to increase profitability.

The coefficient for the Inventory Collection Period is (-.004, p<.05), this indicates that holding other independent variables to zero, an increase in ICP by 1 unit results to a decrease of 0.004 units on returns. It implies that the total number of days taken before inventories are sold should be minimized to boost returns.

The coefficient for the Average payment Period is (.001, p<.05), this indicates that holding other independent variables to zero, an increase in APP by 1 unit results to an increase of 0.001 units on returns. It implies that the period taken to settle payables should be made longer to increase profitability of these firms.

The coefficient for the CCC is (-.001, p<.05), this indicates that holding other independent variables to zero, an increase in CCC by 1 unit results to a decrease of 0.001 units on returns. It implies that the CCC which the length of time between when a firm makes payment and when it receives cash inflow should be minimized to increase profitability.

The regression coefficient for Debt Ratio (DR) is (-.001, p<.05), this indicated that holding other independent variables to zero, an increase in DR by 1 unit results to a decrease of 0.001 units on returns. Debt was however, found not to directly influence the level of profitability of the Sugar producing companies in Kenya. There is need to manage working capital variables to boost performance by ensuring that accounts receivables are collected in the shortest time possible and payables are stretched for longer period possible to increase profitability of firms. Inventories should also not be kept for long before they are sold out.

The study concludes that there exists a relationship between working capital management and profitability of sugar producing companies in Kenya.

5.4 Recommendations for Policy and Practice

The study recommends that sugar producing companies should have working capital management ratios that will help them to remain profitable. This they can achieve by observing the duration of their Accounts Receivable Days which should be shorter, Accounts Payable Days which should be longer and optimum Debt Ratio.

Appropriate working capital management policy is helpful in decision making on the investment mix, asset allocation, risk and return balancing. Firms should also build good relations with their customers, suppliers and other financiers to build confidence and good business working environment to enhance performance.

5.5 Limitations of the Study

Since half of the licensed sugar factories are private companies, availability of their financial reports was challenging as these reports are regarded as confidential. Some of the sugar factories are owned and funded by the government. Existing government bureaucracies and inefficiencies made it also challenging to obtain timely and complete information on the government funded companies.

Time – the period for carrying out the research was a bit short given that the population of study was in different geographical locations. The researcher believes that if the period was longer, then it would have been better.

The size of the population could have limited confidence in the results and this might limit generalizations to other situations.

Project related costs were a real challenge to the study. The costs for transport, internet, telephone calls, stationery and data analysis software were some of the challenges.

5.6 Recommendations for further study

Further research should be carried out in other manufacturing sectors such as plastics manufacturing, to assess the impact of working capital management on the profitability of firms involved.

Use of other control variables to measure working capital should also be applied to enhance comparison of working capital management and profitability.

The relationship between working capital management and other aspects such as growth and investments can be measured over and above profitability.

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APPENDIX I: List of Registered Sugar Producing Companies in Kenya as at 01/07/2014

1. Nzoia Sugar Company
2. Chemelil Sugar Company
3. Muhoroni Sugar Company
4. Sony Sugar Company
5. Mumias Sugar Company
6. Kibos Sugar & Allied Industries
7. Butali Sugar Company
8. Soin Sugar Company
9. West Kenya Sugar Company
10. Kwale International Sugar Company

Source: www.kenyasugar.co.ke

APPENDIX II: Data Sheet

	ROA	ACP	ICP	APP	CCC	DR	LOS
2009	0.3500	113.4	22	792.6948	-1138.2	0.686218	7.1
	0.1000	88.1	36	618.6939	-600.4	1.012177	6.7
	0.1000	76.7	38.8	569.1752	-588.9	0.5816	6.6
	0.0400	38.7	71.8	137.17	-97.2	3.028829	6.7
	0.3500	112.2	24.3	693.2835	-965.3	0.5681	6.6
	0.0100	28	87.9	106.5127	-58.7	0.350794	6.2
2010	0.0100	27.9	93.3	102.8211	-44.9	0.93729	6.8
	0.0100	29.8	74.2	106.8328	-62.7	0.309745	6.7
	0.0500	55.1	62.2	177.1949	-132.3	0.225097	7.2
	0.0500	54.4	62.8	148.083	-123.5	3.271638	6.6
	0.0900	75.7	44.2	369.4193	-341.6	1.189565	6.7
	0.0900	69.1	44.2	310.3778	-270.5	0.377161	7.2
2011	-0.0300	18.8	101.6	96.60295	1.5	1.628721	7.1
	0.0900	68.4	45.2	294.0918	-244.3	0.418962	6.6
	-0.0200	23.6	98.1	97.84356	-28.6	1.004773	6.8
	-0.0200	23.9	96.7	102	-32.5	0.222473	6.5
	0.0700	62.9	56.3	241.5271	-178.6	0.594928	6.7
	0.0600	61.1	56.7	180.6832	-161.9	0.410565	6.6
2012	0.0600	55.3	61.6	178.024	-138.4	0.46341	6.8
	-0.1200	13.6	106.8	79.18252	23	0.187701	5.7
	-0.0600	13.7	103.6	87.81879	17.5	0.137982	6.7
	0.0500	45.7	63.3	145.8528	-110.8	0.821478	6.4
	0.0800	66.1	47.1	276.5177	-221.4	0.564619	6.2
	0.0800	63.7	51	256.7269	-181	0.398951	6.5
2013	-0.5500	9.4	214.3	66.13927	41.9	0.129694	6.8
	0.2500	99.6	27.1	632.8358	-837.6	0.021111	6.5
	0.0200	31.6	72.6	108.6851	-70.2	0.934915	7.2
	0.0400	37.3	72	119.7461	-91.7	3.222938	6.7
	0.0400	32.4	72.6	118.0082	-83	1.586445	6.8
	-0.1300	11.1	110.1	67.58409	38.4	0.196677	6.8