

Managing Efficiency and Profitability Through Working Capital: an Empirical Analysis of BSE 200 Companies

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Abstract: Efficient management of working capital helps to avoid financial crises, thereby, increasing the profitability and enhances the firm value. The present study analyses the working capital performance of 164 manufacturing BSE 200 companies classified into 19 industries over the period of 2000-2010 based on working capital score calculated by using normalised values of Cash Conversion Efficiency, Days Operating Cycle and Days Working Capital. The study explores abundant scope to increase the efficiency of 145 companies by improving the parameters of analysis. The improvements are bound to generate increased profits and profitability of leading corporate of India. The study tests the relationship between the working capital score and profitability measured by Income to Current Assets and Income to Average Total Assets. The results of the study support earlier studies revealing that efficient management of working capital significantly affects profitability.

Key words: Cash conversion efficiency, correlation, days operating cycle, days working capital, efficiency of working capital management

INTRODUCTION

Working capital policy is an important issue in any organization because without the proper management of working capital components it will be difficult for the organizations to run its operations smoothly. Working capital management is significant due to the fact that it plays a vital role in keeping the wheels of the business running (Lawrence and Charles, 1985). Its effective provision can ensure the success of a business while its inefficient management can lead not only to losses but also to the ultimate downfall of what might otherwise be a promising concern. Business success heavily depends on the ability of financial executives to effectively manage receivables, inventory, and payables (Filbeck and Krueger, 2005). Furthermore working capital policy has been major issue especially in developing countries. Adequate working capital needs to be maintained in order to discharge day-to-day liabilities and to protect the business from adverse effects (Sayaduzzaman, 2006; Siddiquee and Khan, 2009). It aims at protecting the purchasing power of assets and maximise the return on investment.

Most of the Chief Financial Officers' (CFO) time and efforts are devoted to working capital management (Gitman, 1976). A study of Fortune 1000 firms found out that more than one-third of the financial management time is spent in managing current assets and one-fourth of the financial management time is spent managing current liabilities (Gitman, 2004). Still, a large number of business failures have been attributed to inability of

financial managers to plan and control properly the current assets and current liabilities of their respective firms, (Smith, 1973). Therefore, there is a need to develop sustainable working capital management practices.

The issues involved in managing working capital of any firm are concerned with the management of the firm's inventory, cash, marketable securities, receivables etc and payables etc in order to achieve a proper balance between risk and return. A well-designed and implemented working capital management must contribute positively to the creation of a firm's value (Zirayawati *et al.*, 2009; Afza and Nazir, 2007). For maximising profits or minimising of working capital cost or to maintain a balance between liquidity and profitability, there is a need to optimise working capital (Padachi *et al.*, 2008). Too little investment in working capital i.e aggressive working capital policy can lead to disruption in production, increases the risk of not being able to meet the financial obligations and impairs profitability. At the same time a conservative financing policy i.e too much investment in working capital means idle funds that can earn no profit but involves cost. So, a financial manager has to be vigilant in maintaining appropriate levels of working capital.

LITERATURE REVIEW

Some of existing studies conducted in the area of working capital management are as follows:

Aggarwal (1976) in his study on "management of working capital of India" studied 34 selected large

manufacturing and trading public limited companies in both the sectors-private and public. He has made an attempt to throw focus on the utilization of current assets, resource-pattern of financing the working capital being followed by these companies and how far different companies have been successful in collecting their receivables in time. The study emphasizes the fact that the degree of efficiency of administration of working capital largely determines the success or failures of overall operations of an enterprise.

Moyer *et al.* (2003) found that Working Capital consists of a large portion of a firm's total investment in assets, 40% in manufacturing and 50-60% in retailing and wholesale industries respectively. The firms could reduce its financing cost and increase the funds available for expansion if they minimise the funds tied up in current assets. They found that cash helps to keep the firm liquid. It enables the firm to pay its obligations and also protects the firm from becoming bankrupt.

Scherr (1989) analysed that by implementing best practices in WC, companies can strengthen strong cash flow levels, improve profitability, budgeting and forecasting process, predictability and manageability of results, heighten risk visibility and reduce reaction time.

Shin and Soenen (1998) highlighted that efficient WCM is very important for creating value for the shareholders.

Cote and Latham (1999) argued the management of receivables, inventory and accounts payable have tremendous impact on cash flows, which in turn affect the profitability of firms. Each of the WC items (i.e., cash, receivables and inventories) helps in the management of firms in its own particular way.

McCormick (1999) claimed that firms in the developing economies have many problems such as being small in size (in terms of volume of investment and sales) and lack of resources. Because of their small size, firms may quickly be exposed to problems of production capacity to satisfy the demand they may have for their products and this makes inventory management more relevant.

Fishazion *et al.* (2002) found that both human and financial resources of the firms in developing economies are also very limited to manage WC investments and short-term debt. Proper WCM is particularly important for the firms in developing countries in order to solve these problems.

Anand and Gupta (2002) analysed working capital management performance of Corporate India by using three financial parameters-Cash Conversion Efficiency, Days Operating Cycle and Days Working Capital and by assigning them different weights in the overall score, to rank and analyse working capital management performance. This study provides the estimates by using data of 427 companies over the period 1998-99 to 2000-01 for each company and for each industry.

Tewolde (2002) claimed that there is also a far reaching effect on the management when firms are strictly regulated and owned by the government. If government owns business firms, the benefits and costs of WCM might be considered to be of a lesser importance because taxpayer's money can be used to pay for their losses. The importance of managing WC is magnified when it refers to firms in developing economies.

Sathyamoorthi and Wally-Dima (2008) analysed the working capital management of retail domestic companies that are listed on Botswana stock exchange. The research findings reveal that the listed companies adopted a conservative approach in the management of their working capital and suggest that the working capital is not static overtime but varies with the changes in the state of economy.

Pradeep (2008) attempted to analyse the size and composition of working capital. It also tries to examine as to what proportion of current assets has been financed by long term sources. The study tries to evaluate the effect of size of inventory and impact of working capital through inventory ratios, working capital ratios, and trends, computation of inventory and working capital, and liquidity ranking. It was found that the size of inventory directly affects working capital and its management. Size of inventory and working capital management of Indian Farmers and Fertilizer Cooperative Limited is properly managed and controlled as compared to National Fertilizers Ltd (NFL).

OBJECTIVES OF THE STUDY

- To identify the companies that excelled in managing their working capital based on Cash Conversion Efficiency, Days Operating Cycle, Days Working Capital and Overall Score among the sample companies and amongst their respective industries.
- To identify benchmark firms in each industry and to propose improvements in each of the parameters so that Corporate India can manage its working capital more efficiently, this can ultimately enhance firm value.
- To measure and test the relationship between the working capital performance and profitability of sample firms and industry.

RESEARCH METHODOLOGY

- The parameters selected to assess the working capital management performance of companies in India are:
 - **Cash Conversion Efficiency (CCE):** Measured by relating net cash flows from operating activities to sales revenue. It captures the working capital efficiency of a firm as it measures the speed at which the firm is able to convert its revenues to cash flows.

Higher is the ratio, higher is the speed of conversion. CCE looks at how efficient companies are at generating free cash flow from operations or operating cash flow from sales revenues and how much free cash flow makes the journey through the operating cost structure of a company. Though CCE is a simple metric to compute but it provides powerful insights into the overall health of an organisation's cash-generation capabilities. It exhibits better management of receivables and lower dependence on external sources of finance; thereby reducing interest cost and thereby enhanced profitability. (REL and CFO, 2001).

- **Days Operating Cycle (DOC):** Measures the efficiency with which the firms manage their inventory and receivables. It is the sum of raw material cycle (in days), work in progress cycle (in days), finished goods cycle (in days) and receivables (conversion period, in days). The lower the days operating cycle the better it is. This depicts that the firm is minimising its investment in working capital and accelerating its working capital ratio. Reduction in operating cycle shall unleash funds which can be alternatively deployed by the firm (Anand, 2001).
- **Days Working Capital (DWC):** Is DOC minus trade creditors (accounts payables period, in days). It measures the liquidity risk of the firms. DWC is a measure of the cash conversion cycle that gives insight about the underlying health of a business. It is a key metric because it measures the average number of days tied up in net working capital in the operating cycle. If DWC is trending upwards over time then it will have a negative financial impact on overall company profit (REL and CFO, 2001).
- **Overall efficiency score:** The technique used to develop an overall score for working capital was originally used by CFO Europe Magazine and REL Consultancy Group in their first Working Capital Survey in 1997 (Mintz and Lazere, 1997). CFO Europe Magazine and REL Consultancy Group used only two parameters namely Cash Conversion Efficiency and Days Working Capital giving equal weightage to both parameters. The original survey reports reveal Working Capital benchmarks for public companies using data for 1996. Each company is ranked against its peers and also against the entire field of 1,000 companies.

In the present study Cash Conversion Efficiency, Days Operating Cycle and DaysWC and overall efficiency score have been used to evaluate the working capital performance as presence of these parameters shall help to capture the dynamics of risk return trade-off. The overall ranking has combined CCE, DOC and absolute value of DWC. CCE has been assigned a weight of 0.5. A weight of 0.25 each has been assigned to days of

operating cycle and days of working capital measures. The weights assigned are according to the relative importance based on value judgments (Anand and Gupta, 2002). To convert CCE, DOC and DWC into one meaningful additive score, each is normalized (it measures the relative performance of all the firms under study) as follows:

- **Normalised Cash Conversion Efficiency (CCE) =**

$$\frac{\text{Highest Overall CCE}-\text{Company CCE/}}{\text{Highest Overall CCE}-\text{Lowest Overall CCE}}$$

A company approaching a zero normalized CCE is considered as a best performer.

- **Normalised Days Operating Cycle (DOC) =**

$$\frac{\text{Lowest Overall DOC}-\text{Company DOC/}}{\text{Lowest Overall DOC}-\text{Highest Overall DOC}}$$

Lower normalized DOC represents better performance on this account.

- **Normalised Days Working capital(DWC) =**

$$\frac{\text{Lowest Overall Absolute DWC}-\text{Company Absolute DWC/}}{\text{Lowest Overall Absolute DWC}-\text{Highest Overall Absolute DWC}}$$

A company with a lower normalized DWC would be considered a better performer in this regard.

The overall efficiency score is calculated as follows:

- **Overall efficiency score =**

$$\text{Normalised Cash Conversion Efficiency} \times 0.50 + \text{Normalised Days Operating Cycle} \times 0.25 + \text{Normalised Days Working capital (DWC)} \times 0.25$$

The company getting lowest overall score would be ranked the best performer.

- **Proposed improvements in working capital efficiency:** Taking the best firm in each industry as the benchmark, proposed improvements in each of parameters i.e CCE, DOC, DWC and Overall Efficiency have been computed. The performance of each firm has been subtracted from the performance of the benchmark company. In each parameter, the absolute improvements of each firm have been aggregated and average has been worked out to find out improvements proposed for the industry (considering constraints improvements for each firm have not been exhibited).

Table 1: Top ten companies on basis of normalised cash conversion efficiency

Company	Industry	Normalised cash conversion efficiency	Rank
Chambal fertilisers and chemicals	agriculture	-0.04836	1
B F utilities Ltd.	power	0.152034	2
New Delhi television Ltd.	media and publishing	0.173367	3
GMR infrastructure Ltd	diversified	0.21917	4
Ashok Leyland Ltd	transport equipments	0.229176	5
Housing development and infrastructure Ltd	housing related	0.261853	6
Hindustan construction company Ltd.	housing related	0.270084	7
Essar oil Ltd	oil and gas	0.274624	8
Videocon industries Ltd	consumer durables	0.274941	9
Amtek auto Ltd.	transport equipments	0.283198	10

Proposed improvements = $\{ \sum (\text{Score of Benchmark firm} - \text{score of individual firm}) / \{ \text{No of firms in the industry} - 1 (\text{i.e benchmark firm}) \}$

Correlation and testing: To find relationship between the overall efficiency score calculated for measuring the working capital performance and the profitability (measured by Income to Current Assets and Income to Total Assets), Karl Pearson Correlation Coefficient has been calculated and tested at 5 and 1%, respectively. Coefficient of determination i.e. r^2 has also been calculated.

Sample size: The present study has calculated on working capital performance of BSE 200 companies listed on Bombay Stock Exchange, India. The data has been taken from the PROWESS database of Centre for Monitoring Indian Economy. In order to facilitate better analysis, the non-manufacturing companies especially those related to banking and financial sector have been excluded from the study. The study has thus, included 164 manufacturing companies, classified into 19 industries (as per BSE classification), in respect of which data for 10 years i.e. from the year 2000-2001 to 2009-2010 has been taken.

Software used: The analysis has been done by using SPSS 17.0 software package.

Scheme of study: The study is divided into 5 sections. Section A outlays the theoretical foundations of working capital management. Section B briefly reviews some of the literature on the management of working capital. Section C covers the objectives and research framework of the study. The empirical analysis and results are presented in Section D:

- Firm wise analysis
- Industry wise analysis
- Inter industry analysis
- Proposed improvement in working capital efficiency
- Efficiency and profitability relationship

and Managerial Implications in Section E.

ANALYSIS AND RESULTS

The empirical study has calculated CCE, DOC, DWC and overall efficiency score for 164 companies classified into 19 industries. In order to rank industries on the basis of overall efficiency score, the Arithmetic Mean has been calculated

Firm wise analysis:

Cash conversion efficiency: The company with the best performance in view with normalised cash conversion efficiency is Chambal Fertilisers of Agriculture Sector with normalised value of -0.04836, followed by B.F. Utilities Ltd. of Power Sector with normalised value of 0.152034. This implies that these companies are the amongst the best as far as the cash conversion efficiency is concerned which means that they have better cash generation capabilities. The lowest normalised cash conversion efficiency is of Tata Consultancy Services Ltd. of Information Technology Sector with normalised value of 0.887679. The top ten companies based on average normalised cash conversion efficiency are shown in Table 1.

Days operating cycle: Lower Normalised Days Operating Cycle means that these companies are making the least investment in current assets i.e inventory and receivables and are thus able to generate funds for its day to day activities through spontaneous sources. The company with the lowest Normalised Days Operating Cycle is Jain Irrigation Systems Ltd. of Agriculture Sector with the normalised value of 0.9547, followed by Reliance Infrastructure Ltd. of Power Sector with normalised value of 0.113834. Chambal Fertilisers and Chemicals which was the best in case of normalised Cash Conversion Efficiency is ranked at number 9 in case of Days Operating Cycle. The top ten companies based on average normalised Days Operating Cycle are shown in Table 2.

Normalised days working capital: Siemens Ltd of Capital Goods sector has the lowest absolute normalised Days Working Capital of 0.09518, followed by Reliance Infrastructure Ltd of Power Sector with normalised value of 0.11345. This implies that these companies have lower

Table 2: Top ten companies on basis of normalised days operating cycle

Company	Industry	Normalised days operating cycle	Rank
Jain irrigation systems Ltd.	agriculture	0.095467	1
Reliance infrastructure Ltd.	power	0.113834	2
Essar oil Ltd	oil and gas	0.12107	3
Television eighteen India Ltd.	media and publishing	0.12838	4
GTL Ltd	information technology	0.145039	5
GMR infrastructure Ltd.	diversified	0.155136	6
Reliance power Ltd.	power	0.166667	7
DLF Ltd	housing related	0.179227	8
Chambal fertilisers and chemicals	agriculture	0.185303	9
CESC Ltd	power	0.187575	10

Table 3. Top ten companies on basis of absolute normalised days working capital

Company	Industry	Absolute normalised days working capital	Rank
Siemens Ltd	capital goods	0.095189174	1
Reliance infrastructure Ltd.	power	0.113455398	2
Essar oil Ltd	oil and gas	0.122115227	3
GTL Ltd	information technology	0.127088077	4
Jain irrigation systems Ltd.	agriculture	0.131733865	5
Television eighteen India Ltd.	media and publishing	0.136765995	6
Rolta India Ltd.	information technology	0.149860171	7
GMR infrastructure Ltd.	diversified	0.152743574	8
Max India Ltd.	diversified	0.164653938	9
GVK power & infrastructure Ltd.	diversified	0.193685643	10

Table 4: Top ten companies on the basis of overall efficiency score

Company	Industry	Overall score	Rank
Chambal fertilisers and chemical	agriculture	0.115314	1
Sun TV network Ltd	media and publishing	0.057657	2
Indiabulls real estate Ltd	housing related	0.028828	3
GMR infrastructure Ltd	diversified	0.186555	4
Essar oil Ltd	oil and gas	0.198109	5
Bombay dyeing & Mfg Co Ltd	textiles	0.099054	6
Reliance infrastructure Ltd	power	0.261382	7
BF utilities Ltd	power	0.264625	8
New Delhi television Ltd	media and publishing	0.283242	9
Ashok Leyland Ltd.	transport equipments	0.284706	10

liquidity risk. Jain Irrigation Systems Ltd which ranked at first rank in case of Days Operating Cycle is ranked at fifth place in case of Days Working Capital. Chambal Fertilisers and Chemicals which was ranked at number one in case of Cash Conversion Efficiency and number nine in case of Days Operating Cycle is ranked at number 67 in case of Days Working Capital. This means that Chambal Fertilisers and Chemicals is able to generate cash from its operations efficiently as well as is able to manage its inventory and receivables efficiently but delays payments to its creditors. The top ten companies based on lowest average absolute normalised Days Working Capital are shown in Table 3.

Weighted overall efficiency score: Based on the overall efficiency score Chambal Fertilisers and Chemicals of Agriculture Sector has been rated as the best company with the lowest overall score of 0.1153. The next best performer based on overall score is Sun TV Network Ltd of Media and Publishing Sector with the score of 0.0567. The third rank has been occupied by Housing Related Sector Company Indiabulls Real Estate Ltd with the

overall score of 0.0288. The top ten companies based on overall efficiency score are shown in Table 4.

Industry wise analysis: This part of the study details out the best company of each industry based on all the parameters of evaluating the working capital performance.

Cash conversion efficiency: On the basis of Normalised Cash Conversion Efficiency Chambal Fertiliser and Chemical Ltd has occupied the first rank not only in the Agriculture sector but also amongst all the companies under study. Areva T & D India Ltd has the highest rank amongst the companies in Capital Goods sector but its overall rank is 15. From the FMCG Sector, Colgate-Palmolive (India) Ltd is the best scorer with Normalised Cash Conversion Efficiency of 0.425 whereas its overall ranking is 41. It is followed by Dr Reddy's Laboratories Ltd at rank 42, which is the best in Healthcare Sector. The best company of all the 19 industries on the basis of Normalised Cash Conversion Efficiency along with their overall rank is shown in Table 5.

Table 5: Industry wise-best company based on cash conversion efficiency

Industry (no of companies)	Company	Normalised cash conversion efficiency	Industry rank	Overall rank
Agriculture (6)	Chambal fertilisers and chemical	-0.04836	1	1
Capital goods (14)	Areva T & D India Ltd	0.313305	1	15
Chemicals and petrochemicals (2)	Godrej industries Ltd	0.526762	1	99
Consumer durables (2)	Videocon industries Ltd.	0.274941	1	9
Diversified (9)	GMR infrastructure Ltd	0.21917	1	4
FMCG (7)	Colgate-palmolive (India) Ltd.	0.42576	1	41
Healthcare (13)	Dr Reddy's laboratories Ltd.	0.426674	1	42
Housing related (17)	DLF Ltd	0.354884	1	22
Information technology (14)	Financial technologies (India) Ltd	0.301975	1	13
Media and publishing (7)	New Delhi television Ltd.	0.173367	1	3
Metal products and mining (17)	Ispat industries Ltd	0.295042	1	12
Miscellaneous (2)	Pantaloon retail (India) Ltd.	0.406937	1	34
Oil and gas (16)	Essar oil Ltd	0.274624	1	8
Power (10)	BF utilities Ltd	0.152034	1	2
Telecom (7)	Reliance communications limited	0.31998	1	16
Textiles (1)	Bombay dyeing & Mfg Co Ltd	0.710984	-	153
Tourism (2)	Indian hotels Co Ltd.	0.447035	1	53
Transport equipments (11)	Ashok Leyland Ltd	0.229176	1	5
Transport services (7)	Container corporation of India	0.416783	1	37

Table 6: Industry wise best company on basis of days operating cycle

Industry (no of companies)	Company	Normalised days operating cycle	Industry rank	Overall rank
Agriculture (6)	Jain irrigation systems Ltd	0.095467	1	1
Capital goods (14)	Crompton greaves Ltd	0.24253	1	16
Chemicals and petrochemicals (2)	Godrej industries Ltd.	0.307984	1	31
Consumer durables (2)	Titan industries Ltd	0.302355	1	30
Diversified (9)	GMR infrastructure Ltd	0.155136	1	6
FMCG (7)	Tata tea Ltd	0.318103	1	35
Healthcare (13)	Apollo hospitals enterprises Ltd	0.363397	1	54
Housing related (17)	DLF Ltd	0.179227	1	8
Information technology (14)	GTL Ltd	0.145039	1	5
Media and publishing (7)	Television eighteen Indian Ltd	0.12838	1	4
Metal products and mining (17)	Sterlite industries Ltd	0.232217	1	13
Miscellaneous (2)	Pantaloon retail (India) Ltd	0.368192	1	59
Oil and gas (16)	Essar oil Ltd	0.12107	1	3
Power (10)	Reliance infrastructure Ltd	0.113834	1	2
Telecom (7)	Tata communications Ltd	0.27054	1	21
Textiles (1)	Bombay dyeing & Mfg Co Ltd	0.258967	1	18
Tourism (2)	EIH Ltd	0.265207	1	20
Transport Equipments (11)	Amtek auto Ltd	0.194299	1	11
Transport services (7)	Essar shipping ports & logistics Ltd	0.255665	1	17

Days operating cycle: On the basis of Normalised Days of Operating Cycle, Jain Irrigation Systems Ltd ranks first amongst the companies of Agriculture Sector. It also ranks first amongst all the 164 companies taken for the purpose of study. Crompton Greaves Ltd has the lowest Days Operating Cycle of 0.2453 in the Capital Goods Sector but it ranks 16 amongst all the companies. Apollo Hospitals Enterprises Ltd has the lowest normalised days operating cycle of 0.3633 in the Healthcare Sector and it ranks 54 on overall basis. DLF Ltd has the lowest normalised days operating cycle of 0.179 in the Housing Related Sector and it ranks 8 on overall basis. Tata Communications Ltd has the lowest days operating cycle in Telecom Sector and it ranks 21 on overall basis. The best company in all the 19 Sectors on the basis of Normalised Days Operating Cycle along with their overall ranks is shown in Table 6.

Days working capital: On the basis on Absolute Normalised Days Working Capital Jain Irrigation Systems Ltd has the lowest value of 0.1317 in the Agriculture Sector and it ranks 5 on overall basis. Siemens Ltd has the lowest days working capital of 0.0951 in not only the Capital Goods Sector but on overall basis as well. GMR Infrastructure Ltd has the lowest days working capital of 0.1527 in the Diversified Sector and its ranks 8 on overall basis. In the Housing Sector, Indiabulls Real Estate has the lowest days working capital of 0.2502 and it ranks 21 on overall basis. In the Healthcare Sector, Sun Pharmaceuticals Inds Ltd has the lowest value of 0.3768 but it ranks 69 on overall basis. The best company amongst 19 industries on the basis of Absolute Normalised Days Working is shown in Table 7.

Overall efficiency score: The overall score for measuring the working capital performance has been calculated on

Table 7: Best company-industry wise on basis on absolute normalised days working capital

Industry (no of companies)	Company	Normalised days working capital	Industry rank	Overall rank
Agriculture (6)	Jain irrigation systems Ltd	0.131734	1	5
Capital goods (14)	Siemens Ltd	0.095189	1	1
Chemicals and petrochemicals (2)	Asian paints Ltd	0.338348	1	48
Consumer durables (2)	Titan industries Ltd	0.30416	1	32
Diversified (9)	GMR infrastructure Ltd	0.152744	1	8
FMCG (7)	Hindustan unilever Ltd	0.338625	1	49
Healthcare (13)	Sun pharmaceuticals Inds Ltd	0.376866	1	69
Housing related (17)	India bulls real estate Ltd	0.250285	1	21
Information technology (14)	GTL Ltd	0.127088	1	4
Media and publishing (7)	Television eighteen India Ltd	0.136766	1	6
Metal products and mining (17)	Hindustan zinc Ltd	0.234389	1	16
Miscellaneous (2)	MMTC Ltd	0.288777	1	31
Oil and gas (16)	Essar oil Ltd	0.122115	1	3
Power (10)	Reliance infrastructure Ltd	0.113455	1	2
Telecom (7)	Tanla solutions Ltd	0.212868	1	13
Textiles (1)	Bombay dyeing & Mfg Co Ltd	0.578066086	-	149
Tourism (2)	Indian hotels Co Ltd	0.5267	1	149
Transport equipments (11)	Ashok Leyland Ltd	0.304222	1	33
Transport services (7)	Mercator lines Ltd	0.223592	1	14

Table 8: Industry wise best company on basis of overall score

Industry (no of companies)	Company	Overall score	Industry rank	Overall rank
Agriculture (6)	Chambal fertilisers and chemical	0.115313742	1	1
Capital goods (14)	Areva T&D India Ltd	0.361126364	1	23
Chemicals and petrochemicals (2)	Godrej industries Ltd	0.440352	1	66
Consumer durables (2)	Titan industries Ltd	0.448419	1	69
Diversified (9)	GMR infrastructure Ltd	0.186555	1	2
FMCG (7)	Tata tea Ltd	0.41997	1	49
Healthcare (13)	Apollo hospitals enterprises Ltd	0.429837	1	58
Housing related (17)	DLF Ltd	0.289379	1	8
Information technology (14)	Wipro Ltd	0.355129	1	18
Media and publishing (7)	New Delhi television Ltd	0.283242	1	6
Metal products and mining (17)	Gujarat mineral development Corpn.	0.322799	1	12
Miscellaneous (2)	Pantaloon retail (India) Ltd	0.387502	1	28
Oil and gas (16)	Essar oil Ltd	0.198109	1	3
Power (10)	Reliance infrastructure Ltd	0.261382	1	4
Telecom (7)	Tanla solutions Ltd	0.311092	1	10
Textiles (1)	Bombay dyeing & Mfg Co Ltd	0.498879	-	111
Tourism (2)	Indian hotels Co Ltd.	0.450521	1	75
Transport equipments (11)	Ashok Leyland Ltd	0.284706	1	7
Transport services (7)	Mercator lines Ltd.	0.407438	1	43

Table 9: Industry wise overall analysis based of arithmetic mean all parameters

Industry (no of companies)	Average normalised cash conversion efficiency	Average normalised days operating cycle	Average normalised days working capital	Average overall score
Agriculture (6)	0.439861 (1)	0.303517 (2)	0.311351 (1)	0.373647492 (2)
Capital goods (14)	0.44912136 (5)	0.508843 (19)	0.393198 (8)	0.365203 (1)
Chemicals and petrochemicals (3)	0.560823 (17)	0.329163 (4)	0.369123 (6)	0.454983 (10)
Consumer durables (2)	0.434261 (4)	0.450974 (13)	0.47672 (16)	0.449054 (8)
Diversified (9)	0.531223 (15)	0.415267 (9)	0.347064 (3)	0.459824 (12)
FMCG (7)	0.521568 (14)	0.500346 (17)	0.48897 (17)	0.508113 (17)
Healthcare (13)	0.571642 (18)	0.490993 (16)	0.468568 (15)	0.525711 (18)
Housing related (17)	0.430766 (3)	0.450988 (14)	0.430179 (14)	0.396806 (3)
Information technology (14)	0.515404 (11)	0.502803 (18)	0.383298 (7)	0.479227 (15)
Media and publishing (7)	0.520553 (13)	0.418698 (10)	0.354425 (5)	0.44537 (7)
Metal products and mining (17)	0.487578 (9)	0.406379 (7)	0.408775 (12)	0.451303 (9)
Miscellaneous (2)	0.455006 (6)	0.412227 (8)	0.32836 (2)	0.41265 (4)
Oil and gas (16)	0.499616 (10)	0.463912 (15)	0.402957 (9)	0.466525(13)
Power (10)	0.471098 (7)	0.362389 (5)	0.407689 (11)	0.428068 (6)
Telecom (7)	0.51767 (12)	0.444808 (12)	0.349314 (4)	0.457366 (11)
Textiles (1)	0.710984 (19)	0.258967 (1)	0.578066 (18)	0.56475 (19)
Tourism (2)	0.480445 (8)	0.323261 (3)	0.642629 (19)	0.481695 (16)
Transport equipments (11)	0.429813 (3)	0.388166 (6)	0.4172 (13)	0.416248 (5)
Transport services (7)	0.533311 (16)	0.42538 (11)	0.405594 (10)	0.474399(14)

Figures in brackets are industry ranks

basis of CCE, DOC and DWC. On the basis of overall efficiency score Chambal Fertilisers and Chemical of

Agriculture Sector is rated at first rank with overall score of 0.115. The overall best of Capital Goods sector is i.e

Areva T & D India Ltd is rated at 23 on overall basis. Tata Tea Ltd with lowest overall score of 0.4199 is rated the best in FMCG sector but it is ranked at 49 on overall basis. Apollo Hospitals Enterprises Ltd is ranked at number one in Healthcare Sector but its ranked at 58 on overall basis. Mercator Lines is rated as the best in Transport Services Sector and it is ranked at number 43 on overall basis. The best company in all the 19 industries on the basis of overall efficiency score is shown in Table 8.

Inter industry working capital efficiency: The average of Normalised Cash Conversion, Normalised Days Operating Cycle, Absolute Normalised Days Working Capital and Overall Efficiency Score is presented in Table 9. The lowest average overall score is of Capital Goods Sector which means that this sector has the best working capital performance amongst the industries being studied in the paper. It is followed by Agriculture Sector at number two and Housing Sector at number three. The Transport Sector is at number five followed by Power Sector in relation to overall best working capital performance.

Proposed improvements in performance parameters: Table 10 shows the relative improvement in working capital efficiency parameters that can be achieved by various firms of the industry. The analysis reveals

fascinating results as improvements in all the parameters of 88.41% of the sample firms can be accomplished. Relative improvement in working capital efficiency shall unleash additional cash resources; reduce gross as well as net operating cycle thereby cutting down the financing cost and improvement in the efficiency of the organisation.

Relationship between overall efficiency score and profitability: Efficient management of working capital is an important component of corporate financial management because it directly affects the profitability of the firms (Raheman and Nasr, 2007; Garcia-Teruel and Martinez-Solano, 2007). According to Deloof (2003) the way that working capital is managed has a significant impact on profitability of firms. The correlation coefficient between Overall Score of Working Capital Performance and Income to Current Assets and Income to Sales of top ten companies (on the basis of overall efficiency score) is shown in Table 11.

Table 11 reveals the companies which are the best working capital performers have negative correlation with profitability measures of Income to Current Assets and Income to Average Total Assets. Negative correlation here should be construed as relationship between a low overall efficiency score (better performance indicator) and higher profitability ratio (better performance indicator). Chambal Fertilisers and Chemicals which is the

Table 10: Proposed improvement in working capital efficiency

Industry	Cash conversion efficiency	Days operating cycle	Days working capital	Overall score
Agriculture	0.585865	0.24966	0.21554	0.31
Capital goods	0.21058	0.162258	0.290784	0.094764
Chemicals and petrochemicals	0.068121	0.042357	0.061551	0.029262
Consumer durables	0.318639	0.297238	0.345121	0.00127
Diversified	0.351059	0.292647	0.21861	0.307427
FMCG	0.111776	0.212617	0.175402	0.102833
Healthcare	0.157048	0.138229	0.099344	0.103863
Housing related	0.200957	0.266636	0.155678	0.150224
Information technology	0.229847	0.385285	0.275919	0.133644
Media and publishing	0.40505	0.338704	0.253936	0.189149
Metal products and mining	0.20457	0.185047	0.185285	0.136535
Miscellaneous	0.096138	0.08807	0.079166	0.050295
Oil and gas	0.241062	0.367331	0.300901	0.287589
Power	0.354515	0.276173	0.326926	0.185207
Telecom	0.230639	0.203312	0.159187	0.170653
Textiles	-	-	-	-
Tourism	0.06682	0.116108	0.23186	0.062348
Transport equipments	0.2207	0.213254	0.124275	0.144697
Transport services	0.135949	0.198001	0.212336	0.078122

Table 11: Correlation coefficient between overall efficiency score and profitability (top ten companies)

Company	Industry	Rank	Overall score and income to current assets	Overall score and income to avg total assets
Chambal fertilisers and chemical	Agriculture	1	- 0.596	- 0.573
Sun TV network Ltd	Media and publishing	2	- 0.443	0.0203
Indiabulls real estate Ltd	Housing related	3	0.0930	0.0892
GMR infrastructure Ltd	Diversified	4	- 0.652*	- 0.224
Essar oil Ltd	Oil and gas	5	- 0.163	- 0.108
Bombay dyeing & Mfg Co Ltd	Textiles	6	- 0.401	- 0.288
Reliance infrastructure Ltd	Power	7	0.0453	0.0274
BF utilities Ltd	Power	8	- 0.303	0.023
New Delhi television Ltd	Media and publishing	9	- 0.518	- 0.049
Ashok Leyland Ltd.	Transport equipments	10	- 0.587	- 0.689*

*: Significant at 0.05 level (2 tailed test)

Table 12: Correlation coefficient between overall efficiency score and profitability (top ten industry wise analysis)

Industry (no of companies)	Company	Industry rank	Overall rank	Overall score and income to current assets	Overall score and income to avg total assets
Agriculture (6)	Chambal fertilisers and chemical	1	1	-0.596	-0.573
Capital goods (14)	Areva T&D India Ltd	1	23	-0.014	-0.258
Chemicals and petrochemicals (2)	Godrej industries Ltd	1	66	-0.585	-0.672*
Consumer durables (2)	Titan industries Ltd	1	69	-0.763*	-0.349
Diversified (9)	GMR infrastructure Ltd	1	2	-0.652*	-0.224
FMCG (7)	Tata tea Ltd	1	49	-0.281	-0.115
Healthcare (13)	Apollo hospitals enterprises Ltd	1	58	-0.558	-0.412
Housing related (17)	DLF Ltd	1	8	-0.452	-0.221
Information technology (14)	Wipro Ltd	1	18	-0.865**	0.012
Media and publishing (7)	New Delhi television Ltd	1	6	-0.518	-0.049
Metal products and mining (17)	Gujarat mineral development Corpn.	1	12	0.0286	-0.074
Miscellaneous (2)	Pantaloon retail (India) Ltd	1	28	-0.069	-0.056
Oil and gas (16)	Essar oil Ltd	1	3	-0.163	-0.108
Power (10)	Reliance infrastructure Ltd	1	4	0.0453	0.0274
Telecom (7)	Tanla solutions Ltd	1	10	-0.501	-0.327
Textiles (1)	Bombay dyeing & Mfg Co Ltd	1	111	-0.401	-0.288
Tourism (2)	Indian hotels Co Ltd.	1	75	-0.484	-0.328
Transport equipments (11)	Ashok Leyland Ltd	1	7	-0.587	-0.689*
Transport services (7)	Mercator lines Ltd.	1	43	-0.613	-0.545

*: Significant at 0.05 level (2 tailed test); **: Significant at 0.01 level (2 tailed test)

Table 13: Overall correlation analysis

Industry (no of companies)	Rank on basis of average overall score	Overall score and income to current assets	Overall score and income to avg total assets
Agriculture (6)	2	- 0.449**	- 0.123
Capital goods (14)	1	- 0.115	- 0.209*
Chemicals and petrochemicals (3)	10	- 0.130	- 0.034
Consumer durables (2)	8	- 0.626**	- 0.234
Diversified (9)	12	- 0.155	0.192
FMCG (7)	17	- 0.161	- 0.067
Healthcare (13)	18	0.0201*	0.060
Housing related (17)	3	0.046	- 0.156
Information technology (14)	15	- 0.036	0.033
Media and publishing (7)	7	- 0.010	- 0.285*
Metal products and mining (17)	9	- 0.236**	- 0.039
Miscellaneous (2)	4	0.111	0.092
Oil and gas (16)	13	0.015	0.162
Power (10)	6	- 0.084	- 0.009
Telecom (7)	11	- 0.249	0.020
Textiles (1)	19	- 0.401	- 0.288
Tourism (2)	16	- 0.336	-0.401
Transport equipments (11)	5	0.051	-0.110
Transport services (7)	14	- 0.215	-0.099
Overall		- 0.048	-0.007

*: Significant at 0.05 level (2 tailed test); **: Significant at 0.01 level (2 tailed test)

best performers as to working capital have negative correlation of -0.596 and -0.573 between the overall score of working capital performance and Income to Current Assets and Income to Avg. Total Assets. GMR infrastructure has significant correlation (-0.653, significant at 0.05 level) between the working capital performance and Income to Current Assets. Ashok Leyland Ltd. has significant negative correlation of -0.689 significant at 0.05 levels between Overall Score and Income to Avg total Assets.

The analysis signifies that the lower value of overall score has an inverse relationship with higher value of

profitability. The study proposes that all the managements must endeavour to escalate their working capital efficiency in order to enhance profitability. It has been observed that even in case of organisation has positive correlation coefficient, the coefficient value is too small and is not significant.

Table 12 depicts the correlation coefficients of best working capital performers of each industry and profitability. The table clearly points out that there is negative correlation between the overall score and profitability with an exception to Gujarat Mineral Development Corporation and Reliance Infrastructure

Table 14: Working capital efficiency and profitability matrix

	Companies with high profitability	Companies with low profitability
Companies with good working capital performance	0.216466 (45){0.046858}	0.13739 (37){0.0188}
Companies with poor working capital performance	0.002153 (37){0.00004}	0.39666 (45){0.00035}

Figures in parentheses: () indicate number of companies and {} represent r^2

Ltd. Titan Industries has a significant negative correlation coefficient of -0.763 (significant at 0.05 level). Godrej Industries Ltd has a significant correlation coefficient between overall score and Income to Avg Total Assets.

Table 13 depicts the pooled correlation analysis of each industry and pooled correlation of all the companies under study put together. The table reveals that on pooled data of all the 164 companies put together the overall correlation coefficient is -0.048 and -0.007 between the overall score and income to current assets and overall score and income to average total assets. This implies that better management of working capital generates positive returns on current assets as well as total assets of the company. Overall low negative correlation indicates that better management of working capital does affect the profitability of the companies under study but the impact is not very significant. There are other factors like the operating risk, business environment; government policies etc that also have influence on the profitability of the companies. The Capital Goods sector which is the best as far the working capital is concerned has a significant negative correlation of -0.209 (significant at 0.05 levels). The agriculture sector which has the second best performance among all the industries as far as the working capital performance is concerned as significant negative correlation of -0.0449 (significant at 0.001 level) between overall score and income to current assets which is also the best among all the industries. The Metal Products and Mining Sector which has 17 companies have a significant negative correlation of -0.0236 (significant at 0.01 levels).

Based on working capital efficiency and profitability (Income to Average Total Assets) of the firms the correlation matrix is presented in Table 14.

Table 14 clearly shows that there is association between good working capital performance & high profitability and poor working capital performance & poor profitability as depicted by the correlation of 21 and 39%, respectively. The coefficient of determination of 4 and 0.3% shows that other factors contribute contributed marginally towards profitability. The degree of association between Companies with Good Working Capital Performance and Low profitability and Poor Working Capital Performance & High Profitability is low to the extent of 13 and 0.2% respectively.

MANAGERIAL IMPLICATIONS

The study suggests the managers to cut down the days operating cycle and days working capital cycle, pay

attention to cash conversion efficiency as this leads to better efficiency of working capital, thereby creating an impact on the profitability of a firm.

The overall score calculated on the basis of these parameters will be of immense use in benchmarking and evaluating the working capital performance of Corporate India. Benchmarking of the companies in each industry offers ample scope for the other firms in the industry to follow the pursuits of the leaders which can bring massive improvements in the reduction of operating cycles and cash realisation.

The managers need to plan and control properly the current assets and liabilities of their firms. It is expected that a well designed and implemented policy based on these parameters will help the managers to manage their working capital more efficiently and contribute positively to the creation of firm's value.

The study recommends that there should be reduction in volume of investment in current assets which can reduce the cost of financing working capital and consequently enhance profits and profitability of the firm.

The analysis supports the maxim that better working capital performance would result in hiked profits and increased profitability of an organisation. So, proper management of working capital, besides other factors, is necessary to smoothly conduct business activities.

CONCLUSION

Working capital management is, therefore, one of the important facets of a firm's financial management effecting both its profitability and efficiency.

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