

# RETURN ON NET WORKING CAPITAL (RONWC): A DIRECT OUTCOME MEASURE OF WORKING CAPITAL EFFICIENCY OF FIRMS

Punam Prasad, Narayanasamy Sivasankaran  
Indian Institute of Management, Ranchi

## Abstract

**Purpose:** The extant literature measures the impact of working capital efficiency on the profitability of firms using accounting measures such as ROA, ROCE, ROE, Gross Operating Income (GOI) and market measure of Tobin's Q. All these measures establish an indirect approach to study the association of working capital efficiency with the profitability of the firms. This paper establishes a direct relationship by introducing 'Return on Net Working Capital' (RONWC) as a new profitability measure of working capital management. Furthermore, an empirical test is conducted using the non-financial Indian firms and results are encouraging.

**Design/methodology/approach:** This paper investigates the relation between working capital efficiency and the profitability of the firms in the Indian context during the period 2011 to 2016 using panel regression model.

**Findings:** The study finds the existence of a significant negative relationship between return on net working capital (RONWC) and net trade cycle (NTC). Relationship between net trade cycle and conventional profitability measures like return on assets, return on equity, return on capital employed, gross operating income and Tobin's Q were also tested and found to be statistically insignificant. Regarding control variables, return on net working capital increases with firm size, age of the firm, operating cash flow, sales growth and leverage and the relationship between RONWC and the control variables were found to be significant as well.

**Practical implications:** This study contributes by aiding managers in measuring the impact of the investment in working capital on the profitability of their firms in a direct manner using return on net working capital.

**Originality/value:** The present study proposes Return on Net working Capital (RONWC) as a direct profitability measure of working capital efficiency to academia and practitioners.

**Keywords:** Working capital management; Working capital efficiency; Return on net working capital; Profitability; Net trade cycle

**Paper type** Research paper

## 1. Introduction

Corporate finance theory deals with four major decisions namely, capital structure (Modigliani and Miller, 1958; Jensen and Meckling, 1976; Myers and Majluf, 1984; Titman, 1988; Harris and Raviv, 1991), capital budgeting (Taggart, 1977; Gitman and Forrester, 1977; Burns and Walker, 2009; Bennouna et al., 2010), dividend payout (Litner, 1956; Brittan, 1966; Black, 1976; Baskin, 1989; Bhattacharyya, 2007) and working capital management. Working capital management is a very sensitive area in the field of financial management since it involves the decisions about the amount and composition of current assets and financing of the same (Joshi, 1995). Working capital management is the administration of current assets such as cash, marketable securities, receivables and inventories (Van Horne, 1977).

Some relevant research has been done on the individual components of working capital but a comprehensive view in this perspective is yet to be developed (Dewing, 1941; Ramey, 1989; Blinder and Maccini, 1991). Firms traditionally focused on capital budgeting and capital structure decisions whereas in the recent past, companies across different industries focused on working capital efficiency owing to the global financial crisis. The studies conducted on the relationship between working capital management and the global financial crisis resulted in two conclusions: (1) firms with sound working capital management practices fared better during the crisis than others; and (2) the crisis had led to changes in working capital management practices of all the firms (Liddell, 2008; KPMG, 2010). Working capital management is important because firms with inadequate or low levels of current assets face difficulties in running their day to day operations smoothly (Horne and Wachowicz, 2000; Eljelly, 2004) while firms with excessive levels of current assets have a negative effect on their profitability (Van, Horne and Wachowicz, 2004). Working capital management plays an important role in a firm's profitability, risk and firm value (Smith, 1980). It is an important issue in organizations since it is difficult to identify the basic drivers and an appropriate level of working capital (Lamberson, 1995). The way of managing working capital efficiently varies from firm to firm as it depends on the industry, nature of the business and its strategy.

Firms try to keep an optimal level of working capital that maximizes their value (Deloof, 2003; Howorth and Westhead, 2003 and Afza and Nazir, 2007). Over the years, many researchers have focused on determining the optimal level of each component of working capital. The consensus in academia seems to recognize the paucity of working capital management theory owing to the inherent difficulties in the development of a perfect working capital decision model. Researchers like Horrigan (1965), Luo (1985), Zhou (1995) and Su (2001) attempted to understand the factors that determine the working capital of firms and found that growth of the firm (Nunn, 1981, Deloof, 2003; Kieschnick, Laplante and Moussawi, 2006; Nazir and Afza, 2008; Appuhami, 2008; Nilsson et

al.,2010), firm size (DeLoof, 2003), leverage (Chiou, Cheng and Wu, 2006; Jeng-Ren, 2006; Nazir and Afza, 2008 and Nilsson et al., 2010), capital expenditure, financial expenditure and operating expenditure (Chiou, Cheng and Wu, 2006; Appuhami, 2008; Nilsson et al., 2010) have different levels of impact on the working capital management of the firms.

The existing literature on working capital management has established an indirect relationship between working capital efficiency and profitability of firms. The proxy used for working capital efficiency were cash conversion cycle (Gitman, 1974; Shin and Soenen, 1998; DeLoof, 2003; Lazaridis and Tryfonidis, 2006; Gill et al., 2010), weighted cash conversion cycle (Gentry, Vaidyanathan and Lee, 1990) and net trade cycle (Soenen, 1993). Profitability is measured using different traditional accounting measures such as return on capital employed (ROCE) (Jose et al., 1996), return on assets (ROA) (Jose et al., 1996; Chiou et al., 2006; Padachi, 2006; Garcia-Teruel and Martinez-Solano, 2007; Banos-Caballero et al., 2010), return on equity (ROE) (Jose et al., 1996) and gross operating income GOI (Banos-Caballero, Garcia-Teruel and Martinez-Solano, 2012) and Tobin's Q as a market-based measure (Nazir and Afza, 2008).

Academic research work carried over on the relationship between working capital efficiency (NTC / CCC) and profitability (ROCE/ROE/ROA/GOI/Tobin's Q) of firms have reported a mixed evidence, where some of them have reported a positive and significant relationship (Shin and Soenen, 1998; Lazaridis and Tryfonidis, 2006; Mathuva, 2009) the others have reported a negative and significant relationship (Kim and Sherman, 1998; Wang, 2002; DeLoof, 2003; Padachi, 2006; Garcia-Teruel and Martinez-Solano, 2007; Falope and Ajilore, 2009; Nazir and Afza, 2009; Banos-Caballero et al., 2010) between these two variables.

The extant literatures on working capital management posit an indirect approach to study the relationship between working capital efficiency and profitability of the firms. None of the existing studies directly measure the relationship between the two variables. To fill up this research gap, this paper introduces and empirically tests 'return on net working capital (RONWC)' as a direct profitability measure of working capital management.

The objectives of the paper are as follows:

- To introduce return on net working capital (RONWC) as a direct profitability measure of working capital management.
- To empirically test whether there is a direct relationship between working capital efficiency (measured by net trade cycle) and profitability (measured by RONWC) of firms.

The rest of the paper is organized as follows: the second section deals with literature review and the development of the concept of return on net working capital (RONWC). The third section presents the methodology documenting the sample selection, variables used and model specification. Analysis and discussion of the results is presented in the fourth section. The fifth section concludes the research and spells out the scope for future research.

## 2. Review of relevant literature and development of the concept of return on net working capital

Research on working capital management has been extensively investigated at empirical levels. Working capital management involves making an appropriate investment in current assets such as cash, marketable securities, receivables and inventories as well as the level and mix of short-term financing (Brigham and Daves, 2002; Emery et al., 2004). A firm may be able to reduce the investment in fixed assets by renting or leasing of plant and machinery but the same cannot be followed for the components of working capital. The management of working capital is important for the financial health of businesses of all sizes (Padachi, 2006).

Working capital management has a significant impact on both the liquidity and profitability of the firms (Shin and Soenen, 1998). The main purpose of a firm is to maximize profit and also to maintain liquidity. Increasing profits at the cost of liquidity can pose serious problem to the firms, hence they should strike a balance between these two objectives. If profits are ignored by the firms, they cannot survive for long and conversely if liquidity is not cared for it may lead towards insolvency. Hence, firms try to keep an optimal level of working capital that maximizes their value (DeLoof, 2003). Business failures are attributable to the inability of financial managers to plan and control current assets and current liabilities of their firms (Smith, 1973).

Present literature have used a number of proxies for working capital efficiency such as current ratio, quick ratio, cash conversion cycle and its variants like weighted cash conversion cycle, adjusted cash conversion cycle and net trade cycle. The conventional measures of corporate liquidity such as current ratio and quick ratio are of the static nature and their suitability in examining the firm's working capital efficiency has been questioned by many researchers (Emery, 1984; Kamath, 1989). Gitman (1974) introduced the cash conversion concept as a crucial element of working capital management. Gitman defines cash cycle as "the number of days from the time the firm pays for its purchases of the most basic form of inventory to the time the firm collects for the sale of its finished product". Richards and Laughlin (1980) operationalized the cash cycle concept by reflecting the net interval between cash expenditures on purchases and the ultimate recovery of cash receipts from product sales. They claim that this method is superior to other forms of working capital analysis that rely on traditional ratios like current and quick ratio. Cash conversion cycle is the excess of the sum of days' inventory and days' receivables over days' payables of a firm. Gentry, Vaidyanathan and Lee (1990) developed a modified version of cash conversion cycle called the weighted cash conversion cycle (WCCC), which scales the timing by the amount of funds in each step of the cycle. The weights are calculated by dividing the amount of cash tied up in each component by the final value of the component. Thus, WCCC includes both the number of days and the amount of funds that is tied up at each stage of the cash cycle. WCCC is extended into adjusted cash conversion cycle (ACCC) by some researchers (Viskari, 2012). NTC is basically cash conversion cycle where all three components (accounts receivables, inventory and accounts payables) are expressed in terms of number of days of sales. The shorter the net trade cycle, the more efficient the firm is in managing its' working capital; the lower the need for external financing and the higher is its' financial performance. An inverse relationship can be anticipated between the firm's NTC and its profitability.

Researchers have measured profitability of firms with the help of accounting measures such as return on assets, return on equity, return on capital employed, gross operating income and market measure of Tobin's Q. Profitability is used as a measurement for performance because it evaluates the efficiency with which plant, equipment and current assets are transformed

into profits (Kamal and Mohd Zulkifli, 2004). Return on assets is an indicator of managerial efficiency and it shows how the firm's management converts the assets into earnings. It is measured by dividing the net income of the firm by the book value of the total assets (Jose et al., 1996; Chiou et al., 2006; Padachi, 2006; Garcia-Teruel and Martinez-Solano, 2007; Banos-Caballero et al., 2010). ROCE reveals the profit earned by a firm on its capital employed (Smith and Begemann, 1997; Vishnani and Shah, 2007 and Mohamad and Saad, 2010). ROE reports the profits earned by a firm for its equity investors (Afza and Nazir, 2008; Azam and Haider, 2011 and Akoto and Vitor, 2013). Gross operating income is sales minus the cost of sales divided by total assets as measured by Banos-Caballero et al. (2010), Garcia-Teruel and Martinez-Solano (2012) in their study. Tobin's Q is a market-based measure of performance introduced by James Tobin (1969) as a proxy for the stock market return. A number of empirical studies (Lang and Litzenberger, 1989; Morck et al., 1988; McConnell and Servaes, 1990; Cho, 1998) have employed Tobin's Q ratio to categorize companies according to their relative market performance.

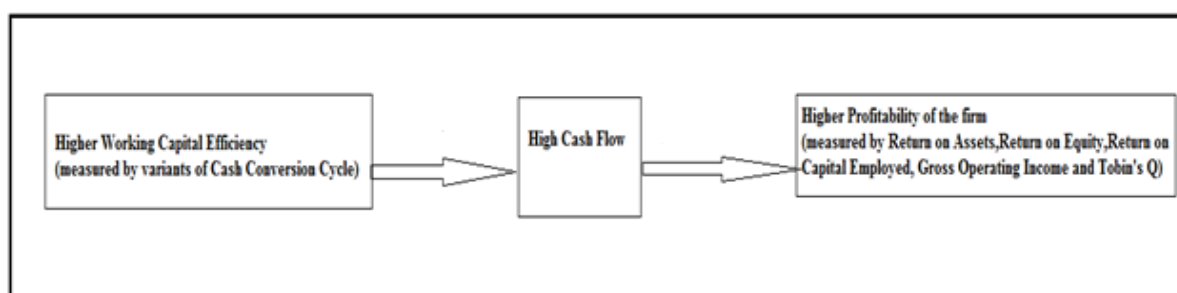
Empirical research carried out on the relationship between working capital efficiency and profitability of the firms has reported mixed evidence. Kamath (1989) reported an inverse relationship between the net trade cycle and profitability in the retail grocery industry. Soenen (1993) and Jose et al. (1996) indicate that a lower NTC/CCC corresponds with better operating performance. Shin and Soenen (1998) reported a strong negative relationship between the net trade cycle and corporate profitability for a large sample of listed American firms for the 1975 to 1994 period. Wang (2002) found a negative relationship between return on investment and cash conversion cycle for the firms operating in Japan and Taiwan. Deloof (2003) found a significant negative relationship between gross operating income and cash conversion cycle. Studies conducted by Garcia-Teruel and Martinez-Solano (2007) and Falope and Ajilore (2009) found similar results as reported by Deloof (2003). The results of studies by Hager (1976), Gill et al. (2010) pointed out a positive and significant relationship between cash conversion cycle and profitability of the firms.

Soenen (1993) investigated the relationship between net trade cycle and return on investment in the US firms and found a negative relationship between the two variables. Jose et al., (1996) examined the relationship between cash conversion cycle and profitability by considering a large number of the American firms and found a significant negative relationship between CCC and profitability and observed that aggressive working capital management policy is associated with higher profitability. Shin and Soenen (1998) found a strong negative relationship between a proxy for working capital management i.e. net trade cycle (NTC) and the firm's profitability and they suggested that one possible way to create shareholder value is to reduce firm's NTC. Wang (2002) examined the relationship between cash conversion cycle and profitability (measured by ROA and ROE) of 1555 Japanese firms and 379 Taiwanese firms and concluded that reducing CCC enhanced operating performance in spite of differences in the structural characteristics of both these countries.

A sample of 1,009 large Belgium firms were analyzed for the period 1992 to 1996 and results confirmed that firms can improve their profitability by reducing the number of days of accounts receivable and inventories to a reasonable minimum (Deloof, 2003). The negative relationship between cash conversion cycle and profitability is consistent with the view that more profitable firms are efficient in managing their working capital. Lazaridis and Tryfonidis (2006) studied the relationship between firm's profitability (through gross operating profit) and the working capital efficiency (through cash conversion cycle) for the listed firms in Athens Stock Exchange and concluded that if cash conversion cycle is kept at the optimal level it may positively affect the shareholders' wealth. Garcia-Teruel and Martinez-Solano, (2007) studied small and medium size European companies and observed that shortening the cash conversion cycle improves the firm's profitability. Falope and Ajilore (2009) studied a sample of 50 Nigerian quoted non-financial firms, using panel data regression, and found a significant negative relationship between net operating profitability and cash conversion cycle, the average collection period, inventory storage days and average payment period. Further, they found no significant variations in the effects of working capital management between large and small firms. However on the contrary, a significant and positive relationship between the cash conversion cycle and firms' profitability was established by Gill et al. (2010) using a sample of 88 firms listed on New York stock exchange. This means that higher the cash conversion cycle, higher the profitability of the firm.

From the above discussion, we can conclude that a firm can generate an additional amount of cash by reducing its cash conversion cycle or net trade cycle which in turn can be used for investment in operating assets and thereby increasing the profitability of the firm. Hence majority of the studies reported by the literature on working capital management postulate an indirect negative relationship between cash conversion cycle and profitability of the firms (as seen in Figure 1).

**Figure 1: Indirect relationship between working capital efficiency and profitability of the firms assumed by existing literature**



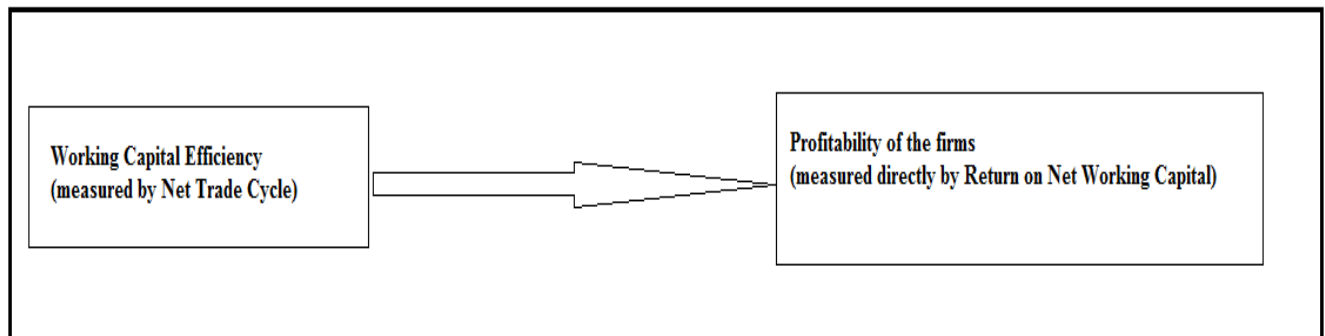
However, the literature is very silent about any sort of direct relationship between working capital efficiency and profitability of firms which leads us to the following research question:



Is it possible for a firm to directly measure the impact of its working capital efficiency on its profitability?

Hence, this paper aims to establish an explicit relationship between working capital efficiency and profitability of the firms as indicated in Figure 2.

**Figure 2: Proposed direct relationship between working capital efficiency and profitability of the firms**



### Concept of Return on Net Working Capital (RONWC)

Historically, the profitability of firms was examined using the accounting measure of return on asset (ROA). Later, the researchers questioned the relevance of ROA in reporting the share of profits for different types of investors i.e. debtholders (investors) and equity shareholders. To alleviate the above issue, ROA was decomposed into return on invested capital (ROIC) and return on equity (ROE) (Anthony et al, 2013; Damodaran, 2014). Further, firms with same ROA might have different debt-equity ratios. Therefore ROA does not reflect the differences in the financing mix of firms. This realization encouraged researchers to investigate the impact of capital structure on the profitability of firms. Capital structure theories (Modigliani and Miller, 1958; Modigliani and Miller, 1963; Modigliani and Miller, 1977; Jensen and Meckling, 1976; Titman, 1988; Myers and Majluf, 1984; Harris and Raviv, 1991) state that firms can optimally design their capital structure in order to increase their value. It is logically apparent that if firms can have differences in their capital structure then they can also have differences in their asset structure i.e. proportion of net fixed assets and net working capital. The differences in the asset structure of firms in general, and the differences in the net working capital investment of firms in particular, should lead to differences in profitability of the firms. However, the conventional profitability measures such as ROA, ROIC, ROE, GOI and Tobin's Q do not explicitly reveal the differences in the asset structure differences of firms in general and the differences in their working capital efficiency in particular. Hence, the question that comes to our mind is that whether the impact of working capital efficiency on profitability of firms can be measured in a direct manner?

To prove our view in the preceding paragraph, we have taken a sub-sample from our existing sample of firms and computed ROA, ROIC [or ROCE], ROE, GOI and Tobin's Q for them. The results are presented in Table 1.

**Table 1: Profitability Ratios and Net Trade Cycle for sample firms**

Company Name	Industry	Profitability measure	Profitability	Net Working Capital (NWC) (in Rs. Million)	Capital Employed (CE) (in Rs. Million)	NTC (in days)	NWC/CE (ratio)
Ambuja Cements Ltd.	Cement	ROA (in percentage)	15	21426.78	90598.63	61	0.24
Anjani Portland Cement Ltd.	Cement	ROA (in percentage)	15	-277.43	2780.32	52	-0.10
India Cements Ltd.	Cement	ROCE (in percentage)	26	-8172.30	64102.73	20	-0.13
Srichakra Cements Ltd.	Cement	ROCE (in percentage)	26	-85.83	509.57	70	-0.17
Heidelberg Cement India Ltd.	Cement	ROE (in percentage)	13	-2663.20	17477.55	-183	-0.15
Panyam Cements & Mineral Inds. Ltd.	Cement	ROE (in percentage)	13	-728.23	1196.10	106	-0.61
Mandhana Industries Ltd.	Cloth	GOI (in percentage)	4	2909.00	13014.42	270	0.22
Ruby Mills Ltd.	Cloth	GOI (in percentage)	4	-434.13	8142.32	320	-0.05
Parabolic Drugs Ltd.	Drugs & pharmaceuticals	Tobin's Q (in times)	0.15	-502.75	7125.42	216	-0.07
Wanbury Ltd.	Drugs & pharmaceuticals	Tobin's Q (in times)	0.15	-1109.10	3335.18	50	-0.33

Two companies Ambuja Cement Ltd. and Anjani Portland Cement Ltd. have reported the same (six year average) ROA of 15%. However, Ambuja Cement has reported a positive proportion of NWC/CE of 24% while Anjani Portland Cement Ltd reported negative NWC/CE proportion of -10%. This indicates that two firms operating in the same industry with same ROA figures differ with reference to their investments in net working capital (NWC). Further, these two firms have differences in their six-year average working capital efficiency measured through net trade cycle (NTC).

Similarly, we can find differences among firms across industries; in their investment in net working capital (NWC) and working capital efficiency (measured by (NTC) inspite of reporting the same ROCE, ROE, GOI and Tobin's Q. For instance, Wanbury Ltd. is relatively efficient in working capital management ( with a NTC of 50 days) compared to its' competitor firm (Parabolic Drugs Ltd.) with an NTC of 216 days, even though both have same Tobin's Q of 0.15 times.

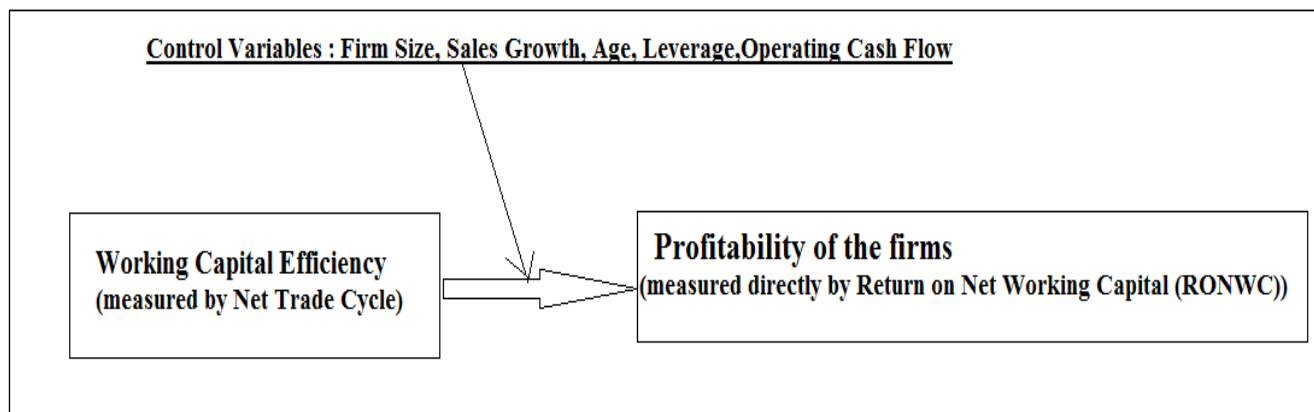
Hence, we can confidently conclude that profitability measures in existing literature do not explicitly reflect the impact of working capital efficiency of firms. Hence, there arises a need to replace the traditional measures of profitability with a new measure of Return on Net Working Capital (RONWC) (see Appendix Table A1 for formulation of RONWC).

Thus, we propose our hypothesis as follows:

H<sub>0</sub>: Working capital efficiency has no direct impact on the profitability of the firms measured by return on net working capital (RONWC)

This paper empirically tests the direct relationship between profitability (RONWC) and working capital efficiency (NTC) and also finds the impact of the factors such as firm size, sales growth, leverage, age of the firm and operating cash flow in determining the profitability of the firm. Accordingly, our theoretical framework is shown in Figure 3.

**Figure 3: Theoretical Framework**



### 3. Methodology

This section deals with the selection of appropriate samples, sources, analytical framework for data analysis, the distribution patterns of data, and description of our variables of interest.

#### *Selection of sample and data source:*

The initial sample of our study constitutes all firms listed in the Bombay Stock Exchange Limited (BSE). Total number of companies listed in BSE on 01/04/2011 is 5318, of which non-financial firms are 1566. It is customary in financial economics research to exclude banking, financial and insurance companies as they are being governed by different regulations and their financial characteristics, use of leverage and reporting are substantially different from those of non-financial firms thus making comparison difficult. While finalizing our sample, we have not included firms who have not filed their return to the Registrar of Companies regularly thus leading to missing data and firms which are merged/de-merged/ acquired /vanished/de-listed during our study period of 2011 to 2016. Further, these firms were divided into 129 industrial sectors according to their nature of business. List of the participating industries are given in the Appendix (A2). Hence, our final sample is of 1566 firms with 9396 firm-year observations.

#### *Source of data:*

We sourced the data from Prowess database, created by the Centre for Monitoring Indian Economy (CMIE). This database contains detailed information on the financial indicators of Indian firms, compiled from various sources such as profit and loss accounts and balance sheets, and annual reports. This is a reliable source of information, which many researchers have used extensively in other empirical works in financial economics (Bertrand et al., 2002; Sarkar and Sarkar, 2000; Jaiswal and Firth, 2007; Saravanan, et al., 2016).

#### *Variables*

The variables were selected keeping in mind our objectives and based on the theories related to working capital efficiency and control. The variables with their theoretical predictions on working capital efficiency are given in the Appendix (A3).

#### *Dependent Variables:*

The dependent variables used by our study and their measurement are presented below.

- Return on Assets (ROA) = Earnings before tax and interest (EBIT)(1-t) / Total Assets [Jose et al.,(1996)]
- Return on Equity (ROE) = PAT/Owners' Equity [Jose et al.,(1996)]
- Return on Capital Employed (ROCE) = EBIT(1-t)/(Owners' Equity + Long-term liability) [Jose et al.,(1996)]
- Gross operating income (GOI) = (Sales-cost of sales)/ total assets [Banos-Caballero, Garcia-Teruel and Martinez-Solano (2012)]
- Tobin's Q = Sum of book value of total debt plus market value of equity divided by the book value of total assets of the firm [(James Tobin, (1968)]

- $RONWC = [EBIT(1-t)/Capital\ Employed] * [NWC / Capital\ employed]$  (as proposed by us)

*Independent Variables:*

*Net Trade Cycle (NTC)* = [(Accounts receivable + Inventory – Accounts payable) / (Net Sales / 365)] Soenen(1993)]

*Control Variables:* We have considered the following relevant control variables such as firm size, sales growth, leverage, operating cash flow and age of the firm.

- Size = Natural logarithm of Sales [(DeLoof,2003; Chiou, Cheng and Wu, 2006;Nilsson et al.,2010)].
- Sales Growth =(Current year's sales- previous year's sales)/ previous year's sales [(DeLoof,2003; Appuhami,2008, Nunn,1981, Kieschnick, Laplante and Moussawi,2006;Nazir and Afza,2008); Hawawini et al.(1986) and Moussawi et al.(2006)]
- Leverage = Total Debt/Total Assets [(Nazir and Afza,2008;Chiou,Cheng and Wu, 2006Nilsson et al.,2010)]
- Operating cash flow = Cash flow from operations / Total Assets [(Chiou, Cheng and Wu, 2006; Appuhami, 2008;Nilsson et al., 2010)]
- Age = Number of years since the incorporation of the firm [(Chiou, Cheng and Wu, 2006)]

*Statistical Tools:*

We have used panel data model consisting of a time series for each cross-section unit in the data panel (Wooldridge,2002).Panel data involves pooling of observations on across-section of units over several time periods and facilitate identification of effects that are not detectable in pure cross-section or time-series regression (Baltagi,2008). Panel data allows researchers to obtain reliable estimates and to find and estimate effects and does not require restrictive assumptions.

We have conducted the following tests: static panel data of fixed effects, static panel data of random effects and pooled ordinary least squares (OLS).The fixed effects model takes into account the individuality of each firm or cross-sectional unit included in the sample by letting the intercept vary for each firm but still assumes that the slope coefficients are constant across firms. The random effects model estimates the coefficients under the assumption that the individual or group effects are uncorrelated with other explanatory variables and can be formulated. This study also employed the Hausman(1978) specification test to determine which estimation model, either fixed or random effects, best explains our estimation.

We have also carried out multiple regression analysis to understand the impact and significance of variables.

*Model Specification*

The relationship between working capital efficiency (measured by NTC) and direct profitability measure (RONWC) were tested through the following models. Further, individual components of net trade cycle such as days' receivables, days' inventory and days' payables were also examined individually with the performance measures.

Model 1:

$$RONWC_{it} = \alpha + \beta_1 NTC_{it} + \beta_2 Size_{it} + \beta_3 SalesGrowth_{it} + \beta_4 Leverage_{it} + \beta_5 OCF_{it} + \beta_6 Age_{it} + \epsilon_{it}$$

Model 2:

$$ROA_{it} = \alpha + \beta_1 NTC_{it} + \beta_2 Size_{it} + \beta_3 SalesGrowth_{it} + \beta_4 Leverage_{it} + \beta_5 OCF_{it} + \beta_6 Age_{it} + \epsilon_{it}$$

Model 3:

$$ROE_{it} = \alpha + \beta_1 NTC_{it} + \beta_2 Size_{it} + \beta_3 SalesGrowth_{it} + \beta_4 Leverage_{it} + \beta_5 OCF_{it} + \beta_6 Age_{it} + \epsilon_{it}$$

Model 4:

$$ROCE_{it} = \alpha + \beta_1 NTC_{it} + \beta_2 Size_{it} + \beta_3 SalesGrowth_{it} + \beta_4 Leverage_{it} + \beta_5 OCF_{it} + \beta_6 Age_{it} + \epsilon_{it}$$

Model 5:

$$GOI_{it} = \alpha + \beta_1 NTC_{it} + \beta_2 Size_{it} + \beta_3 SalesGrowth_{it} + \beta_4 Leverage_{it} + \beta_5 OCF_{it} + \beta_6 Age_{it} + \epsilon_{it}$$

Model6:

$$Tobin's\ Q_{it} = \alpha + \beta_1 NTC_{it} + \beta_2 Size_{it} + \beta_3 SalesGrowth_{it} + \beta_4 Leverage_{it} + \beta_5 OCF_{it} + \beta_6 Age_{it} + \epsilon_{it}$$

where:

ROA is Return on Assets; ROCE is Return on Capital Employed; ROE is Return on Equity; GOI is Gross Operating Income; Tobin's Q is market based profitability measure; RONWC is Return On Net Working Capital, NTC is the Net Trade Cycle, Size is the firm's size, Leverage is Total debt to total assets, Sales Growth is the firm's sales growth, OCF is operating cash flow; Age is year of incorporation of the firm

#### 4. Analysis and Discussion:

This section presents the various estimation results and discusses the implications of the findings.

Table 2 presents descriptive statistics wherein mean value of return on net working capital is 280%, return on assets is 9%, return on equity is 135%, return on capital employed is 67%, gross operating income is 1491% and Tobin's Q is 52.29 times. The median number of days of net trade cycle is 93 days for the sample firms considered in our study. The average age of the firms is 33 years. Mean value of leverage is 0.72 times, sales growth is 194% and operating cash flow as a percentage of total assets is 6%.

**Table 2: Summary Statistics**

Variables	Number of Observations	Mean	Median	Standard Deviation	Minimum	Maximum
ROA (in percentage)	9396	9	9	20	-449	1021
ROE (in percentage)	9396	135	25	850	-27228	38407
ROC (in percentage)	9396	67	34	215	-2985	15432
GOI (in percentage)	9396	1491	5	96694	-2722	9295833
Tobin's Q (in times)	9396	52.29	2.33	853.29	-3591.70	77166.92
RONWC (in percentage)	9396	280	1	52010	-2054950	4487727
NTC (in days)	9396	15959	93	378491	-535403	22773601
Size (in times)	9396	7.07	7.26	2.50	-2.30	15.21
Sales Growth (in percentage)	9396	19410	8	513622	-100	43329900
Leverage(in times)	9396	0.72	0.57	2.74	0.00	127.65
OCF (in percentage)	9396	6	6	18	-558	801
Age (in years)	9396	33	27	19	1	153

To find the degree of linear relationship, pair-wise correlations were calculated for both dependent and independent variables and same is shown in Table 3. A high correlation between the independent variables affects their joint power in explaining the dependent variable. The correlation coefficients are also used as an indicator of the presence of multi-collinearity problem. Gujarati(2003) suggests the acceptance level should not exceed 0.85. The result presented in Table 3 shows that most cross-correlation terms for the explanatory variables are fairly small, thus giving no cause for concern about the problem of multi-collinearity among the explanatory variables. The variance inflation factors are also found to be less than 1 for all variables denoting that there is no multi-collinearity among the independent variables.

**Table 3: Correlation coefficient matrix**

	ROA	ROE	ROC	GOI	Tobin's Q	RONWC	NTC	Size	Sales Growth	Leverage	OCF	Age
ROA	1											
ROE	.168**	1										
ROC	.194**	.396**	1									
GOI	-.021*	-.004	-.005	1								
Tobin's Q	-.007	.002	.013	-.001	1							
RONWC	-.019	-.007	-.005	.000	.000	1						
NTC	.002	.004	.003	-.001	-.001	.000	1					
Size	.070**	.121**	.114**	.024*	-.023*	-.005	-.129**	1				
Sales Growth	.007	.012	.007	-.001	-.002	.000	-.002	.044**	1			
Leverage	-.023*	-.190**	-.032**	.035**	-.008	.002	-.005	-.101**	-.001	1		
OCF	.355**	.108**	.117**	-.037**	-.001	-.006	-.005	.126**	.008	-.114**	1	
Age	.020*	.061**	.081**	.000	-.020	-.009	-.011	.150**	-.006	.046**	.039**	1

\*\* . Correlation is significant at the 0.01 level (2-tailed).  
\* . Correlation is significant at the 0.05 level (2-tailed).

**Table 4: Regression Results**

Dependent Variable :	RONWC	ROA	ROE	ROCE	GOI	Tobin's Q
Regression Model :	Fixed Effects					
	1	2	3	4	5	6
Firm Size	50.73446	0.0014926	-7.77E-02	0.0069414	-5.533874	-6.266799
	0.000	0.244	0.100	0.599	0.133	0.291
Leverage	9.573463	0.0222339	-2.04391	-0.0234318	50.44699	0.0474436
	0.000	0.255	0.000	0.437	0.001	0.997
Sales Growth	0.0001483	1.80E-07	2.66E-05	2.39E-06	-0.000811	0.000433
	0.897	0.652	0.071	0.561	0.703	0.815
Age of the firm	4.635211	-0.0076997	-0.0106949	-0.045262	-20.94239	21.68667
	0.000	0.000	0.794	0.000	0.000	0.000
Operating Cash Flow	5.785687	0.3387395	-0.6357034	0.4923449	-23.97793	26.32381
	0.000	0.000	0.166	0.000	0.718	0.648
NTC	-0.00000392	0.0000000883	0.000000267	0.000000134	0.0000469	0.0000143
	0.000	0.113	0.193	0.8070	0.114	0.579
Days' Receivables	0.005	3.96E-07	0.0001983	0.000047	-7.49E-07	-0.0112636
	0.000	0.978	0.811	0.843	0.991	0.895
Days' Inventory	-0.016	5.76E-08	-0.000143	-0.000034	3.33E-06	0.0121174
	0.000	0.997	0.861	0.883	0.991	0.884
Days' Payables	-0.002	-2.92E-06	-0.000172	-0.000054	-8.05E-07	0.0157306
	0.000	0.844	0.845	0.828	0.991	0.861
Constant	0.2910926	-116.0081	3.757638	2.074672	301.4934	-610.3653
	0.000	0.2600	0.004	0.000	0.114	0.000
Number of observations	9396	9396	9396	9396	9396	9396
F-statistic	2.82	1.27	4.26	1	1.03	1.24
Prob(F-statistic)	0.0000	0.0000	0.0000	0.4698	0.2018	0.0000



We used fixed effects panel regression analysis to find the impact of working capital efficiency on profitability of the firms. Hausman test was employed and results confirmed the use of fixed effects model. Fixed effects estimation assumes firm specific intercepts which captures the effect of those variables that are particular to the firm and are constant over time.

The profitability measures and the working capital efficiency (NTC) are investigated for all 9396 firm-year observations. The results are shown in Table 4. Regression result (1) rejects the null hypothesis since there is a significant and negative relationship between net trade cycle (NTC) and RONWC. The coefficient of the net trade cycle variable is negative and the relationship is significant ( $p$  value = 0.0000). This reveals that firms with lower net trade cycle generate higher profitability. Further when the same model was tested with days' accounts receivables as independent variable and RONWC as dependent variable, the coefficient is found to be positive and significant implying that an increase in days' accounts receivables, lead to an increase in RONWC. This indicates that profitable firms tend to follow liberal credit policy. The coefficient of days' inventory is negative and significant when individually tested with RONWC suggesting that profitable firms keep low inventory level. A negative and significant relation between days' payables and profitability measure (RONWC) is consistent with the view that more profitable firms pay their outstanding on time (Deloof, 2003). Speeding up the payments to suppliers might increase profitability because firms often receive substantial discount for prompt payment. The control variables such as firm size, leverage, age of the firm and operating cash flow are also found to be significant. The results of fixed effects model analysis suggest that the firms can increase profitability by reducing the net trade cycle, the days' inventory and the days' payables and by increasing the days' receivables.

Regression results (2) to (6) indicate that the relationship between NTC and profitability measures such as ROA, ROE, ROCE, GOI and Tobin's Q are positive and not significant. Even the control variables are found to be not significant except for the operating cash flow which is significant with ROA and ROCE; leverage is significant with ROE and age of the firm is significant in all cases except ROE. Even when these models from (2) to (6) are tested with days' receivables, days' inventory and days' payables individually with other profitability measures are found to be not significant.

The F-values of four regression models (1, 2, 3 and 6) are found to be statistically significant as seen in Table 4, whereas the Durbin-Watson (D-W) value of 3.959596 indicates no autocorrelation among the independent variable of all the six models.

## 5. Conclusion, implications and scope for future research

The existing accounting metrics aim to measure the impact of working capital efficiency on the profitability of the firms by using traditional mechanics such as ROA, ROCE, ROE and Gross Operating Profit. However, the extant literature reveals the existence of an indirect relationship between working capital efficiency and profitability of the firms. The practitioners and academia are not able to measure the direct impact of working capital efficiency on the profitability of the firms. This is the major limitation of the existing literature on working capital efficiency. Hence, there arises a need to measure the effect of working capital efficiency on the profitability of the firms in a direct manner.

This study used a new measure of profitability (RONWC) to investigate the relationship with working capital efficiency (NTC) of 1566 non-financial Indian firms for the period 2011 to 2016 using panel data regression model and found a negative relationship between RONWC and net trade cycle. This indicates that shorter NTC leads to more profits for the firms (as reported by Hager, 1976; Kamath, 1989; Soenen, 1993; Jose et al., 1996; Shin and Soenen, 1998; Wang, 2002; Deloof, 2003; Garcia-Teruel and Martinez-Solano, 2007). The days' inventory has negative and significant relationship with RONWC suggesting that profitable firms keep low inventory level (in support of the findings of Deloof, 2003; Padachi, 2006; Falope and Ajilore, 2009; Garcia-Teruel and Martinez-Solano, 2007). The days' receivables was found to have positive and significant association with RONWC indicating profitable firms work with higher receivable terms (as reported by Padachi, 2006; Falope and Ajilore, 2009; Garcia-Teruel and Martinez-Solano, 2007; Mathuva, 2009). A negative and significant relationship of days' payables with RONWC suggested that profitable firms wait less to settle their payables (in support of the findings of Deloof, 2003; Falope and Ajilore, 2009). With respect to the control variables, RONWC increases with firm size (as that of Deloof, 2003; Chiou, Cheng and Wu, 2006; Nilsson et al., 2010), age of the firm (as reported by Chiou, Cheng and Wu, 2006), operating cash flow (as concluded by Chiou, Cheng and Wu, 2006; Appuhami, 2008; Nilsson et al., 2010), sales growth (as that of Nunn, 1981; Deloof, 2003; Moussawi et al., 2006; Nazir and Afza, 2008; Appuhami, 2008; Nilsson et al., 2010) and leverage (as revealed by Chiou, Cheng and Wu, 2006; Nazir and Afza, 2008; Nilsson et al., 2010). Relationship of net trade cycle with RONWC is statistically significant while the relationship of conventional profitability measures used with NTC is not statistically significant.

This study proposes the concept of Return on Net working Capital (RONWC) as a direct profitability measure of working capital efficiency to academia and practitioners. The researchers and practitioners could possibly consider RONWC as a direct measure of working capital efficiency in addition to the existing indirect measures. As the current study considers a time period of six years only the results of the study may differ if time window is enhanced. Further, differences across industry practices regarding credit policy, inventory policy and payables management need further investigation.

Further, the study may be extended to understand the relationship between return on net working capital (RONWC) and working capital liquidity and utilization of firms in both developed and emerging markets. Research work can also be carried over on whether corporate governance plays a role in improving the return on net working capital (RONWC) of firms.

## References:

1. Afza, T. and Nazir, M.S. (2007), "Working capital management practices of firms: Empirical evidence from Pakistan", pp.334-343.
2. Afza, T. and Nazir, M.S. (2008), "Working capital approaches and firm's returns", Pakistan Journal of Commerce and Social Sciences, Vol.1 No.1, pp.25-36.
3. Akoto, R. K., Awunyo-Vitor, D. Angmor, P.L., (2013), "Working capital management and profitability: Evidence from Ghanaian listed manufacturing firms", *Journal of Economics and International Finance*, Vol. 5.No.9, pp. 373-379.



4. Appuhami, B.R.(2008), "The impact of firms' capital expenditure on working capital management : an empirical study across industries in Thailand", *International Management Review*, Vol.4 No.1, pp.11-24.
5. Azam,M. and Haider, S.I.(2011), "Impact of Working Capital Management on Firms' Performance: Evidence from Non-Financial Institutions of KSE-30 index", *Interdisciplinary Journal of Contemporary Research in Business*, Vol.3, No.5, pp.211-224.
6. Baltagi, H., (2008), "Econometrics Analysis of panel data, 4<sup>th</sup> ed., John Wiley and Sons Ltd, London.
7. Banos-Caballero, S., García-Teruel, P.J. and Martinez-Solano, P. (2010), "Working capital management in SMEs", *Accounting and Finance*, Vol. 50 No. 3, pp. 511-527.
8. Banos-Caballero, S., García-Teruel, P.J. and Martinez-Solano, P. (2012), "How does working capital management affect the profitability of Spanish SMEs", *Small Business Economics*, Vol. 39 No. 2, pp. 517-529
9. Baskin, J. (1989), "An Empirical Investigation of the Pecking Order Hypothesis", *Financial Management*, Vol. 1 No.1, pp.26-35.
10. Bertrand, M., P. Mehta, and S. Mullainathan, (2002), "Ferretting out Tunneling: An Application to Indian Business Groups", *The Quarterly Journal of Economics*, Vol.117, pp. 121-148.
11. Bhattacharyya, N. (2007) "Dividend policy: a review", *Managerial Finance*, Vol. 33 No.1 , pp.4-13.
12. Black F., (1976), "The dividend puzzle", *Journal of Portfolio Management*, Vol. 2, No.4, pp. 5-8.
13. Blinder and Maccini, L.J. (1991), "Taking Stock: A Critical Assessment of Recent Research on Inventories", *Journal of Economic Perspectives*, Vol. 5, pp.73-96.
14. Brainard, William C., and James Tobin. (1968), "Pitfalls in Financial Model Building", *American Economic Review*, Vol.58 No.2, pp.99-122.
15. Brigham, E. F. and Daves, P.R. (2002), "Intermediate Financial Management", 7<sup>th</sup> Ed. New York : Thompson Learning Inc.
16. Britain, John A. (1966), "Corporate Dividend Policy", Washington, D.C., The Brooking Institution.
17. Burns, R.M. and Walker, J. (2009), "Capital Budgeting Surveys: The Future Is Now", *Journal of Applied Finance*, Vol.19, pp.78-90.
18. C.Jen-Ren, C.Li and W. Han-Wen (2006), "The determinants of working capital management", *Journal of American Academy of Business*, Vol.10 No.1, pp.149-155.
19. Chiou, J.R., Cheng, L. and Wu, H.W. (2006), "The determinants of working capital management", *Journal of American Academy of Business*, Vol.10.No.1, pp.149-155.
20. Cho, M.H., (1998), "Ownership structure, investment and the corporate value: an empirical analysis", *Journal of Financial Economics*, Vol.47, pp. 103-121.
21. Damodaran, A.,(2014), *Investment Valuation: Tools and Techniques for determining the value of any asset*, second edn, John Wiley and Sons Inc., New York, ISBN: 0-471-41490-5, pp.21.
22. Deloof, M. (2003), "Does working capital management affect profitability of Belgian firms?", *Journal of Business Finance & Accounting*, Vol. 30 No.3/4, pp.573-588.
23. Dewing, Arthur S. (1941), "The Financial Policy of Corporations, 4th ed. New York", The Ronald Press Company.
24. Eljelly, A. M. A. (2004), "Liquidity - profitability tradeoff: An empirical investigation in an emerging market", *International Journal of Commerce and Management*, Vol. 14 No.2, pp. 48-61.
25. Emery, G. W. (1984), "A pure financial explanation for trade credit", *Journal of financial and quantitative analysis*, Vol.19 No.3, pp. 271-285.
26. Falope, O.I. and Ajilore, O.T. (2009), "Working capital management and corporate profitability : evidence from panel data analysis of selected quoted companies in Nigeria", *Research Journal of Business Management* , Vol.3 No.3, pp.73-84.
27. Garcia-Teruel, P. J. and Martinez-Solano, P.(2007), "Effects of working capital management on SME profitability", *International Journal of Managerial Finance*, Vol. 3 No.2, pp. 164-177.
28. Gentry, J.A., Vaidyanathan, R., and Lee, Wai, H., (1990), "A Weighted Cash Conversion Cycle", *Financial Management*, Vol. 19 No. 1, pp. 90
29. Gill, A., Biger, N. and Mathur, N. (2010), "The relationship between working capital management and profitability: evidence from the United States", *Business and Economics Journal*, Vol.1, pp.1-9.
30. Gitman, L.J. and Forrester, J.R. (1977), "A survey of capital-budgeting techniques used by major U.S. firms", *Financial Management*, pp.66-71.
31. Gitman, Lawrence, J. , (1974), "Estimating Corporate Liquidity Requirements :A Simplified Approach", *The Financial Review*, Vol. 9 No.1, pp.79-88.
32. Gujarati, D.N. (2003), "Basic Econometrics", New York: McGraw Hill Book Co.
33. Hager, H.C., (1976), "Cash Management and cash cycle", *Management Accounting*, Vol 57 No.9, pp.19-21.
34. Harris, M. and Raviv, A. (1991), "The Theory of Capital Structure", *Journal of Finance*, Vol. 46 No. 1, pp. 297-355.
35. Hausman, J.A., (1978), "Specification tests in econometrics", *Econometrica* , 46:1251-1271.
36. Hawawini, G., Viallet, C. and Vora, A. (1986), "Industry influence on corporate working capital decisions", *Sloan Management Review*, Vol. 27 No.4, pp. 15-25.
37. Horrigan, J.O. (1965), "Some empirical base of financial ratios analysis", *The Accounting Review*, pp.558-568.
38. Howorth, C. and Westhead, P. (2003), "The focus of working capital management in UK small firms", *Management Accounting Research*, Vol.14. No.2, pp. 94-111.
39. Jaiswal, M. and Firth, M. (2007), "Top Management Compensation and Firm Performance in the Emerging Markets: Evidence from India Working Paper 602, Indian Institute of Management Calcutta

40. Jensen, M.C. and Meckling, W.H. (1976), "Theory of the firm: managerial behavior, agency costs and ownership structure", *Journal of Financial Economics*, Vol. 3 No. 4, pp. 305-360.
41. Jose, M., Lancaster, C. and Stevens, J. (1996), "Corporate returns and cash conversion cycles", *Journal of Economics and Finance*, Vol. 20 No.1, pp.33-46.
42. Joshi, P. (1995), "Working capital management under inflation", first ed., Anmol Publishers, London, pp.20-93.
43. K. Bennouna, G.G. Meredith, T. Marchant (2010), "Improved capital budgeting decision making: evidence from Canada", *Management Decision*, Vol.28 No.2 , pp. 225-247.
44. Kamal, N., and Mohd Zulkifli, M. (2004), "Determinants of corporate performance of Malaysian companies" ,Accepted for Presentation at the Fourth Asia Pacific Interdisciplinary Research in Accounting Conference 4 to 6, July 2004.
45. Kamath, Ravindra. (1989), "How Useful are common liquidity measures?", *Journal of Cash Management* 9, No.1 pp. 24-28
46. Kieschinde R., LaPlante M. and Moussawi R. (2006), "Corporate Working Capital Management: Determinants and Consequences", in B.C. Egbide and P.E. Enyi (2008)'s *Working Capital Management and Profitability: A Study of 25 Listed Companies in the Nigerian Stock Exchange*. An Unpublished M.Sc. Dissertation Submitted to the Dept. of Accounting, CBS, CU, Ota, Ogun State.
47. Kim, C. S., Mauer, D. C., & Sherman, A. E. (1998), "The determinants of corporate liquidity: Theory and evidence", *Journal of financial and quantitative analysis*, Vol. 33 No. 3, pp. 335-359.
48. KPMG (2010), "Cash and working capital management in China".
49. Lamberson, M. (1995), "Changes in working capital of small firms in relation to changes in economic activity", *American Journal of Business*, Vol.10 No.2, pp.45-50
50. Lang, L., Litzenger, R.H., (1989), "Dividend announcement cash flow signaling vs. free cash flow hypothesis", *Journal of Financial Economics*, Vol.24, pp.181-191.
51. Lazaridis, I. and Tryfonidis, D. (2006), "Relationship between working capital management and profitability of listed companies in the Athens stock exchange", *Journal of Financial Management and Analysis*, Vol. 19 No. 1, pp. 26-35.
52. Liddell, J.(2008), "How the chaos on Wall Street , and the subsequent downturn, will impact upon working capital management".
53. Litner, J. (1956), "Distribution of incomes of corporations among dividends, retained earnings and taxes", *American Economic Review*, Vol. 46 No. 2, pp.97-143.
54. Luo, C.H.(1984), "The operational performance and the financial ratio in Taiwan", unpublished master's dissertation, Department of Industrial and Information Management, National Cheng Kung University, Taiwan.
55. Mathuva, D. (2009), "The influence of working capital management components on corporate profitability: a survey on Kenyan listed firms", *Research Journal of Business Management*, Vol. 4 No.1, pp.1-11.
56. McConnell, J., Servaes, H., (1990), "Additional evidence on equity ownership and corporate value", *Journal of Financial Economics*, Vol.27, pp.595-613.
57. Miller, M.H. (1977), "Debt and taxes", *Journal of Finance*, Vol. 32 No. 2, pp. 261-275.
58. Modigliani, F. and Miller, M.H. (1958), "The cost of capital, corporation finance and the Theory of Investment", *American Economic Review*, Vol. 48 No. 3, pp. 261-297.
59. Modigliani, F. and Miller, M.H. (1963), "Corporate income taxes and the cost of capital: a correction", *American Economic Review*, Vol. 53 No. 3, pp. 433-443.
60. Mohamad, N.E.A., Saad, N.M. (2010), "Working capital management: The effect of market valuation and profitability in Malaysia", *International Journal of Business and Management*, Vol. 5 No.11, pp.140-148.
61. Morck, R., Shleifer, A., Vishny, R., (1988), "Management ownership and market valuation: an empirical analysis", *Journal of Financial Economics*, Vol.20, pp.293-315.
62. Myers, S.C. and Majluf, N.S. (1984), "Corporate financing and investment decision when firms have information investors do not have", *Journal of Financial Economics*, Vol. 13 No. 2, pp. 187-221.
63. Nazir, M. S., & Afza, T. (2009), "Impact of aggressive working capital management policy on firms' profitability", *The IUP Journal of Applied Finance*, Vol.15 No.8, pp 19-30.
64. Nilsson, H. (2010), "The effect of company characteristics on working capital management", Umeå School of Business.
65. Nunn, K. P., (1981), "The strategic determinants of working capital: a product-line perspective", *The Journal of Financial Research*, Vol.4.No.3, pp. 207-219.
66. Padachi, K. (2006), "Trends in working capital management and its impact on firm's performance: an analysis of Mauritian small manufacturing firms", *International Review of Business Research Papers*, Vol. 2 No. 2, pp. 45-58.
67. R.N. Anthony, D. Hawkins, K.A. Merchant (2013), "Accounting: Texts and Cases", Vol. 13, McGraw-Hill/Irwin
68. Ramey, V.A.(1989), "Inventories as Factors of Production and Economic Fluctuations", *American Economic Review*, Vol. 79, pp. 338-354.
69. Richards, V. D., & Laughlin, E. J. (1980), "A cash conversion cycle approach to liquidity analysis", *Financial Management*, Vol. 9 No.1, pp.32-38.
70. Robert N. Anthony, David F. Hawkins and Kenneth A. Merchant (2013). *Accounting: text and cases. McGraw Hill Education (India) Private Limited*
71. Saravanan, D., Radhakrishnan, M., Balagurunathan, R. (2016), "Journal of chemical and Pharmaceutical research", Vol.8 No.1, pp.698-703.
72. Sarkar, J. and Sarkar, S. (2000), "Large Shareholder Activism in Corporate Governance in Developing Countries: Evidence from India", *International Review of Finance*, Vol.1 No.3, pp.161-194.

73. Shin, H. H., & Soenen, L. (1998). Efficiency of working capital management and corporate profitability. *Financial Practice and Education*, (8), 37-45.
74. Smith, K., (1980), "Profitability versus liquidity tradeoffs in working capital management", in K. V. Smith, Readings on the management of working capital, St. Paul, MN, West Publishing Company, New York, pp. 549-562.
75. Smith, K.V. (1973), "State of the art of working capital management", *Financial Management*, Vol. 2 No.3, pp. 50-55.
76. Smith, M. B. (1997), "Measuring Association between Working Capital and Return on Investment", *South African Journal of Business Management*, Vol 28 No.1.
77. Soenen, Luc A. (1993). Cash conversion cycle and corporate profitability. *Journal of Cash Management*. Vol 13.No.5, pp.53-57
78. Su, F.(2001), "The impact of the change of business cycle in manufacturing industry", unpublished master's dissertation, Department of accounting, National Cheng Chi University, Taiwan.
79. Taggart, R.A. (1977), "A model of corporate financing decisions", *Journal of Finance*, Vol.32, pp. 1467-84.
80. Titman, S. and Wessels, R. (1988), "The Determinants of Capital Structure Choice", *The Journal of Finance*, Vol.43 No.1, pp.1-19.
81. Van Horne, J. C., & Wachowicz, J. M. (2000), "Fundamentals of Financial Management", Prentice Hall Publishers, New York.
82. Van Horne, J. C., & Wachowicz, J. M. (2004), "Fundamentals of Financial Management", 12 ed., Prentice Hall Publishers, New York.
83. Van Horne, J.C., (1977), "A risk-return analysis of a firm's working capital position", *Eng.Econ.*, pp.71-88.
84. Vishnani, S., & Shah, B. K. (2007), "Impact of Working Capital Management Policies on Corporate performance- An Empirical study", *Global business review*, Vol. 8 No.2, pp. 267-281.
85. Viskari, S., Ruokola, A., Pirttilä, M. and Kärri, T. (2012), "Advanced model for working capital management: bridging theory and practice", *International Journal of Applied Management Science*, Vol. 4, No. 1, pp.1-17.
86. Wang, Y.J.(2002), "Liquidity management, operating performance, and corporate value: evidence from Japan and Taiwan", *Journal of Multinational Financial Management*, Vol.11 No. 2, pp. 159-169
87. Wooldridge, J.M. (2002), "Econometrics analysis of cross section and panel data", Cambridge, Mass: The MIT Press.
88. Zhou, D.C. (1995), "The impact of the change of business cycle on financial ratio in manufacturing industry", *Journal of the Bank of Taiwan*, Vol.46 No.2, pp.67-98.

#### Appendix:

**Table A1: Formulation of RONWC**

ROCE (Return on Capital Employed) =  $\text{EBIT} (1-t) / \text{Capital Employed}$   
 where Capital Employed = Fixed Assets+ (Current Assets – Current Liability)

Net working capital (NWC) refers to the amount of capital available for use of the entire firm (both equity and debt claimholders).

Let us state  $\text{ROCE} = \text{RONWC} + \text{RONFA}$ . This means that ROCE of the firm is the sum of RONWC plus RONFA.

Let us find RONWC as below:

$\text{RONWC} = \text{ROCE} * \text{proportion of NWC in the Capital Employed}$

Where  $\text{ROCE} = [\text{EBIT} (1-t) / \text{Capital Employed}]$

Proportion of Net working capital in the Capital Employed =  $\text{NWC} / \text{CE}$

$\text{RONWC} = [\text{EBIT}(1-t) / \text{Capital Employed}] * [\text{NWC} / \text{Capital employed}]$

$\text{RONWC} = \text{ROCE} * \text{proportion of NWC in Capital Employed}$ ; where we can extend the formula as stated below  $\text{RONWC} = [\text{EBIT}(1-t) / \text{Capital Employed}] * [\text{NWC} / \text{Capital employed}]$

**Table A2: List of the Participating Industry Groups**

Industry Group	Number of Participating Companies	Percentage (%)
Trading	798	8.49%
Drugs & pharmaceuticals	474	5.04%
Computer software	396	4.21%
Other automobile ancillaries	306	3.26%
Business consultancy	240	2.55%
Cotton & blended yarn	240	2.55%
Diversified	204	2.17%
Other textiles	204	2.17%
Cloth	192	2.04%
Metal products	192	2.04%
Other chemicals	186	1.98%



Steel	174	1.85%
Infrastructural construction	168	1.79%
Other miscellaneous services	168	1.79%
Cement	150	1.60%
Paper & newsprint	150	1.60%
Plastic furniture, floorings & miscellaneous items	150	1.60%
Industrial construction	144	1.53%
General purpose machinery	132	1.40%
Hotels & restaurants	132	1.40%
Other construction & allied activities	132	1.40%
Plastic packaging goods	132	1.40%
Other agricultural products	120	1.28%
Other electronics	120	1.28%
Sugar	120	1.28%
Castings & forgings	114	1.21%
Organic chemicals	114	1.21%
Wires & cables	114	1.21%
Dyes & pigments	108	1.15%
Industrial machinery	96	1.02%
Commercial complexes	90	0.96%
Readymade garments	90	0.96%
Textile processing	90	0.96%
Housing construction	84	0.89%
Inorganic chemicals	84	0.89%
Man-made filaments & fibres	84	0.89%
Electricity generation	78	0.83%
Fertilisers	78	0.83%
Plastic tubes, pipes, fittings & sheets	78	0.83%
Steel pipes & tubes	78	0.83%
Tea	78	0.83%
Gems & jewellery	72	0.77%
Generators, transformers & switchgears	72	0.77%
Media-broadcasting	66	0.70%
Cosmetics, toiletries, soaps & detergents	60	0.64%
Health services	60	0.64%
Pesticides	60	0.64%
Plastic films & flexible packaging	60	0.64%
Aluminium & aluminium products	54	0.57%
Beer & alcohol	54	0.57%
Dairy products	54	0.57%
Minerals	54	0.57%
Mining & construction equipment	54	0.57%
Telecommunication services	54	0.57%
Transport logistics services	54	0.57%
Vegetable oils & products	54	0.57%
Miscellaneous electrical machinery	48	0.51%
Miscellaneous manufactured articles	48	0.51%
Other non-ferrous metals	48	0.51%
Processed foods	48	0.51%
Diversified cotton textile	42	0.45%
Education	42	0.45%
Glass & glassware	42	0.45%
ITES	42	0.45%
Machine tools	42	0.45%
Media-content	42	0.45%
Media-print	42	0.45%
Paper products	42	0.45%
Rubber products	42	0.45%
Copper & copper products	36	0.38%
Other construction materials	36	0.38%

Other domestic appliances	36	0.38%
Other recreational services	36	0.38%
Other transport equipment	36	0.38%
Tyres & tubes	36	0.38%
Footwear	30	0.32%
Sponge iron	30	0.32%
Two & three wheelers	30	0.32%
Books & cards	24	0.26%
Ceramic products	24	0.26%
Computers, peripherals & storage devices	24	0.26%
Ferro alloys	24	0.26%
Granite	24	0.26%
Production & distribution of films	24	0.26%
Refractories	24	0.26%
Retail trading	24	0.26%
Shipping transport services	24	0.26%
Storage & distribution	24	0.26%
Storage batteries	24	0.26%
Tourism	24	0.26%
Abrasives	18	0.19%
Bakery products	18	0.19%
Boilers & turbines	18	0.19%
Crude oil & natural gas	18	0.19%
Dry cells	18	0.19%
Exhibition of films	18	0.19%
Natural gas trading & distribution	18	0.19%
Other leather products	18	0.19%
Paints & varnishes	18	0.19%
Refinery	18	0.19%
Road transport services	18	0.19%
Starches	18	0.19%
Wood	18	0.19%
Agricultural machinery	12	0.13%
Air transport services	12	0.13%
Caustic soda	12	0.13%
Coal & lignite	12	0.13%
Communication equipment	12	0.13%
Engines	12	0.13%
Lubricants, etc.	12	0.13%
Other industrial machinery	12	0.13%
Pig iron	12	0.13%
Polymers	12	0.13%
Poultry & meat products	12	0.13%
Soda ash	12	0.13%
Tobacco products	12	0.13%
Air-conditioners & refrigerators	6	0.06%
Animation content provider	6	0.06%
Cocoa products & confectionery	6	0.06%
Consumer electronics	6	0.06%
Courier services	6	0.06%
Diversified machinery	6	0.06%
Electricity distribution	6	0.06%
Floriculture	6	0.06%
Industrial cooling equipment	6	0.06%
Marine foods	6	0.06%
Road transport infrastructure services	6	0.06%
Shipping transport infrastructure services	6	0.06%
Synthetic rubber	6	0.06%
<b>Grand Total</b>	<b>9396</b>	<b>100.00%</b>

**Table A3: Variable definition**

Variables	Measure	Empirical Evidence
<b>Dependent variables :</b>		
<b>Profitability measures</b>		
Return on Assets (ROA)	Earnings before tax and interest (1-tax rate) / Total Assets	Jose et al.,(1996);Nazir and Afza, 2008)
Return on Equity (ROE)	Profit after tax /Owners' Equity	Jose et al.,(1996);
Return on Capital (ROC)	Earnings before tax and interest (1-tax rate) /(Owners' Equity + Long-term liability)	
Gross Operating Income(GOI)	(Sales-Cost of Sales)/ Total Assets	Banos-Caballero, Garcia-Teruel and Martinez-Solano (2012)
Tobin's Q	(Book value of Total Debt + Market value of Equity)/ Book value of Total Assets	Morck et al.(1988); McConnell and Servaes(1990);Cho(1998);Nazir and Afza(2008)
Return on Net Working capital(ROA) [RONWC]	[Earnings before tax and interest (1-tax rate) /Capital Employed ]* [NWC/ Capital employed]	Proposed direct measure of profitability of this study
<b>Independent variables :</b>		
<b>Working Capital Efficiency measure</b>		
Net Trade Cycle(NTC)	NTC is used as a measure of working capital efficiency and is basically equal to the cash conversion cycle where all three components are expressed as a percentage of sales $\left[ \frac{\text{Accounts Receivables} * 365}{\text{sales}} + \left( \frac{\text{Inventory} * 365}{\text{sales}} \right) - \left( \frac{\text{Accounts payables} * 365}{\text{Sales}} \right) \right]$	Soenen(1993)
<b>Control Variables</b>		
SIZE	Natural log of Sales	Deloof(2003);Positive and significant relation between company size and working capital management (Chiou, Cheng and Wu,2006; Kieschnick, Laplante and Moussawi,2006);Positive and not significant relationship (Nazir and Afza,2008);Negative relation between company size and working capital efficiency(Nilsson et al., 2010)
Sales Growth	measured by variation in its annual sales value with reference to previous year's sales (Current year's sales- Previous year's sales)/ Previous year's sales	Deloof(2003);Appuhami(2008);Nunn(1981);Kieschnick, Laplante and Moussawi(2006); Nazir and Afza(2008);Kim et al.(1998); Opler et al.(1999);Wu(2001);Hawawini et al.(1986) and Moussawi et al.(2006) ;Kieschnick, Laplante and Moussawi (2006) concluded that sales growth has a positive impact on working capital management;Positive and not significant relationship results by (Appuhami,2008; Nazir and Afza,2008);Nilsson et al.(2010) found that sales growth has a negative impact on working capital efficiency
Leverage	Total Debt / Total Assets	Nazir and Afza(2008);Chiou,Cheng and Wu( 2006);Jeng-Ren(2006) and Nilsson et al.(2010)results give a negative association between debt and working capital efficiency; relationship between profitability and leverage is negative as supported by the findings of Myers and Majluf(1984) and Rajan and Zingales'(1995)
Operating Cash Flow	Operating Cash Flow/Total Assets	Chiou,Cheng and Wu( 2006); Appuhami( 2008);Nelson et al., 2010) results give negative relationship;negative and significant results by (Chiou,Cheng and Wu, 2006; Appuhami, 2008)
Age	Number of years since the incorporation of a company	Positive and significant results by Chiou, Cheng and Wu(2006)

