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Integrating Sustainability into Working Capital Efficiency: Evidence from the Indian Manufacturing Sector

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Abstract

Working capital is the most essential part of an organization. The success of an enterprise is met by efficiently managing the working capital. It is a traditional concept with increased importance that exists even today. The present study aims to assess the working capital efficiency of listed Indian companies. The necessary data is gathered from secondary sources and extracted from the balance sheet spanning 2018 to 2023. The efficiency is analyzed using the working capital management efficiency index proposed by Bhattachrya in 1997. The performance index of working capital, utilization index of working capital, and financial efficiency index of working capital are computed. Over the study period, it is observed that, the average Performance index of selected companies was found to be over one, indicating that working capital is adequately managed. The utilization index of selected companies was also over one, highlighting that they efficiently utilize current assets to generate sales. Average efficiency index results reveal that 26 companies have index value of more than one, signifying that all these companies are very effective in utilizing working capital. The result revel that, the companies are efficient in managing their working capital to generate sales during the study period.

Key words: Working capital efficiency, Performance index, Utilization Index, Efficiency Index.

1. Introduction

In the modern era of business, working capital management is an age-old practice that is practiced even today. Being an important element of an organization, working capital management focuses on financing short-term assets and liabilities (Bhatia and Barwal, 2015). It is also referred to as an organization's view system that keeps the businesses alive. The literature highlights that working capital is the lifeblood of every organization (Baños-Caballero et al., 2020). The efficient management of working capital ensures efficient funding in the organization, thereby leading to objective achievement. Hence, ensuring adequate working capital is required not only for the short-term but also in the long-term as it helps the businesses to grow profitably (Deloof, 2003).

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The assets maintained do not yield higher profits, while under-maintained assets make the company highly vulnerable to business (Lucía et al., 2021) and liabilities drive towards bankrupt. Hence, having adequate assets in working capital ensures reasonable returns to the owners. Therefore, efficient working capital plays an important role in improving the operational performance of the business, and hence, it is vital to understand the efficiency index of the working capital employed.

Traditional finance witnesses' studies in the area of long-term finances and investment decisions of the firm. However, short-term finances are also essential to finance working capital. The short-term assets and obligations form a larger part of the business, highlighting its importance in the niche area of the business. The efficient management of working capital leads to proper management of short-term assets and liabilities, thereby taking care of the business's long-term profitability (Boisjoly et al., 2020).

Working capital is measured through gross working capital, which reports the sum total of current assets, while net working capital considers the difference between current assets and liabilities. Usually, net working capital is considered, and it is financed through long-term sources at a higher cost, thereby denting profitability. Whereas, efficiency of working capital is studied through ratio analysis, and working capital cycle traditionally. The modern methodology of measuring efficiency of working capital is narrowly witnessed.

The literature in the area of working capital efficiency using efficiency index methodology is barely found in India. Hence, this study is carried out to assess the efficiency of the working capital of selected listed companies. The article is arranged as 1. introduction, 2. literature review, 3. methodology, 4. results and discussion, and conclusion are presented in section 5.

2. Literature Review

Working capital management has been explored by many authors from various perspectives. Few analyzed working capital management Merville and Tavis (1973); Aldubhani et al., (2022); Ahmad et al., (2022); Halil et al., (2024) while some assessed working capital efficiency Farrah et al., (2016); Kasiran et al., (2016); Prasad et al., (2019); Habib and Mourad (2022); Banerjee, & Deb, (2023).

Working capital refers to that part of capital used in day-to-day business. Managing of day-to-day business activity is essential as it is directly related to firm's profitability (Chellaswamy and Ligy, 2019). Goel and Sharma (2016) studied the Indian manufacturing sector using Data Envelopment Analysis to measure the efficiency of working capital management. The study revealed that the companies considered in the study recorded 40% to 50% (Seth et al., 2020) efficiency in utilizing working capital that directly affected the profitability. Firm's growth, proportion of fixed assets, age, etc. has a direct effect on efficiency, and there is a need for critical working capital management policy. Hence, it is essential to study working

capital management and its efficiency. Working capital management efficiency index is a critical measure to evaluate how effectively the companies have utilized their working capital to improve sales. Several studies employed the working capital efficiency index suggested by Bhattacharya (1997) in assessing companies' and sectors' working capital efficiency in generating sales. Press, Valipour, and Jamshidi (2012) found a positive relationship between the performance, efficiency, and utilization index and the assets' efficiency. The authors validated that the tool provided by Bhattacharya (1997) is superior to the traditional method of measuring working capital efficiency. Afza and Nazir (2011) studied the importance of efficient working capital for Pakistan-based cement sector companies for two decades. They concluded that the companies outperformed in performance of efficiency during the period. Sarathadevi (2011) studied Sri Lankan listed trading companies for the period of 2004 to 2010. The authors observed that all the considered companies had an efficiency index higher than one. These companies were found to be good at managing their working capital, indicating positive signs for their operational efficiency and financial health.

A study of the textile sector of Pakistan was carried out by Shehzad et al. (2012) using the parallel methodology proposed by Bhattacharya. The study revealed that companies were high on performance with an efficiency index of more than one, indicating efficient management of working capital. Along similar lines, Göker (2020) analyzed 19 companies listed on the BIST Sustainability Index for the period of 2015-2018. The authors found that companies' efficiency in overall is good as the efficiency index is more than one.

Intara and Wanganusorn (2020) studied 53 companies in the agricultural and food industry listed on the Thai Index over 11 years. The study revealed that efficient working capital management enhances financial performance of listed companies and also documents positive significant relationship between working capital management and financial performance.

Rahman (2023) studied the automobile sector with ten passenger car manufacturers for ten years. The study opined many companies showed good working capital management performance and efficiently managed working capital, which led to increased sales with existing assets. Similarly, a study (Yousaf, 2022) regarding certified firms in the Czech manufacturing sector revealed that firms with more than one efficiency index were more successful in achieving profits during COVID-19 times too, proving better performance in bad times.

Praveen and Mahendran (2013) studied the Indian sugar sector from 2007 to 2012 and concluded that Indian sugar companies have a fairly better efficiency index and hence perform better. Harsh et al. (2015) studied Indian health sector listed companies on BSE-200. Data for 14 years was fetched using the PROWESS database. The study found that the selected 13 companies efficiently manage working capital, especially the current assets for sales generation. The study concluded that efficiently managed working

capital positively affects ratio of income to average total assets. Chellaswamy and Ligy (2019) explored the efficiency index suggested by Bhattacharya (1997). Authors studied the Indian automobile industry and reported inconsistency in Indian automobile sector and necessity of sound policies to effectively manage working capital.

2.1: Sustainability in Business through Working Capital

In recent years, sustainability has become a first consideration in financial and operational decision-making in industries. For the manufacturing sector in India, sustainable practices are not only environmental or regulatory requirements but also strategic imperatives for long-term value creation (Narayan et al., 2024). Efficient working capital management plays a vital role in supporting sustainability objectives by minimizing resource wastage, improving asset utilization, and enhancing financial resilience thereby resulting in decreased working capital requirement (Dewangan & Kannadhasan, 2025).

By optimizing current assets and liabilities, companies can reduce overproduction, inventory excesses, and energy consumption and factors that have significant environmental and economic implications. For instance, lean inventory management, a subset of efficient working capital use, contributes to lower material waste and reduced carbon emissions from storage and logistics. Furthermore, companies with strong working capital efficiency are often better positioned to invest in sustainable technologies and practices, such as energy-efficient machinery or cleaner supply chains.

In the context of the 27 companies studied from the BSE Manufacturing Index, those with higher efficiency index values may also demonstrate better preparedness to integrate ESG (Environmental, Social, and Governance) factors into their financial strategies. Although this study does not directly evaluate sustainability metrics, it highlights a vital connection—financial efficiency and sustainability are increasingly interlinked. Future research could explore how improvements in working capital efficiency correlate with sustainability performance, particularly in areas like resource conservation, and responsible supply chain management. Advantage of employing efficiency index, followed by the limited availability of research in India, that too in the manufacturing sector, drives conduct of the present study. Hence authors aim to Integrate Sustainability into Working Capital Efficiency of the manufacturing companies listed on the Indian manufacturing index.

3. Methodology

The present study employs the secondary data collected from the BSE Manufacturing Index (www.bseindia.com). The data is extracted from the annual reports of the company spread over five years (2018 to 2023). In all, 27 companies were selected out of the 30 listed on BSE Manufacturing index (3 company's data was inadequate). The novel literature documented consideration of 72 (Press, Valipour and Jamshidi, 2012); 14 (Kaur and Singh, 2012); 24 (Kasiran et al., 2016); 22 (Afza and Nazir, 2007); 16 (Chisti,

2012), 15 (Prasad and Lakshmi, 2018); 19 (Göker, 2020); 8 companies (Erem, 2020) and hence sample of 27 companies is justifiable. The extracted data is then fed into the spreadsheet to compute Performance Index (PI), Utilization Index (UI), and Efficiency Index (EI). Finally, WCM Efficiency index propounded by Bhattacharya (1997) is employed to assess the WCM efficiency. Calculation of Performance Index of Working Capital Management (PIWCM) using the following model (1);

$$PI_{WCM} = \frac{I_S \Sigma_i^n {}_1 \frac{W_{i(t-1)}}{W_{it}}}{N} \quad \text{….. (1)}$$

Where,

Is= Sales Index defined as: St / St-1, Wi = Individual group of current assets, N= Number of current assets group and, i= 1, 2, 3...N

Calculation of Utilization Index of working capital management (UIWCM), using the following model (2);

$$UI_{WCM} = \frac{A_{t-1}}{A_t} \quad \text{….. (2)}$$

Where, A = Current Assets / Sales

Calculation of Efficiency Index of working capital management (EIWCM), using the following model (3);

$$EI_{WCM} = PI_{WCM} \times UI_{WCM} \quad \text{….. (3)}$$

4. Results and Discussion

The study assessed the working capital efficiency of 27 companies listed on the BSE Manufacturing Index. Secondary data collected over five years and analysis is presented below:

Table (1.1) depicting PI, UI, and EI

SL No.	Company Name	Performance Index			Utilization Index			Efficiency Index		
		Min	Max	Avg	Min	Max	Avg	Min	Max	Avg
1	Grasim Industries Ltd	0.85	2.45	1.41	0.88	1.37	1.06	0.96	2.28	1.26
2	Indian Tobacco Ltd	0.85	1.48	1.26	0.84	1.24	1.03	0.71	1.77	1.27
3	Eicher motors Ltd	0.70	32.26	7.41	0.66	2.12	1.21	0.53	32.99	7.52
4	Divi's Laboratories Ltd	1.05	14.35	4.32	0.80	1.24	1.01	0.89	14.97	4.48
5	Coal India Ltd	0.01	28.97	10.71	0.00	33.36	11.42	0.81	3.10	1.35
6	Bharat Heavy Electronics Ltd	0.47	2.03	1.10	0.67	2.82	1.36	0.62	1.27	0.82
7	Sun Pharmaceutical Industries Ltd	0.88	59.77	14.10	0.75	2.25	1.12	0.87	79.45	17.64
8	ONGC	0.85	3.21	1.71	0.74	1.05	0.92	1.02	3.35	1.81
9	Pidilite Industries Ltd	0.72	4.60	2.19	0.62	1.05	0.98	0.59	7.40	2.71
10	Reliance Industries Ltd	0.88	2.70	1.80	0.6	1.24	0.95	1.46	2.17	1.84
11	Titan	0.00	26.35	7.29	0.74	1.11	0.92	0.00	23.69	7.25
12	Tata Steel	1.04	5.13	3.08	0.37	2.42	1.24	0.43	12.17	4.66
13	Ultratech Cement	1.26	2.54	2.10	0.68	1.41	1.04	0.89	3.73	2.29

SL No.	Company Name	Performance Index			Utilization Index			Efficiency Index		
		Min	Max	Avg	Min	Max	Avg	Min	Max	Avg
14	UPL Ltd	0.87	17.83	4.54	0.55	1.39	0.98	0.63	32.51	7.45
15	Hero Motocorp Ltd	0.72	1.53	1.14	0.82	1.29	1.02	0.69	1.54	1.13
16	Asian Paints	1.31	2.10	1.17	0.63	1.10	0.95	1.12	3.10	1.92
17	Bajaj auto Ltd	1.00	3.31	1.76	0.43	1.62	1.17	0.84	3.68	1.86
18	Bharat Petroleum Corporation Ltd	1.35	2.04	1.69	0.77	1.36	1.09	1.19	2.65	1.65
19	Cipla Ltd/India	1.30	115.35	24.40	0.89	1.89	0.98	1.27	129.13	27.18
20	JSW Steel Ltd	1.04	72.87	16.48	0.65	1.13	0.96	0.98	64.29	15.23
21	Mahindra and Mahindra Ltd	0.74	3.96	1.81	0.73	1.11	0.97	0.73	1.11	1.83
22	Maruti Suzuki India Ltd	0.42	2.10	49.45	0.42	2.10	1.07	0.61	256.84	84.90
23	Tata motors ltd	0.02	38.18	8.50	0.41	1.89	1.24	0.01	93.80	19.53
24	Tata Consumer	1.55	21.64	6.05	0.87	1.02	0.95	1.56	22.63	6.36
25	Hindustan Unilever Ltd	1.03	2.05	1.36	0.98	1.12	1.03	1.02	2.09	1.33
26	Hindalco Industries ltd	0.87	7.28	2.57	0.74	2.56	1.34	0.74	6.98	2.26
27	Dr. Reddy's Laboratories	1.32	6.24	2.97	0.85	1.15	1.03	1.25	6.42	2.89

4.1. Performance Index (PIwcm)

Table 1.1 depicts the Performance Index results of the selected companies. The Performance Index greater than 1(>1), indicates that the working capital is efficiently used. It is inferred that, all the 27 companies in the study were very effective at managing their working capital during the study period. Out of selected companies, the average performance index of all the companies is higher than 1 indicating working capital is appropriately managed to generate sales. Further, the results show that the performance of selected companies in order to generate the sales has been effective. The Average Performance index was found to be least (1.10), while the highest was 49.45 for Bharat Heavy Electronics Limited and Maruti Suzuki India Ltd, respectively. In overall performance index of the selected companies resulted in 6.75 depicting that the selected sample on the index is capable enough to generate higher sales than the working capital employed, demonstrating higher efficiency.

4.2. Utilization Index (UIwcm)

The utilization index shows how well the organization uses its current assets to generate sales. Any growth in current assets supported by higher sales would indicate that current assets were being used effectively. UI of more than one indicates effective use of current assets in generating sales. The computations presented in Table 1.1 show that out of 27 companies selected, 17 have a utilization index of more than one, while 10

companies have less than 1. The average Utilization Index was found to be 0.92, and the highest was 11.42 for Oil and Natural Gas Corporation Ltd, Titan, and Coal India Ltd, respectively. The results are greater than 1, which are the benchmarks for measurement of efficiency. Companies with more than 1 reveals that their utilization of current assets in generating sales is effective. On the contrary, the utilization index of less than one bearing company is not that productive in using given assets.

4.3. Efficiency Index (EI_{WCM})

The efficiency index is a measurement of the ultimate efficiency level since this index is from the performance and utilization index. Table 1.1 shows that out of the selected companies, 26 companies have a high-efficiency level of working capital management since the efficiency index is over 1. In this study, the high levels of efficiency index are influenced by the high-performance index. The average efficiency index was 0.82, while the highest was 27.18 for Bharat Heavy Electronics Ltd and Cipla Ltd, respectively. The result thus implies that the selected 26 companies effectively utilize working capital in generating sales, except Bharat Heavy Electronics Ltd.

5. Conclusion

The success of an enterprise depends on efficient management of short-term assets and liabilities. Efficient management marks positive effect on the profitability. Efficient working capital management prevents companies from making losses. It ensures efficient management of firms' current assets and helps fulfill current liabilities, thereby increasing firms' value. Hence the importance of working capital is very high. The present study is undertaken because of the significance efficient working capital measured using index method in Indian Manufacturing sector. For this purpose, 27 companies listed on the BSE Manufacturing Index of India are selected. The annual reports were employed to extract the financial data. Performance Index, utilization Index, and efficiency index of Working Capital Management (PIWCM) are computed to ascertain the working capital efficiency. The working capital efficiency index method depicts performance and level of utilization of working capital in generating sales.

The empirical results of selected companies have an average efficiency index value of either one or more than one, except for Bharat Heavy Electronics Ltd. The average Performance index of selected companies was found to be over one, indicating that working capital is adequately managed. The utilization index of selected companies was also over one, highlighting that they efficiently utilize current assets. At last, the average efficiency index results reveal that 26 companies have more than one value, signifying that these companies are very effective in utilizing working capital. Hence it can be concluded that, 26 companies are efficient in managing working capital during the study period. They were able to efficiently use current

assets and manage the current liabilities efficiently in sales generation. Moreover, this operational efficiency supports broader sustainability goals by optimizing resource use, reducing environmental impact, and enabling reinvestment into sustainable innovations and practices.

5.1. Theoretical implications:

The outcomes of the study findings will benefit the stakeholders of the company especially managers and the owners. The finance managers of the respective companies will be able to develop means and schemes to ensure effective utilization of working capital in the enterprises. Technical and scale efficiency can be undertaken to ensure the effective utilization and productivity of the enterprise. Further, the managers will be able to identify the weaker section of the working capital management application and will be able to craft a strategy. Lastly, the study would also help shareholders and owners of the company to overview the performance of the company in generating sales.

5.2. Limitations of the study:

The study has some limitations. Primarily, the study considers 27 firms listed on BSE Manufacturing index with five years spread over 2018 to 2023. Secondly, other factors that may affect working capital management and decides efficiency like managerial ability, financial distress and ESG conditions are discounted by the study.

5.3. Scope of the study

The present study outlines the working capital efficiency of selected companies on the index. However, there is scope to include other companies listed on different exchanges that can also be explored. Secondly, comparison of companies across the sectors or exchanges will enrich the literature. Thirdly, a longitudinal study may also add value to the literature.

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