The importance of Working Capital in an industry cannot be overstressed. It is one of the important causes of success or failure in an industry. This case studies a concrete example and makes certain suggestions for the consideration of the management of the company.

Whatever be the size of a business, working capital is its life blood. The funds needed to carry out the day to day operations of a business, for the purchase of raw materials, payment of wages and other such expenses, constitute working capital. For running a business successfully, an adequate amount of working capital is a sine qua non. A business firm bedeviled with a shortage of working capital will be technically insolvent. The liquidity of a business is also one of the key factors determining its propensity to success or failure.¹

Justification for the Study

In India, paucity of working capital has become a chronic disease in the industrial sector. This calls for a systematic and integrated approach towards utilising a company’s assets with maximum efficiency. In recent times, a few case studies regarding the management of working capital in some companies belonging to selected industries have been made by different authors. The object of these case studies was to make an in-depth analysis of different aspects of the working capital management of these companies. The findings of these studies not only throw light on technical weaknesses in the managerial activities of the companies, but also help scholars and researchers to develop new ideas, techniques and methods in respect of the management of working capital.

With this end in view, an effort has been made in this article to make an indepth study of a cooperative sugar factory in Tamil Nadu, in respect of its performance and its working capital management.

In India, paucity of working capital has become a chronic disease in the industrial sector. This calls for a systematic and integrated approach towards utilising the company’s assets with maximum efficiency.
Data and Methodology

For this study, one major cooperative sugar factory namely the National Sugar Mills, Madurai has been purposively selected. The period of study covers five years, 1984-85 to 1989-90. The study covers mainly the following aspects (i) working capital analysis (ii) financing working capital and (iii) its impact on profitability. The data for the study was collected from the annual reports of the selected company. Statistical techniques namely co-efficient of correlation and multiple regression are used for analysing the data.

Working Capital Analysis

In Table 1 a component wise analysis of the company’s working capital has been made so as to trace the factors responsible for the significant changes in it. From the table it is evident that on an average 45.28 per cent of the total assets of the company are current assets. This signifies that during this period the major portion of the total investment of the company has been made on the working capital. The share of current assets out of total assets which was 46.48 per cent in 1987-89, decreased to 38.59 per cent in 1989-90. A component wise analysis of the working capital was done to trace the factors responsible for the significant changes in different years. From the table it is evident that the two components namely Inventory and Receivables contributed an average of 69 per cent and 18.22 per cent respectively towards the gross working capital,

Table 1: Components of Working Capital

<table>
<thead>
<tr>
<th>Particulars</th>
<th>1984-85</th>
<th>85-86</th>
<th>86-87</th>
<th>87-89</th>
<th>89-90</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inventory</td>
<td>314.13</td>
<td>376.24</td>
<td>298.57</td>
<td>605.16</td>
<td>702.20</td>
</tr>
<tr>
<td></td>
<td>(63.65)</td>
<td>(72.00)</td>
<td>(62.83)</td>
<td>(70.12)</td>
<td>(76.38)</td>
</tr>
<tr>
<td>Receivables</td>
<td>117.20</td>
<td>71.26</td>
<td>87.38</td>
<td>158.56</td>
<td>155.67</td>
</tr>
<tr>
<td></td>
<td>(23.75)</td>
<td>(13.64)</td>
<td>(18.39)</td>
<td>(18.37)</td>
<td>(16.93)</td>
</tr>
<tr>
<td>Cash</td>
<td>6.37</td>
<td>52.53</td>
<td>55.59</td>
<td>57.33</td>
<td>21.95</td>
</tr>
<tr>
<td></td>
<td>(01.29)</td>
<td>(10.05)</td>
<td>(11.70)</td>
<td>(06.65)</td>
<td>(02.39)</td>
</tr>
<tr>
<td>Other CA</td>
<td>55.81</td>
<td>22.44</td>
<td>33.69</td>
<td>41.92</td>
<td>39.57</td>
</tr>
<tr>
<td></td>
<td>(11.31)</td>
<td>(04.31)</td>
<td>(04.86)</td>
<td>(07.08)</td>
<td>(04.30)</td>
</tr>
<tr>
<td>Gross working Capital</td>
<td>493.51</td>
<td>522.44</td>
<td>475.23</td>
<td>862.97</td>
<td>919.39</td>
</tr>
<tr>
<td></td>
<td>(100)</td>
<td>(100)</td>
<td>(100)</td>
<td>(100)</td>
<td>(100)</td>
</tr>
<tr>
<td>Ratio of CA to TA</td>
<td>46.48</td>
<td>47.36</td>
<td>40.66</td>
<td>53.29</td>
<td>38.59</td>
</tr>
</tbody>
</table>

Figures in parenthesis denote percentage to total
Sources: Computed from Annual reports

Financing of Working Capital

In Table 2, an attempt has been made to explain the relative importance of long term and short-term debt in financing working capital. The table reveals that the percentage of long-term funds used for financing working capital has shown a decreasing trend during the study period except in 1987-89. It decreased from 38.26 per cent in 1984-85 to 27.28 per cent in 1989-90. This decreasing trend shows that National Sugars utilised its long term funds more effectively by investing them in the fixed assets.
**Table 2: Financing of Working Capital**

<table>
<thead>
<tr>
<th>Particulars</th>
<th>1984-85</th>
<th>85-86</th>
<th>86-87</th>
<th>87-89</th>
<th>89-90</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross Working Capital</td>
<td>493.51</td>
<td>522.47</td>
<td>475.23</td>
<td>862.97</td>
<td>919.39</td>
</tr>
<tr>
<td>Sources of Working Capital</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. L.T. Funds</td>
<td>352.18</td>
<td>298.43</td>
<td>274.38</td>
<td>474.72</td>
<td>562.88</td>
</tr>
<tr>
<td>b. S. T. Funds</td>
<td>141.33</td>
<td>224.04</td>
<td>200.85</td>
<td>388.25</td>
<td>356.51</td>
</tr>
<tr>
<td>Total Long term funds</td>
<td>920.41</td>
<td>879.21</td>
<td>967.92</td>
<td>1231.12</td>
<td>2026.11</td>
</tr>
<tr>
<td>% of L.T.Funds used for financing working capital</td>
<td>38.26</td>
<td>23.94</td>
<td>28.35</td>
<td>38.56</td>
<td>27.78</td>
</tr>
</tbody>
</table>

*Sources: Computed from Annual reports*

**Working Capital Estimation and the Resultant Variations**

In Table 3, an estimation of the working capital requirements of the company on the basis of simple regression technique was made; variations between actual and estimated working capital have been found out and the variation has been tested with the help of the most popular Chi-square test.

The linear regression formula used is \( Y = a + bx \), where \( Y \) is working capital, \( X \) is sales, \( b \) is rate of growth in working capital, \( a \) is the intercept of the line on the \( y \) axis i.e. the amount of working capital required when sales are nil. The Chi-square formula used is \( x^2 = (O-E)^2/E \) where \( O \) is the actual working capital and \( E \) is the expected working capital.

The table shows that, except in 1984-85 and 1989-90, there was a shortage of working capital. In 1985-86, there was a shortage of Rs.65.23 lakhs which increased to Rs.107.70 lakhs in 1986-87 and decreased to 18.02 lakhs in 1987-89. The table value of the Chi-square test at 5% significant level is 9.49 which is far below the calculated chi-square value, i.e. 117.38. This signifies that the difference between estimated and actual working capital is expressive.

**Table 3: Estimation of Working Capital Requirements**

<table>
<thead>
<tr>
<th>Year</th>
<th>Actual Working Capital (O)</th>
<th>Estimated Working Capital (E)</th>
<th>Excess Working Capital</th>
<th>Shortage W. Capital</th>
<th>(O-E)^2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1984-85</td>
<td>352.18</td>
<td>330.98</td>
<td>21.20</td>
<td>-</td>
<td>1.36</td>
</tr>
<tr>
<td>1985-86</td>
<td>298.43</td>
<td>363.66</td>
<td>-</td>
<td>65.23</td>
<td>11.70</td>
</tr>
<tr>
<td>1986-87</td>
<td>274.38</td>
<td>382.08</td>
<td>-</td>
<td>107.70</td>
<td>30.36</td>
</tr>
<tr>
<td>1987-89</td>
<td>474.72</td>
<td>492.74</td>
<td>-</td>
<td>18.02</td>
<td>0.66</td>
</tr>
<tr>
<td>1989-90</td>
<td>562.88</td>
<td>393.13</td>
<td>169.75</td>
<td>-</td>
<td>73.30</td>
</tr>
</tbody>
</table>

*Table Value of Chi-Square (X^2) with (n-1) i.e., 4 degree of freedom at 0.05 level is 9.49*
The table shows that, except in 1984-85 and 1989-90, there was a shortage of working capital. In 1985-86, there was a shortage of Rs. 65.23 lakhs which increased to Rs. 107.70 lakhs in 1986-87 and decreased to 18.02 lakhs in 1987-89.

Impact of Working Capital on Profitability

In order to judge the liquidity position and its impact on profitability, it is necessary to analyse the different working capital ratios as exhibited in Table 4.

It appears from the table that the current ratio of National Sugars has moved between 2.22:1 to 3.49:1 during the period of study. On an average, it stands at 2.60:1 for the entire period. Conventionally, a standard of 2.1 is considered satisfactory. It is thus, discerned that the liquidity of National Sugars, as measured by the current ratio, is satisfactory. This signifies that the margin of safety available to short-term creditors is relatively high i.e. for every rupee of current liability the cushion available is Rs.1.60. The co-efficient of correlation between the profitability ratio and the current ratio of National Sugars is +0.667. This indicates that there is a high degree of positive correlation between the two variables. At a 5% level of significance, the value of the co-efficient of correlation is found to be not significant.

The quick ratio of the industry has moved between 0.60:1 to 1.27:1 during the entire period of study which is moderately good, as compared to the standard norm of 1:1. The co-efficient of correlation between the profitability ratio and the quick ratio stands at +0.837. This indicates that there is a high degree of positive correlation between the two variables. The value is also found to be significant at a 5% level of significance. The correlation between profitability ratio and working capital turnover ratio and profitability ratio and receivables turnover ratio indicates

Table 4: Impact of Working Capital on Profitability

<table>
<thead>
<tr>
<th>Year</th>
<th>CR</th>
<th>LR</th>
<th>WTR</th>
<th>ITR</th>
<th>RTR</th>
<th>CTR</th>
<th>PBT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1984-85</td>
<td>3.49</td>
<td>1.27</td>
<td>2.75</td>
<td>3.08</td>
<td>8.25</td>
<td>151.85</td>
<td>9.19</td>
</tr>
<tr>
<td>1985-86</td>
<td>2.33</td>
<td>0.65</td>
<td>3.88</td>
<td>3.08</td>
<td>16.27</td>
<td>22.07</td>
<td>5.52</td>
</tr>
<tr>
<td>1987-89</td>
<td>2.22</td>
<td>0.66</td>
<td>4.04</td>
<td>3.17</td>
<td>12.10</td>
<td>33.46</td>
<td>2.31</td>
</tr>
<tr>
<td>1989-90</td>
<td>2.58</td>
<td>0.60</td>
<td>2.37</td>
<td>1.90</td>
<td>8.56</td>
<td>60.72</td>
<td>-0.40</td>
</tr>
</tbody>
</table>

Co-efficient of correlation

| (r) + Value | 0.667 | 0.837 | 0.060 | 0.417 | 0.043 | 0.587 |
|            | (1.552) | (2.652) | (0.105) | (0.795) | (0.074) | (91.256) |

CR-Current ratio; LR-Liquid ratio; WTR-Working Capital Turnover ratio; ITR-Inventory Turnover ratio; RTR-Receivables Turnover ratio; CTR-Cash Turnover ratio; PBT-Profit before tax to Sales.

* Significant at 0.05 level Source: Computed
a low positive correlation coefficient of 0.60 and 0.043 respectively. At a 5% level of significance, this is not found to be significant. The correlation between profitability ratio and inventory turnover ratio and profitability ratio and cash turnover ratio indicates a moderate positive correlation coefficient of 0.417 and 0.587 respectively. At a 5% level of significance, this is also found to be significant.

**Multiple Regression Model**

To estimate the impact of various working capital ratios namely current ratio, liquid ratio and working capital turnover ratio on profit before tax, the following functional relationship is formulated.

\[
PBT = \beta_0 + \beta_1 CR + \beta_2 LR + \beta_3 WTR
\]

where, \(PBT\) represents profit before tax, \(CR\) is the current ratio, \(LR\) is the liquid ratio, \(WTR\) indicates working capital turnover ratio and \(\beta_0, \beta_1, \beta_2, \beta_3\) are relevant parameters of the multiple regression model (Table 5).

The estimated coefficient of multiple determination \((R^2)\) exhibits 99 per cent of variations in \(PBT\) in the National Sugar Mills which has been explained by those three ratios during the study period.

The coefficient of regression between the profitability ratio and the current ratio is computed at 0.468. This implies that one unit increase or decrease in \(CR\) will cause 0.468 units increase or decrease in profitability. Further this coefficient is found to be statistically significant at a 5% level in accordance with the 't' test. The coefficient of regression between the profitability ratio and the quick ratio is computed at -0.572 which implies that one unit increase in liquid ratio would decrease the \(PBT\) by 0.572 units and this coefficient is statistically valid at a 5% level of significance. Similarly, the coefficient of regression between the profitability ratio and the working capital turnover ratio is computed at 0.135 which implies that one unit increase in the working capital turnover ratio would increase the \(PBT\) by 0.135 units and this coefficient is also statistically valid at a 5% level of significant. The calculated value of 'F' is found to be greater than the table value at a 5% level which implies that the model is perfectly fit. Regarding the estimated value of the D-W statistics, the existence of an auto correlation is completely ruled out in the model.

**Table 5: Multiple Regression Results**

<table>
<thead>
<tr>
<th>Company</th>
<th>Regression constant (\beta_0)</th>
<th>Coefficient of CR</th>
<th>Coefficient of LR</th>
<th>Coefficient of WTR</th>
<th>(R^2)</th>
<th>'F' value</th>
<th>D.W. statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>National Sugars</td>
<td>-1.189</td>
<td>0.468</td>
<td>-0.572</td>
<td>0.135</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(PBT = \beta_0 + \beta_1 CR + \beta_2 LR + \beta_3 WTR)</td>
<td>(0.116)</td>
<td>(0.049)</td>
<td>(0.072)</td>
<td>(0.013)</td>
<td>0.997*</td>
<td>119.79</td>
<td>3.244</td>
</tr>
<tr>
<td></td>
<td>(t=10.24^*)</td>
<td>(t=9.61^*)</td>
<td>(t=7.99^*)</td>
<td>(t=10.07^*)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

CR—Current ratio; LR—Liquid ratio; WTR—Working Capital Turnover ratio; PBT—Profit before tax; D.W. Statistics—Durbin Watson Statistics

* Significant at 5% level Figures in parantheses denote standard error of the estimates.
The coefficient of regression between the profitability ratio and the current ratio is computed at 0.468. This implies that one unit increase or decrease in CR will cause 0.468 units increase or decrease in profitability.

Comments

1. The average percentage of current assets to total assets is 45.28 which indicates that the company has made investment in working capital following a moderate approach.

2. Of the components of working capital, Inventory (69 per cent) and Receivables (18.22 per cent) are the dominant contributory causes for the galloping increase in working capital.

3. The decreasing trend of long-term funds used for financing the working capital shows that the mill has to utilise its long-term funds more effectively by investing them in fixed assets.

4. The company has experienced either excess or shortage of working capital in all the years under study. Except in 1984-85 and 1987-89, in all the other years, major discrepancies between the actual and the estimated working capital were noticed.

5. The liquidity position of the National Sugars is satisfactory during the study period. The two liquidity ratios, current ratio and quick ratio, remained equal or above the standard norms throughout the study periods.

6. The impact of working capital ratios on profitability showed both negative and positive impacts.

7. With the help of a multiple regression model, it is estimated that one unit increase in current ratio would increase the profit before tax by 0.468 units and this is statistically valid at a 5% level of significance.

Conclusion

The above study generally indicates a moderate trend in the financial position and the utilisation of working capital. Variations in working capital size should be avoided and correct estimation and maintenance should be made. Attempts should also be made to use funds more effectively, by keeping an optimum level of working capital, neither more nor less. Keeping more current assets causes a reduction in profitability. The impact of working capital on profitability shows a mixed trend indicating both positive and negative trends. Efforts should be made to ensure a positive trend in the estimation and maintenance of the working capital.

References


Mr. A. Vijay Kumar  
Lecturer in Commerce  
Erode Arts College  
Erode,  
Tamil Nadu

Dear

There is a dire need of a book on working capital management wherein views, analysis and research of leading experts in the field may be presented to benefit the readers, students and those who are interested in the subject.

Accordingly, I have planned to edit a book on the subject together with one of my colleagues from the IIF. The book would be published by Indian Institute of Finance. It would also be used as a prescribed book for IIF students pursuing post graduate programmes.

I am glad to inform you that your well-written article entitled 'Working Finance in National Cooperative Sugar Mills Ltd., Tamil Nadu -- A Case Study' published in the Management and Labour Studies, Vol. 19, No. 2, April 1994, has been selected to be included in the book.

I would like to request you to kindly grant me necessary permission to include your article in the above referred book of readings. The book will benefit a large number of readers as well as your goodself. You would be entitled to two complementary copies of the book.

I look forward for your kind and positive response.

With regards,

Yours sincerely,

J. D. Agarwal
In developing countries like India, capital is the scarce productive resources and its proper utilisation promotes the rate of growth, cuts down the cost of production and improves the efficiency of the productive system. Total capital of a country comprises of fixed capital and working capital. Fixed capital investments generates production capacity possible whereas working capital renders the utilisation of that capacity possible. Working capital is the life blood of every business irrespective of its sizes. For running a business successfully, adequate amount of working capital is a sine qua non. At the same time, the liquidity of a business is one of the key factors determining its prosperity to success or failure.

JUSTIFICATION FOR THE STUDY

In India, paucity of working capital has become a chronic disease in the industrial sector which calls for a systematic and
integrated approach towards utilising the company's assets with maximum efficiency. In recent times case studies were carried out in the management of working capital in selected industries by different authors. The objects of these studies were to make an indepth analysis of different aspects of working capital management in these companies. The findings of such studies not only help to solving the problem but also enable the research scholars to have new perspective and insights into techniques and methods.

With this end in view, an effort has been made in this article to have an indepth study of Co-operative Sugar Industry in Tamil Nadu in respect of its Performance of Working Capital and Management.

DATA AND METHODOLOGY

For this study, one major co-operative sugar industry, namely Salem Sugar Mills, Mohanur, Salem (Dt) has been selected purposively. The period of study covers five years, i.e., 1984-85 to 1989-90. The study covers mainly the following aspects: (1) Working capital analysis, (2) Financing Working capital, and (3) its impact on the Profitability. The data for the study are collected from the annual reports of the selected industry. The statistical techniques, namely, coefficient of correlation and multiple regression are used for analysing the data.

WORKING CAPITAL ANALYSIS

From Table 1 it is evident that on an average, more than two-third of the total assets of the company, i.e. 66.60 Per cent are current assets. It signifies that during this period the major portion of the total investment of the company has been made for working purpose. Component-wise analysis of working capital has been done to make an attempt to trace out the factor's responsible for the significant changes in working capital for different years. From the table it is evident that of the four components except "other current assets" which accounted for only 1.80 per cent of gross working capital, the other two components, namely "inventory" and "receivables" contributed 44.68 and 24.88 per cent towards gross working capital.
where as the last one, i.e., cash, contributed 28.63 per cent towards the gross working capital.

| Table 1 |
| Components of Working Capital of Salem Sugar |

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Inventory</td>
<td>388.39</td>
<td>659.42</td>
<td>490.53</td>
<td>111.52</td>
<td>848.77</td>
</tr>
<tr>
<td></td>
<td>(39.35)</td>
<td>(52.12)</td>
<td>(37.59)</td>
<td>(56.23)</td>
<td>(38.10)</td>
</tr>
<tr>
<td>Receivables</td>
<td>330.27</td>
<td>355.08</td>
<td>287.28</td>
<td>299.44</td>
<td>571.85</td>
</tr>
<tr>
<td></td>
<td>(33.46)</td>
<td>(38.07)</td>
<td>(22.07)</td>
<td>(15.15)</td>
<td>(25.67)</td>
</tr>
<tr>
<td>Cash</td>
<td>251.19</td>
<td>231.76</td>
<td>500.15</td>
<td>324.34</td>
<td>759.63</td>
</tr>
<tr>
<td></td>
<td>(25.45)</td>
<td>(18.32)</td>
<td>(38.33)</td>
<td>(60.32)</td>
<td>(34.10)</td>
</tr>
<tr>
<td>Other CA</td>
<td>17.20</td>
<td>18.89</td>
<td>26.97</td>
<td>32.43</td>
<td>47.43</td>
</tr>
<tr>
<td></td>
<td>(1.74)</td>
<td>(1.49)</td>
<td>(2.01)</td>
<td>(1.65)</td>
<td>(2.13)</td>
</tr>
<tr>
<td>Gross Working</td>
<td>987.05</td>
<td>1265.15</td>
<td>1304.93</td>
<td>1976.54</td>
<td>2227.69</td>
</tr>
<tr>
<td>Capital</td>
<td>(100)</td>
<td>(100)</td>
<td>(100)</td>
<td>(100)</td>
<td>(100)</td>
</tr>
<tr>
<td>Ratio of current assets to total assets</td>
<td>59.51</td>
<td>65.70</td>
<td>64.39</td>
<td>71.82</td>
<td>71.62</td>
</tr>
</tbody>
</table>

*Notes*: Figures in parentheses denote percentage to Total.
*Source*: Annual reports of the Mill.

**FINANCING OF WORKING CAPITAL.**

In Table 2, an attempt has been made to explain the relative importance of long-term and short-term debt in working capital. From the table it reveals that percentage of long-term funds used for financing working capital has shown a continuous upward trend during the study period. It increased from 35.51 per cent in the year 1984-85 to 55.57 per cent in the year 1989-90. This raising trend speaks of the increasing dominance of long-term funds as source of working capital than short-term funds.
TABLE 2
Financing of Working Capital

(Rs. in Lakhs)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Gross working capital</td>
<td>987.05</td>
<td>1265.15</td>
<td>1304.93</td>
<td>1976.54</td>
<td>2227.69</td>
</tr>
<tr>
<td>(2) Source of working capital</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(a) Long-term</td>
<td>363.72</td>
<td>493.48</td>
<td>548.99</td>
<td>819.52</td>
<td>1104.03</td>
</tr>
<tr>
<td>(b) Short-term</td>
<td>623.33</td>
<td>771.67</td>
<td>755.94</td>
<td>1157.02</td>
<td>1123.66</td>
</tr>
<tr>
<td>(3) Total long-term funds</td>
<td>1024.35</td>
<td>1135.84</td>
<td>1270.56</td>
<td>1595.07</td>
<td>1986.59</td>
</tr>
<tr>
<td>(4) % of long-term funds used for financing working capital</td>
<td>35.51</td>
<td>42.77</td>
<td>43.21</td>
<td>51.38</td>
<td>55.57</td>
</tr>
</tbody>
</table>

Source: Annual reports of the Mill.

IMPACT OF WORKING CAPITAL ON PROFITABILITY

In order to judge the liquidity position and its impact on profitability, it is necessary to analyse the different working capital ratio's as exhibited in Table 3. The working capital ratio's in the present study consists of Current Ratio (CR), Liquid Ratio (LR), Working Capital Turnover Ratio (WTR), Inventory Turnover Ratio (ITR), Receivables Turnover Ratio (RTR) and Cash Turnover Ratio (CTR).

It appears from the table that the current ratio of Salem Sugars has moved between 1.58:1 to 1.98:1 during the period of study. On an average, it stands at an average of 1.73:1 for the entire period. As a convention, a standard of 2:1 is considered satisfactory. It is discorded that the liquidity of Salem Sugars as measured by current ratio is satisfactory. The co-efficient of correlation between profitability ratio and current ratio of Salem Sugars is — 0.108. It indicates that there is a low degree of negative correlation between the two variables and found to be not significant at 5% level.
## Impact of Working Capital on Profitability

<table>
<thead>
<tr>
<th>Year</th>
<th>Working Capital Ratio's</th>
<th>Profit before tax to sales</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CR</td>
<td>LR</td>
</tr>
<tr>
<td>1984-85</td>
<td>1.58</td>
<td>0.95</td>
</tr>
<tr>
<td>1985-86</td>
<td>1.64</td>
<td>0.78</td>
</tr>
<tr>
<td>1986-87</td>
<td>1.73</td>
<td>1.07</td>
</tr>
<tr>
<td>1987-89</td>
<td>1.71</td>
<td>0.74</td>
</tr>
<tr>
<td>1989-90</td>
<td>1.98</td>
<td>1.22</td>
</tr>
</tbody>
</table>

Co-efficient of correlation (r) —0.108 +0.096 —0.656 —0.431 —0.924 —0.494 —

' t' Value (—0.188) (0.166) (—1.505) (—0.828) (—4.197) (—0.983) —

Note: Figures in parentheses denote calculated ' t' value.

* Significant at 5% level of significance.

Source: Computed.

The standard norm of current ratio (2:1) may vary from industry to industry. Hence, the current ratio is not a conclusive index of the real liquidity of a firm. It needs an additional analysis of the quality of current assets. This is done by examining Liquid ratio. Quick ratio has moved between 0.74:1 to 1.22:1 during the entire period of study which is more or less equal and above the standard norm of 1:1. The co-efficient of correlation between profitability ratio and quick ratio stands at +0.096. The value is also found to be insignificant at 5% level.

Thirdly, the correlation between profitability ratio and working capital turnover ratio indicates a high degree of negative correlation of — 0.656 and found to be not significant. Fourthly, the co-efficient of correlation between profitability and Inventory Turnover ratio is —0.431. This is also insignificant at 5% level. Fifthly, the co-efficient of correlation between profitability ratio and receivables Turnover ratio is found at — 0.924 which is found to be significant at 5% level of significance. Lastly, the co-efficient of correlation between Profitability ratio and Cash Turnover ratio indicates a moderate degree of negative correlation of — 0.494 which is also found to be insignificant at 5% level.
MULTIPLE REGRESSION MODEL

In order to estimate the impact of various working capital ratio’s, namely current ratio, Liquid ratio and working capital Turnover Ratio on profit before tax, the following functional relationship is formulated:

\[ PBT = \beta_0 + \beta_1 \text{CR} + \beta_2 \text{LR} + \beta_3 \text{WTR} \]

where \( PBT \) represents Profit before tax, \( \text{CR} \) be the current ratio, \( \text{LR} \) be the Liquid ratio, \( \text{WTR} \) indicates the working capital Turnover ratio and \( \beta_0, \beta_1, \beta_2, \beta_3 \) are relevant parameters of the multiple regression model.

### Table 4
Regression Estimate of Working Capital on Profitability

<table>
<thead>
<tr>
<th>Companies</th>
<th>( \beta_0 )</th>
<th>( \beta_1 )</th>
<th>( \beta_2 )</th>
<th>( \beta_3 )</th>
<th>( R^2 )</th>
<th>F Value</th>
<th>D.W. Statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salem Sugars</td>
<td>+0.478</td>
<td>-0.159</td>
<td>0.028</td>
<td>-0.046</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PBT = \beta_0 + \beta_1 \text{CR} + \beta_2 \text{LR} + \beta_3 \text{WTR}</td>
<td>(0.021)</td>
<td>(0.010)</td>
<td>(0.007)</td>
<td>(0.002)</td>
<td>0.992</td>
<td>172.40</td>
<td>2.094</td>
</tr>
<tr>
<td>+\beta_1 \text{LR} + \beta_3 \text{WTR}</td>
<td>t=23.02</td>
<td>t=15.98</td>
<td>t=4.23</td>
<td>t=21.91</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\( PBT = \) Profit before tax, \( \beta_0 = \) Regression constant, \( \beta_1 = \) Co-efficient of current ratio (CR), \( \beta_2 = \) Co-efficient of Liquid ratio (LR), \( \beta_3 = \) Co-efficient of working capital Turnover ratio (WTR).

Figures in Parentheses indicate the standard errors of the parameters.

D.W. Statistic—Durbin Watson Statistic (for testing Auto-Correlation).

* Significant at 5% level.

Source: Computed.

The estimated co-efficient of multiple determination (\( R^2 \)) exhibits 99% of variations in PBT in Salem Sugar Mills has been explained by these three ratio during the study period. It could be inferred that the co-efficient of regression between profitability ratio and current ratio is computed at — 0.159. It implies that one unit increase in current ratio will cause a 0.159 units decrease in Profitability and vice versa. Further this co-efficient is found to be statistically significant at 5% level as per ‘t’ test. The co-efficient of regression between Profitability ratio and Quick ratio is computed at +0.028 implies that one unit increase in Liquid ratio would increase the profit before tax by 0.028 units and this co-efficient is also statistically valid at 5% level. Similarly, the co-efficient of regression
between Profitability ratio and working capital Turnover ratio is computed at — 0.046 implies that the unit of increase in working capital turnover ratio would decrease the profit before tax by — 0.046 units and this co-efficient is also statistically valid at 5% level of significance. Of the three variables, Liquid ratio is far more impact on profit before tax than Current ratio and working capital Turnover ratio.

As the calculated value of “F” found to be greater than the table value at 5% level of significance implies that the model is perfectly fit. Regarding the estimated value of D-W statistics, the existence of Auto-correlation is completely ruled out in the model.

COMMENTS

1. The average percentage of current assets to total assets is 66.60 per cent which indicate that the company has made investment in working capital following the aggressive approach.

2. Of the components of working capital, Inventory and Receivables are the dominant contributory behind the rapid increase in working capital which has increased at a galloping rate.

3. The most critical comment that can be made as an outcome of this study is regarding the increasing dependencies of the company on Long-term funds in relation to the financing working capital. The Average percentage of long-term funds used has been worked out as 45.69. It signifies the greater risk taken by the company.

4. The Liquidity position of the Salem Sugars is satisfactory during the study period. The two Liquidity ratio, current and quick ratio, remained equal or above the standard norms throughout the study period.

5. Out of the six independent working capital components ratio, only Liquid ratio have positive impact while all others have negative impacts. With the help of multiple regression model, it is estimated that one unit increase in liquid ratio would increase the PBT by 0.028 units and it is statistically valid at 5% level of significance.
CONCLUSIONS

From the foregoing analysis, it can be emphasised that basically the objective of working capital management centres around the success of short-term liquidity and profitability. In the first part of this study, it is proved that Salem Sugars have good liquidity position during the period under study. In the second part, it can be concluded that the companies may have to maintain a relatively low level current assets in order to have higher profitability.

REFERENCES


The Sugar Industry be the second largest organised industry next in importance to textile industry plays an eminent role in economic of India. The Sugar Industry has a great significance which cannot be valued in its relation to agricultural and industrial economy of the rural regions of India. It is an industry which affects agriculture fundamentally. Therefore, expansion of sugar industry in India is an indispensable factor for the life of socio-economic life of India. Sugar is an agro-based industry. The outstanding feature of the industry is a vital link between the factory and cultivators whose interest and well-being are inter-dependent. No other agro-based industry can compete with in having great impact and close contact between the agriculturists and factory owners. Located in rural areas, sugar industry has provided the most effective truncheon for carrying progressive trend into the country side.

Importance of Sugar Industry to National Economy

Sugar industry is the largest among the processing industries next to cotton textiles. Located in rural areas they have an intrinsic symbiotic relationship with the rural masses and serve as a nerve centre for rural development. There were 400 sugar factories out of which 385 were in operation during 1990-91 season. On an average sugar factory receives cane supplies from 35,000 to 40,000 cane growers per annum.

The total number of sugar cane suppliers in the country including their dependents is over 35 million. Sugar Mills paid over Rs.5000 crores millions to the cultivators by way of cane price in 1990-91. This apart, the Sugar Mills distribute cane seeds, fertilisers and agricultural inputs of the order of Rs 200 crores annually.

Sugar Industry is the largest single employer in the rural areas. It provides...
employment to over 3.5 lakh work. The annual wage bill of the industry is of the order of Rs.525 crores. The contribution of the industry to the central exchequer by way of central excise duty is Rs.700 crores. Besides, the state government collects about Rs.350 crores per annum through purchase tax and cane cess and social security commission on sugar cane. The total exports in 1983 were of the order of 7.24 lakh tonnes and foreign exchange earnings were of the order of about Rs.180.96 crores. This is an industry best suited to promote rural transformation. Each industry deals with 100 to 400 villages for its cane supplies or an average of 200 villages.

Indian Sugar Industry - A Retrospective

India has been known as the original home of sugar and sugarcane. The growth of the sugar industry is full of tales of adventure and conquest. It received attention of the builders of different empires from time to time. It was between the fourth and sixth centuries that the art of making sugar was discovered in India. The cane was cut into pieces and crushed by a heavy weight and the juice thus obtained was boiled and stirred until solids formed. These solids being of uneven shapes and sizes were called "Sankara", the Sanskrit term for gravel. The modern word "Sugar" is a derivative of the word Sarkara. Historically it is said that the modern process of sugar manufactures was introduced in the west as early as in 1953 but the same process came to India as late as in about 1903 when the first sugar factory with vacuum pan process and modern milling method was commissioned in Saran at Mahowrah in Bihar in 1904.

Progress of the Industry

The history of Sugar Industry in India begins in 1903 when a sugar factory was set up in Bihar and Uttar Pradesh each. Before 1932, there were only 32 factories operating in the country. In that year tariff protection was granted to the industry and as a result, the number of factories shot up to 137 by 1937 and India became self-sufficient in sugar. The performance of the industry during the various plans has been remarkable as brought out by the fact that the number of sugar mills in the country increased from 139 in 1950-51 to 385 in 1990-91 (220 in the Co-operative Sector and 165 in the Private Sector and Public Sector). A notable feature of the development of the sugar industry after Independence is its remarkable expansion in the Co-operative Sector, out of 385 factories working in 1990-91, 220 were in the Co-operative Sector which accounted for about 57 percent of the total sugar production in the country. This is a welcome feature because it enables the farmers to derive all benefits of Cooperation.

Sugar Industry in Tamil Nadu

Tamil Nadu is one of the leading producers of sugar in the Country. The production of sugar by the Tamil Nadu is about 10 per cent of the Country's production. Income generated from cane sale proceeds in Tamil Nadu exceeds...
Rs.400 crores year. During 1990-91, 31 sugar mills were functioning in the State. Of these 14 are in co-operative sector, 3 in publ sector and 14 in private sector.

Agricultural Economics of Sugarcane in Tamil Nadu

It would be seen that the average area under sugarcane in Tamil Nadu during the period 1973-74 to 1992-93 was 187 thousand hectare. The annual growth rate of sugarcane area in Tamil Nadu is 2.44 percent which is more than all India growth rate (1.37 percent) and also significant at 1 percent level of significance. The average annual sugarcane production in Tamil Nadu during the same period was 18,930 thousand tonnes which accounts nearly 10 percent of the country’s sugarcane production. The annual growth rate of production of sugarcane in Tamil Nadu (3.05 percent) was also higher than the all India sugarcane production (2.91 percent) and also significant at 1 percent level of significance.

Technical performance

The total installed crushing capacity of sugar mills in Tamil Nadu was increased from 5.74 lakh tonnes to 10.04 lakh tonnes from the year 1981 - 82 to 1990 - 91. The capacity utilization by the Tamil Nadu Sugar Mills were always exceeds 100 percent except in the year 1983-84 and also it was higher than all India average. It is evident that the average duration of crushing season by Tamil Nadu mills was 171 days, which was higher than the all India average. This shows annual growth rate of 1.27 percent which is not significant. The average annual cane crushed by the Tamil Nadu Sugar Mills was 7,178 thousand tonnes which accounts nearly 10 percent of the Country’s total sugarcane crushed. The annual growth rate of sugarcane crushed was 6.93 percent which was higher than the all India average and significant at 1 percent level of significance.

The average sugar production of Tamil Nadu Sugar Mills was 659 thousand tonnes which accounts nearly 8.9 percent of Country’s total sugar production. The annual growth rate of sugar production by Tamil Nadu Sugar Mills was 7.22 percent which was higher than the all India growth rate and significant at 1 percent level of significance. The average recovery of sugar by Tamil Nadu Sugar Mills was 9.08 percent with the annual growth rate of 0.65 percent which is significant at 1 percent level of significance. The per capita consumption sugar in Tamil Nadu is on par with the all India consumption.

Forecast about the Industry

The total area under sugarcane in Tamil Nadu in 2000 AD will be estimated as 263 thousand hectare with the annual increase of 5 thousand hectare. Similarly, the total estimated sugarcane production of Tamil Nadu in 2000 AD will be 28,361 thousand tonnes which accounts nearly 10.5 percent of Country’s total Sugarcane production. The annual
increase of sugarcane production of Tamil Nadu will be 572 thousand tonnes. The yield of cane per hectare in 2000 AD by Tamil Nadu will be 109.90 tonnes per hectare, which is higher than the all India level.

For the next seven years, the production of sugar by Tamil Nadu Sugar Mills will be increased at the rate of 45 thousand tonnes per annum. On this basis, total sugar production by the Tamil Nadu sugar mills in the year 2000 AD will be 1,399 thousand tonnes which accounts nearly 9.8 per cent of Country's total sugar production. Similarly, the consumption of sugar in Tamil Nadu will also increase at the rate of about 27 thousand tonnes per annum. On this basis, the total sugar consumption in Tamil Nadu in the year 2000 AD will be 829 thousand tonnes reflecting the surplus of 570 thousand tonnes.

Conclusion

Despite all handicaps and difficulties, no other industry in the State of Tamil Nadu has developed as fast as the Sugar Industry. The Industry has indeed very bright prospects, as there is abundant supply of raw materials, cheap labour and huge local market. The Government is bound to continue on a long-term basis partial control and dual pricing system so that the interests of consumers on the one hand and that of industry on the other hand are protected and reconciled.

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April 3, 1995

Mr A Vijayakumar
Lecturer in Commerce
Erode Arts College
Erode 638 009

Dear Mr Vijayakumar,

I am happy to inform you that your co-authored article on "Working Capital Management in Sugar Mills of Tamil Nadu" has been accepted for publication and will appear in due course in MANAGEMENT AND LABOUR STUDIES.

With kind regards,

Yours sincerely,

(Mrs) Janaki Jagan
Manager