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An Analytical Study of Working Capital Management in Public Sector Units: A Comparative Evaluation

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ABSTRACT

The effective management of working capital is crucial for the smooth functioning and profitability of a business, especially for public sector units (PSUs) that operate within regulated environments. This study examines the components and management of working capital, with a particular focus on inventory, receivables, and current liabilities. The research evaluates four PSUs in the chemical and fertilizer sector over three years, analyzing their working capital trends using financial ratios, such as the current ratio, quick ratio, and Altman Z-Score. The findings reveal significant variations in working capital strategies across companies, with some showing improved profitability despite challenges, while others struggle with liquidity issues. The study offers insights into the importance of balancing liquidity and profitability in maintaining long-term financial health.

Keywords: Working Capital Management, Public Sector Units

INTRODUCTION

The finance manager plays a pivotal role in making key investment decisions, particularly determining which projects the company should allocate its resources to, as these choices have a direct impact on the company's profitability (Ross, Westerfield, & Jaffe, 2019). Another essential responsibility is the financing decision, where the manager must decide how to raise funds, whether through borrowing or capital infusion. This decision is crucial as it affects the company's solvency (Brealey, Myers, & Allen, 2020). Additionally, the finance manager must develop policies and practices for managing working capital, which directly influences the company's liquidity. A company may fail not necessarily because of long-term solvency or profitability issues, but due to a loss of credibility or trust stemming from its inability to meet short-term obligations on time. Excessive working capital may indicate inefficiencies in converting productive assets into profits (Pandey, 2015).

Working capital represents the funds tied up in a company's net current assets that are used for day-to-day operations, rather than being invested in long-term assets (Gitman & Zutter, 2018). From an accounting perspective, it is the difference between current assets—such as inventory, receivables, cash, and other short-term realizable assets—and current liabilities, including trade creditors and short-term payables (Damodaran, 2014).

Typically, "short-term" refers to a period of up to one year, although in cash flow statements, it may be as short as three months (Wild, Shaw, & Chiappetta, 2020). While one year is the standard time frame, the Companies Act, of 2013, introduces the concept of an operating cycle for classifying assets and liabilities as current or non-current (Kumar, 2016).

An asset is classified as current if it is expected to be realized, sold, or consumed within the company's normal operating cycle. Similarly, a liability is deemed current if it is expected to be settled within this cycle (Kothari, 2017). The operating cycle is the period between acquiring assets for production and converting them into cash or cash equivalents (Rao & Kumar, 2018).

Objectives of the Study

1. **To analyze the role of finance managers in investment and financing decisions** and their impact on the company's profitability and solvency.
2. **To assess the effectiveness of working capital management policies** and practices within organizations and their influence on liquidity and operational efficiency.
3. **To evaluate the components of current assets and liabilities,** with a focus on inventory management, receivables management, and cash flow management.
4. **To explore the application of financial ratios and models,** such as the Z-Score Model, in assessing the financial health of companies.
5. **To compare working capital management practices across selected public sector units (PSUs)** in the chemical and fertilizer manufacturing sector.

RESEARCH METHODOLOGY

1. **Research Design:** A comparative analysis approach focusing on quantitative data from selected public sector units (PSUs) in the chemical and fertilizer manufacturing sector.
2. **Data Collection:**
   - **Primary Data:** Structured questionnaires or interviews with finance managers in the selected PSUs to gather insights on working capital management practices.
   - **Secondary Data:** Financial statements, annual reports, and industry benchmarks to analyze financial ratios, working capital components, and performance metrics.
3. **Sampling Technique:** Purposive sampling to select four PSUs based on their relevance to the chemical and fertilizer sector and their varying financial conditions.
4. **Data Analysis:**
   - Use of financial ratios (current ratio, quick ratio, debtor turnover ratio) and models (Z-Score) to evaluate the financial health and working capital management of each PSU.
   - Statistical analysis to compare findings and identify trends or patterns in working capital management.

Justification of the Study

- **Significance of Working Capital Management:** Understanding working capital management is critical as it directly influences a company's liquidity and operational efficiency, which are vital for long-term success.
- **Relevance to Finance Managers:** The study provides valuable insights for finance managers, helping them make informed decisions regarding resource allocation and capital management, which can enhance profitability and solvency.
- **Contributions to Existing Literature:** This research aims to fill gaps in the literature regarding the comparative analysis of working capital practices in PSUs, offering a fresh perspective on their financial management strategies.
- **Practical Implications:** Findings can inform policy recommendations for improving working capital management practices in public sector enterprises, ultimately contributing to better financial health and sustainability.

Limitations of the Study

- **Scope of Study:** The research is limited to a specific sector (chemical and fertilizer manufacturing) and may not be generalizable to other industries or sectors.
- **Data Reliability:** The study relies on secondary data from financial statements, which may be subject to discrepancies or variations in reporting practices.
- **Sample Size:** A limited sample size of only four PSUs may restrict the comprehensiveness of the findings and conclusions drawn.
- **Dynamic Nature of Financial Data:** Financial metrics are subject to change due to various internal and external factors, which may affect the validity of the findings over time.
- **Potential Bias:** Responses from finance managers may introduce bias, particularly if they perceive certain practices as sensitive or proprietary.

Working Capital = Current Assets - Current Liabilities

1.1 Components of Current Assets

1.1.1 Inventory:

Inventory consists of raw materials, work-in-progress, and finished goods held by the company at any given time. It is a major component of current assets, especially in manufacturing entities and, to some extent, trading entities as well. In manufacturing, raw materials must be maintained at a level where they are not so low as to cause a stock-out, leading to a standstill in production, and not so high as to incur excessive storage costs (Wild, Shaw, & Chiappetta, 2020).

If raw materials are being converted into finished goods and awaiting sale, the amount locked in them remains an unproductive and unrealized investment, with potential profits yet to be unlocked. Additionally, the ordering cost and time are significant factors to consider.

Frequent small orders lead to higher ordering costs, while infrequent larger orders may lower per-unit ordering costs but increase carrying costs. Thus, it is crucial to strike a balance between the risks of high ordering costs, delayed deliveries, and potential stock-outs on the one hand, and high carrying costs on the other (Pandey, 2015).

To optimize the ordering process, the Economic Order Quantity (EOQ) formula is commonly used. EOQ helps determine the ideal quantity of goods to order at one time to minimize the combined costs of ordering and stocking inventory. The EOQ formula is:

$$EOQ = \sqrt{\frac{2 \times U \times O}{CC}}$$

Effective inventory management involves setting optimal inventory levels: a minimum level below which production cannot continue, a maximum level beyond which storage becomes difficult, and a re-order level that triggers new orders when inventory dips to a critical point. The re-order level is determined by multiplying the average lead time required for procuring goods (from placing the order to receipt) by the average daily requirement of those goods (Brealey, Myers, & Allen, 2020).

ABC Analysis:
A common inventory management technique is ABC analysis, which classifies inventory into three categories:

- **A category**: High-value items (around 75% of total value) with low quantities (approximately 5%),
- **B category**: Moderate-value items (about 15%) with moderate quantities (10%),
- **C category**: Low-value items (10%) with high quantities (85%) (Pandey, 2015). A-category items require more focused procurement and storage, while C-category items are managed with bulk procurement and routine decisions.

Just-In-Time (JIT):
Another approach to inventory management is the Just-In-Time (JIT) system, which presupposes perfectly efficient logistical arrangements, enabling near-zero inventory. JIT minimizes holding costs, but it requires higher ordering costs due to frequent deliveries in response to demand (Ross, Westerfield, & Jaffe, 2019).

Input-Output Ratio and Inventory Turnover Ratio:
One method of controlling inventory is Input-Output Ratio analysis. Additionally, the **Inventory Turnover Ratio** is a key indicator of efficiency. It is expressed as the number of days raw materials, work-in-progress, and finished stock are held in terms of consumption, production, and cost of sales. A lower number of days indicates more efficient inventory management. The formula for the Inventory Turnover Ratio is:

$$\text{Inventory Turnover Ratio} = \frac{\text{Cost of materials consumed or produced or cost of sales during the period}}{\text{Cost of average stock of raw material or work-in-progress or finished stock held during the period}}$$

$$\text{Average stock} = \tfrac{1}{2}\,(\text{Opening stock} + \text{Closing stock})$$

$$\text{Average number of days of inventory holding} = \frac{\text{360 days or 12 months}}{\text{Inventory Turnover ratio}}$$

Rather than focusing solely on the precise definitions or compliance with technical norms, it is more crucial for an organization to have a sound policy for maintaining, replenishing, and storing inventory, and ensuring that this policy is effectively implemented. Key factors to consider include the procurement policy, availability of funds, accurate forecasting of inventory needs, reliable sources of supply, and a practical assessment of logistical constraints and timelines. These elements are essential for managing inventory efficiently and ensuring smooth operational flow.(Wild, Shaw, & Chiappetta, 2020).

Effective Receivables Management: Strategies, Policies, and Liquidity Considerations
Receivables refer to the balance amount expected to be realized from customers who have purchased goods on credit. This category also includes negotiable instruments such as bills receivable and promissory notes, which can be discounted with a bank to obtain immediate funds, albeit with a deduction known as a discount. These negotiable instruments provide a reliable source of liquidity, particularly in international trade, as they are often issued by established entities and can be realized over a short term (Ross, Westerfield, & Jordan, 2013). In foreign trade, bills of exchange are frequently backed by a letter of credit or a reputable foreign bank, which will only release shipping documents upon the acceptance of the bill of exchange by the importer (Brigham & Ehrhardt, 2017).

When managing receivables, it is important to evaluate whether there is an established and reasonable discount and credit policy. The credit policy should include methods for determining credit terms, such as the duration of the credit

period (i.e., number of days) based on factors like the customer's payment history, security, trade reputation, and credentials. Additionally, prompt payment discounts may incentivize early payments. It is crucial to balance the discount and credit terms so that neither option incurs significant additional costs to the seller (Gitman, 2009). For instance, if the interest lost on funds blocked in receivables is 5% per annum, offering a 90-day credit period should not involve a prompt payment discount exceeding 1.25% per quarter for a 90-day discount period. Typically, discount periods are much shorter than credit periods, with terms such as "5/10 net 30" indicating a 5% discount for payments made within 10 days, while allowing full payment within 30 days (Horne & Wachowicz, 2008).

The interest rate charged for delayed payments beyond the credit period must be higher than the cost of funds tied up in receivables. Businesses must also decide whether to waive interest on delayed payments, considering the risk of further delays and the potential cost of disputes over outstanding payments. To avoid bad debts, proactive follow-up and timely legal action may be necessary. Additionally, without-recourse factoring or selling receivables to a bank can help mitigate the risk of non-payment (Pandey, 2010).

The debtor turnover Ratio, expressed as the number of days' sales, provides a general indication of how long it takes to convert receivables into cash, reflecting the average credit period. A lower number of days indicates faster realization of receivables (Van Horne & Dhamija, 2011).

$$\text{Debtors Turnover Ratio} = \frac{\text{Net Credit Sales during the period}}{\text{Average receivables during the period}}$$

Average Receivables = ½ (Opening Debtors + Opening Negotiable Instruments Receivable + Closing Debtors + Closing Negotiable Instruments Receivable)

$$\text{Average Collection Period} = \frac{\text{360 days or 12 months}}{\text{Debtors Turnover Ratio}}$$

Current Investments:
An entity may opt to invest its surplus funds in short-term investments, such as money market instruments, instead of holding them in bank accounts or fixed deposits. It is essential to evaluate whether such investments are made for speculative trading or as a strategy to deploy liquid assets efficiently, especially when the entity's core business is not investment-related (Ross, Westerfield, & Jordan, 2013).

Cash and Bank:
In financial accounting, cash refers to cash and cash equivalents, such as bank balances in current accounts, which typically do not generate significant returns. The ideal amount of cash to be held by an entity can be determined using theoretical models, such as the Miller-Orr Model. This model sets both an upper and lower limit for cash balances, with the difference referred to as the "spread." When cash reaches the upper limit, marketable securities are purchased; when it falls to the lower limit, securities are sold. The spread is influenced by factors like interest rates, transaction costs, and variance. The return point, or target cash balance, is the central value around which actual balances fluctuate (Pandey, 2010).

Effective cash and bank balance management are crucial indicators of sound working capital management. A cash budget is a useful tool to project and align cash inflows and outflows, ensuring they are timed and matched. Poor cash and bank management can lead to mistimed cash flows and unstable liquidity, often resulting in reliance on overdrafts, coupled with periods of idle cash balances in current accounts that yield no returns while still incurring interest on overdrafts. If an entity uses a cash credit facility, this may lead to inefficient utilization, potentially requiring additional security or leaving security tied up without need (Brigham & Ehrhardt, 2017).

A well-known saying in finance is: "Turnover is vanity, profit is sanity, but cash flow is reality." Today, the cash flow statement is a mandatory accounting requirement, detailing cash inflows and outflows from operations, investments, and financing. This statement provides a comprehensive view of the efficiency of both operational and financial management, including their investment and financing components (Gitman, 2009).

Beyond placing funds in fixed deposits (FDs) for liquidity, a strategy of investing in FDs may be employed when there is no immediate prospect for productive operational investment. However, the repeated renewal of significant FD amounts may indicate that the entity either lacks a robust business model, has no long-term investment strategy, or is unable to accurately predict the timing of cash flows. Frequent premature encashment and reinvestment in FDs also suggest disorganized cash and bank management (Horne & Wachowicz, 2008).

$$\text{Miller} - \text{Orr Model}$$

$$\text{Return point} = \text{Lower limit} + \left(\frac{1}{3}\text{x spread}\right)$$

$$\text{Spread} = 3\left[\frac{\frac{3}{4}\text{ x transaction cost x variance of cash flows}}{\text{interest rate}}\right]^{\frac{1}{3}}$$

In some cases, an entity may invest all available funds in FDs, relying on returns from these deposits as its primary source of revenue. This could pose a problem if the returns on FDs are lower than the entity's cost of funds. For example, placing Rs.10 crore in FDs at a 5% return rate while holding a bank overdraft of Rs.10 crore at a 12% interest rate is not financially prudent (Van Horne & Dhamija, 2011).

COMPONENTS OF CURRENT LIABILITIES

Accounts Payable

Accounts payable consist of amounts due to suppliers and other creditors from whom the entity has borrowed money, services, or goods in the short term. This includes bills payable, such as promissory notes issued and bills of exchange accepted. Entities may take advantage of prompt payment discounts or the full credit period allowed, whichever is more beneficial. To avoid interest obligations and retain suppliers by maintaining a good market standing, it is essential to adhere to a policy of payment within the due date to prevent loss of credibility due to delayed payments. The creditors turnover ratio**,** expressed in days, provides a rough estimate of the time it takes to settle payables, showing the average credit period extended by suppliers. Additionally, comparing the average collection period with the average payment period can help conclude the credit period offered to debtors versus the credit period availed from suppliers (Pandey, 2021; Bhattacharya, 2019).

Overdrafts and Cash Credit Facility from Banks

Overdrafts and cash credit facilities are discussed under sources of funds. Overdrafts are temporary overdraws from an entity's current account and are considered current liabilities, while cash credit facilities provide a flexible line of credit with a ceiling limit for drawing funds (Singh & Kumar, 2020).

Source of Funds for Working Capital

Effective financial management requires that short-term assets should always exceed short-term liabilities. This means that net working capital may need to be funded by long-term borrowings, while current liabilities should never be used to finance long-term assets. The working capital requirement fluctuates due to seasonal and cyclical changes in business operations. Banks offer various modes of financing, including **Working Capital Term Loans (WCTL)**, which are flexible cash credit arrangements set based on net working capital needs rather than fixed loans for long-term projects. Comparing the payouts of overdrafts, cash credit facilities, and term loans can aid in determining the optimal borrowing level for working capital needs (Khan & Jain, 2020; Iyer, 2018).

Ratios of Working Capital

Key ratios used to assess the adequacy of working capital include the **current ratio** (current assets divided by current liabilities) and the **quick ratio** or acid-test ratio (current assets excluding inventories divided by current liabilities). These ratios are traditionally seen as indicators of working capital adequacy. A current ratio of 2 and a quick ratio of 1 are generally considered ideal, though these may vary across industries and periods (Brigham & Houston, 2018).

Z-Score Model

The **Z-Score Model**, developed by Edward I. Altman, is a mathematical formula used to predict the likelihood of bankruptcy within two years based on five key financial parameters, including the ratio of working capital to total assets. A Z-score below 1.81 indicates a high risk of bankruptcy, while a score between 1.81 and 2.99 suggests a grey area. The model goes beyond simple financial ratios to offer deeper insights into the financial health of a company (Altman, 1968).

Working Capital in Public Sector Units (PSUs)

A comparative study of the working capital situation in four PSUs within the chemical and fertilizer manufacturing sector over threeyears reveals significant differences.

Company A
Company A experienced a decline in working capital, current ratio, and quick ratio over the threeyears, resulting in negative working capital by the end of the period. The Altman Z-score remained positive due to the company's market price-to-book value ratio, reflecting investor trust in the company's prospects. Despite low debtor collection periods, the company's EBIT improved, primarily due to production efficiency gains (Singh, 2020).

Company B
Company B represents a turnaround case, with improved working capital and current ratio, though the quick ratio remained unchanged, indicating more investment in inventories. The longer debtor collection period suggests a more liberal credit policy, although sales did not significantly increase. Despite a negative Z-score, the company's outlook improved due to better cost control (Mehta & Verma, 2021).

Company C
Company C had the healthiest financial profile, with strong working capital ratios, positive profit margins, and a stable Altman-Z score, indicating long-term sustainability (Gupta, 2019).

Company D
Company D showed an improved working capital situation and ratios. However, fluctuating sales and raw material costs affected the company's performance, leading to a decline in the Z-score. This reflected uncertainty in future sales, although lower raw material costs helped mitigate the decline (Nair & Sharma, 2021).

Analysing accounts from this perspective highlights how long-term sustainability and working capital performance are often linked to perceptions of prospects. Companies with stable growth are typically seen as having a healthy or improving working capital position (Bhattacharya, 2019).

Audit Observations Relating to Working Capital
Several significant audit observations related to working capital management have been highlighted in various reports. Some of the key observations are detailed below:

Performance Audit Relating to Government Companies
The Government of Kerala (GoK) introduced a scheme in 2006 to provide working capital assistance to the coir sector. Additionally, a debt revival package was implemented in the handloom sector by the Government of India (GoI) during the period 2012-13 to 2016-17. The audit reviewed the implementation of these schemes, and several observations were noted (Audit Report No. 5, 2017).

Working Capital Assistance for the Coir Sector

- The GoK provided working capital assistance to coir societies with objectives such as increasing working days to generate employment, boosting production, and strengthening the marketing network. Financial assistance ranging from ₹5.00 lakh to ₹7.50 lakh was provided based on viability assessments and project reports. Project offices were to review the performance of the societies quarterly.
- Between 2012-13 and 2016-17, assistance amounting to ₹10.58 crore was extended to 544 societies across Kerala. However, 21 of these societies, which received ₹81.94 lakh, later became defunct. In the Kayamkulam project office, 66 out of 128 societies, which received ₹1.59 crore in assistance, registered no significant increase in production, despite an increase in working days (Audit Report No. 5, 2017).
- In the Alappuzha project office, 21 of 25 yarn societies saw a decline in working days and production from 2012-13 to 2015-16. There was no system in place for quarterly reviews to monitor the societies' performance.
- GoK acknowledged the audit observations and stated that corrective measures were introduced, and a Project Management Unit would be constituted to monitor activities monthly. However, the audit concluded that the objectives of employment generation and increased production were not achieved satisfactorily (Audit Report No. 5, 2017).

Meghalaya Energy Corporation Limited (MeECL) and its Subsidiaries
Financial stability can be assessed by various financial ratios, one of which is the Current Ratio (Current Assets ÷ Current Liabilities).

The benchmark for this ratio is 2:1. The audit report noted that MeECL and its subsidiaries consistently failed to meet this benchmark from 2012-13 to 2016-17, with ratios falling below 1:1 for four out of five years (Audit Report, 2017). This indicated poor short-term liquidity and insufficient working capital, which hindered the companies' ability to meet their day-to-day financial obligations (Audit Report, 2017).

Chhattisgarh Road Development Corporation Limited
The audit noted a significant loss of ₹1.90 crore in interest income due to the company's failure to avail of the auto sweep facility in its bank accounts. The company held substantial funds ranging from ₹20.54 lakh to ₹100 crore in its accounts without taking advantage of this facility, which could have automatically converted surplus balances into fixed deposits, earning interest (Audit Report, 2017). After the audit observation, the company obtained the auto sweep facility in June 2017, but the loss of interest could have been avoided had it acted earlier (Audit Report, 2017).

Andhra Pradesh State Road Transport Corporation (APSRTC)
APSRTC approached SBI and HUDCO for a ₹400 crore loan to purchase buses. However, the corporation withdrew the funds prematurely and deposited them in short-term deposits at interest rates lower than the loan interest rate. This led to an avoidable interest burden of ₹4.52 crore. The audit noted that proper loan drawdown based on actual need could have prevented this financial loss (Audit Report No. 3, 2018).

Learning Points from Audit Observations

1. **Working Capital Assistance Should Be Performance-Based**: As seen in the Kerala Coir sector case, mere disbursement of funds without proper monitoring and performance metrics led to defunct societies and unachieved objectives. Working capital assistance should be tied to measurable outcomes (Audit Report No. 5, 2017).
2. **Importance of Maintaining Adequate Liquidity Ratios**: The Meghalaya energy sector example illustrates the risk of poor liquidity management. Power companies failed to maintain adequate liquidity, impacting their ability to meet short-term obligations (Audit Report, 2017).
3. **Maximizing Returns on Idle Funds**: The Chhattisgarh Road Development Corporation's loss due to not using the auto sweep facility shows the importance of effective financial management. Companies should ensure surplus funds are invested optimally (Audit Report, 2017).
4. **Avoid Borrowing Without Immediate Need**: The Andhra Pradesh State Road Transport Corporation's borrowing without immediate use of funds resulted in unnecessary interest costs, highlighting the need for better fund management (Audit Report No. 3, 2018).

Findings

1. **Company A** experienced a decline in working capital and faced liquidity problems, indicated by negative working capital by the end of the three years. However, it maintained a positive Altman Z-score, supported by strong investor confidence and operational efficiency.
2. **Company B** improved its working capital situation through better cost control, though it maintained a more liberal credit policy, resulting in longer debtor collection periods. Its quick ratio remained stagnant, indicating issues with inventory management.
3. **Company C** had the best financial health, reflected in strong working capital ratios, positive profit margins, and a stable Altman Z-score. This company was most efficient in managing liquidity and profitability.
4. **Company D** (data incomplete) showed mixed results in its financial indicators but struggled with liquidity issues due to high investments in inventories and slow debtor realization.

Suggestions

1. **Optimize Inventory Management:** Companies should employ strategies like Economic Order Quantity (EOQ), ABC analysis, and Just-in-Time (JIT) inventory systems to balance ordering and carrying costs, ensuring efficient stock levels.
2. **Improve Receivables Management:** Implementing stricter credit policies and prompt payment incentives can help reduce the debtor collection period, improving liquidity.
3. **Leverage Cash and Bank Management Tools:** Public sector units should adopt tools like the Miller-Orr model to manage cash flow effectively and avoid unnecessary reliance on overdrafts.
4. **Enhance Financial Ratios Monitoring:** Regular monitoring of financial ratios like the current ratio and quick ratio can provide early warnings of liquidity issues and help companies take corrective measures.
5. **Focus on Cost Control and Efficiency Gains:** Companies that focus on production efficiency and cost control, like Company A, can offset liquidity challenges by improving their EBIT margins.

CONCLUSION

This study highlights the importance of effective working capital management in ensuring the financial stability of public sector units. While some companies like Company C demonstrated sound working capital strategies that resulted in strong financial performance, others faced challenges due to inefficient inventory management and liberal credit

policies. To avoid liquidity crises, PSUs must adopt a balanced approach to managing current assets and liabilities, leveraging financial tools and techniques to optimize cash flows and minimize risks. Improved financial health, as reflected in positive Altman Z-scores and efficient working capital ratios, will contribute to the long-term sustainability of these entities.

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