An Analysis of Working Capital Management in Select Construction Companies

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Abstract

For a successful working of a business organization fixed and current assets play a vital role as organization generally invests in these options. An attempt has been made in this paper to study the working capital components and the effect of working capital management policies on profitability of 10 Infrastructure companies. The paper also tries to study the correlation between liquidity, profitability and Profit before Tax (PBT) of selected Infrastructure companies. The study is based on secondary data collected from annual reports of different Infrastructure companies and PROWESS (CMIE Database) for the period 2007 to 2012. In this paper there is an application of correlation and regression analysis to identify the significant effects of Working capital management on the profitability. The Management of operating capital is indispensable as it might induce a direct impact on profitability and liquidity.

Keywords: Inventory, Payables, Profitability and Liquidity

Introduction

Working Capital Management **(WCM)** is the management of short term financing requirements of a firm. This includes maintaining the optimal balance of working capital components such as receivables, inventory and payables and using the cash efficiently for day-to-day operations. Every business needs funds for two intentions for its constitution and to carry out its day- today operations. Long term funds are required to create production facilities through the purchase of fixed assets such as plant & machinery, solid background, building, furniture, etc. Investments in these assets represent that piece of a firm's capital which is blanked out on permanent or fixed earth and is called fixed capital. Funds are also needed for short-term purposes for the purchase of crude material, payment of wages and other day – to- day expenses etc. These funds are known as making capital. In mere words, working capital refers to that section of the firm's capital, which is needed for financing short- term or current assets such as cash, marketable securities, debtors & inventories. Hence, it is also known as revolving or circulating capital or short term capital. Optimization of working capital balance means minimizing the working capital requirements and making maximum possible revenues. Efficient WCM increases firms' free cash flow, which in turn increases the firms' growth opportunities and turn back to shareholders. Even though firms traditionally are focused on long term capital budgeting and capital structure, the recent trend is that many companies across different industries focus on WCM efficiency. The management of working capital by managing the proportions of the WCM components is important to the financial health of businesses from all industries. To reduce accounts receivable, a firm may have strict collections policies and limited sales credits to its customers. This would increase cash inflow. However, the strict collection policies and lesser sales credits would lead to lost sales thus reducing the profits. Maximizing account payables by having longer credits from the suppliers also has the opportunity of taking poor quality fabrics from a provider that would finally bear on the profitability. Minimizing inventory may lead to lost sales by stock-outs.

Construction is an essential part of any country's infrastructure and

industrial development. The Indian construction sector is an inbuilt component of the economic system and a conduit for a significant portion of India's development investment. Forecasting working capital along with cash requirements is essential for all construction contractors during the tendering stage since cash flow at the beginning of the project is a major case of construction companies' failure. In the contracting business, construction firms are generally more concerned with short-term financial strategies than longer term ones. Working capital management is the central issue of all short-term financial concerns. Every business needs adequate liquid resources in order to maintain day to day cash flows. A Contractor needs enough cash to by wages and salaries as they fall due and to pay creditors if it is to keep its workforce and ensure its supplies. Maintaining adequate working capital; is not only important in the short term. Sufficient liquidity must be preserved in order to insure the survival of business in the long term as well. Even a profitable business may fail if it does not have adequate cash flows to meet its liabilities as they fall a due. Therefore, when a business makes an investment decision they must not only consider the financial outlay involved with acquiring the new machine or the new building, etc. but must also take account of the additional current assets that are usually involved with any expansion of activity. In working capital analysis, the direction of change over a period of time is of crucial importance. Not only that, analysis of working capital trends provides a base to judge whether the practice and prevailing policy of the management with regard to working capital is good enough or an improvement is to be made in managing the working capital funds. Hence, in this study, an attempt is made about the trend of the working capital management of the selected enterprise.

Literature Review

Working capital management involves the relationship between a firm's short-term assets and its short-term liabilities. The management of working capital involves managing inventories. **Gilbert and Reichert** (1995) analyzed that time value of money cash flow analysis is used to select projects in 91 percent of the firms. Accounts receivable management models are used in 59 percent of these firms, while inventory management models

were used in 60 percent of the companies. Across a limited sample, **Weinraub and Visscher** (1998) observe a tendency of construction firms with low levels of current ratios to also have low levels of current liabilities. Combining accounts receivable and payable into one issue is billed, **Satoris, and Ferguson's** (1984) finding that payees define the date of payment as the date payment is received, while payers view payment as the postmark date. Additional WCM insight across firms, industries, and time are needed. **Maness and Zietlow** (2002) presents two models of value creation through effective short-term financial management activities.

Navon (1996) proposed a relationship between cash flow, cost flow, and expense flow. The cost flow is the projection of the project's costs as a function of time. In principle, to compile the cost

Flow for a project, the costs of each activity have to be distributed over its duration. Time lag is not taken into consideration when cost flow is prepared. The money could have been paid before the activity is performed, that is, used as a down payment or for the services given. Alternatively, the money may be paid later, upon completion of the credit period. In other words, the time when a resource is used on the site differs from when it is paid for. This difference is called the time lag and can be positive or negative, depending on the mode of payment.

Kenley and Wilson (1989) found to have an excellent fit for the data for 80% of the projects analyzed and is useful for the post-examination of a construction project's net cash flow. This model is very flexible and capable of adapting to a wide degree of inter-project variability.

Raheman and Nasr (2007) conducted a study to analyze the relationship between WCM and Profitability in case of Pakistani Firms. The result shows that, there is a strong negative relationship between the variables of WCM and profitability of the firm. It means that as the cash conversion cycle increases, it will lead to decreasing profitability of the firm and managers can create positive value for the shareholders by reducing the cash conversion cycle to a possible minimum level. There is a significant negative relationship between liquidity and profitability. It was also found that there is

positive relationship between size of the firm and its profitability as well as a significant relationship between debt used by the firm and its profitability.

Arditi et al. (2000) found budgetary and macroeconomic issues as the main reasons for construction company failure in the US. **Osama** (1997), on the other hand, presented a study of the factors that contribute to the failure of construction contractors in Saudi Arabia and found that the most important factors were: difficulty in acquiring work, bad judgment, and lack of experience in the firm's line of work, difficulty with cash flow, lack of managerial experience, and low profit margins. **Kivrak and Arslan (2008)** examined the critical factors causing the failure of construction companies through a survey conducted among 40 small to medium-sized Turkish construction companies. A lack of business experience and country's economic conditions were found to be the most influential factors to company failure. A scrutiny of the sub-factors related to the lack of business experience confirms that difficulties with cash flow and poor relationship with the client drove the contractors" failure.

Kangari (1988) found that more than half of business failures in construction were due to unrealistic profit margin. The Construction sector is not capital intensive but working capital intensive according to **Dagar (2008).** Main aim of this research is to establish the relationships among the factors that contribute to working Capital requirements.

Objectives of Research

- To establish a relationship between Working Capital Management and Profitability over a period of **5** years from **2007 to 2012**.

- To study a relationship between profitability and liquidity ratios of **10** Indian construction companies.

Research Methodology

The Management of working capital is essential as it might have a direct impact on profitability and liquidity. Therefore, an attempt has been made in this paper to study the working capital components and effect of working capital management policies on profitability of 10 Infrastructure companies.

The study is based on secondary data collected from PROWESS (CMIE Database) & annual budgetary report available in the company websites for the period 2007-2012. Now, with the help of profitability **(ROI)** and liquidity **(Quick ratio, Current ratio, Debtors turnover & Creditors turnover)** ratios obtained, we can generate relationship between these ratios using Correlation & Regression analysis in Excel and can check significant/insignificant relationship between working capital ratios and profitability. Thus, it can be concluded as the working capital management is an important aspect which is very vital for the success of different Construction companies.

Hypothesis

- **Null Hypothesis (H_0):** There is no significant relationship between Working capital ratios and Profitability.

- **Alternative Hypothesis (H_1):** It is assumed that there is a significant relationship between Working capital and Profitability.

Analysis for different construction firms in India

1.   Gammon Infrastructure Projects Ltd.

Year	ROI	Quick ratio (times)	Current ratio (times)	Debtors turnover	Creditors turnover
2007	0.029	2.94	2.947	4.712	2.873
2008	0.02	8.48	8.389	6.29	1.081
2009	0.028	3.458	3.323	4.718	1.205
2010	0.026	0.797	0.755	9.88	4.521
2011	0.064	3.341	2.898	3.212	8.396
2012	0.055	0.241	0.236	3.157	10.11

Table 1

Analysis: In (Table 1) Profitability (ROI) and Liquidity (Quick ratio, Current ratio, Debtors turnover & Creditors turnover) ratios can be seen for the period of 2007-2012 for Gammon Infrastructure Projects Ltd.

	ROI	Quick ratio	Current ratio	Debtors turnover	Creditors turnover
ROI	1				
Quick ratio	-0.43203	1			
Current ratio	-0.47028	0.998372596	1		
Debtors turnover	-0.6754	0.007344693	0.027991122	1	
Creditors turnover	0.903923	-0.626575385	-0.64825398	-0.433226191	1

Table 2: Correlation Matrix

Correlation Analysis:

In (Table 2) analysis shows that there is negative Correlation between ROI and Quick ratio (-0.43203), Current ratio (-0.47028), Debtors turnover ratio (-0.6754) but there is positive Correlation between ROI and Creditors ratio for the time period 2007 to 2012. This shows high degree of Correlation between ROI and Creditors ratio. Hence, from Correlation matrix it can be concluded that with increase in Creditors ratio there is an increase in Profitability (ROI) and vice-versa.

Regression analysis:

SUMMARY OUTPUT	
Regression Statistics	
Multiple R	0.999866078
R Square	0.999732174
Adjusted R Square	0.99866087
Standard Error	0.00065625
Observations	6

Table 3

Analysis: In (Table 3) it shows that independent variable **(R^2)** explains **99.97%** of the variation in Profitability of Gammon Infrastructure Projects Ltd.

ANOVA					
	df	SS	MS	F	Significance F
Regression	4	0.001607569	0.000402	933.1919	0.024545894
Residual	1	4.30664E-07	4.31E-07		
Total	5	0.001608			

Table 4

Analysis: In (Table 4) significance value of **F (0.024)** shows that there is significant impact of Working capital ratios on Profitability of Gammon Infrastructure Projects Ltd. Hence, Null Hypothesis is rejected and Alternative Hypothesis is accepted.

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
ROI	0.031653719	0.001486473	21.29451	0.029874	0.012766285	0.050541153	0.012766285	0.050541153
Quick	0.035418157	0.002023987	17.4992	0.03634	0.009700959	0.061135355	0.009700959	0.061135355
Current	-0.03604229	0.002083947	-17.2952	0.036768	-0.062521347	-0.009563234	-0.062521347	-0.009563234
Creditor	-0.002029652	0.000140717	-14.4236	0.044067	-0.003817633	-0.000241671	-0.003817633	-0.000241671
debtors	0.00295993	0.000130001	22.76846	0.027943	0.001308107	0.004611753	0.001308107	0.004611753

Table 5

Analysis: In (Table 5) if **P** < 0.05 than it has statistically significant impact on Profitability. Therefore, in (Table 5) **P** value < 0.05 i.e. it has statistically significant impact on Profitability (ROI).

2.   G.M.R. Infrastructure Ltd.

Year	ROI	Quick ratio (times)	Current ratio (times)	Debtors turnover	Creditors turnover
2007	0.003	3.276	3.274	0	0.33
2008	0.017	0.829	0.829	0	0.894
2009	0.017	13.02	12.909	0	1.014
2010	0.002	0.113	0.127	5.656	3.318
2011	0.009	0.665	0.668	7.049	1.44
2012	0.017	0.793	0.809	4.49	2.626

Table 6

Analysis: In (Table 6) Profitability (ROI) and Liquidity (Quick ratio, Current ratio, Debtors turnover & Creditors turnover) ratios can be seen for the period of 2007-2012 for GMR.

	ROI	Quick ratio	current ratio	Debtors turnover	Creditors turnover
ROI	1				
Quick ratio	0.350064	1			
current ratio	0.34949	0.999998558	1		
Debtors turnover	-0.30293	-0.554114669	-0.554450738	1	
Creditors turnover	-0.1611	-0.407445024	-0.407542884	0.711363482	1

Table 7: Correlation matrix

Correlation Analysis:

In (Table 7) analysis shows that there is negative Correlation between ROI and Creditors turnover ratio (-0.161), Debtors turnover ratio (-0.302) but there is positive Correlation between ROI and Quick ratio (0.350), current

ratio (0.349) for the time period 2007 to 2012. This shows high degree of Correlation between ROI and Quick ratio and Current ratio. Hence, from Correlation matrix it can be concluded that with increase in Quick ratio & current ratio there is an increase in Profitability (ROI) and vice-versa.

Regression analysis:

SUMMARY OUTPUT	
Regression Statistics	
Multiple R	0.547821069
R Square	0.300107923
Adjusted R Square	-2.499460384
Standard Error	0.013407297
Observations	6

Table 8

Analysis: In (Table 8) it shows that independent variable **(R^2)** explains **30.01%** of the variation in Profitability of G M R Infrastructure Ltd.

ANOVA					
	df	*SS*	*MS*	*F*	*Significance F*
Regression	4	7.70777E-05	1.93E-05	0.107198	0.962130001
Residual	1	0.000179756	0.00018		
Total	5	0.000256833			

Table 9

Analysis: In (Table 9) significance value of F **(0.96)** shows that there is insignificant impact of Working capital ratios on Profitability of G M R Infrastructure Ltd. Hence, Null Hypothesis is accepted and Alternative Hypothesis is rejected.

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
ROI	0.016375365	0.018865266	0.868017	0.544905	-0.223330567	0.2560813	-0.22333057	0.256081297
Quick ratio	0.345105693	0.735742055	0.469058	0.720786	-9.003383488	9.69359487	-9.00338349	9.693594875
Current ratio	-0.348151537	0.743056667	-0.46854	0.721056	-9.78958168	9.09327861	-9.78958168	9.093278606
Debtors turnover	-0.00088974	0.002988165	-0.29775	0.815765	-0.03885798	0.0370785	-0.03885798	0.037078501
Creditors turnover	0.001157749	0.007546641	0.153412	0.90309	-0.094731413	0.09704691	-0.09473141	0.097046911

Table 10

Analysis: In (Table 10) if **P** value < 0.05 than it has statistically significant impact on Profitability. Therefore, in (Table 10) P **value** > 0.05 i.e. it has statistically insignificant impact on Profitability (ROI).

3.   Hindustan Construction Co. Ltd.

Year	ROI	Quick ratio (times)	Current ratio (times)	Debtors turnover	Creditors turnover
2007	0.041	0.179	1.549	1,089.93	1.691
2008	0.114	0.201	1.775	1,061.82	2.02
2009	0.125	0.09	1.446	682.031	2.076
2010	0.065	0.072	1.355	934.514	1.529
2011	0.047	0.27	1.116	7.921	1.552
2012	-0.157	0.282	1.037	3.607	1.371

Table 11

Analysis: In (Table 11) Profitability (ROI) and Liquidity (Quick ratio, Current ratio, Debtors turnover & Creditors turnover) ratios can be seen for the period of 2007-2012 for Hindustan Construction Co. Ltd.

	ROI	Quick ratio	Current ratio	Debtors turover	Creditors turover
ROI	1				
Quick ratio	-0.6288172	1			
Current ratio	0.7138092	-0.446047242	1		
Debtors turover	0.6344104	-0.670834727	0.899765529	1	
Creditors turover	0.794182	-0.445444281	0.784902754	0.558078065	1

Table 12: Correlation Matrix

Correlation Analysis:

In (Table 12) analysis shows that there is negative Correlation between ROI and Quick ratio (-0.628) but there is positive Co-relation between ROI and current ratio (0.713), Creditors turnover (0.749) & Debtors turnover (0.634) for the time period 2007 to 2012. This shows a high degree of Correlation between ROI and current ratio, Creditors turnover & Debtors turnover. Hence, from Correlation matrix it can be concluded that with increase in current ratio, Creditors turnover & Debtors turnover there is an increase in Profitability (ROI) and vice-versa.

Regression analysis:

SUMMARY OUTPUT	
Regression Statistics	
Multiple R	0.870033837
R Square	0.756958878
Adjusted R Square	-0.215205612
Standard Error	0.112614778
Observations	6

Table 13

Analysis: In (Table13) it shows that independent variable **(R^2)** explains **75.69%** of the variation in Profitability of Hindustan Construction Co. Ltd.

ANOVA					
	df	*SS*	*MS*	*F*	*Significance F*
Regression	4	0.039499	0.009875	0.778633	0.67957935
Residual	1	0.012682	0.012682		
Total	5	0.052181			

Table 14

Analysis: In (Table 14) significance value of **F (0.67)** shows that there is insignificant impact of Working capital ratios on Profitability of Hindustan Construction Co. Ltd. Hence, Null Hypothesis is accepted and Alternative Hypothesis is rejected.

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
ROI	-0.375003278	0.486482907	-0.77085	0.581926	-6.556354689	5.806348133	-6.556354689	5.806348133
Quick ratio	-0.996143321	2.114195873	-0.47117	0.719685	-27.85954894	25.8672623	-27.85954894	25.8672623
Current ratio	0.612877718	1.830270973	0.334856	0.794295	-22.64291999	23.86867543	-22.64291999	23.86867543
Debtors turover	-0.000273913	0.000890161	-0.30771	0.809958	-0.011584483	0.011036657	-0.011584483	0.011036657
Creditors turover	-0.045244573	0.818570595	-0.05527	0.964848	-10.44617015	10.355681	-10.44617015	10.355681

Table 15

Analysis: In (Table 15) if **P** value < 0.05 than it has statistically significant impact on Profitability. Therefore, in (Table 15) **P** value > 0.05 i.e. it has statistically insignificant impact on Profitability (ROI).

4.   IVRCL Infrastructures & Projects Limited

Year	ROI	Quick ratio (times)	Current ratio (times)	Debtors turnover	Creditors turnover
2007	0.158	0.909	0.971	4.203	2.748
2008	0.144	0.738	0.831	5.68	3.401
2009	0.134	0.73	0.797	4.919	3.505
2010	0.038	0.711	0.773	3.287	2.785
2011	0.083	0.802	0.863	2.278	2.311
2012	0.009	0.668	0.727	2.205	2.157

Table 16

Analysis: In (Table 16) Profitability (ROI) and Liquidity (Quick ratio, Current ratio, Debtors turnover & Creditors turnover) ratios can be seen for the period of 2007-2012 for I V R C L Ltd.

`	ROI	Quick ratio	Current ratio	Debtors turover	Creditors turnover
ROI	1				
Quick ratio	0.666690108	1			
Current ratio	0.747411001	0.988560947	1		
Debtors turover	0.79730237	0.15404078	0.273631661	1	
Creditors turnover	0.688894544	-0.011673225	0.09135438	0.943289851	1

Table 17: Correlation matrix

Correlation Analysis:

In (Table17) analysis shows that there is positive Correlation between ROI and Quick ratio (0.666), Current ratio (0.747), Creditors turnover (0.797) & Debtors turnover ratio (0.688) for the time period 2007 to 2012. This shows high degree of Correlation between ROI and Quick ratio, Current ratio, Creditors turnover & Debtors turnover ratio. Hence, from Correlation matrix it can be concluded that with increase in Quick ratio, Current ratio, Creditors turnover & Debtors turnover ratio there is an increase in Profitability (ROI) and vice-versa.

Regression analysis:

SUMMARY OUTPUT	
Regression Statistics	
Multiple R	0.976207972
R Square	0.952982004
Adjusted R Square	0.764910018
Standard Error	0.029633947
Observations	6

Table 18

Analysis: In (Table 18) it shows that independent variable **(R^2)** explains **95.29%** of the variation in Profitability of I V R C L Ltd.

ANOVA					
	df	*SS*	*MS*	*F*	*Significance F*
Regression	4	0.017799163	0.00445	5.067113	0.320156898
Residual	1	0.000878171	0.000878		
Total	5	0.018677333			

Table 19

Analysis: In (Table 19) significance value of **F (0.32)** shows that there is insignificant impact of Working capital ratios on Profitability of, I V R C L Ltd. Hence, Null Hypothesis is accepted and Alternative Hypothesis is rejected.

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
ROI	-0.501799759	0.347357878	-1.44462	0.385466	-4.915400076	3.911800558	-4.91540008	3.911800558
Quick ratio	-0.375702005	2.049621115	-0.1833	0.884587	-26.41860752	25.66720351	-26.4186075	25.66720351
Current ratio	0.862892182	2.178416452	0.39611	0.7599	-26.81651326	28.54229762	-26.8165133	28.54229762
Debtors turover	0.003781709	0.049784866	0.075961	0.951734	-0.628794997	0.636358415	-0.628795	0.636358415
Creditors turnover	0.054546434	0.10076243	0.541337	0.68413	-1.225761637	1.334854505	-1.22576164	1.334854505

Table 20

Analysis: In (Table 20) if **P** value < 0.05 than it has statistically significant impact on Profitability. Therefore, in (Table 20) **P** value > 0.05 i.e. it has statistically insignificant impact on Profitability (ROI).

5.   Jaiprakash Associates Ltd.

Year	ROI	Quick ratio (times)	Current ratio (times)	Debtors turnover	Creditors turnover
2007	0.176	0.702	1.167	8.573	4.063
2008	0.178	0.596	0.892	8.368	3.306
2009	0.17	0.631	0.908	7.623	3.769
2010	0.235	0.847	1.225	5.973	5.1
2011	0.134	0.786	1.244	4.83	5.018
2012	0.096	1.346	1.87	3.386	3.817

Table 21

Analysis: In (Table 21) Profitability (ROI) and Liquidity (Quick ratio,

Current ratio, Debtors turnover & Creditors turnover) ratios can be seen for the period of 2007-2012 for Jaiprakash Associates Ltd.

	ROI	Quick ratio	Current ratio	Debtors turover	Creditors turnover
ROI	1				
Quick ratio	-0.598607877	1			
Current ratio	-0.621877548	0.982286186	1		
Debtors turover	0.578346114	-0.860428629	-0.846812883	1	
Creditors turnover	0.287694149	0.092940662	0.16302029	-0.408438694	1

Table 22: Correlation matrix

Correlation Analysis:

In (Table 22) analysis shows that there is negative Correlation between ROI and Quick ratio (-0.598), Current ratio (-0.621) but there is positive Correlation between Creditors turnover (0.578) & Debtors turnover (0.287) for the time period 2007 to 2012. This shows high degree of Correlation between ROI and Debtors ratio. Hence, from Co-relation matrix it can be concluded that with increase in Creditors turnover & Debtors turnover there is an increase in Profitability (ROI) and vice-versa.

Regression analysis:

SUMMARY OUTPUT	
Regression Statistics	
Multiple R	0.976726285
R Square	0.953994237
Adjusted R Square	0.769971183
Standard Error	0.02243117
Observations	6

Table 23

Analysis: In (Table 23) it shows that independent variable (R^2) explains 95.39% of the variation in Profitability of Jaiprakash Associates Ltd.

ANOVA					
	df	SS	MS	F	Significance F
Regression	4	0.010433676	0.002608	5.184102	0.316800435
Residual	1	0.000503157	0.000503		
Total	5	0.010936833			

Table 24

Analysis: In (Table 24) significance value of **F (0.31)** shows that there is insignificant impact of Working capital ratios on Profitability of Jaiprakash Associates Ltd. Hence, Null Hypothesis is accepted and Alternative Hypothesis is rejected.

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
ROI	-0.397411976	0.21198064	-1.87476	0.311951	-3.090881384	2.296057431	-3.090881384	2.296057431
Quick ratio	0.650727676	0.259695894	2.50573	0.241736	-2.649021527	3.950476879	-2.649021527	3.950476879
Current ratio	-0.418103752	0.172923639	-2.41785	0.249661	-2.615306907	1.779099404	-2.615306907	1.779099404
Debtors turover	0.036729443	0.013101752	2.803399	0.218131	-0.1297441	0.203202985	-0.1297441	0.203202985
Creditors turnover	0.072228706	0.02092194	3.452295	0.179492	-0.193609746	0.338067158	-0.193609746	0.338067158

Table 25

Analysis: In (Table 25) if P value < 0.05 than it has statically significant impact on Profitability. In (Table 25) **P** value > 0.05 i.e. it has statistically insignificant impact on Profitability (ROI).

6. Lanco Infratech Ltd.

Year	ROI	Quick ratio (times)	Current ratio (times)	Debtors turnover	Creditors turnover
2007	0.1	0.52	0.578	4.377	1.509
2008	0.135	0.413	0.476	4.122	1.582
2009	0.153	0.361	0.48	4.635	4.03
2010	0.194	0.719	0.828	3.384	3.074
2011	0.084	0.35	0.423	2.276	2.142
2012	0.033	0.238	0.31	2.999	2.431

Table 26

Analysis: In (Table 26) Profitability (ROI) and Liquidity (Quick ratio, Current ratio, Debtors turnover & Creditors turnover) ratios can be seen for the period of 2007-2012 for Lanco Infratech Ltd.

	ROI	Quick ratio	Current ratio	Debtors turnover	Creditors turnover
ROI	1				
Quick ratio	0.776505	1			
Current ratio	0.829884	0.990435682	1		
Debtors turnover	0.433866	0.195200697	0.212595271	1	
Creditors turnover	0.430972	0.036617639	0.173344993	0.168458252	1

Table 27

Correlation Analysis:

In (Table 27) analysis shows that there is positive Correlation between ROI and Quick ratio (0.776), Current ratio (0.829), Creditors turnover (0.433) & Debtors turnover ratio (0.430) for the time period 2007 to 2012. This shows high degree of Correlation between ROI and Debtors ratio. Hence, from Correlation matrix it can be concluded that with increase in Quick ratio, Current ratio, Creditors turnover & Debtors turnover ratio there is an increase in Profitability (ROI) and vice-versa.

Regression analysis:

SUMMARY OUTPUT	
Regression Statistics	
Multiple R	0.998780055
R Square	0.997561597
Adjusted R Square	0.987807987
Standard Error	0.006242542
Observations	6

Table 28

Analysis: In (Table28) it shows that independent variable **(R^2)** explains 99.75% of the variation in Profitability of Lanco Infratech Ltd.

ANOVA					
	df	*SS*	*MS*	*F*	*Significance F*
Regression	4	0.015942531	0.003985633	102.2761	0.074010073
Residual	1	3.89693E-05	3.89693E-05		
Total	5	0.0159815			

Table 29

Analysis: In (Table 29) significance value of F (0.07) shows that there is marginal significant impact of Working capital ratios on Profitability of Lanco Infratech Ltd. Hence, Null Hypothesis is accepted and Alternative Hypothesis is rejected.

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
ROI	-0.147270613	0.014977728	-9.832640113	0.064524	-0.337580697	0.043039471	-0.3375807	0.043039471
Quick ratio	-9.501940819	1.128350938	-8.421086469	0.075246	-23.83899885	4.835117217	-23.8389989	4.835117217
Current ratio	9.382889568	1.086346119	8.637108749	0.073381	-4.420446634	23.18622577	-4.42044663	23.18622577
Debtors turnover	0.020107676	0.00325178	6.183589816	0.102069	-0.021210111	0.061425463	-0.02121011	0.061425463
Creditors turnover	-0.215403443	0.027586786	-7.808210764	0.081091	-0.5659268	0.135119914	-0.5659268	0.135119914

Table 30

Analysis: In (Table 30) if P value < 0.05 than it has statically significant impact on Profitability. Therefore, in (Table 30) P value > 0.05 i.e. it has statically insignificant impact on Profitability (ROI).

7. Larsen & Toubro Ltd.

Year	ROI	Quick ratio (times)	Current ratio (times)	Debtors turnover	Creditors turnover
2007	0.272	0.688	0.983	3.215	2.207
2008	0.285	0.58	0.873	3.652	2.201
2009	0.317	0.646	0.958	3.698	2.634
2010	0.285	0.56	0.901	3.285	2.481
2011	0.197	0.846	0.896	3.477	2.187
2012	0.19	0.9	0.948	3.216	2.169

Table 31

Analysis: In (Table 31) Profitability (ROI) and Liquidity (Quick ratio, Current ratio, Debtors turnover & Creditors turnover) ratios can be seen for the period of 2007-2012 for Larsen & Toubro Ltd.

	ROI	Quick ratio	Current ratio	Debtors turnover	Creditors turnover
ROI	1				
Quick ratio	-0.90305076	1			
Current ratio	0.08266409	0.249491071	1		
Debtors turnover	0.470663223	-0.354724765	-0.386790557	1	
Creditors turnover	0.717043604	-0.534305041	0.157590018	0.397177415	1

Table 32: Correlation matrix

Correlation Analysis:

In (Table 32) analysis shows that there is negative Correlation between ROI and Quick ratio (-0.903) but it shows positive Co-relation with Current ratio (0.08), Debtors turnover (0.47) & Creditors turnover (0.717) for the time

period 2007 to 2012. This shows high degree of Correlation between ROI and Current ratio, Debtors turnover & Creditors turnover. Hence, from Correlation matrix it can be concluded that with increase in Current ratio, Debtors turnover & Creditors turnover there is an increase in Profitability (ROI) and vice-versa.

Regression analysis:

SUMMARY OUTPUT	
Regression Statistics	
Multiple R	0.999722636
R Square	0.999445349
Adjusted R Square	0.997226745
Standard Error	0.002734287
Observations	6

Table 33

Analysis: In (Table 33) it shows that independent variable **(R^2)** explains 9**9.94%** of the variation in Profitability of Larsen & Toubro Ltd.

ANOVA					
	df	*SS*	*MS*	*F*	*Significance F*
Regression	4	0.013471857	0.003368	450.4839	0.035320014
Residual	1	7.47633E-06	7.48E-06		
Total	5	0.013479333			

Table 34

Analysis: In (Table 34) significance value of F (0.03) shows that there is significant impact of Working capital ratios on Profitability of Larsen & Toubro Ltd. Hence, Null Hypothesis is rejected and Alternative Hypothesis is accepted.

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
ROI	-0.249206162	0.042672157	-5.84002	0.107963	-0.791407323	0.292994999	-0.79140732	0.292995
Quick ratio	-0.316276803	0.011257017	-28.096	0.022649	-0.45931076	-0.173242846	-0.45931076	-0.17324285
Current ratio	0.478415267	0.035870824	13.33717	0.047644	0.022633237	0.934197296	0.022633237	0.9341973
Debtors turnover	0.068276597	0.007061447	9.668925	0.065609	-0.021447589	0.158000783	-0.02144759	0.15800078
Creditors turnover	0.022610309	0.008757297	2.581882	0.235246	-0.088661694	0.133882313	-0.08866169	0.13388231

An Analysis of Working... **25**

Table 35

Analysis: In (Table 35) if P value < 0.05 than it has statistically significant impact on Profitability. Therefore, in (Table 35) P value indicates that Quick ratio (0.02) & Current ratio (0.04) values < 0.05 i.e. it has statistically significant impact on Profitability (ROI). On the other hand, Debtors turnover (0.06) & Creditors turnover (0.23) values > 0.05 which has statistically insignificant impact on Profitability (ROI).

8.   Nagarjuna Construction Company Limited

Year	ROI	Quick ratio (times)	Current ratio (times)	Debtors turnover	Creditors turnover
2007	0.117	0.465	0.686	6.487	3.538
2008	0.124	0.477	0.711	4.784	2.742
2009	0.094	0.42	0.688	4.365	2.797
2010	0.118	0.474	0.709	4.081	2.722
2011	0.071	0.416	0.65	3.655	2.641
2012	0.015	0.269	0.508	3.765	2.841

Table 36

Analysis: In (Table 36) Profitability (ROI) and Liquidity (Quick ratio, Current ratio, Debtors turnover & Creditors turnover) ratios can be seen for the period of 2007-2012 for N C C Ltd.

	ROI	Quick ratio	Cuurent ratio	Debtors turnover	Creditors turover
ROI	1				
Quick ratio	0.979835	1			
Cuurent ratio	0.967147	0.979975253	1		
Debtors turnover	0.561082	0.478959473	0.402554442	1	
Creditors turover	0.230139	0.15464385	0.065621307	0.914712357	1

Table 37: Correlation matrix

Correlation Analysis:

In (Table 37) analysis shows that there is positive Correlation between ROI and Quick ratio (0.979), Current ratio (0.967), Debtors turnover (0.561) & Creditors turnover (0.230) for the time period 2007 to 2012. This shows high degree of Correlation between ROI and Quick ratio, Current ratio, Debtors turnover & Creditors turnover. Hence, from Correlation matrix it can be concluded that with increase in Quick ratio, Current ratio, Debtors turnover & Creditors turnover there is an increase in Profitability (ROI) and vice-versa.

Regression analysis:

SUMMARY OUTPUT	
Regression Statistics	
Multiple R	0.991042875
R Square	0.98216598
Adjusted R Square	0.910829898
Standard Error	0.012435265
Observations	6

Table 38

Analysis: In (Table38) it shows that independent variable (R^2) explains 98.21% of the variation in Profitability of N C C Ltd.

ANOVA					
	df	*SS*	*MS*	*F*	*Significance F*
Regression	4	0.008516198	0.002129	13.76815	0.199125301
Residual	1	0.000154636	0.000155		
Total	5	0.008670833			

Table 39

Analysis: In (Table 39) significance value of **F (0.19)** shows that there is insignificant impact of Working capital ratios on Profitability of N C C Ltd. Hence, Null Hypothesis is accepted and Alternative Hypothesis is rejected.

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
ROI	-0.111165965	0.206990625	-0.53706	0.68624	-2.741231219	2.51889929	-2.741231219	2.51889929
Quick ratio	0.254341633	0.400303023	0.635373	0.639658	-4.831990536	5.340673801	-4.831990536	5.340673801
Cuurent ratio	0.176999211	0.410294117	0.431396	0.74072	-5.036281837	5.39028026	-5.036281837	5.39028026
Debtors turnover	0.018552339	0.025058454	0.740362	0.594279	-0.299845502	0.336950179	-0.299845502	0.336950179
Creditors turover	-0.036928139	0.072649515	-0.50831	0.700617	-0.960027749	0.886171471	-0.960027749	0.886171471

Table 40

Analysis: In (Table 40) if P value < 0.05 than it has statistically significant impact on Profitability. Therefore, in (Table 40) P value > 0.05 i.e. it has statistically insignificant impact on Profitability.

Table 43

Analysis: In (Table43) it shows that independent variable **(R^2)** explains **98.78%** of the variation in Profitability of Punj Lloyd Ltd.

ANOVA					
	df	*SS*	*MS*	*F*	*Significance F*
Regression	4	0.015930939	0.003983	20.26213	0.164925543
Residual	1	0.000196561	0.000197		
Total	5	0.0161275			

Table 44

Analysis: In (Table 44) significance value of **F (0.16)** shows that there is insignificant impact of Working capital ratios on Profitability of Punj Lloyd Ltd. Hence, null hypothesis is accepted and alternative hypothesis is rejected.

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
ROI	0.286010992	0.21820531	1.310743	0.4149	-2.486550354	3.058572338	-2.486550354	3.058572338
Quick ratio	-0.131489418	0.112558761	-1.16818	0.450717	-1.561684074	1.298705238	-1.561684074	1.298705238
Current ratio	-0.429657073	0.191945212	-2.23844	0.267469	-2.868552235	2.00923809	-2.868552235	2.00923809
Debtors turnover	-0.121966484	0.053004791	-2.30105	0.260989	-0.795456214	0.551523246	-0.795456214	0.551523246
Creditors turover	0.292621086	0.082949289	3.527711	0.175849	-0.761349558	1.34659173	-0.761349558	1.34659173

Table 45

Analysis: In (Table 45) if **P** value < 0.05 than it has statistically significant impact on Profitability. Therefore, in (Table 45) **P** value > 0.05 i.e. it has statistically insignificant impact on Profitability.

10. Simplex Infrastructures Ltd.

Year	ROI	Quick ratio (times)	Current ratio (times)	Debtors turnover	Creditors turnover
2007	0.211	0.975	1.282	2.45	4.351
2008	0.175	0.893	1.219	2.822	4.8
2009	0.146	0.618	0.897	3.744	5.272
2010	0.131	0.732	0.981	2.832	3.788
2011	0.12	0.693	0.894	2.287	2.234
2012	0.079	0.74	0.935	2.961	2.349

Table 46

Analysis: In (Table 46) Profitability (ROI) and Liquidity (Quick ratio, Current ratio, Debtors turnover & Creditors turnover) ratios can be seen for the period of 2007-2012 for Simplex Infrastructures Ltd.

	ROI	Quick ratio	Current ratio	Debtors turnover	Creditors turnover
ROI	1				
Quick ratio	0.70993	1			
Current ratio	0.832701	0.967510528	1		
Debtors turnover	-0.1669	-0.534990059	-0.363408122	1	
Creditors turnover	0.701451	0.20991385	0.445526918	0.555795508	1

Table 47: Correlation matrix

Correlation Analysis:

In (Table 47) analysis shows that there is positive Correlation between ROI and Quick ratio (0.709), Current ratio (0.832) & Creditors turnover (0.701) but there is negative Correlation between ROI and Debtors turnover (-0.166) for the time period 2007 to 2012. This shows high degree of Correlation between ROI and Quick ratio, Current ratio, Debtors & Creditors turnover. Hence, from Correlation matrix it can be concluded that with increase in Quick ratio, Current ratio & Creditors turnover there is an increase in Profitability (ROI) and vice-versa.

Regression analysis:

SUMMARY OUTPUT	
Regression Statistics	
Multiple R	0.980344704
R Square	0.96107574
Adjusted R Square	0.805378698
Standard Error	0.020142506
Observations	6

Table 48

Analysis: In (Table48) it shows that independent variable (R^2) explains 96.10**%** of the variation in Profitability of Simplex Infrastructures Ltd.

ANOVA					
	df	*SS*	*MS*	*F*	*Significance F*
Regression	4	0.010017613	0.002504	6.17273	0.292098754
Residual	1	0.000405721	0.000406		
Total	5	0.010423333			

Table 49

Analysis: In (Table 49) significance value of **F (0.29)** shows that there is insignificant impact of Working capital ratios on Profitability of Simplex Infrastructures Ltd. Hence, null hypothesis is accepted and alternative hypothesis is rejected.

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
ROI	0.209744439	0.175170278	1.197375	0.44297	-2.01600498	2.435493857	-2.01600498	2.435493857
Quick ratio	1.026462789	1.530196059	0.670805	0.623846	-18.41652162	20.4694472	-18.41652162	20.4694472
Current ratio	-0.87965625	1.357718299	-0.64789	0.634012	-18.13110293	16.37179043	-18.13110293	16.37179043
Debtors turnover	-0.081379994	0.045531195	-1.78735	0.324739	-0.659908684	0.497148697	-0.659908684	0.497148697
Creditors turnover	0.073775261	0.055848083	1.320999	0.412509	-0.63584191	0.783392432	-0.63584191	0.783392432

Table 50

Analysis: In (Table 50) if **P** value < 0.05 than it has statistically significant impact on Profitability. Therefore, in (Table 50) **P** value > 0.05 i.e. it has statistically insignificant impact on Profitability.

Conclusion

In this research paper, 10 construction firms had been selected to study significant/insignificant impact of Working Capital ratios on Profitability (ROI). On the basis of analysis conducted we have found out that **Gammon Infrastructure Projects Ltd.** & **Larsen & Toubro Ltd.** have significant impact of working capital ratios on Profitability whereas, **Lanco Infratech Ltd.** has marginal significant impact on Profitability but remaining construction firms have insignificant impact on Profitability. Hence, it may be concluded that the increase in the Working capital ratios of the company decreases the profitability of construction firms throughout the study period i.e. significantly effecting ROI. The research paper shows that the liquidity of the company has an impact on profitability. When there is an increase in liquidity the profitability of the company decreases and vice versa.

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