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Working Capital Management In Bharat Heavy Electricals Limited (BHEL): An Empirical Study of The Maharatana Company

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ABSTRACT

Working Capital Management (WCM) is a critical aspect of corporate financial management, directly influencing liquidity, efficiency, and profitability. Effective WCM ensures operational flexibility and optimal utilization of current assets and liabilities, directly influencing financial performance. This study examines the effectiveness of WCM practices in Bharat Heavy Electricals Limited (BHEL), a Maharatna public sector enterprise, during the period 2014–15 to 2023–24. The paper reviews the existing literature, highlighting the varying impacts of inventory, receivables, and payables on profitability across different industries. For BHEL, an engineering and manufacturing giant, efficient WCM is critical given its diverse operations and national economic role. The study aims to analyse WCM's effect on BHEL's profitability, addressing gaps in empirical research on key WCM variables in large public enterprises. The research focuses on the relationship between working capital components—Cash Conversion Cycle (CCC), Accounts Days Inventory (ADI), Accounts Days Receivable (ADR), and Accounts Days Payable (ADP)—and profitability measured through Return on Assets (ROA). Using secondary data from BHEL's annual reports and financial statements, the study employs descriptive statistics, ratio analysis, and Pearson correlation to evaluate trends and associations. Results reveal a significant decline in current assets and working capital over the study period, accompanied by a fall in current and quick ratios, indicating tightening liquidity. CCC reduced sharply from 270 days in 2014–15 to negative values in recent years, reflecting reduced receivables and extended payables. Correlation analysis confirms a strong negative relationship between inventory holding period (ADI) and profitability, supporting the hypothesis that longer inventory cycles adversely affect returns. Conversely, ADR showed a weak positive association with ROA, while ADP exhibited no significant impact. The findings highlight that efficient WCM—particularly minimizing inventory holding periods and optimizing receivables—is essential for sustaining profitability in large public enterprises. This study aims to contribute to empirical literature by offering sector-specific insights into WCM dynamics within India's engineering and manufacturing industry.

1. INTRODUCTION

Working capital is the portion of an enterprise's total financial resources that are devoted to variable operational needs and represent the continuous flow of funds in day-to-day operations. A enterprise that is able to maintain an adequate level of working capital offers operational flexibility and provides more

options to the enterprise to decide when and how to utilize its current assets and current liabilities i.e. working capital. "The goal of working capital management is to strike the right balance between profitability and liquidity." (Brigham, E. F., & Ehrhardt, M. C. (2022)). The process of WCM is focuses on providing direction to the administration of current assets and current

liabilities in such a manner that the enterprise is able to utilize these efficiently.

“The concept of working capital management addresses the enterprise management of their short-term capital, which is an important component of corporate financial management, directly affects the profitability and liquidity of both small and large firms” (Agyei & Yeboah, (2011); Tauringana & Afrifa, (2013)). Enterprises must carefully manage their short-term assets and obligations (current assets and current liabilities) to maintain an efficient working capital level. The ability to establish and maintain efficient working capital levels has emerged as a critical factor in business valuation. Effective management of short term assets and obligations occupies a central position in financial management practices and influence the profitability of businesses significantly. "Effective working capital management minimizes financial risk while maximizing operational efficiency" Brigham, E. F., & Ehrhardt, M. C. (2022).

2. PROFILE OF BHEL

BHEL is regarded as one of the foremost public sector enterprises in India and considered a prominent engineering and manufacturing company, came into existence on the 13th of November, 1964. BHEL plays an essential role in the energy and infrastructure sectors and ranks among the top power equipment manufacturers worldwide, symbolizing India's industrial accomplishments. The company's mission is to function as an Indian multinational engineering firm that delivers complete business solutions through high-quality products, systems, and services across various sectors, including energy, industry, transportation, infrastructure, and other emerging fields. BHEL caters to the essential sectors of the economy, offering an extensive range of products, systems, and services to clients in infrastructure, energy, and industry.

BHEL through the vast operations, skilled workforce, innovation, diverse products, and strong commitment to sustainability, has produced substantial value for its stakeholders.

The company's most valuable asset is its dedicated and highly skilled team of over 28,000 employees, which serves as the foundation of its success. BHEL's dedication to national development is evident in various ways, including its contribution to the country's power generation capacity, the introduction of cutting-edge technology and innovation within the Indian engineering sector, a nationwide presence, the establishment of world-class facilities, and its societal contributions through initiatives focused on youth skill development, health and hygiene, education, cleanliness, and environmental protection, among others. Emphasizing BHEL's prominent status within the country's engineering and power sector, the 'Limca Book of Records 2006' exhibited BHEL under the “Doing India Proud” section.

This study largely focuses on WCM and profitability analysis of BHEL as a leading Maharatna public enterprise.

3. LITERATURE REVIEW

Studies across multiple industries by the researchers have revealed that the “management of current assets and current liabilities” (Agyei and Yeboah, (2011); Tauringana, and AgyapongAfrifa, (2013)) affects both profitability and liquidity in a significant manner. “Standard financial analysis defines working capital as the difference between current assets and current liabilities” (Arnold, 2008; Jeng-Ren et al., (2006)).

Prof. S.C. Kuchhal suggests that the net concept of working capital is a long-run view. The operation of current assets is constant in short-run analysis & decision-making but variable and manageable in long-run operations.

Panigrath A. K. (2017) in his research, investigated the efficiency of working capital management strategies implemented by Indian cement companies between 2006 and 2015. The analysis focused on identifying relationships between working capital management variables and their collective efficiency and revealed an inverse correlation between profitability and both accounts payable duration and inventory holding

periods, while evidencing a positive association with accounts receivable collection times.

Ghosh and Maji (2003) conducted a study to assess the effectiveness of working capital management by analyzing the performance index, utilization index, and overall efficiency index of Indian cement firms between 1992–93 and 2001–02. By implementing the regression analysis and industry benchmarks to establish a target efficiency level for individual firms, the researcher examined the speed at which these firms achieved their efficiency goals during the study period. They found that some firms in the sample were able to improve their efficiency during these years.

Focusing on India's public sector energy industry, Sarkar and Sarkar (2013) decade-long investigation (2000-2010) assessed how WCM practices affected the financial outcomes of major oil and gas companies. As an indicator of profitability, they employed return on capital employed. Using descriptive statistics and correlation analysis, the researchers identified three key financial ratios-current ratio, current assets to total assets ratio, and inventory turnover ratio has significant impact on profitability across the six studied enterprises.

Mbawuni, Mbawuni, and Nimako (2016) conducted a six-year analysis for 2008 to 2013, assessing the influence of working capital management strategies on the financial results of petroleum retail companies in Ghana. Researchers investigated that Ghanaian petroleum merchants exhibit strong liquidity positions, demonstrated by positive net working capital balances and healthy working capital to total assets ratios that surpass industry benchmarks. The study identified average day's payable as the sole working capital metric significantly influencing asset returns. The study also discloses that, contrary to expectations, inventory holding period, collection periods, and overall cash conversion efficiency demonstrated negligible effects on profitability measures.

Goel U., Sharma A. K. (2015) studied WCM efficiency in the Indian manufacturing sector among 1,200 firms for a period of 10 years

between 2004 and 2013. The cross-industry study examined how firm-specific characteristics, macroeconomic conditions, and external factors influenced working capital efficiency across 11 sectors. The study also revealed significant fluctuations in WCM effectiveness during the observation period, with measurable impacts from the financial crisis. Research indicates that internal company characteristics— particularly debt ratio, asset composition, profitability, revenue growth, organizational size, and the firm's age—significantly influence the effectiveness of WCM, while macroeconomic factors have a negligible impact.

In summary, the literature review indicates that management of current assets and current liabilities i.e. “working capital management” is crucial for profitability, while the specific variables that might be used as indicators for this management are still not well established. The goal of the current study is to look into how a number of these variables relate to BHEL's profitability.

4. OBJECTIVES

The purposes of this research endeavor are:

- To evaluate the efficiency of WCM in BHEL over the period 2014–15 to 2023–24.
- To examine the relationship between working capital components and BHEL's profitability, particularly through the Return on Assets (ROA).
- To analyze the trends in ratios and their implications for BHEL.
- To investigate the changing composition of BHEL's current assets and liabilities over the study period.
- To determine the effectiveness of BHEL's working capital policies.

5. METHODOLOGY

The purpose of the present research is largely to study WCM and profitability analysis of BHEL. The scope of the study entails only the WCM of BHEL for the financial period ranging from 2014-15 to 2023-24. The source of data is

secondary and acquired from the website, annual report, and audited financial statements. The current study aims to assess the effectiveness of BHEL's WCM techniques.

Data was assessed through descriptive statistics, correlation measures, and ratio-based comparisons to derive meaningful insights. The study employed percentage-based descriptive statistics to characterize the distribution patterns of all measured variables, including dependent, independent, and controlled parameters. Pearson correlation analysis measured the relationships between independent and

dependent working capital components (CCC, ADI, ADR, ADP) and profitability (ROA), and controlled variables CR, QR, INV/CA, CA/TA, CA/TURN RATIO, LEV, and TURN GROW.

This quantitative research employed a non-experimental correlational design, relying on systematic measurement to analyze variable relationships. It fundamentally relies on measurement of systematically transform observable phenomena into mathematically analyzable data relationships.

6. VARIABLES FOR DESCRIPTIVE STATISTICS

ROA	Return on assets (Dependent Variables) <i>Ratio of PBT to Total Assets</i> Relating the profitability of a company to the asset base.
ADI	Total days of inventory holding (Independent Variable) <i>Dividing inventory by turnover (excluding GST)</i> A higher number denotes greater inventory investment.
ADR	Number of days Accounts Receivables (Independent Variable) <i>Dividing trade receivables by turnover (excluding GST)</i> Higher value represents more investment in accounts receivables.
ADP	Number of days of Accounts Payables (Independent Variable) <i>Dividing trade payables to annual purchase (Material consumption + Closing inventory of Raw material & components, Materials with fabricators/ contractors & Stores & spare parts- Opening inventory of Raw material & components, Materials with fabricators/contractors & Stores & spare parts)</i> The higher the value, the longer the firm takes to settle the payment to creditors.
CCC	Cash Conversion Cycle (Independent Variable) (ADI+ADR-ADP) The higher the value, the longer it takes for the firm to transform its input resources into cash flow.
CR	Current Ratio (Independent Variable) <i>Current assets divided by current liabilities.</i> The relationship between current assets and current liabilities
QR	Quick Ratio (Independent Variable) <i>Dividing quick assets by current liabilities</i> Interrelationship between quick assets and current liabilities.
INV/CA	Inventory to current assets (Controlled Variable) <i>Dividing inventory by current assets.</i> Shows the portion of current assets tied up in inventory. Generally a lower ratio is considered better.
CA/TA	Current assets total assets (Controlled Variable) <i>Dividing current assets by total assets.</i> Demonstrates the scope of total funds invested in working capital.
CA/TURN RATIO	Current assets turnover (Controlled Variable) <i>Dividing current assets by turnover</i> A higher ratio indicates the capability to achieve maximum sales with the minimum investment.
LEV	Leverage (Controlled Variable) <i>Dividing Total Debt by Total Assets</i> The ratio of total debtors to total assets significantly influences a firm's solvency position.
TURN GROW	Turnover growth (Controlled Variable) <i>Change in turnover from the previous year.</i> Explain successive growth rates to ensure high liquidity.

7. RESEARCH HYPOTHESIS

Numerous studies demonstrate that when a business adopts an aggressive WCM strategy, the components of gross working capital and profitability are negatively correlated. On the basis of theoretical and empirical evidences based on the review of literature on WCM-profitability linkages, following hypothesis is proposed for the study:

- H1:** Negative correlation exists between the CCC and profitability at BHEL.
- H2:** Negative association exists between the length of time BHEL holds inventory and profitability.
- H3:** Negative correlation exists between the duration of accounts receivable and its impact on profitability.
- H4:** Positive correlation exists between the accounts payable period and profitability.

8. TEST AND DATA ANALYSIS

WCM performs an essential role in ensuring an organization's financial soundness and the success or failure of an organization's operations as a whole is profoundly affected by WCM. Effective and thorough management of working capital can handle any situation and ensure the smooth operation of the business.

Table 1 presents the structure of current asset components in reference to BHEL for the period of 2014-15 to 2023-24. Initially trade receivables cover the major portion of current assets and occupy more than fifty percent of working capital during 2014-15. However, the

receivables portion of the current assets is in reducing trend and reached 13.85% by the end of 2023-24. Cash is another important component in the structure of current assets of BHEL, and its minimum level and maximum level during the study period was 17.82% and 26.52% over current assets. Inventory consists 20.81% portion of current assets in 2014-15 which increased to 20.90% at the end of 2023-24. Less than 1% of current assets were made up of the other components in 2014-15, and in 2023-24, that percentage rose to 46.73%. The profitability of an enterprise largely depends upon how it utilizes these components in an economic manner. Ensuring a sufficient level of working capital by a business helps prevent shortfalls and bolsters a robust credit rating.

Current assets are showing a decline in its financial values during the study period. Current assets, which were 48538 Crore during 2014-15 reached 34546 Crore during 2023-24. However, in the same duration, current liabilities are showing a marginal increase and reached 25333 Crore during 2023-24 from 22207 Crore during 2014-15. Due to the decline in the value of current assets, working capital in BHEL reduced 9213 Crore during 2023-24 from 26330 Crore during 2014-15. Generally speaking, a 2:1 current ratio is considered to be ideal. However, it is not rational for all kinds of enterprises and largely depends upon the nature of the enterprise. The current ratio in BHEL showed us a declining trend. Table 2 reflects the fact that over the period of analysis the current ratio, which was 2.19 during 2014-15 & reached 1.36 during 2023-24. The Quick Ratio

Table 1: Composition of Gross Working Capital (in Crore)

Particulars	2023-24	2022-23	2021-22	2020-21	2019-20	2018-19	2017-18	2016-17	2015-16	2014-15
Inventories	7221	6756	6560	7191	8906	8113	6259	7372	9602	10102
Trade										
Receivables	4785	3128	3025	4034	7108	12010	14064	22076	22430	26224
C, CE, BB	6157	6698	7154	6701	6419	7503	11176	10492	10086	9813
Loans/ Other										
Financial Assets	240	186	212	228	259	320	294	356	334	2225
Other CA	16143	12327	10094	10180	10013	10394	10345	2598	2673	175
Total CA	34546	29095	27045	28334	32704	38340	42138	42894	45125	48538
Quick Assets	27325	22339	20485	21143	23798	30226	35879	35522	35523	38436

CA= Current Assets; C, CE, BB= Cash, Cash Equivalents and Bank balance Source: Compiled from various Annual reports of BHEL

Table 2: Net Working Capital and Working Capital Ratios

Particulars	2023-24	2022-23	2021-22	2020-21	2019-20	2018-19	2017-18	2016-17	2015-16	2014-15
CA	34546	29095	27045	28334	32704	38340	42138	42894	45125	48538
CL	25333	23480	21499	20322	22579	23056	21907	20126	20724	22207
WC	9213	5615	5546	8012	10125	15284	20232	22768	24402	26330
QA	27325	22339	20485	21143	23798	30226	35879	35522	35523	38436
C, CE, BB	6157	6698	7154	6701	6419	7503	11176	10492	10086	9813
TA	59417	57354	56708	55701	60236	64416	63718	61230	65163	66729
CR	1.36	1.24	1.26	1.39	1.45	1.66	1.92	2.13	2.18	2.19
QR	1.08	0.95	0.95	1.04	1.05	1.31	1.64	1.76	1.71	1.73
ALR	0.67	1.19	1.29	0.84	0.63	0.49	0.55	0.46	0.41	0.37
CA/TA	0.58	0.51	0.48	0.51	0.54	0.60	0.66	0.70	0.69	0.73

CA= Current Assets; CL= Current Liabilities; WC= Working Capital (CA-CL); QA= Quick Assets; C, CE, BB= Cash, Cash Equivalents and Bank balance; TA= Total Assets are in crores. CR= Current Ratio; QR= Quick Ratio; ALR= Absolute Liquid Ratio; CA/TA= Current Assets/ Total Assets are in times.

displays a company's true liquidity. Generally, the benchmark for the liquid ratio is 1:1 to be considered satisfactory. There is a consecutive downfall in the quick ratio except during 2016-17 and 2023-24. The highest level of quick ratio during the study period was 1.76 during 2016-17 and the lowest 0.951 during 2022-23.

The absolute liquid ratio indicates the availability of sufficient funds in cash and cash equivalents to fulfill short-term liabilities. The absolute liquid ratio during the study period gradually increased from 0.37 to 0.67. During the course of the study, the share of current assets in relation to total assets also experienced a decline.

Reductions in receivables and, to a lesser extent, inventory were the main cause of the increase in working capital performance.

Table 3 reveals that during the study period both ADI and ADR registered a fall; however, during the same period, ADP recorded an increase. Due to a fall in ADI and ADR and an increase in ADP, CCC was reduced to -7.15 days, which was 270 days during 2014-15. ROA shows negative percentage during 2015-16, 2019-20 and 2020-21; however, during 2014-15 ROA was at its highest level. During the study period current assets are higher than turnover. BHEL maintained a low level of external financing from 2014-15 to 2017-18 however, afterword's the borrowings level increased and reached 7.99% of total assets at the end of 2023-24.

BHEL experienced a decline in turnover growth during the study period as exhibited in table below:

Table 3: Various ratio analysis of Working Capital

Particulars	2023-24	2022-23	2021-22	2020-21	2019-20	2018-19	2017-18	2016-17	2015-16	2014-15
ADI	107.66	103.26	110.96	161.07	158.64	100.90	82.03	97.01	139.68	124.81
ADR	71.34	47.81	51.17	90.35	126.61	149.36	184.32	290.47	326.29	324.00
ADP	186.15	223.87	202.57	215.74	225.21	205.38	245.81	205.02	194.16	178.69
CCC	-7.15	-72.80	-40.44	35.68	60.04	44.89	20.54	182.45	271.81	270.11
ROA	0.37	1.20	0.77	-6.48	-1.10	3.19	2.49	1.03	-1.79	3.21
QR	1.08	0.95	0.95	1.04	1.05	1.31	1.64	1.76	1.71	1.73
INV/CA	20.90	23.22	24.26	25.38	27.23	21.16	14.85	17.19	21.28	20.81
CA/TA	58.14	50.73	47.69	50.87	54.29	59.52	66.13	70.05	69.25	72.74
CA/TURN RATIO	1.41	1.22	1.25	1.74	1.60	1.31	1.51	1.55	1.80	1.64
LEV	7.99	8.45	8.37	8.68	8.19	3.96	0.09	0.15	0.19	0.09
TURN GROW	2.52	10.66	32.42	-20.47	-30.18	5.38	0.40	10.56	-15.07	-23.05

Table 4: Correlation examination for dependent, independent, and controlled variables within BHEL

Particulars	ADI	ADR	ADP	CCC	ROA	QR	INV/CA	CA/TA	CA/TR	LEV	TURN GROW
ADI	1										
ADR	.009	1									
ADP	-0.143	-.348	1								
CCC	0.249	.959 [#]	-.507	1							
ROA	-0.769 [#]	.211	-.095	.039	1						
QR	-0.257	.947 [#]	-.192	.828 [#]	.341	1					
INV/CA	0.776 [#]	-.485	-.091	-.254	-.539	-.734 [*]	1				
CA/TA	-.237	.936 [#]	-.309	.841 [#]	.391	.970 [#]	-.702 [*]	1			
CA/TURN RATIO	-0.588	-.648 [*]	.132	-.733 [*]	.497	-.542	.052	-.540	1		
LEV	0.350	-.910 [#]	.132	-.765 [#]	-.432	-.988 [#]	.774 [#]	-.946 [#]	.443	1	
TURN GROW	-0.717 [*]	-.381	.035	-.505	.388	-.218	-.272	-.300	.789 [#]	.139	1

[#]Correlation is significant at the 0.01 level (2-tailed). ^{*}Correlation is significant at the 0.05 level (2-tailed).

Person's Correlation is an attempt to find the relationship between dependent, independent, and controlled variables. The correlation test investigates how the CCC and its components—ADI, ADR, and ADP interrelate with one another and examine their collective impact on a firm's profitability. According to Table 4, result indicates a positive correlation between CCC and ADI & ADR. However, CCC relation with only ADR is significant. CCC and ADP is negative but lacks statistical significance, indicating no meaningful association. Further, ROA is negatively correlated with INV/CA and LEV but positively with QR, CA/TA, CA/TURN, and TURN GROW. Among the independent variables, a notable positive correlation exists between ADR and CCC, QR & CA/TA; CCC and QR & CA/TA; ADI & INV/CA and QR & CA/TA. ADI & TURN GROW, ADR and CA/TURN & LEVERAGE, CCC & LEV and QR & LEV among the independent variables show significant negative relationships.

9. DISCUSSION OF RESULT

Management of working capital is an important component that directly affects enterprise profitability. Many past studies of Indian public enterprises reveal the fact that there is a great need to enforce efficient corporate financial management to improve WCM practices.

The relationship between CCC and profitability is the subject of H1. During the

research period, the results of ROA and CCC showed a decreasing trend. Based on the study WCM of BHEL, testing hypothesis H1 shows that CCC and ROA are positively associated (0.039) hence, the hypothesis is not supported. However, association is very low. This implies that the enterprise has a very low impact on the cash conversion cycle on profitability. The study additionally indicates that within the control variables CA/TA (0.841) exhibited a significant positive correlation with CCC, and CA/TURN RATIO (-0.733) and LEV (-0.765) exhibited a significant negative correlation with CCC.

The findings from the H2 testing indicated that ADI has a significant negative correlation (-0.769) with ROA; hence, H2 accepted. The research indicated that within the control variables, INV/CA and LEV are positively correlated with ADI, out of which the relation with INV/CA (0.776) is significant and ADI association with TURN GROW (-0.717) is significant negative association.

The findings of the research indicate a positive association between ADR (0.211) and ROA; therefore, H3 is not supported. However, association is low. This implies a delay in payment from debtors has no effect on the profitability in terms of ROA. Within the control variables, CA/TA (0.841) is considerably associated with ADR and LEV (-0.910), and CA/TURN (-0.648) are significantly negatively associated.

H4 related to the association between

ADP and profitability. The findings of this study indicate that there is a negative relationship between ADP (-0.091) and ROA; hence, H4 is not supported. The relationship between ADP and RAO is showing a low level of negative correlation. The present research discovered that during the study period, QR, INV/CA, and CA/TA variables had a negatively correlated with ADP. Independent variable QR is significantly positively associated with ADR (0.947) and CCC (0.828).

Out of the four hypothesis three are not supported; however, only H2 demonstrates a notable negative correlation between the inventory holding period and profitability. It suggests that inventory management (ADI) is the most critical WCM component impacting BHEL's profitability (ROA).

10. CONCLUSION

BHEL has experienced a significant transformation in its working capital structure over the study period, greatly enhancing efficiency (as indicated by the negative CCC) but resulting in a notable decrease in liquidity and overall working capital levels. The current research investigated the liquidity, efficiency, and influence of WCM on the profitability of BHEL. Based on the study, it is concluded that with the passage of time, BHEL is able to maintain effective and efficient WCM. BHEL accomplished an impressive transformation of its CCC, reducing it from a significant 270 days in 2014-15 to a negative -7.15 days by 2023-24. This achievement places the company in a strong position,

enhancing operational cash flow.

Further, this research concludes that decreased turnover also made an impact on the level of current assets over turnover. Throughout the study period, both turnover and the current ratio experienced a declining trend, indicating a reduction in the level of current assets relative to turnover. Additionally, during this same timeframe, the proportion of current assets to total assets also diminished.

Leverage during the study period increased from a very low level of 0.09 in 2014-15 to 7.99 by 2023-24, indicates that initially the enterprise largely depended on its own funds to finance its operations, but later utilised external sources of financing as well. BHEL adopted an aggressive approach to WCM.

With the substantial negative impact of ADI on ROA, BHEL must strengthen its commitment to inventory management strategies, advanced demand forecasting, supply chain collaboration, and lean manufacturing to further cut down inventory days without disrupting operational flow. It is essential to uphold the extended ADP that supports CCC, but it must be sustainable and not damage crucial supplier relationships or result in increased input costs. Future borrowing choices should meticulously assess the cost of debt in relation to the necessity of preserving sufficient operational flexibility. BHEL's study of working capital during the study period exhibits a delicate and often challenging balance between efficiency, profitability, and liquidity. ■

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