SAP Implementation Impact of Working Capital on Inventory

Kuruganty Seetha Ram Babu¹, Dr. A. V. Satyanarayana², Dr. A. Prabhu Kumar³

¹Research Scholar JNTU Hyderabad, ²Professor Emeritus, Department of Business Management Osmania University, Hyderabad ³Director, School of Management Science, JNTUH, Hyderabad

Abstract—Global business domain is highly volatile and challenging for organizations to sustain and grow. Key strategy of any organization is generation of profits through efficient utilization of working capital. Effective management of inventory helps business firms to compete in the global marketplace, provided management uses reliable, centralized and secured computer systems. Inventory occupies the most strategic position in the working capital structure in any business enterprise, which constitutes the largest current asset component. The working capital turnover is largely governed by the inventory turnover, which helps the business growth.

Business information systems are always evolving in fulfillment of business requirements because of dynamic market place, evolving technology, innovation in products and marketing strategies. Organizations should implement supply Chain Management (SCM) for inventory optimization that supports reliable manufacturers in overcoming uncertainties faced in tight competitive environment. SAP Technology helps reducing inventory levels to a significant level without effecting production and sales. Integration of SAP and SCM enhances the return on investment of a business through reduced working capital.

Keywords—Working Capital management, SAP, Inventory, Pharmaceutical and

I. INTRODUCTION

Working Capital Management (WCM) is designed to showcase the efficient utilization of current assets and current liabilities for the company’s growth, profitability and liquidity. It determines the Return on Investment (ROI) and provides the working capital requirements at right time. WCM as a managerial accounting strategy ensures financial health and operational success of any business establishment. The working capital cycle (WCC) denotes amount of time taken to convert the net current assets and current liabilities into cash. The longer conversion cycle indicates inefficient management of working capital.

Working Capital = Current Asset – Current Liability

Inventory means a physical stock of goods kept in storage locations to meet the anticipated demand through production operations for satisfying the placed customer orders.

Every manufacturing firm should maintain sufficient stocks for regular and uninterrupted production schedule. The purpose of inventory management is to achieve a balance between the low inventory and high return on investment.

II. LITERATURE SURVEY

Working Capital Management (WCM): WCM plays a pivotal role in realizing the goals and objectives of any business establishment in carrying out all round activities with increased business growth and reduced risk, [1]. Corporate should manage working capital efficiently [2], which minimizes the potential debts of existing liabilities and current assets, hence decrease spending on the assets [3]. [4], clarify efficient working capital management involves planning and controlling of current assets and current liabilities as it influences both liquidity and profitability. Effective management of working capital increases the growth and profits of the firm. [5].

Working capital is used in daily firm activities like production operations, payment of short-term debts, interests, marketing and administrative activities and will be converted into cash or cash equivalents or assets within a year [6]. Working capital policy allocates appropriate funds for conducting firms’ required basic activities through management of current assets within the WCM policy framework, [7], 2008. [8], have conducted a study on the working capital management on pharmaceutical companies concluded that provisions are not sufficient.

Current Assets (CA) are used efficiently for day to day business activities. An asset that is constantly flowing in and out of the firm through business operations, as cash is used for procurement of raw materials which were converted into finished goods and then back to cash by sales in less than year is termed as current assets or circulating assets.

CA consists of cash and Bank balances, various inventory types including raw materials, work-in-progress and finished goods, receivables from debtors, readily realizable securities and tax reserve certificates.
Generally time taken for conversion of current assets components into cash is one year [9]. Current assets are reasonably expected to be realized into cash or consumed within a normal operating cycle [10]. Current Assets is also as floating asset or revenue asset since it is directly utilized in earning revenue [11]. Liquid investments are sometimes treated as current assets, as they realize within a year or at an early date. But if these investments are held as long term investment, they are termed as fixed assets or non-current assets [12].

Current Liabilities (CL) is either repayable or liquidated within a short period of time by using existing current assets resources or by the creation of similar current liabilities. List of Current liabilities, therefore, include, trade creditors, accounts payables including Bank Overdraft, cash credit to the extent of its excess over the minimum balances, short-term borrowings and certain other obligations including different provisions, i.e., provision for taxation, proposed dividend etc.

III. RESEARCH METHODOLOGY

A. Objectives

To analyze the performance of select pharmaceutical companies using working capital on inventory.

B. Hypothesis

Three pharmaceutical companies are selected which belong to pharmaceutical industry, that have implemented SAP and are located in Hyderabad were considered for the study.

Null Hypothesis (H0): There is no significant difference before and after implementation of SAP.
Alternate Hypothesis (H1): There is a significant difference before and after implementation of SAP.

C. Research Methodology

Sources of Data: Data drawn from the balance sheets of respective companies.

Software Used: The data analysis is carried out using SPSS 16.0 software.

D. Statistical Tools and Techniques

Paired t-test: The paired t-test is a statistical procedure confirms whether the mean difference between two sets of observations is zero, it is applied to evaluate the impact of implementation of SAP using inventory working capital, before and after implementation of SAP.

E. Variables of the Study

Inventory Working Capital Consists of Percentage of Inventory over Current Assets (PICA) and Percentage of Inventory over Current Liabilities (PICL).

Percentage of Inventory over Current Assets (PICA) Percentage of Inventory over Current Assets is calculated to know the portion of inventory in total current assets.

\[
PICA = \frac{\text{Inventory}}{\text{Current Assets}} \times 100
\]

Percentage of Inventory over Current Liabilities (PICL) Percentage of Inventory over Current Liabilities is calculated to know the portion of inventory over total current liabilities.

\[
PICL = \frac{\text{Inventory}}{\text{Current Liabilities}} \times 100
\]

F. Scope of Study

Scope of study is confined to 3 SAP Implemented Pharmaceutical companies.

Natco Data obtained from the annual reports of the NATCO Company and the data is considered for the analysis taking into consideration of 6 years before and 6 years after implementation of SAP. NATCO implemented SAP in 2011 hence the financial year 2011 is excluded from analysis.

Neuland Labs Data obtained from the annual reports of the Neuland Company and the data is considered for the analysis taking into consideration of 7 years before and 7 years after implementation of SAP. Neuland implemented SAP in 2010 hence the financial year 2010 is excluded from the analysis.

Dr Reddy Labs Data obtained from the annual reports of the Neuland Company and the data is considered for the analysis taking into consideration of 10 years before and 10 years after implementation of SAP. Reddy Labs implemented SAP in 2007 hence the financial year 2007 is excluded from the analysis.

IV. ANALYSIS OF INVENTORY WORKING CAPITAL

Calculations related to the working capital on inventory before and after implementation of SAP.
From the table 1, it is concluded that before and after implementation of SAP at NATCO there is a mixed trend in increase and decrease in the percentage of inventory to current assets (PICA) and a mixed trend in increase and decrease in the percentage of inventory to current liabilities (PICL).

<table>
<thead>
<tr>
<th>Year</th>
<th>D</th>
<th>PICA</th>
<th>PICL</th>
<th>Year</th>
<th>D</th>
<th>PICA</th>
<th>PICL</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>-1</td>
<td>58.770</td>
<td>79.548</td>
<td>2012</td>
<td>+1</td>
<td>37.705</td>
<td>42.576</td>
</tr>
<tr>
<td>2009</td>
<td>-2</td>
<td>32.431</td>
<td>80.300</td>
<td>2013</td>
<td>+2</td>
<td>43.844</td>
<td>42.331</td>
</tr>
<tr>
<td>2008</td>
<td>-3</td>
<td>35.872</td>
<td>85.589</td>
<td>2014</td>
<td>+3</td>
<td>49.199</td>
<td>57.989</td>
</tr>
<tr>
<td>2007</td>
<td>-4</td>
<td>30.323</td>
<td>74.603</td>
<td>2015</td>
<td>+4</td>
<td>45.549</td>
<td>53.179</td>
</tr>
<tr>
<td>2006</td>
<td>-5</td>
<td>29.079</td>
<td>77.496</td>
<td>2016</td>
<td>+5</td>
<td>42.688</td>
<td>72.460</td>
</tr>
<tr>
<td>2005</td>
<td>-6</td>
<td>25.886</td>
<td>81.197</td>
<td>2017</td>
<td>+6</td>
<td>32.089</td>
<td>55.690</td>
</tr>
</tbody>
</table>

Percentage of Inventory over Current Assets Ratio (PICA)
Percentage of Inventory over Current Liabilities Ratio (PICL)
Source: Compiled from the Company Balance Sheet
D is Distance from Before and After Implementation

From the table 2, it is concluded that before and after implementation of SAP at Neuland there is a mixed trend in increase and decrease in the percentage of inventory to current assets (PICA) and a mixed trend in decrease and increase in the percentage of inventory to current liabilities (PICL).

<table>
<thead>
<tr>
<th>Year</th>
<th>D</th>
<th>PICA</th>
<th>PICL</th>
<th>Year</th>
<th>D</th>
<th>PICA</th>
<th>PICL</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>-1</td>
<td>40.870</td>
<td>77.473</td>
<td>2011</td>
<td>+1</td>
<td>35.590</td>
<td>67.369</td>
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<tr>
<td>2008</td>
<td>-2</td>
<td>38.301</td>
<td>76.389</td>
<td>2012</td>
<td>+2</td>
<td>41.772</td>
<td>31.796</td>
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<tr>
<td>2007</td>
<td>-3</td>
<td>42.572</td>
<td>90.573</td>
<td>2013</td>
<td>+3</td>
<td>39.571</td>
<td>35.057</td>
</tr>
<tr>
<td>2006</td>
<td>-4</td>
<td>42.857</td>
<td>84.124</td>
<td>2014</td>
<td>+4</td>
<td>35.034</td>
<td>31.801</td>
</tr>
<tr>
<td>2005</td>
<td>-5</td>
<td>49.103</td>
<td>108.499</td>
<td>2015</td>
<td>+5</td>
<td>35.989</td>
<td>38.208</td>
</tr>
<tr>
<td>2004</td>
<td>-6</td>
<td>52.545</td>
<td>113.462</td>
<td>2016</td>
<td>+6</td>
<td>40.440</td>
<td>46.891</td>
</tr>
<tr>
<td>2003</td>
<td>-7</td>
<td>48.121</td>
<td>131.023</td>
<td>2017</td>
<td>+7</td>
<td>37.196</td>
<td>44.879</td>
</tr>
</tbody>
</table>

Percentage of Inventory over Current Assets (PICA)
Percentage of Inventory over Current Liabilities Ratio (PICL)
Source: Compiled from the Company Balance Sheet
D is Distance from Before and After Implementation
From the table 3 it is concluded that before and after implementation of SAP at Reddy labs there is a mixed trend in decrease and increase in the percentage of inventory over current assets and a mixed trend in increase and decrease in the percentage of inventory over current liabilities.
V. ANALYSIS OF PAIRED T-TEST

To study the impact of implementation of SAP, the components of inventory working capital were analyzed from the perspective of before and after implementation of SAP using paired t-test.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>t-value</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>PICA</td>
<td>Before</td>
<td>3.53935E1</td>
<td>11.928466</td>
<td>-1.142</td>
</tr>
<tr>
<td></td>
<td>After</td>
<td>4.18457E1</td>
<td>6.079913</td>
<td></td>
</tr>
<tr>
<td>PICL</td>
<td>Before</td>
<td>7.97888E1</td>
<td>3.690369</td>
<td>5.233</td>
</tr>
<tr>
<td></td>
<td>After</td>
<td>5.40375E1</td>
<td>11.197131</td>
<td></td>
</tr>
</tbody>
</table>

NATCO PICA The results of after applying paired t-test are presented in the table 4, where PICA mean before SAP implementation is 3.53935E1 and after implementation is 4.18457E1, which shows a rise in PICA mean value after SAP implementation, thereby indicating increased production to meet demand, hence leading to more working capital investment in inventory. The PICA standard deviation before implementation of SAP is 11.928466 and after implementation is 6.079913, which shows a decrease in the standard deviation of PICA after implementation of SAP showing increased sales and profits. The t-value is -1.142 and the p-value is 0.305. As the p-value is more than 0.05, the null hypothesis is accepted. Hence, it is inferred that the percentage of inventory to current assets before and after implementation of SAP, the difference is not significant.

NATCO PICA is high which indicates less qualitative current assets and large inventory volume with increased inventory holding costs, hence decreased profits. Higher percentage of inventory to current assets can be taken as a sign of poor inventory management, with decreased liquidity position and efficient usage of working capital.

NATCO PICL The results after applying paired t-test are presented in the table 4, where PICL mean before SAP implementation is 7.97888E1 and after implementation is 5.40375E1, which shows a decrease in the mean value of PICL after implementation of SAP, thereby, indicating an increase in liquidity position to meet the short term obligations. The PICL standard deviation before implementation of SAP is 3.690369 and after implementation is 11.197131, which shows an increase in the standard deviation of PICL after implementation of SAP showing efficiency of meeting short term obligations. The t-value is 5.233 and the p-value is 0.003. As the p-value is less than 0.05, the null hypothesis is rejected.
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Hence, it is inferred that the percentage of inventory to current liabilities before and after implementation of SAP, the difference is significant.

NTACO PICL is high which indicates good working capital position and efficient management of the short term obligations.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Before</th>
<th>After</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>t-value</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>PICA</td>
<td>4.490999E1</td>
<td>3.79417E1</td>
<td>5.096838</td>
<td>2.643282</td>
<td>3.130</td>
<td>0.020</td>
</tr>
<tr>
<td>PICL</td>
<td>9.73633E1</td>
<td>4.22730E1</td>
<td>20.708613</td>
<td>12.553158</td>
<td>6.057</td>
<td>0.001</td>
</tr>
</tbody>
</table>

**Table V**

Neuland PICA The results after applying paired t-test are presented in the table 5, where percentage of inventory over current assets mean before SAP implementation is 4.490999E1 and after implementation is 3.79417E1, which shows a decrease in the mean value of PICA after implementation of SAP, thereby indicating efficient production. The PICA standard deviation before implementation of SAP is 5.096838 and after implementation is 2.643282, which shows a decrease in the standard deviation of PICA after implementation of SAP showing increased sales and profits. The t-value is 3.130 and the p-value is 0.020. As the p-value is less than 0.05, the null hypothesis is rejected. Hence, it is inferred that the percentage of inventory to current assets before and after implementation of SAP, the difference is significant.

Neuland PICL is low which indicates more qualitative current assets and have small volume and decreased cost of inventory holding and hence increased profit. Lower percentage of inventory to current assets can be taken as a sign of good inventory management with increased liquidity position and efficient usage of working capital.

**Table VI**

Dr Reddy labs PICA The results after applying paired t-test are presented in the table 6, where percentage of inventory over current assets mean before SAP implementation is 2.48127E1 and after implementation is 2.99690E1, which shows a rise in PICA mean value after SAP implementation, thereby indicating increased production to meet demand, hence leading to more working capital investment in inventory. The PICA standard deviation before implementation of SAP is 5.218663 and after implementation is 7.601515, which shows an increase in the standard deviation of PICA after implementation of SAP meeting the increased sales. The t-value is -1.932 and the p-value is 0.085. As the p-value is more than 0.05, the null hypothesis is accepted. Hence, it is inferred that the percentage of inventory to current assets before and after implementation of SAP, the difference is not significant.

Reddy labs PICL is high which indicates less qualitative current assets and increased cost of inventory holding and hence decreased profits. High percentage of inventory to current assets can be taken not as a sign of good inventory management, inefficient usage of working capital and poor liquidity position.

Dr Reddy labs PICL The results after applying paired t-test are presented in the table 6, where PICL mean before SAP implementation is 8.45980E1 and after implementation is 5.11721E1, which shows a decrease in the mean value of PICL after implementation of SAP, thereby indicating increase in liquidity position to meet short term obligations. The PICL standard deviation before implementation of SAP is 29.136402 and after implementation is 21.147844, which shows a decrease in the standard deviation of PICL after implementation of SAP showing efficiency in utilization of working capital. The t-value is 2.423 and the p-value is 0.038. As the p-value is less than 0.05, the null hypothesis is rejected.
Hence, it is inferred that the Percentage of inventory over current liabilities before and after implementation of SAP, the difference is significant.

Reddy labs PICL is high which indicates good working capital position and efficient management of the short term obligation.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Significant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Company</td>
<td>NATCO</td>
</tr>
<tr>
<td>PICA</td>
<td>No</td>
</tr>
<tr>
<td>PICL</td>
<td>Yes</td>
</tr>
</tbody>
</table>

SAP implementation brought remarkable improvement with NATCO both PICA is insignificant and PICL is significant, Neuland both PICA and PICL are significant and Dr Reddy Labs both PICA is insignificant and PICL is significant,

VI. CONCLUSION

Working capital and inventory are important components in daily operations, hence carries business importance in both internal and external environment. Every business need long term and short term funds. WCM is also known as revolving or circulating capital and is essential for any business to succeed.

Any change in working capital on inventory will influence the business cash flows where a positive change indicates paid out cash. An increase in inventory will have a negative effect on the business working capital holding. However, decrease in inventory will have a negative effect on the business. Efficiency of the working capital depends on how effectively Inventory management is held and used.

REFERENCES