

# **Working capital management efficiency and corporate profitability: Evidences from quoted firms in Nigeria**

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## **Abstract**

Decisions relating to working capital involve managing relationships between a firm's short-term assets and liabilities to ensure a firm is able to continue its operations, and have sufficient cash flows to satisfy both maturing short-term debts and upcoming operational expenses at minimal costs, increasing corporate profitability. Research results from compared working capital costs and returns of 22 quoted firms on the Nigerian Stock Exchange evidencing improved gross working capital positions using the difference between means show that costs of working capital exceed returns on working capital investments affecting their profitability. To redress this anomaly and improve net returns and corporate profitability from the use of working capital, quoted firms in Nigeria should optimize working capital investments to avoid over investment with its attendant

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inventory costs, lost returns on excess cash holdings and receivables; and under investment with its attendant stock-out, illiquidity and bad debts costs; determine its working capital policies ensuring it improves corporate profitability; appraise investments in working capital using capital investment models, determining ahead the viability of such investment; and ascertain and compare working capital costs and benefits to determine the existence of gains if any before investment in the proposed working capital.

**JEL classification numbers:** G3, M2

**Keywords:** working capital, corporate profitability, investments and operational efficiency

## 1 Introduction

Organizations invest their funds in assets that have long life Span, fixed assets, which it can use for operating for a long period. These are the core tools for functioning the organization to produce goods and services to meet customers' needs. Acquisitions of these assets are not an end in itself. Inputs materials are needed, for running through these fixed assets to produce products and services that will meet the needs of customers. Finance is also required to ensure that these input materials are available when needed. These input materials and finance for acquiring them regularly for firm use, ensure that fixed assets are in use and working.

Investments in these items are necessary for the working of fixed assets and the firm. In financial theory, working capital is the composite of current assets and liabilities. Assets necessary for the working of fixed assets are inventories, cash and accounts receivables; and liabilities necessary for the working of fixed assets are accounts payables.

Minimization of investments in these assets according to Helfert [14] relative to the level and patterns of a firm's operations is a crucial element in the total management of operating funds. Efficiency in the management of these investments, he added, require a clear understanding of the economics of trade-off involved in it.

Pandey [19] noted that excessive working capital results in unnecessary accumulation of inventories leading to inventory mishandling, wastage and theft; higher incidence of bad debts; complacency of management inefficiency; increasing speculative profit from accumulated inventories and consequent loss of profits. Inadequate working capital, he added, stagnate growth from investment capital inadequacies, increased operating inefficiencies; increased inefficiencies in the utilization of fixed assets, making operating plans implementation difficult reducing profitability.

Findings from Hayajneh and Yassine [13] on Jordanian firms; Amarjit et al [1] on American firms; Samiloglu and Demirgunes [21] on Turkish firms; Vedavinayagan [24] on telecommunication firms in the United States of America; Raheman and Nasr [20] on Pakistani firms and Filbeck and Krueger [9] suggest improved corporate profitability from improved gross working capital investments.

The purpose of this study is to ascertain if there exists any improvement in profitability of quoted firms in Nigeria from improved gross working capital position due to increase in liquidity for acquisition of current assets from improved access to bank finance and capital base increase of banks themselves in Nigeria.

## **2 Theoretical framework and review of literature**

### **2.1 Theoretical framework**

Working capital decisions provide a classic example of the risk-return nature of financial decision making. Increasing a firm's net working capital, current assets less current liabilities, reduces the risk of a firm not being able to pay its bills on time. This at the same time reduces the overall profitability of the firm. Working capital management involves the risk-return trade-off: not taking additional risk unless compensated with additional returns.

The existence of a firm according to Ross [25], depend on the ability of its management to manage the firm's working capital. Working capital management involves the process of converting investment in inventories and accounts receivables into cash for the firm to use in paying its operational bills. As such, working capital management she added, is thus at the very heart of the firm's day-to-day operating environment, and improving corporate profitability.

### **2.2 Review of literature**

#### **2.2.1 Components and determinants of working capital**

The working capital of a firm is a combination of its short term assets and liabilities. Current assets of a firm are made up of accounts receivables, trade credit and consumer credit; inventory, raw materials, work-in progress and finished goods; cash and all receipts falling due within a year.

Current liabilities consists of accounts payable for purchases, overdrafts, loan repayments falling due within a year, and other payments to government falling due within a year.

The components of working capital a firm invests in and its level of investments is a function of firm's operating factors. Investment in accounts

receivable, is determined by the firm's credit policy. The longer the credit period given to a customer, the higher will be its investments in accounts receivables [5].

Investment in inventory is a function of the cost of holding such inventory, storage, obsolescence, opportunity cost of investments in inventory, rate of return on other equivalent-risk investment opportunities. The higher the cost of holding inventory, the lower will be the level of inventory a firm will hold. Discounts on bulk purchases also determine the amount of inventory held in a firm. Benefits of holding inventory are reduction in stock-outs for production and sales with its attendant costs.

The quantity of cash held by a firm is traditionally the function of its potential usage and returns on investing idle funds. Potential usages of cash are the transactionary, precautionary and speculative purposes. High probability of potential usage of cash increases its level in a firm. Probability of profitable returns on cash investments in treasury bills, fixed and savings, reduces the amount of cash held by a firm. The level of current liabilities of a firm is a dependent upon the trade credit policies of suppliers, availability of cheap bank credit and government extension of payments from the company to the government; with each affecting corporate profitability positively or negatively.

### **2.2.2 Corporate working capital management efficiency**

Decisions relating to working capital and short-term financing are referred to as working capital management. It involves managing relationships between a firm's short-term assets and its short-term liabilities. Its goal is to ensure that a firm is able to continue its operations and that it has sufficient cash flow to satisfy both maturing and short-term debts, and upcoming operational expenses. Working capital decisions are reversible and based on cash flows and profitability. Measurement of a firm's cash flow is by the cash conversion cycle, the net of days from the outlay of cash for raw materials, to receiving payments from customers. This metric makes explicit the inter-relatedness of decisions relating to

inventories, accounts receivables and payable, and cash. This effectively corresponds to the time that the firm's cash tied up in operations and unavailable for other activities.

The profitability measure of a firm's working capital compares the returns on capital (ROC) which results from working capital management, with the cost of capital, resulting from investment decisions. Firm value is enhanced when ROC exceeds cost of capital. In combination of these criteria, firms' management combines policies and techniques for managing of working capital. These policies aim to manage current assets, cash and its equivalents, inventories, debtors, and short-term financing such that cash flows and returns are acceptable. Cash management identifies the cash balance which allows for the business to meet day-to-day expenses while reducing cash holding costs. Inventory management identifies the level of inventory which allows for uninterrupted production while reducing investments in raw materials and minimizing re-ordering costs, and hence increasing cash flow.

Debtor management identifies appropriate credit policy i.e. credit terms which will attract customers, such that any impact on cash flows and the cash conversion cycle will be offset by increased revenue and hence return on capital. Short-term financing management identifies the appropriate sources of financing given the cash conversion cycle. Though it is agreed in financial theory that inventory is ideally financed by credit granted by the supplier, firms may need to utilize overdraft or convert debtors to cash through factoring.

Investments in customer credit in the form of accounts receivables and inventories of goods or materials are long-term resource commitments. Minimization of these investments relative to the level and pattern of a firm's operation is crucial in the total management of operating funds. The key to a successful management of customers credit and inventories according to Helfert [14], is a clear understanding of the economies of trade-offs involved in it.

Credit terms are a function of the competitive environment as well as of a careful assessment of the nature and credit worthiness of the customers. Involved in this is the decision on whether extended credit terms, and the resulting rise in receivables outstanding are compensated for by the contribution from any incremental sales gained. Similarly, extending normal credit to marginal customers need to be carefully assessed in terms of risk of delayed payments or default, compared with contribution from sales gained.

To forestall adverse effects of credit on firm operators, working capital efficiency require constant updating of credit performance, and developing sound criteria for credit extension. Efficiency in credit management ensures that a firm is able to pay its bills on time and carry sufficient stocks [18].

Inventory management in successful firms, according to Helfert [14], has evolved into a rigorous process of maximizing assets. This he added is made possible by advances in information technology, leading to reduction in inventory levels. Efforts to reduce investments in inventory yielded the just-in-time deliveries by suppliers to customers and carefully rescheduled restocking triggered by instantaneous purchase data from supplies available in the press and the internet. In effect, these techniques have created a close relationship between major suppliers and customers usually with electronic linkages of inventories, order, processing and production scheduling. This allows for timely co-ordination of schedules and minimization of firm inventories and associated investments costs.

Trade credit from suppliers and accounts payable, helps offset receivables and inventories. Efficiency in working management requires a firm to make use of credit terms extended to it, balancing such with favourable trade-offs for early payments from customers with discounts. Accounts payable, a form of working capital finance to this end should be maximally used by firms.

Helfert [14] suggested the exceeding of normal credit terms deliberately, as such making the interest pay-off more favourable; cautioning of the risk of

affecting the company's credit standing if delays beyond the credit terms granted, become habitual. Sound management of suppliers' credit, thus requires current up-to-date information on accounts and aging of payables to ensure proper payments.

Firms are going concerns requiring working capital for its day-to-day operations. Though current, their investments should be considered a long-term commitment to ensure proper planning and commitment of resources, unless the firm is characterized by significant seasonal or cyclical fluctuations. This central importance of working capital to the operational efficiency has co-opted firm's to put much emphasis on adequate planning, co-ordination and control of its working capital to reduce associated costs and increase revenues and profitability.

Management of working capital in financial theory is possible using ratios. The ratios used to analyze components of working capital, attempts to express the relative effectiveness with which inventories and receivables are managed. They aid in detecting signs of deterioration in value, or excessive accumulation of inventories and receivables. Inventories are related to sales and cost of sales to determine of changes in relationship overtime. Accounts receivables are also related to sales to determine changes overtime. The debtors-to-credit sales ratio establishes how quickly cash is being collected from credit sales; and creditors-to-purchases ratio to establish the length of time it takes a firm to pay its suppliers. The liquidity ratios, of current and acid-test, are used to determine the responsiveness of a firm to pay for its liabilities. Ideal levels of these ratios are 2:1 for current ratio, and 1:1 for acid-test ratio.

Working capital turnover ratio focuses on working capital items only, relating sales revenue to working capital. The cash conversion cycle determines the length of time for cash to complete the operating cycle, from time of purchase of materials with cash to time of sales and recovery of cash. This cycle according to Anthony et al [2] and Gitman [11], a measure of firm's liquidity, indicates the time interval for which additional short term financing might be needed to support sales.



These measures of turnover, gives an indication of how well a firm manages particular subsets of its assets, and regular analysis ensures early detection of signs of deterioration in value or excessive accumulation of inventories and receivables.

### **2.2.3 Working capital management, corporate operational embarrassments and profitability**

Firms acquire fixed assets with which it intends carrying on its business. These are long-term and capital in nature. They require consumable inputs to yield the desired purpose for their acquisition. The consumables are necessary for the operation of fixed capital assets of the firm. These consumables are raw materials, finance, labour and overheads. The combination of these for production and service delivery, outputs finished products and services to meet customer needs and firm sales and profit objectives. These consumable inputs and product outputs are necessary for proper operation of a firm. Their absence causes embarrassment to the firm.

Illiquidity makes a firm unable to meet its cash requirements: payment for raw materials, salaries, overheads and debts. Non-availability of raw materials will result in a firm being unable to meet production runs, with resultant production shut down; and inability to meet customer demand. This is more pronounced in period of expanding sales [3]. Insufficient cash result in delay in payment to suppliers, lenders, labour and payment for overheads; resulting in withdrawal of input supplies by suppliers. These affect production, cause labour strike and turnover, absence of necessary overheads for production and operation; and finished goods supply shortage. Insufficient finished goods to meet customer demands cause customer disappointment, loss of their goodwill and patronage, lost sales and profit. The non-availability of these consumables -components of working capital- result in disruption of production and disappointment of customers.

Carrying out the day-to-day business of a firm is essential for achieving the operational, sales and profit objectives of the firm. Prompt execution of production and sales schedules is a function of prompt delivery of raw materials inputs, provision of overheads, payment for labour services and availability of finished goods. The profit level of a firm is a measure of efficiency in the use of firm resources in operation, measured as the difference between cost of operation and sales.

The lower the cost expended on operations in a firm, the higher will be the profit of the firm, a measure of operational efficiency. Input materials, overheads, labour and finished goods quality should be high and cheap to achieve production efficiency, high patronage and profit.

Meigs and Meigs [26], noted that for a firm to remain solvent and be in operation, it must determine its needed working capital at all times, compare it with that available, identify the sources of its working capital and raise the needed working capital. Shin and Soenen [23] concluded from their study of the relationship between working capital and value creation (profitability) to shareholders that there exists a strong negative relationship between the length of a firm's net-trade cycle and profitability suggesting the reduction in a firm's net trade cycle to reduce operational embarrassments and create value for shareholders. Furthering, Deloof [6] argued conclusively from his study of 1,009 large Belgian non-financial firms from 1992-1996 that there exists a significant negative relationship between gross operating income and the number of days accounts receivable, inventories and accounts payable; noting that increasing corporate profitability is feasible through the reduction in the number of days for accounts receivable and inventories. Efficiency in the management of working capital reducing operational embarrassments according to findings by Ghosh and Maji [12], improved the efficiencies and profitability of Indian cement companies during the 1992-1993 periods to the 2001-2002 periods.

#### **2.2.4 Efficient working capital management, operational efficiency and corporate profitability**

Working capital decisions provide a classic example of the risk-return nature of financial decision making. Increasing a firm's net working capital, current assets less current liabilities, reduces the risk a firm not being able to pay its bills on time. This at the same time reduces the overall profitability of the firm. Working capital management involves the risk-return trade-off: not taking additional risk unless compensated with additional returns. The existence of a firm according to Ross [25], depend on the ability of its management to manage the firm's working capital. Working capital management involves the process of converting investment in inventories and accounts receivables into cash for the firm to use in paying its operational bills. As such, working capital management he added, is thus at the very heart of the firm's day-to-day operating environment. Cash management identifies the cash balance which allows for the business to meet day-to-day expenses while reducing cash holding costs. Inventory management identifies the level of inventory which allows for uninterrupted production while reducing investments in raw materials and minimizing re-ordering costs, and hence increases cash flow. Debtor management identifies appropriate credit policy i.e. credit terms which will attract customers, such that any impact on cash flows and the cash conversion cycle will be offset by increased revenue and hence return on capital. Short term financing management identifies the appropriate sources of financing, given the cash conversion cycle. Though it is agreed in financial theory that inventory is ideally financed by credit granted by the supplier, firms may need to utilize overdraft or convert debtors to cash through factoring.

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successful management of customers' credit and inventories according to Helfert [14], is a clear understanding of the economies of trade-offs involved in it.

Credit terms are a function of the competitive environment as well as of a careful assessment of the nature and credit worthiness of the customers. Involved in this, is the decision on whether extended credit terms, and the resulting rise in receivables outstanding, are compensated for by the contribution from any incremental sales gained. Similarly, extending normal credit to marginal customers need to be carefully assessed in terms of risk of delayed payments or default, compared with contribution from sales gained.

To forestall adverse effects of credit on firm operators, working capital efficiency require constant updating of credit performance, and developing sound criteria for credit extension. Efficiency in credit management ensures that a firm is able to pay its bills on time and carry sufficient stocks [18]. Inventory management in successful firms, according to Helfert [14] and Scott et al [22], has evolved into a rigorous process of maximizing assets. Trade credit from suppliers and accounts payable he added helps offset receivables and inventories. Efficiency in working management requires a firm to make use of credit terms extended to it, balancing such with favourable trade-offs for early payments from customers with discounts. Accounts payable, a form of working capital finance, should be maximally used by firms. Helfert, [14] suggested the exceeding of normal credit terms deliberately, making interest pay off more favourable; cautioning of the risk of affecting the company's credit standing if delays beyond the credit terms granted, become habitual. Sound management of suppliers' credit, thus requires current up-to-date information on accounts and aging of payables to ensure proper payments.

Working capital components are controllable by firm management. Empirical studies reveal that investments in firm's working capital have attendant costs and benefits. Firms reduce investments in inventories of raw materials to accumulate cash, with the risk of running out of inventories and production halt.

Reduction in money tied up in receivables, by reducing credit to customers result in their patronizing the firm's competitors. Cost of firm's investments in receivables is the interest that would have been earned if customers had paid up quickly or interest paid on finance borrowed to acquire the current assets. The firm also forgoes interest of investing such in marketable securities. The cost of holding inventory is the storage, insurance costs, risks of spoilage, obsolescence and the opportunity of cost of capital. These costs encourage firms to hold current assets to a minimum. Carrying costs discourages large investments in inventories; and low level of inventories make it more likely that the firm's will face shortage costs. Running out of inventory will result in production shut down. Holding a small finished goods inventory will result in inability of the firm fulfilling orders. Holding little cash will require the firm selling securities to meet up its cash, and incurring capital market trading costs. Minimization of accounts receivables, restrict credit sales and loss of customers. These according to Brealey et al [4], suggest the need for striking a balance between the cost and benefits of current assets; finding the level of current assets that minimizes the sum of carrying costs and shortage costs. Findings by Lazaridis and Tryfonidis [16] from their study of 131 firms listed on the Athens Stock Exchange between 2001 and 2006, showed a statistically strong relationship between profitability and behavior in a working capital component: cash conversion cycle. Furthering, Eljelly [7] observed from his study of 929 companies in Saudi Arabia that the size of working capital variables have significant effect on profitability at the industry level. From their study of 8,872 small to medium size enterprises in Spain from 1996-2002, Garcia-Teruel and Martnez-Solano [16] concluded that reduction in inventories and shortening of cash conversion cycle improve corporate profitability. To Mathuva [17], there exists a significant relationship between account collection period, inventory conversion period and average payment period; and profitability as evidenced from findings from his study of 30 firms listed on the Nairobi Stock Exchange from 1993-2008 countering an earlier conclusion by Kamath [15] of the

existence of a reverse relationship between cash conversion cycle and profitability. Findings from the Turkish firms by Samiloglu and Demirgunes [21] showed that accounts receivables period, inventory period and leverage significantly and negatively affect corporate profitability. Similar conclusions were drawn by Raheman and Nasr [20] from their study of 94 firms listed on the Karachi Stock Exchange from 1999-2004. Detailing, Hayajneh and Yassine [13] concluded that firm size, sales growth and current ratio (working capital components) affect corporate profitability from their study of 53 Jordanian manufacturing firms listed on the Amman Exchange from 2000-2006.

Firms are going concerns requiring working capital for its day-to-day operations. Though current, their investments should be considered a long-term commitment to ensure proper planning and commitment of resources, unless the firm is characterized by significant seasonal or cyclical fluctuations. This central importance of working capital to the operational efficiency thus require firm's to put much emphasis on adequate planning, co-ordination and control of its working capital to reduce associated costs and increase revenues.

### **2.2.5 The Nigerian economy and working capital management of quoted firms in Nigeria**

Nigerian firms as others the world over, utilize working capital for smooth operation. They plan for and manage their inventories, cash, receivables and payables, to ensure that requirements in these items are met. Raw materials are needed for production; finished goods inventory to meet customer demand and sales and profit objectives of firms. Cash is necessary to meet the liquidity of Nigerian firms. Considering the low per-capita income and disposable income of Nigerian consumers, Nigerian firms offer trade credit to customers, creating accounts receivables. These firms also take advantage of trade credit from other

firms, creating accounts receivables. The little working capital available to Nigerian firms is managed by them to avoid operational embarrassments.

The Nigerian economy characterized by low capacity utilization of firms, infrastructural breakdown, unstable monetary policies, lack of local raw materials inputs, unstable foreign exchange market, multiple taxation, low level of disposable income and purchasing power of citizens, and high cost of finance, has negatively impacted on the working capital situation of Nigerian firms. Liquidity situations of these firms are negative due to the high interest charged on bank loans obtained by them to meet short-term financial obligations, also necessitated by failed trade credit policies to customers. Multiple taxes by the three tiers of government have worsened the financial situations of Nigerian firms.

Raw materials inputs, mostly imported, are affected by unstable foreign exchange market and monetary policies of the government. Raw materials inventory are thus affected by inadequate foreign exchange for importation, delays in clearing at the Nigerian port, and poor transportation network. These affect the production runs of Nigerian firms and delivery of finished goods to customers. Retailers importing finished goods are also affected by these factors. Local delivery of raw materials to firms and delivery of finished goods to customers, are hampered by poor transport infrastructures in the country. Low level of disposable income and purchasing power of citizens affect patronage of firms' products. This does not favour holding of large inventories with attendant costs. Thus firms opt for the just-in-time system which is negatively affected by poor infrastructure. High cost of debt/overdraft in Nigeria limited the short-term finance of Nigerian firms to collections on sales, hampering growth in net working capital.

These factors have negatively affected the working capital positions, planning, management, and the operational efficiencies of Nigerian firms, exposing them to operational embarrassments, though improvements in working capital positions of quoted firms have been recorded since increase in capital base of banks to N25billion.

### 3 Methodology

#### 3.1 Hypothesis

The following hypothesis is tested on the assured relationship between the identified variables:

**H<sub>0</sub>** : Gross working capital investments in quoted firms in Nigeria are not profitable

i.e. returns from gross working capital investment ( $U_1$ )  $\leq$  costs of gross working capital investments ( $U_2$ )

**H<sub>1</sub>**: Gross working capital investments in quoted firms in Nigeria are profitable

i.e. returns from gross working capital investment ( $U_1$ )  $\geq$  costs of gross working capital investments ( $U_2$ )

#### 3.2 Data description

Data from annual reports of 22 quoted firms from eight sector categorization of the Nigerian Stock Exchange (banking-9, petroleum-1, healthcare-2, breweries-2, industrial products-1, food and beverages-5, building materials-1, and conglomerates-1) for the year 2010 after recorded improvements in working capital positions caused by improved access to bank finance for acquisition of gross working capital (for quoted manufacturing firms), and improved liquidity position for banks. Percentage of income to gross working capital (column 6 in Table 1) and working capital costs (column 7 in Table 1) were computed from data obtained from annual reports of sampled firms.



Table 1: Gross working capital, net working capital, percentage returns and costs of gross working capital

Company	Current assets (N'000)	Current liabilities (N'000)	Net working capital (N'000)	Operating profit (N'000)	% Return on gross working capital(U <sub>1</sub> )	Cost % on gross working capital (U <sub>2</sub> )
Oando plc	159,933,058	191,383,683	(31,450,625)	10,667,689	6.7	13.25
Nigerian Breweries	40,284,272	44,879,902	4,595,690	10,992,047	27.3	42
Lafarge	17,668,945	58,070,071	(40,401,126)	8,464,365	47.91	39.2
Neimeith Pharmaceutical	2,578,298	1,255,065	1,323,233	(40,501)	-1.57	14.12
Guinness Nigeria plc	38,327,725	30,648,377	7,679,348	19,988,975	52.15	65
Dangote flour Mills plc	35,699,406	43,538,749	(7,839,343)	1,758,137	4.92	23.4
First Bank plc	1,793,314,000	1,964,632,000	(171,318,000)	33,537,060	1.87	27.6
Flour Mills of Nig plc	53,095,500	52,732,100	363,400	24,439,500	46.03	36
UBA plc	1,157,925,000	1,438,270,000	(280,345)	3,219,000	0.28	23.17
Access Bank plc	550,491,898	490,034,284	60,457,614	28,105,815	5.11	23.59
Cadbury Nigeria plc	9,313,300	23,180,500	(13,867,200)	(2,370,000)	-25.45	32.61
Nestle	18,845,800	19,011,000	(165,200)	13,783,200	73.14	23.81
Unilever plc	13,706,482	12,404,654	1,301,828	5,661,052	41.3	24.2
7up plc	13,287,000	11,617,700	1,669,300	2,223,400	16.74	42.75
Zenith Bank plc	1,458,294,000	1,406,782,000	51,512,000	50,672,000	3.47	28
SmithklineBeecham plc	7,290,000	4,626,000	2,664,000	2,470,000	33.88	25.41
Diamond bank plc	483,669,438	544,663,900	(60,994,462)	(8,174,413)	1.69	22
Intercontinental Bank plc	1,144,182,000	1,133,133,000	11,049,000	47,103,100	4.12	33.61
Wema Bank plc	108,103,307	188,307,351	80,204,044	12,964,108	12	20.08
Fidelity Bank plc	364,069,000	343,574,000	20,495,000	3,760	1.03	34
Oceanic Bank plc	392,841,890	1,032,375,200	639,533,310	(117,865,654)	-30	36
Vitafoam plc	4,258,166	3,127,623	1,130,543	823,232	19.33	44.06
			Total		<b>401.96</b>	<b>673.86</b>

Source: Corporate annual reports for 2010

From Table 1, we obtain the descriptive statistics of the data for  $U_1$  and  $U_2$  shown in Table 2.

Table 2: Descriptive Statistics of data for  $U_1$  and  $U_2$  of sampled firms

	N	Minimum	Maximum	Sum	Mean		Std. Deviation	Variance
	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Statistic
U1	22	-25.45	73.14	401.95	18.2705	4.92761	23.11256	534.190
U2	22	13.25	65.00	673.86	30.6300	2.48032	11.63374	135.344
Valid N (listwise)	22							

### 3.3 Data analysis

To determine whether the returns on gross working capital is greater than the costs of gross working capital of sampled quoted firms, we use the one-tailed test for difference between two means (when the variances of the populations are unknown and the sample sizes are small). By assuming the same variance for the populations ( $\sigma_1 = \sigma_2 = \sigma$ ), we compute a pooled variance using the model:

$$S_p^2 = \frac{(n_1 - 1)S_1^2 + (n_2 - 1)S_2^2}{n_1 + n_2 - 2}$$

with  $S_p^2 = 175.35$ ;  $S_p = 13.242$ .

The standard deviation for the difference between means of the populations is:

$$\sigma_{\bar{x}_1 - \bar{x}_2} = S_p \sqrt{\frac{1}{n_1} + \frac{1}{n_2}} = 3.99$$

To test the significance of difference between population means, we use the t-test:

$$t = \frac{\bar{X}_1 - \bar{X}_2 - (U_1 - U_2)}{\sigma_{\bar{x}_1 - \bar{x}_2}} = -3.98$$

with  $(n_1 + n_2 - 2)df = 42$ .

The table value of  $-t_\alpha$  with 42 df = -1.303. Since the calc $t_\alpha$  of -3.98 is greater than  $tabt_\alpha$  of -1.303, reject  $H_0$  and accept  $H_1$  i.e. returns on improved working capital gross working capital investment positions of quoted firms in Nigeria is less than the cost of gross working capital investments of these firms indicating inefficiency in the use of their gross working capital investments; affecting negatively their profitability.

#### **4 Discussion of findings and conclusions**

Research results show that returns on improved working capital position of quoted firms in Nigeria are less than the cost of working capital of these firms indicating inefficiency in the use of working capital by these firms; affecting negatively their profitability. This negative result from the working capital returns and costs equation indicate low levels of returns to shareholders. With the improved gross working capital position of quoted firms in Nigeria, they still rely much on short term liabilities for financing short term capital, incurring more costs and reducing profitability. This is evidenced in Table 1 as 50% of sampled firms maintain negative working capital positions. Actual profits of quoted firms in Nigeria are high but operating profit to gross working capital (in percentage) is lower than the costs of working capital. Thus improved gross working capital position of quoted Nigerian firms has not improved the profitability of these firms.

Working capital decisions provide a classical example of the risk-return nature of financial decision making. Increasing a firm's working capital reduces risk of illiquidity and increases overall profitability. Its proper management requires trade-off of risks of and returns for financial efficiency of firm's operations which is not evidenced from results on quoted Nigerian firms.

## 5 Recommendations

To improve corporate profitability through efficient management of working capital, quoted firms in Nigeria should:

- (i) Optimize working capital investments to avoid over investment with its attendant inventory costs, lost returns on excess cash holdings and receivables; and under investment with its attendant stock-out, illiquidity and bad debts costs;
- (ii) Determine its working capital policies ensuring it improves corporate profitability;
- (iii) Appraise investments in working capital using capital investment models, determining ahead the viability of such investment;
- (iv) Ascertain and compare working capital costs and benefits to determine the existence of gains if any before investment in the proposed working capital;
- (v) Update their information on accounts payables and receivables as a reminder to ensure prompt payments for bills when due eliminating additional financial costs;
- (vi) Concentrate and localize working capital decisions to optimize investments in them and ensure proper planning /forecasting and control;
- (vii) Automate production, requisition, inventory, order, billing, sales and collection systems for early detection of firm net working capital deficiencies;
- (viii) Focus on cash flows, quick collection systems and discounts to improve on their working capital positions and operational efficiency;
- (ix) Periodically evaluate receivables and liquidity management processes to determine their effectiveness and efficiency, and where necessary changes put in place; and
- (x) Base working capital decisions on the net effects of such decisions on cash flow and profitability of the firm for optimal decision making.

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