Analyzing Trends And Profitability Vis -à -Vis Working Capital Management (WCM) : A Study Of Select Information Technology (IT) Organizations In India

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SECTION- I

INTRODUCTION

In the age of globalization, the financial resources available to an organization have become the key differentiator to determine the ability to tap new markets and enter new economies. Global competitive strategic alliances have appeared as one of the mechanisms to enhance resource available to organizations. It is now accepted that both the fixed and current assets play a vital role in determining and increasing production levels of an organization, since current assets are used in utilizing fixed assets for day to day working (Singh et al., 2008). Working capital plays the same role in a business concern as the heart plays in the human body. Proper management of working capital is very essential for the smooth functioning of a business (Chakraborty, 2008; Jana,2011). Taking the analogy of the human heart further, if working capital management is weak, the business cannot prosper and survive, although there is a large body (Investment) of fixed assets. The available working capital in the industry must be at an adequate level. Inadequate as well as redundant working capital is non-beneficial for the health of the company. It is said *"inadequate working capital is disastrous; whereas redundant working capital is a criminal waste."* (Brigham et al., 2006) Both situations are not warranted in a sound organization. Adequate working capital is the life blood and controls the nerve center of a company. The efficiency with which working capital is managed in an organization is of great significance to the overall well-being of an organizatio (Chakraborty, 2008). The components that attribute heavily to the organizational structure include man, machine, money and materials, i.e. the 4Ms. Consequently, the management is always challenged to ensure the availability of each and every component of the 4Ms for smooth operation of the organization. Working capital management is relatively an important activity for any organization, as it maintains the continuous flow of the 4Ms (Chawla et al., 2010). Efficient working capital management involves planning and controlling current assets and current liabilities in a manner that eliminates the risk of inability to meet due short term obligations on the one hand and avoid excessive investment in these assets on the other hand (Eljelly, 2004). Hence, working capital in this context is one of the cardinal factors that influences profitability of a company and thus is the center point in this study. Moreover, one of the important objectives of any organization is to maximize profit while maintaining liquidity at the optimum level. However, the appropriateness of working capital management is rooted in its potency to institute trade-off between liquidity and profitability. A growing body of literature (for ex. Lazaridis et al., 2006; Deloof, 2003; Grass, 1972; Gitman, 1982; Singh and Bansal, 2010, etc.) suggests a fair influence of working capital on profitability, risk and return of any organization.

The IT industry in India has ousted the growth pattern of other sectors and is witnessing a relatively steep growth rate. Moreover, the industry is equally growing in size with the incorporation of new companies day after day. Consequently, the companies are caught in pincers due to burgeoning competition from other organizations, and financial resources restrain within the organization. A plethora of research in the related area has been so far undertaken in the manufacturing sector; however, the service industry has been largely ignored. The concern for

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working capital management in manufacturing organizations is justifiable because a large amount of working capital is attributed to managing stock, which includes raw materials, work in progress, and finished goods. However, in case of the service industry, the involvement of working capital for maintaining stocks is absolutely meager. So, the service industries are more challenged to deal with the current level of exigencies in comparison to the manufacturing industries. Against this backdrop, the present study first makes an attempt to analyze the size, composition and trends in working capital employed by select Indian IT companies. A study of time-series data of ten years corresponding to Working Capital (WC) for each selected company was carried out to establish trends, significant changes, shocks, identifiable common features and future predictions of the WC requirements. In addition, the study investigates the relationship between the profitability and working capital employed by the select IT companies. The study advanced in the paper is deemed significant in the sense that it can provide enough insights to the management and decision-makers to ascertain their future requirements of WC and preparedness thereof needed to mitigate the future uncertainties.

The first section being introductory, deals with the importance of WCM in the current business environment. It also focuses on the prevailing patterns and shocks based upon the time-series data corresponding to WC of the ten selected IT companies and provides justification for the growing requirements of WCM in the IT industry. The next (second) section focuses on the review of related literature in a bid to explore the nature and strength of the relationship between WCM and profitability and development of the hypotheses. The third section deals with the research methodology, which includes data set & sample. The fourth section deals with data analysis using appropriate descriptive and inferential statistical tools. The final (fifth) section concludes the discussion.

SECTION- II
RELATED LITERATURE REVIEW AND HYPOTHESES

Several studies have documented the results between Working Capital and Profitability. Lazaridis et al. (2006) investigated the relationship between corporate profitability and working capital management using listed companies on the Athens Stock Exchange. They discovered that a statistically significant relationship existed between profitability and the cash conversion cycle. They concluded that businesses can create profits for their companies by correctly handling the cash conversion cycle and keeping each component of the cash conversion cycle (that is accounts receivable, accounts payable, and inventory) to an optimum level. Deloof (2003) also found that the way working capital is managed has a significant impact on the profitability of businesses. Hyun et al. (1998) investigated the relation between the firm's net-trade cycle and its profitability. This relationship was examined by using correlation and regression analysis of industry and working capital intensity. By using a composite sample of 58,985 firm years covering the period 1975-1994, the authors found that in all cases, a strong negative relation existed between the length of the firm's net-trade cycle and its profitability. In addition, shorter net trade cycles were associated with higher risk-adjusted stock returns. Based on the study, the authors also argued that efficient working capital management is an integral part of the overall corporate strategy to create shareholder value. Sathya moorthy et al. (2008) revealed that working capital management is also important from the perspective of sources and uses of funds. Working capital is a spontaneous source of funds as it arises from trading activities based on a significant number of business transactions. In many companies, the amount of funds committed to current assets can and often exceed that of fixed assets. Grass (1972) argued that the literature of finance has neglected the short-term financial decisions, which is working capital management. Shortage of funds for working capital as well as the uncontrolled over-expansion of working capital has caused many businesses to fail, and in less severe cases, has stunted their growth. Gitman (1982) further stated that especially, in small firms, working capital management may be the factor that decides success or failure; in larger firms, efficient working capital management can significantly affect the firm's risk, return and share. Blinder et al. (1991) revealed that working capital management is the management of current assets and current liabilities. Maintaining high inventory levels reduces the cost of possible interruption in the production process or of loss of business due to the scarcity of products, reduces supply costs and protects against price fluctuations among other advantages. Brennan et al. (1988); and Petersen et al. (1997) affirmed that granting trade credit favors the firm's sales in various ways. Trade credit can act as an effective price cut, similarly, Emery (1987) revealed that it can act as an incentive to customers to acquire merchandise at times of low demand. Further, Ng et al. (1999); and Wilner (2000) revealed that firms that invest heavily in inventory and account receivables can suffer low

profit. Thus, greater the investment in current assets, lower is the risk and profitability obtained. Similarly, trade credit is a spontaneous source of financing that reduces the amount required to finance the sums tied up in the inventory and account receivables. The trade credit can have a very high implicit if early payment discounts are available. In fact, the opportunity cost may exceed by 20 percent, depending on the discount percentage, and the discount period granted.
Smith (1997) revealed that profitability and liquidity comprise the salient and all too often conflicting goals of working capital management. The conflict arises because the maximization of the firm's returns could seriously threaten liquidity, and on the other hand, the pursuit of liquidity has a tendency to dilute returns. Over the years, analysts have employed traditional ratio analysis as a primary instrument in the measurement of corporate liquidity in the firms with well-established ratios such as current and quick ratios. Further Literature Review is presented in the

Table 1 : Review of Related Literature

Sl.	Scholarly Observations/studies	Related Areas	Variables	Relation
1.	Horrigan, J. O. (1965)	Financial ratio analysis	Working capital and profitability	Positive Relation
2.	Altman, E. I.(1968)	Corporate Bankruptcy Prediction	Working capital and profitability	Positive Relation
3.	Grass (1972)	Control of Working Capital	Working capital and profitability	Positive Relation
4.	Merville, L. J., and Tavis, L. A. (1973)	Optimum Working Capital Policy	Economic Environment and Working Capital	Positive Relation
5.	Chakraborty, S. K. (1976)	Indian Cement, Sugar And Fertilizer Industries	Working Capital, Turnover and Profit	Positive Relation
6.	Vijaya, K. A. (1977)	Co-operative and private sugar industries of Tamil Nadu	Working capital of Co-operative and Sugar	Negative Relation
7.	Parosh and Timari (1978)	Israeli companies	Profitability and Working Capital	Positive Relation
8.	Vijaysaradhi, S. P. and Rajeswara Rao (1978)	Indian Public Enterprises	Profitability and Working Capital	Negative Relation
9.	Gitman, Lawrence J., E. A. Moses, and L. T. White (1979)	US Top 150 and Bottom 150 Firms from Fortune 1000 largest firms	Profitability and Working Capital	Positive Relation, Short-Term Assets, Management Policies
10.	Richard, V. and Laughlin, E.(1980)	Liquidity analysis	Profitability and Working Capital	Positive Relation
11.	Smith, K. (1980)	Profitability and Liquidity	Profitability and Liquidity	Positive Relation
12.	Smith, Keith V. and Shirley Blake Sell (1980)	US Firms	Profitability and Working Capital	Positive Relation
13.	Banerjee, B.(1982)	Indian Corporate Sector	Working Capital and Profitability	Positive Relation
14.	Gitmann, L. J.(1982)	Major US Firm, Fortune 1000''	Working capital and profitability	Positive Relation
15.	Emery, Gary W.(1984)	-----	Working Capital, Current and Quick ratio V/s Profitability	Negative Relation
16.	Luo, C. H. (1984)	Financial Ratio In Taiwan	Working capital and profitability	Positive Relation
17.	Myers, Stewart and Nicolas Majluf (1984)	Corporate Financing and Investment Decision	Working capital and profitability	Negative Relation
18.	Gitman, Lawrence J., and Charles E. Maxwell(1985)	US Firms	Working capital and profitability	Positive Relation
19.	Liu, F. L. (1985)	Manufacturing Industry in Taiwan	Performance and Financial Ratio	Positive Relation
20.	Shulman, J. M. and Cox, R. A. K. (1985)	WC Management	Working Capital and Profitability	Positive Relation
21.	Hawawini, G., Viallet C., and Vora, A. (1986)	Working Capital Decision at Sloan Corporate Sector	Working Capital and Net Liquid Balance	Positive Relation
22.	Panda, G. S.(1986)	SSI in Orissa	Working Capital and Profitability	Positive Relation
23.	Emery, G.W.(1987)	WC and Demand analysis	WC and Demand analysis	Positive Relation

24.	Sarkar, J.B. and Saha, S.N.(1987)	Indian Public Sector	Working Capital and Profitability	Positive Relation
25.	Brennan, M., Maksimovic, V. and Zechner, J.(1988)	Vendor Financing to Companies	Vendor Financing for Working Capital and Profitability	Positive Relation
26.	Jain, R.K.(1988)	10 Manufacturing Trading & Service Industries of Rajasthan	Working Capital and Profitability	Negative Relation
27.	Mukherjee, A. K.(1988)	Indian Public Enterprises	Profitability and Liquidity	Negative Relation
28.	Panda J. and Satapathy A.K.(1988)	Private Cement Industry	Working Capital and Profitability	Positive Relation
29.	Shin, Hyun-Han and Soenen, Luc (1988)	58,985 firms, 1975 to 1994	Working capital and profitability	Negative Relation
30.	Kamath, Ravindra, (1989)	Liquidity Measurement	Working Capital, Current and Quick ratio V/s Profitability	Negative Relation
31.	Binder, A. S. and Maccini, L. J.(1991)	Inventory Research	Profitability and Inventory	Positive Relation
32.	Gibert, Erik W. and Reichert, Alan K.(1992)	USA Largest Corporation	Working Capital & Cash Management	Positive Relation
33.	Shi, Y. H. (1992)	Taiwan Manufacturing Industries	Working Capital and Profitability	Positive Relation
34.	Yang, A. M. (1992)	Taiwan Textile Industries	Working Capital and Profitability	Positive Relation
35.	Long, M. S., Malitz, I. B. and Ravid, S. A. (1993)	UK	Working Capital and Customer Credit	Positive Relation
36.	Kargar, J., and Blum-enthal, R. A. (1994)	Small Business	Leverage and impact on Working Capital	Positive Relation
37.	Rajan, Raghuram and Luigi Zingales (1995)	International Data	Working capital and profitability	Negative Relation
38.	Vijaykumar, A. and Venatachalam, A.(1995)	31 Sugar Companies in Tamil Nadu	Liquidity and Profitability	Negative Relation
39.	Zhou, D. C. (1995)	Manufacturing industry in Taiwan	Business Cycle And Financial Ratio	Positive Relation
40.	Peel, M. L., and Wilson, N. (1996)	Small Firm Sector	Working Capital and Profitability	Positive Relation
41.	Petersen, M. A. and Rajan, R. G.(1997)	Trade Credit	Working Capital and Accounts Payable	Positive Relation
42.	Smith, M. and Beaumont (1997)	Johannesburg Stock Exchange	Decreased Liability and Increased Profitability	Positive Relation
43.	Smith, M. B.(1997)	Survey	Working Capital and Operating profit	Positive Relation
44.	Taffler, R.(1997)	UK Companies	Working Capital and Profitability	Positive Relation
45.	Mallik, A. K. and Sur, D.(1998)	Indian Tea Industry	Working Capital and Profitability	Positive Relation
46.	Mallik, A. K. and Sur, D.(1998)	HLL Ltd.	Liquidity and Profitability	High Degree of Positive Relation
47.	Maxwell, Charles E., Gitman, Lawrence J. and Smith, Stephanie A.M.(1998)	US and Foreign	Working capital and profitability	Negative Relation due to Account Receivable Policy
48.	Sivarama, Prasad R.(1999)	Indian Paper Industry	Liquidity and Profitability	Positive Relation
49.	Dutta, J. S.(2000)	Horticulture Industry in Himachal	Working Capital and Profitability	Negative Relation due to inventory.
50.	Huang, X. Y.(2000)	Taiwan	W C and Liquidity	Positive Relation
51.	Summers, B. and Wilson, N. (2000)	UK	Working Capital and Customer Credit Term	Positive Relation
52.	Wilner, B. (2000)	USA	Working Capital and Credit of Customer	Positive Relation

53.	Pike R., Nam Sang Cheng (2001)	UK	Working Capital and Debtors Credit Mgt.	Positive Relation
54.	Su, F. C. (2001)	Manufacturing industry in Taiwan	Business Cycle And Financial Ratio	Positive Relation
55.	Sur, D., Biswas, J. and Ganguly, P.(2001)	Indian Primary Aluminum Producing Industry	Profitability and Liquidity	Positive Relation
56.	Wu, Q. S. (2001)	National Science Council Project	Working Capital and Profitability	Positive Relation
57.	Deloof, Marc (2003)	Belgian Firm	Working Capital and Profitability	Positive Relation
58.	Howorth, C. and Westhead, P.(2003)	UK Small Firms	Working Capital and Seasonal Credit	Positive Relation
59.	Lazaridis, Ioannis and Tryfondinis Dimitrios (2006)	Athens Stock Exchange	Working Capital and Profitability	Negative Relation
60.	Chakraborty, Kaushik (2008)	Indian Pharmaceutical Industry	Working Capital and Profitability	Positive Relation
61.	Sathya moorthi, C.R. and Wally-Dima, L. B.(2008)	Listed Retail Companies in Botswana	Profitability and Working Capital	Positive Relation
62.	Singh, J.P. and Pandey, Shishir (2008)	Hindalco Industries Ltd.	Working Capital and Profitability	Positive Relation
63.	Singh, Pradeep (2008)	IFFCO and NFL	Working Capital and Inventory	Positive Relation
64.	Khatik, S.K. and Jain, Rashmi (2009)	Working Capital Analysis of Public State Undertaking	Working Capital and analysis of liquidity	Positive Relation

Table 1. Based on the objectives of the study and supported by extensive literature review, the following hypotheses need to be tested:

❁ **H_1: The time series data corresponding to Working Capital for each selected IT company exhibits a significant relationship/ pattern.**

❁ **H_2: Working Capital Management demonstrates a significant relationship with profitability of an organization.**

SECTION- III

RESEARCH METHODOLOGY AND DATA SOURCE

❁ **Sample Selection :** The top ten companies from the IT sector in terms of size, profitability and sales potential were selected from the IT companies currently operating in India.

❁ **Data Source :** The data required for the present study are the financial records of the companies which were collected through the original source i.e., Annual Reports from official websites of the companies through the internet. The data which included CAs, CLs, WC and Profitability of the respective companies for the period from March 2001

Table 2 : Working Capital For The Period of 2001-2010 (₹ Lakhs)

	TCS	Wipro	Infosys	Mahindra Satyam	L&T Infotech	HCL Technologies	Tech Mahindra	Patni Computer Systems	i-flex Solutions	Mphasis
Mar '01	654	1243.89	797.86	513	2734.83	591.72	90.28	181.74	280.26	45.99
Mar '02	866.3	1453.75	1317.63	1393.1	1632.85	611.61	156.38	172.38	434.86	125.01
Mar '03	1186.2	1300.22	2054.73	1776.32	1459.96	221.46	202.62	244.1	724.56	124.05
Mar '04	-220.86	357.53	1255.75	2241.93	2072.55	-184.83	196	433.12	808.58	202.05
Mar '05	1008.93	938.02	2418.61	2831.89	3144.77	-128.08	190.79	851.33	941.94	7.22
Mar '06	2231.53	1288.29	3888	3765.99	2547.72	-6.49	126.99	278.86	1099.83	56.37
Mar '07	2639.23	2574.3	7216	4962	2507.21	594.1	345.89	264.93	1512.87	259.07
Mar '08	3683.46	7315.8	8595	6004.39	2568.31	298.5	595.4	96.96	1777.81	314.33
Mar '09	4196.38	6153	12390	115.7	5557.14	2164.68	783.2	196.45	2451.35	705.37
Mar'10	3,557.73	9,608.50	13,212.00	1,936.80	5607.93	2,679.02	972.9	212	3,116.36	1,069.58

Table 3 : Profitability For The Period of 2001-2010 (₹ Lakhs)										
Name of Company	Tata Consultancy Services	Wipro	Infosys	Mahindra Satyam	L&T Infotech	HCL Technologies	Tech Mahindra	Patni Computer Systems	i-flex Solutions	Mphasis
Mar '01	856.08	856.08	815.03	636.84	519.15	478.99	129.63	148.99	133.15	37.9
Mar '02	1083.34	1083.34	1,104.75	608.26	607.62	456.93	208.7	223.09	156.53	92.35
Mar '03	1059.68	1059.68	1348.63	439.92	395.03	372.56	227.86	232.21	212.79	53.92
Mar '04	1234.36	1234.36	1702.12	772.42	422.56	411.14	136.47	308.02	229.29	101.05
Mar '05	1948.56	1948.56	2498.99	971.22	803.95	418.07	128.74	312.7	273.82	83.36
Mar '06	2635.81	2635.81	3134	1571.42	1126.07	810.44	284.97	387.32	328.54	93.25
Mar '07	3543.2	3543.2	4605	1710.73	2,062.73	1376.5	201.12	518.04	437.75	193.28
Mar '08	4042.5	4042.5	5647	2085.74	2,823.82	1118.05	487.6	507.61	492.06	311.91
Mar '09	4278.3	4278.3	7410	-1227.9	3430.66	1481.16	1188.6	680.51	775.43	1013.75
Mar'10	6368.2	6368.2	8329	161.2	3657.42	1528.21	1152	811.77	785.02	1209.53

to March 2010 were taken into account for further analysis. Tables 2 & 3 represent the value of WC and profitability respectively for ten companies (in lakhs) considered for the study.

SECTION IV

RESULTS & ANALYSIS

Testing of H_1

❁ H_1: The time series data corresponding to Working Capital for each selected IT company exhibit a significant relationship/ pattern.

In order to test the hypothesis, Correlogram Analysis, which includes investigating Auto Correlation Function (ACF) was used in a bid to investigate if previous values of the series contain much information about the next value, or there is a little relationship between one observation and the next. The ACF plays a very important role in time series forecasting and is a valuable tool for investigating the properties of an empirical time series. In the present case, the ACF tool was allowed to act upon the time series data of WC for the period of ten years viz. 2001 to 2010 corresponding to ten selected IT companies. The statement of the null hypothesis assumed that there is no pattern whatsoever in the data series, i.e. it is said to represent *"white noise"*. Based on the asymptotic chi-square approximation, Box-Ljung Statistic was used for testing the residuals from the forecast model. If the residuals are white noise, the Box-Ljung static has a chi-square distribution with (*h-m*) degrees of freedom, where *h* is the maximum lag being considered and *m* is the number of parameters in the model which has been fitted to the data.

$$Q = n(n+2)\sum_{k=1}^{h} (n-k)^{-1} r_k^2$$

Where,

Q = Box-Ljung Statistic ;

r_k = Autocorrelation coefficient for k lag ;

n = Number of observations in the time series.

The Tables 4 and 5 describe the Auto Correlation Function (ACF) & Partial Auto Correlation Function (PACF) along with the test of significance for the selected IT companies. The analysis connotes that the time series data corresponds to working capital for each company, demonstrating a significant relationship, except in the case of Mahindra Satyam and Patni Computer Systems. Moreover, the lag 1 value of working capital explains heavily the next year values in all the cases where significant relationship exists. Thus, the increased requirement of working capital in IT companies was significantly established.

Testing of H_2

❁ H_2: Working Capital Management exhibits a significant relationship with profitability of an organization.

Table 4 : Correlogram Analysis Of Select IT Companies

Table 4 : Correlogram Analysis Of Select IT Companies							
Autocorrelations& Partial Autocorrelations -						TCS	
			Box-Ljung Statistic				
Lag	Autocorrelation	Std. Error[a]	Value	df	Sig.[b]	Partial Autocorrelation	Std. Error
1	.720	.274	6.918	1	.009	.720	.316
2	.379	.258	9.070	2	.011	-.291	.316
3	.113	.242	9.291	3	.026	-.066	.316
4	-.248	.224	10.524	4	.032	-.495	.316
5	-.437	.204	15.102	5	.010	.093	.316
6	-.396	.183	19.804	6	.003	.054	.316
7	-.296	.158	23.304	7	.002	.066	.316
8	-.232	.129	26.542	8	.001	-.336	.316
a. The underlying process assumed is independence (white noise). b. Based on the asymptotic chi-square approximation.							

Autocorrelations & Partial Autocorrelations- Wipro							
			Box-Ljung Statistic				
Lag	Auto correlation	Std. Error[a]	Value	df	Sig.[b]	Partial Auto correlation	Std. Error
1	.558	.274	4.149	1	.042	.558	.316
2	.388	.258	6.402	2	.041	.111	.316
3	-.041	.242	6.431	3	.092	-.434	.316
4	-.229	.224	7.475	4	.113	-.164	.316
5	-.274	.204	9.277	5	.099	.139	.316
6	-.316	.183	12.282	6	.056	-.166	.316
7	-.271	.158	15.212	7	.033	-.205	.316
8	-.181	.129	17.178	8	.028	.089	.316
a. The underlying process assumed is independence (white noise). b. Based on the asymptotic chi-square approximation.							

Autocorrelations & Partial Autocorrelations- Infosys							
			Box-Ljung Statistic				
Lag	Auto correlation	Std. Error[a]	Value	df	Sig.[b]	Partial Autocorrelation	Std. Error
1	.712	.274	6.751	1	.009	.712	.316
2	.375	.258	8.865	2	.012	-.265	.316
3	.111	.242	9.076	3	.028	-.084	.316
4	.-.162	.224	9.600	4	.048	-.282	.316
5	-.316	.204	11.998	5	.035	-.028	.316
6	-.383	.183	16.392	6	.012	-.130	.316
7	-.343	.158	21.098	7	.004	.039	.316
8	-.316	.129	27.108	8	.001	-.234	.316
a. The underlying process assumed is independence (white noise). b. Based on the asymptotic chi-square approximation.							

Table 4 : Correlogram Analysis Of Select IT Companies (Contd).

Autocorrelations& Partial Autocorrelations - L&T							
			Box-Ljung Statistic				
Lag	Autocorrelation	Std. Error[a]	Value	df	Sig.[b]	Partial Autocorrelation	Std. Error
1	.504	.274	3.384	1	.066	.504	.316
2	-.024	.258	3.393	2	.183	-.372	.316
3	-.070	.242	3.476	3	.324	.208	.316
4	.048	.224	3.522	4	.475	-.025	.316
5	-.028	.204	3.541	5	.617	-.137	.316
6	-.294	.183	6.133	6	.408	-.276	.316
7	-.385	.158	12.050	7	.099	-.099	.316
8	-.218	.129	14.911	8	.061	-.055	.316
a. The underlying process assumed is independence (white noise). b. Based on the asymptotic chi-square approximation.							

Autocorrelations & Partial Autocorrelations - HCL							
			Box-Ljung Statistic				
Lag	Autocorrelation	Std. Error[a]	Value	df	Sig.[b]	Partial Autocorrelation	Std. Error
1	.496	.274	3.278	1	.070	.496	.316
2	.061	.258	3.334	2	.189	-.245	.316
3	-.042	.242	3.364	3	.339	.059	.316
4	-.246	.224	4.574	4	.334	-.328	.316
5	-.315	.204	6.950	5	.224	-.038	.316
6	-.282	.183	9.336	6	.156	-.195	.316
7	-.118	.158	9.890	7	.195	.127	.316
8	-.033	.129	9.957	8	.268	-.185	.316
a. The underlying process assumed is independence (white noise). b. Based on the asymptotic chi-square approximation.							

Autocorrelations & Partial Autocorrelations - Tech Mahindra							
			Box-Ljung Statistic				
Lag	Autocorrelation	Std. Error[a]	Value	df	Sig.[b]	Partial Autocorrelation	Std. Error
1	.629	.274	5.283	1	.022	.629	.316
2	.267	.258	6.354	2	.042	-.214	.316
3	-.030	.242	6.370	3	.095	-.173	.316
4	-.181	.224	7.025	4	.135	-.050	.316
5	-.168	.204	7.706	5	.173	.049	.316
6	-.249	.183	9.567	6	.144	-.277	.316
7	-.291	.158	12.954	7	.073	-.100	.316
8	-.282	.129	17.729	8	.023	-.047	.316
a. The underlying process assumed is independence (white noise). b. Based on the asymptotic chi-square approximation.							

Table 4 : Correlogram Analysis Of Select IT Companies (Contd).

Autocorrelations & Partial Autocorrelations - Iflex							
			Box-Ljung Statistic				
Lag	Auto correlation	Std. Error[a]	Value	df	Sig.[b]	Partial Autocorrelation	Std. Error
1	.622	.274	5.162	1	.023	.622	.316
2	.306	.258	6.565	2	.038	-.133	.316
3	.110	.242	6.774	3	.079	-.038	.316
4	-.079	.224	6.899	4	.141	-.167	.316
5	-.198	.204	7.842	5	.165	-.086	.316
6	-.296	.183	10.464	6	.106	-.158	.316
7	-.342	.158	15.154	7	.034	-.107	.316
8	-.372	.129	23.450	8	.003	-.166	.316
a. The underlying process assumed is independence (white noise). b. Based on the asymptotic chi-square approximation.							

Autocorrelations & Partial Autocorrelations - Mphasis							
			Box-Ljung Statistic				
Lag	Autocorrelation	Std. Error[a]	Value	df	Sig.[b]	Partial Autocorrelation	Std. Error
1	.495	.274	3.267	1	.071	.495	.316
2	.127	.258	3.511	2	.173	-.156	.316
3	-.017	.242	3.516	3	.319	-.018	.316
4	-.182	.224	4.176	4	.383	-.196	.316
5	-.192	.204	5.056	5	.409	-.009	.316
6	-.129	.183	5.559	6	.474	-.032	.316
7	-.197	.158	7.109	7	.418	-.183	.316
8	-.222	.129	10.071	8	.260	-.110	.316
a. The underlying process assumed is independence (white noise). b. Based on the asymptotic chi-square approximation.							

Autocorrelations & Partial Autocorrelations - Patni							
			Box-Ljung Statistic				
Lag	Auto correlation	Std. Error[a]	Value	df	Sig.[b]	Partial Auto correlation	Std. Error
1	.277	.274	1.026	1	.311	.277	.316
2	-.084	.258	1.133	2	.567	-.175	.316
3	-.462	.242	4.790	3	.188	-.431	.316
4	-.335	.224	7.035	4	.134	-.141	.316
5	-.106	.204	7.306	5	.199	-.077	.316
6	.049	.183	7.377	6	.287	-.182	.316
7	.090	.158	7.703	7	.360	-.150	.316
8	.049	.129	7.850	8	.448	-.118	.316
a. The underlying process assumed is independence (white noise). b. Based on the asymptotic chi-square approximation.							

Table 5 : Summary Explanations of ACF For The Select IT Companies				
Name of Company	Maximum Autocorrelation at lag 1	Box-Ljung Statistic		Remarks
		Value (Q)	Sig. (p value)	
TCS	.720	6.918	.009	The value at lag 1 explains 72% of the next estimated value, which is statistically significant at α =.05 (P=.009<.05) i.e. significantly different from r_k = 0.
Wipro	.558	4.149	.042	The value at lag 1 explains 55.8% of the next estimated value, which is statistically significant at α = .05 (P=.042<.05) i.e. significantly different from r_k = 0.
Infosys	.712	6.751	.009	The value at lag 1 explains 71.2% of the next estimated value, which is statistically significant at α =.05 (P=.009<.05) i.e. significantly different from r_k = 0.
Satyam	.254	.862	.553	The value at lag 1 is not significantly different from r_k = 0 at α =.05 (P=.553>.05). Thus, the time series data significantly resembles with white noise series.
L&T	.504	3.384	.066	The value at lag 1 explains 50.4% of the next estimated value, which is statistically significant at α =.10 (P=.009<.10) i.e. significantly different from r_k = 0.
HCL	.496	3.278	.070	The value at lag 1 explains 49.6% of the next estimated value, which is statistically significant at α =.10 (P=.009<.10) i.e. significantly different from r_k = 0.
Tech Mahindra	.629	5.283	.022	The value at lag 1 explains 62.9% of the next estimated value, which is statistically significant at α=.05 (P=.022<.05) i.e. significantly different from r_k = 0.
Iflex	.622	5.162	.023	The value at lag 1 explains 62.2% of the next estimated value, which is statistically significant at α=.05 (P=.023<.05) i.e. significantly different from r_k= 0.
Mphasis	.495	3.267	.071	The value at lag 1 explains 49.5% of the next estimated value, which is statistically significant at α=.10 (P=.071<.05) i.e. significantly different from r_k = 0.
Patni	.277	7.850	.448	The value at lag 1 is not significantly different from r_k = 0 at α =.05 (P=.448>.05). Thus, the time series data significantly resembles with white noise series.

In order to test this hypothesis (H_2), Pearson's correlation coefficient test was applied on the two metric variables viz. Working Capital and Profitability. The correlation coefficient (r) indicates the strength of the association between two metric variables. The value can range from +1 to -1, with +1 indicating a perfect positive relationship, 0 indicating no relationship, and -1 indicating a perfect negative or reverse relationship. Table 6 describes the descriptive statistics related to working capital and profitability of the selected IT companies for a period of ten years (2001-10). The correlation coefficient (*r*) as described in Table 7 reveals a significant positive relationship between Working Capital and Profitability of all the select companies (p value < . 01; p value < .05 for HCL Technologies) except in the case of Patni Computer Systems. The positive direction of relationship in all the significant cases connotes that growth in working capital will result in increased profitability.

SECTION- V

CONCLUSION

The IT industry in India has ousted the growth pattern of other sectors and is witnessing a relatively steep growth rate. Moreover, the industry is growing equally in size, with the incorporation of new companies day after day.

Table 6 : Descriptive Statistics Of Sample IT Companies			
Working Capital - Descriptive Statistics			
Company	**Mean**	**Std. Deviation**	**N**
TCS (WC)	1980.2900	1498.76552	10
Wipro	3223.3300	3239.52487	10
Infosys	5314.5580	4722.36086	10
Mahindra Satyam	2554.1120	1879.46754	10
L&T Infotech	2983.3270	1459.20445	10
HCL Technologies	684.1690	968.84955	10
Tech Mahindra	366.0450	308.90337	10
Patni Computer Systems	293.1870	214.99025	10
i-flex Solutions	1314.8420	908.32082	10
Mphasis	290.9040	339.67343	10

Table 6 (Contd.) : Profitability - Descriptive Statistics			
Company	**Mean**	**Std. Deviation**	**N**
TCS(P)	2705.0030	1822.11500	10
Wipro	2705.0030	1822.11500	10
Infosys	3659.4520	2710.61195	10
Mahindra Satyam	772.9850	931.77912	10
L&T Infotech	1584.9010	1297.15695	10
HCL Technologies	845.2050	483.96314	10
Tech Mahindra	414.5690	412.05288	10
Patni Computer Systems	413.0260	213.63417	10
i-flex Solutions	382.4380	238.44588	10
Mphasis	319.0300	427.68412	10

Table 7 : Correlation Between Working Capital And Profitability		
Name of The Company	**Pearson Correlation (r)**	**Sig. (2-tailed)**
TCS	.879**	0.001
Wipro	.917**	0.000
Infosys	.993**	0.000
Mahindra Satyam	.875**	0.001
L&T Infotech	.821**	0.0004
HCL Technologies	.754*	0.012
Tech Mahindra	.936**	0.000
Patni Computer Systems	-.215	0.551
i-flex Solutions	.985**	0.000
Mphasis	.975**	0.000
** Correlation is significant at the 0.01 level (2-tailed). * Correlation is significant at the .05 level (2-tailed).		

Consequently, the companies are caught in pincers due to the burgeoning competition from other organizations and financial resources restrain within the organization. A plethora of research in the related area has so far been undertaken in the manufacturing sector; however, the service industry has been largely ignored. The concern for working capital management in manufacturing organizations is justifiable because a large amount of working capital

is attributed to managing stock, which includes raw materials, work in progress, and finished goods. However, in case of the service industry, the involvement of working capital for maintaining stock is absolutely meager. So, the service industries are more challenged to deal with the current level of exigencies in comparison to the manufacturing industries. The study uncovers the fact that the time-series data corresponding to working capital for each company demonstrate a significant auto correlation, except in the case of Mahindra Satyam and Patni Computer Systems. Moreover, the lag 1 value of working capital explains heavily, the next year values in all the cases where significant relationship exists. Thus, the increased requirement of working capital in IT companies is significantly established. In addition, the correlation coefficient (*r*) reveals a significant positive relationship between working capital and profitability of all the select companies , with the exception of Patni Computer Systems. The positive direction of relationship in all the significant cases connotes that the growth in working capital would essentially result in increased profitability.

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