CHAPTER V
COSTING AND PRICING IN TELECOMMUNICATION
AND COMPUTER SECTORS
COST BEHAVIOUR

The researcher has tried to study the components of total operating costs from the selected published annual accounts of the companies engaged in telecommunication and computer sectors individually. The data of 3 years for telecommunication industry (1987-88 to 1989-90) (Refer Table No.: 5.1) and of 4 years for computer industry (1985-86 to 1987-88) (Refer Table No.: 5.4) were analyzed and studied.

To study the cost behaviour of any company or product, the time-period considered for study should be long enough to permit the recording procedures to link output produced and/or despatched (sold), with the cost incurred because of that production and despatch. A year or period of twelve months is suitable to link output produced and/or despatched, with the cost incurred because of that production and despatch to reflect the effect of all seasons on costs; and generally the data from companies, government bodies etc. are also available for a year. So, the researcher has considered a year (period of twelve months) as the best cost calculation period to study the cost behaviour.

To study the cost behaviour, an attempt has been made to understand the factors which can have impact on total cost. To test the relationship between a given cost incurred and change in single variable in respect of activity level is vastly oversimplified and misleading. It can be concluded that ma...
costs are affected by more than one factor.

For studying the relationship between characteristics of companies and costs, the companies taken in the sample are classified by size for each referred sector(s).

During the course of study, it became quite clear that material consumption costs (MCR) constitute significant proportion as a percentage of total income i.e., 51 per cent for computer equipment manufacturer and 53 per cent for telecommunication equipment manufacturer. The second major component of costs is direct manufacturing expenses (DME) which works out to 17 per cent of total income for telecommunication equipment manufacturer. The administration and selling expense (ASR) constitute second major component of costs for computer equipment manufacturer i.e., 21 per cent of total income.

The another major component of costs is finance cost (FCR) i.e., 9 per cent for computer sector and 11 per cent for telecommunication sector of total income.

Researchers found that depreciation is sunk cost and is not significant component of cost i.e., 4 per cent of total income for telecommunication sector and 2 per cent of total income for computer sector, so it is omitted from the detailed critical study.

DEFINITION OF VARIABLES

The following cost ratios have been calculated and analyzed:

1) Material costs ratio (MCR) calculated as percentage of material costs to total income (sales revenue).

2) Wages and salaries costs ratio (WSR) calculated as
percentage of wages and salaries expenses to total income (sales revenue),

iii. Direct manufacturing expenses ratio (DHR) calculated as percentage of direct manufacturing expenses to total income (sales revenue).

iv. Administrative and selling expenses ratio (AHR) calculated as percentage of administrative and selling expenses to total income (sales revenue).

v) Finance costs ratio (FR) calculated as percentage of finance costs (financial charges and interest) to total income (sales revenue).

All sample companies are classified in to three groups i.e. small, medium, and big in terms of paid up share capital (SC), net worth (NW), capital employed (CE, total income (i.e.), inventory and debtors, and cash components of each group is compared with other groups.

TELECOMMUNICATION SECTOR

Material Costs Ratio (MCR)

The analysis reveals that consolidated MCR decreased over the period at the rate of 8 per cent annually i.e. from 63 per cent in 1987-88 to 55 per cent in 1988-89. There was hardly any relation between MCR and size in terms of SC and NW. The big group companies (in terms of SC Rs. 10 crore and above each) have lower MCR in comparison to medium group companies. The medium group companies (CE is Rs. 2 - 10 crore each) MCR varied unevenly over the period i.e. 67 per cent in 1987-88, 65 per cent in 1988-89, and 55 per cent in 1989-90. The big group companies MCR decreased over the period at the rate of 8 per cent.
### Frequency distribution of companies - Telecommunication Sector

Pattern of Costs according to size of companies

<table>
<thead>
<tr>
<th>Size groups</th>
<th>No. of companies</th>
<th>AVERAGE COSTS (PERCENTAGE)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NCR</td>
<td>NSR</td>
</tr>
<tr>
<td>87-88</td>
<td>63</td>
<td>54</td>
</tr>
<tr>
<td>88-89</td>
<td>56</td>
<td>51</td>
</tr>
<tr>
<td>89-90</td>
<td>78</td>
<td>77</td>
</tr>
<tr>
<td>All companies</td>
<td>197</td>
<td>182</td>
</tr>
</tbody>
</table>

A. According to size of Capital

1. Small companies
   - Below Rs. 2 crore: (1) (2) (3) (2) (2) (2) (2) (2) (3) (2) (2) (2)
   - (Rs. 2 - 5 crore): (1) (2) (2) (2) (2) (2) (2) (2) (2) (2) (2)

2. Medium companies
   - Below Rs. 2 crore: (3) (2) (2) (3) (2) (2) (2) (2) (2) (2) (2)
   - (Rs. 2 - 5 crore): (4) (4) (4) (4) (1) (1) (1) (1) (1) (1) (1)

3. Big companies

B. According to size of Net Worth

1. Small companies

2. Medium companies
   - Below Rs. 2 crore: (4) (4) (4) (4) (4) (4) (4) (4) (4) (4) (4)
   - (Rs. 2 - 5 crore): (4) (4) (4) (4) (4) (4) (4) (4) (4) (4) (4)

C. According to size of Capital Employed

1. Small companies

2. Medium companies

D. According to size of Total Income

1. Small companies

2. Medium companies
   - Below Rs. 5 crore: (4) (4) (4) (4) (4) (4) (4) (4) (4) (4) (4)
   - (Rs. 5 - 10 crore): (4) (4) (4) (4) (4) (4) (4) (4) (4) (4) (4)

E. According to size of Inventory

1. Small companies

2. Medium companies

F. According to size of Debtors

1. Small companies

2. Medium companies
   - Below Rs. 5 crore: (4) (4) (4) (4) (4) (4) (4) (4) (4) (4) (4)
   - (Rs. 5 - 10 crore): (4) (4) (4) (4) (4) (4) (4) (4) (4) (4) (4)

3. Big companies

Figures in bracket indicate the number of companies in respective categories.
cent annually. Neither a systematic trend nor pattern exists between NCR and size of companies, in terms of TI.

The medium group companies (in terms of TI Rs. 10 - 50 crore each) have constant NCR, while in case of small group companies (TI is less than Rs. 10 crore each) NCR varied unevenly over the period. There was neither a trend nor systematic pattern existed between NCR and size of companies in terms of TI.

The small group companies in terms of inventory, NCR varied unevenly. The NCR of small group companies (inventory is less than Rs. 5 crore each) was higher than that of medium group companies (inventory, Rs. 5 - Rs. 10 crore each) in 1989-90. There is a negative correlation exists between NCR and size of companies in terms of inventory (As inventory increases, materials costs decreases). No conclusion can be made with regard to NCR and size of companies in terms of debt.

Wages and Salaries Costs Ratio (WSR)

The analysis reveals that consolidated WSR was normally between 4 to 5 per cent of total income. The WSR of big group companies in terms of SC (SC is Rs. 5 crore and more) was higher than that of the medium group companies (SC is Rs. 2 - Rs. 5 crore each) by 17 per cent in 1990-91 and 19 per cent in 1991-92 of big group companies, as compared to 4 per cent in 1989-90 and 15 per cent of medium group companies. The analysis of two years (i.e., 1989-90 and 1990-91) reveals that there is a positive correlation exists between WSR and size of companies in terms of SC (As SC increases, WSR increases).

The WSR of medium group companies in terms of TI is Rs. 10 - 50
crore each) was lower than of small group companies (Rs. 10 crore each) over the period. The medium group companies WSR was 3 per cent in 1983-84 and 1987-88, as compared to 5 per cent in 1983-89 and 7 per cent in 1999-99 of small group companies. None of the companies is coming under the category of big group companies (Rs. 50 crore and more).

There is a negative correlation exists between WSR and size of companies in terms of E. No conclusion can be made with regard to WSR and size of companies in terms of debtors, as no systematic trend nor pattern is seen over the period.

The medium group companies (in terms of inventory is Rs. 5 - 20 crore each) WSR was higher than of small group companies (inventory is less than Rs. 5 crore each) over the period. There is a positive correlation exists between WSR and size of companies in terms of inventory.

Direct Manufacturing Expenses Ratio (DMR)

The overall DMR was normally between 17 per cent and 20 per cent over the period. The DMR of big group companies (in terms of SC is Rs. 5 crore or more) was normally higher than of medium group companies (SC is Rs. 2 - 5 crore each) and of small group companies (SC is less than Rs. 2 crore each) over the years. The big group companies and small group companies DMR vary unequally over the period. It can be concluded that there is a positive relationship exists between DMR and size of companies in terms of SC. No systematic trend nor pattern exists between DMR and size of companies in terms of NV, inventory and debtors.

The DMR of big group companies (in terms of CE is Rs. 10 crore or more each) was higher as compared to medium group companies (CE
it Rs. 8 - 10 crore each) over the period. The DMR of big group companies was 20 per cent in 1988-89 and 19 per cent in 1989-90, as compared to 18 per cent in 1987-88 and 1989-90 of medium group companies. There is a positive correlation exists between DMR and size of companies in terms of CE.

The DMR of medium group companies (in terms of TI is Rs. 10 - 50 crore each) was 16 per cent in 1989-90 and 18 per cent in 1989-90 and 1988-89 of small group companies (TI is less than Rs. 10 crore each). There is a negative correlation exists between DMR and size of companies in terms of TI.

Administrative and Selling Expenses Ratio (ASR)

The overall ASR decreased over the period at the rate of 21 per cent annually i.e. from 21 per cent in 1987-88 to 12 per cent in 1989-90. The reason for the decrease in ASR that total income was higher by 94 per cent in 1988-89 as compared to 1988-89. (Refer Table No. 7.17)

The ASR of big group companies (in terms of CE is Rs. 2 - 5 crore or more) was 47 per cent and 50 per cent as compared to 6 of medium group companies (CE is Rs. 2 - 5 crore each) was 14 per cent and 13 per cent and of small group companies (CE is less than Rs. 5 crore each) was 5 per cent and 5 per cent in 1988-89 and 1989-90 respectively. The ASR of all group was lower in 1989-90 as compared to 1988-89. The analysis of two years (i.e. 1988-89 and 1989-90) reveals that there is a positive correlation exists between ASR and size of companies in terms of CE.

The analysis of two years (i.e. 1988-89 and 1989-90) reveals that
ASR of medium group companies (in terms of NW is Rs. 2 - 10 crore each) was lower than of small group companies (NW is less than Rs. 2 crore each). ASR of medium group companies was 11 per cent and 14 per cent and of small group companies was 25 per cent and 28 per cent in 1986-87 and 1989-90 respectively. It can be concluded that there exists a negative relationship between ASR and size of companies in terms of NW.

The ASR of big group companies (in terms of CE is Rs. 10 crore or more each) was higher than of medium group companies (CE is Rs. 1 - 10 crore each) over the period. The ASR of medium group companies (in terms of II is Rs. 10 - 50 crore each) was higher than of small group companies (II is less than Rs. 10 crore each) over the period. It was also found that a positive relationship exist between ASR and size of companies in terms of CE, II and inventory. No conclusion can be made with regard to ASR and size of companies in terms of debt.

Finance Costs Ratio (FR)

The overall FR was normally between 10 per cent and 15 per cent of total income over the period.

The analysis of two years (i.e. 1986-87 and 1989-90) shows that FR of big group companies (in terms of SC is Rs. 5 crore or more) was higher than of medium group companies (SC is Rs. 2 - 5 crore each) and of medium group companies was higher than that of small group companies (SC is less than Rs. 2 crore each) over the period. It can be concluded that a positive relationship is seen between FR and size of companies in terms of SC.

The analysis shows that FR of small group companies (in terms of
### Table: Frequency distribution of companies - Computer Sector

<table>
<thead>
<tr>
<th>Size groups</th>
<th>No. of companies</th>
<th>All companies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Below Rs. 2 crore</td>
<td>50</td>
<td>46 1 1 46 51</td>
</tr>
<tr>
<td>(Rs. 2 - 5 crore)</td>
<td>41</td>
<td>12 13 17 10</td>
</tr>
<tr>
<td>(Rs. 5 crore and above)</td>
<td>35</td>
<td>5 7 9 9 16 17</td>
</tr>
<tr>
<td>Rs. 10 crore and above</td>
<td>20</td>
<td>4 7 9 9 7 9</td>
</tr>
<tr>
<td>Rs. 20 crore and above</td>
<td>12</td>
<td>6 10 10 10</td>
</tr>
</tbody>
</table>

### Average Costs (Percentage)

<table>
<thead>
<tr>
<th>Size groups</th>
<th>MCR</th>
<th>MSR</th>
<th>ERP</th>
<th>ASR</th>
<th>FF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Below Rs. 2 crore</td>
<td>46 1 7 9 9 7 9 4 7 9 9 4 7 9 9 4 7 9 9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Rs. 2 - 5 crore)</td>
<td>46 1 7 9 9 7 9 4 7 9 9 4 7 9 9 4 7 9 9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Rs. 5 crore and above)</td>
<td>46 1 7 9 9 7 9 4 7 9 9 4 7 9 9 4 7 9 9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rs. 10 crore and above</td>
<td>46 1 7 9 9 7 9 4 7 9 9 4 7 9 9 4 7 9 9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rs. 20 crore and above</td>
<td>46 1 7 9 9 7 9 4 7 9 9 4 7 9 9 4 7 9 9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Figures in brackets indicate the number of companies in respective categories.
No systematic relationship is found between FR and size of companies in terms of CE and debtors.

The FR of medium group companies in terms of inventory is Rs. 10 - 20 crore each; was lower than in small group companies (Ti is less than Rs. 10 crore each) over the period. The negative relationship is found in FR and size of companies in terms of Ti.

The FR of medium group companies (in terms of inventory is Rs. 5 - 20 crore each) was higher than in small group companies (inventory is less than Rs. 5 crore each) over the period. There is a positive correlation exists between FR and size of companies in terms of inventory.

COMPUTER SECTOR

Materials Costs Ratio (MCR)

The analysis reveals that consolidated MCR was normally between 41 per cent and 51 per cent over the years i.e., 1976 - 1977 to 1989 - 90.

There was hardly any relationship between MCR and size of companies in terms of SC; CE and NW.

The analysis reveals that medium group companies (in terms of Ti is Rs. 10 - 50 crore each) have lowest MCR as compared to MCR of small group companies and of big group companies. The small group companies (Ti is less than Rs. 10 crore each) MCR increased by
abnormal level i.e. 96 per cent in 1986-87 when industry was passed through keen market competition and recession, the MCR was recorded at 56 per cent in 1988-89 for big group companies (TI is Rs. 50 crore and above). It can be concluded that MCR of small group companies in terms of TI have negative correlation with market situation and sensitivity. The MCR of companies having moderate or more than moderate income i.e. 15 crore each, have no major impact of market situation and sensitivity, nor market factor do not affect them.

The analysis of two years (i.e. 1988-89 and 1989-90) shows that MCR of big group companies (in terms of inventory, i.e. Rs. 50 crore and above) was higher i.e. 56 per cent and 48 per cent than of medium group companies (inventory is Rs. 5 - 20 crore each) i.e. 42 per cent and 17 per cent and the medium group companies MCR was higher than of small group companies (inventory is less than Rs. 5 crore each) i.e. 50 per cent and 41 per cent in 1988-89 and 1989-90 respectively. It can be concluded that there is a positive relationship exists between MCR and size of companies in terms of inventory. No systematic trend or pattern is noticed in MCR and size of companies in terms of doctors.

Wages and Salaries Costs Ratio (WSR)

The analysis shows that consolidated WSR was normally between 12 per cent in 13 per cent up to 1988-89, and declined to 10 per cent in 1989-90.

No systematic pattern or trend is found between WSR and size of companies in terms SC, MW and LE.

The WSR of small group companies (in terms of II is less than Rs.
To create each, 21 per cent and 18 per cent was higher than of medium group companies, 11 per cent, 10 - 50 crore each, i.e., 11 per cent and 15 per cent and of big group companies (1) Rs. 50 crore and above each, i.e., 9 per cent and 11 per cent in 1989-90 and 1987-88 respectively. It can be concluded that there is a negative correlation exists between WSR and size of companies in terms of TL.

The WSR of medium group companies (in terms of inventory Rs. 5 - 20 crore each), i.e., 14 per cent was higher than of small group companies (inventory is less than Rs. 5 crore each) i.e., 11 per cent and of big group companies (inventory is Rs. 20 crore and above each), i.e., 8 per cent in 1989-90. The analysis reveals that a negative correlation exists between WSR and size of companies in terms of inventory, if inventory is maintained at a higher level i.e., more than Rs. 20 crore or at lower level i.e., up to Rs. 5 crore.

The analysis of two years (i.e., 1988-89 and 1989-90) shows that small group companies (in terms of debtors is less than Rs. 5 crore each) WSR i.e., 12 per cent and 22 per cent was higher than that of medium group companies (debtors is Rs. 5 - 20 crore each) i.e., 11 per cent and 17 per cent and of big group companies (debtors is Rs. 20 crore and above each), i.e., 9 per cent and 8 per cent in the year 1989-90 and 1988-89 respectively. It can be concluded that negative correlation exists between WSR and size of companies in terms of debtors.

Direct Manufacturing Expenses Ratio (DMR)

The overall DMR was normally between 5 per cent to 4 per cent over the period. The DMR increased by 2 per cent in 1989-90.
which was stagnant in 1960-69 and 1967-68.

The OMR of big group companies (in terms of SC i.e. Rs. 5 crore or more each) was stagnant i.e. 10 per cent over the period (1907-08 to 1989-90). No systematic pattern or trend is noticed between OMR and size of companies in terms of SC i.e. for small group companies and medium group companies. No conclusion can be made with regard to OMR and size of companies in terms of SC.

No systematic trend or pattern exists between OMR and size of companies in terms of NW and CE.

The analysis of period under study (except year 1939-40) shows that OMR of small group companies (in terms of TI is less than Rs. 10 crore each) i.e. 5 per cent and 7 per cent was lower than that of medium group companies (TI is Rs. 10 - 50 crore each) i.e. 5 per cent and 7 per cent end of big group companies (TI is Rs. 50 crore and above each) i.e. 10 per cent in 1987-88 and 1987-90. There is a positive correlation exists between OMR and size of companies in terms of TI.

No systematic trend or pattern is seen between OMR and size of companies in terms of inventory and debtors.

Administrative and Selling Expenses Ratio (ASR)

The analysis shows that ASR of big group companies (in terms of SC i.e. Rs. 5 crore or more each) was lower than of small group companies (SC is less than Rs. 2 crore each) over the period except year 1939-40. The highest ASR was registered by medium group companies (SC is Rs. 2 - 5 crore each) over the period.

No systematic trend or pattern exists between ASR and size of
companies in terms of CF, AWS and inventory.

The ASR of big group companies (in terms of CF is Rs. 10 crore or more each; i.e. 20 per cent and 21 per cent was lower than that of medium group companies (CF is Rs. 2 - 10 crore; i.e. 35 per cent and 35 per cent in 1980-89 and 1989-90 respectively. It can be concluded that there is a negative correlation exists between ASR and size of companies in terms of CF.

The ASR of small group companies (in terms of TL is less than Rs. 10 crore each) was 31 per cent in 1980-89 and 36 per cent in 1989-90, it declined to 11 per cent in 1988-89 and 20 per cent in 1989-90 for medium group companies (TL is Rs. 10 - 50 crore each) and further declined to 14 per cent in 1988-89 and 1989-90 for big group companies (TL is Rs. 50 crore or more each). It can be concluded that there is a negative relationship exists between ASR and size of companies in terms of TL.

The ASR of small group companies (in terms of debtors is less than Rs. 5 each) was 12 per cent in 1980-89 and 15 per cent in 1989-90, it declined to 31 per cent in 1988-89 and 35 per cent in 1989-90 for medium group companies (debtors Rs. 5 - 20 crore each) and further declined to 14 per cent in 1988-89 and 1989-90 for big group companies (debtors is Rs. 20 crore or more each). It can be concluded that there is a negative relationship exists between ASR and size of companies in terms of debtors.

Finance Costs Ratio (FR)

The overall FR are normally between 7 per cent and 10 per cent or total income over the period.

No systematic trend or pattern is seen between FR and size of
The analysis shows that the FR of small group companies (in terms of TI is less than Rs. 10 crore each) and big group companies (TI is Rs. 50 crore or more each) decreased over the period as total income increased. No trend is found between FR and medium group companies (TI is Rs. 10 - 50 crore each). It can be concluded that a negative relationship exists between FR and size of companies in terms of TI, if TI is Rs. 50 crore and above.

The analysis shows that FR of small group companies (in terms of inventory is less than Rs. 5 crore each) and of big group companies (inventory Rs. 20 crore or more each) has increased as inventory level increased over the period. No trend is noticed between FR and medium group companies (inventory is Rs. 5 - 20 crore each). It can be concluded that a positive correlation exists between FR and size of companies in terms of inventory, if inventory level is Rs. 20 crore and above.

The analysis of three years (i.e., 1985-87 to 1988-89) reveals that as debtors level increased the FR decreased. The FR of small group companies (in terms of debtors is less than Rs. 5 crore each) was 7 per cent in 1986-87 and 20 per cent in 1988-89 declined to 7 per cent in 1986-87 and 8 per cent in 1989-90 for medium group companies (debtors is Rs. 5 - 20 crore each), further declined to 6 per cent in 1986-87 and 8 per cent in 1988-89 for big group companies (debtors is Rs. 20 crore or more). It can be concluded that negative relationship exists between FR and size of companies in terms of debtors.
CONCLUSIONS

The telecommunication and computer sector belongs to high technology industry and requires huge amount of investments. The analysis reveals that the technical know-how and technology for the products or the service sector(s) are mostly imported.

The production and cost of such product(s) industries depend upon many factors. The policies of the country from where technical know-how is imported, the quality assurance requirements of technology transferor, the quality, speed, accuracy of the installed plant and machineries, preventive maintenance of plants and machineries, changes in structure of indirect taxes i.e. customs duty, excise duty, sales tax, local taxes etc., changes in the economic policies of the government i.e. bank rates, credit policy, devaluation or currency, exchange rate variations etc., changes in industrial promotional policies by government i.e. introduction or abolition of subsidy, market sensitivity and situation, financial investment and pattern in use of funds i.e. owned capital or borrowed funds, pattern of deployment of available funds etc. also affect the costs on the company and product.

Material Costs Behaviour

The study shows that factors like inventory and level of activities i.e. total income or net sales revenue are directly affecting the material costs is a percentage of total income.

In telecommunication sector, a negative relationship is seen between material costs and inventory (as inventory level increases, material costs decreases). The companies which are
maintaining high inventory are getting the benefit of economical policies of government and change in structure of indirect taxes, i.e., customs duty, excise duty etc. During the course of study, it became quite clear that import content (among total raw materials consumption costs) in finished product of telecommunication is around 90 per cent in 1989-90. (A. Annual Report 1989-90, Tata Telecom Limited, p. 12 & 91.1 per cent in 1988-89; and A. Annual Report 1988-89, Northern Digital Electronics Limited, 93% per cent in 1988-89 and 89 per cent in 80-71). As import content in final marketable product is very high, companies are getting benefits of economical policies of the government.

In telecommunication sector, neither a systematic trend nor a clear pattern is seen between materials cost and total income.

In computer sector, a positive relationship exists between materials cost and inventory (as inventory level increases, materials costs increases). It became quite clear that import content (among total raw materials consumption costs) in finished product of computers is around 95 per cent in 1989-90. (C. Annual Report 1989-90, Comex Computers Limited, p. 40 & 95 per cent in 1989-90); D. Annual Report 1987-88, Wipro Information Technology Limited, p. 22 & 99 per cent in 1987-88; E. Annual Report 1990-91, Sterling Computers Limited, p. 20 & 89 per cent in 1989-90 and 83 per cent in 90-71; and F. Annual Report 1989-90, PCL: HCL Limited, p. 13 & 45 per cent 1989-90.) As import content is less, companies are but getting benefit of economical policies of the government. The portion of benefits received by manufacturer are grabbed by the indigenous inventory.
It can be concluded that negative relationship exists between materials cost and small group companies, engaged in computer sector, in terms of total income during the period of recession. The companies having total income more than Rs. 10 crore have registered very insignificant impact on materials costs during the period of recession.

Wages and Salaries Costs Behaviour

The study shows that factor like level of activity i.e. total income or not sales revenue is directly affecting the wages and salaries costs as a percentage of total income.

In both referred sectors i.e. telecommunication and computers, a negative relationship exist between wages and salaries costs and total income (as income level increases, wages and salaries costs decreases). It become quite clear that both sectors are capital intensive and require skilled manpower. Once the infrastructure has been built up in an organization i.e. by installation of fixed plants and machineries, recruited skilled manpower and trained them, company cannot disturb the infrastructure. The manpower costs i.e. wages and salaries remain constant, fixed and unaffected by changes in the level of activity i.e. output or sales realization. The costs as a percentage of total income or cost per unit, with the change in level of output, varies as the expenditure incurred for it remain unaffected by the level of output.

So, in both referred sectors, as total income increases, wages and salaries costs decreases.
Direct Manufacturing Costs Behaviour

As the telecommunication sector is a developing sector and requires huge amount of investments in infrastructure. The recurring infrastructural expenses are rather constant, fixed and unaffected by changes in the level of output. For the purpose of establishing an organization in this sector, companies are raising funds from long term finance sources i.e. share capital and borrowed funds. So, a positive correlation exists between direct manufacturing expenses (DME) and size of companies in terms of share capital and capital employed (as share capital and capital employed increases, DME increases). And a negative relationship exists between DME and size of companies in terms of total income (as total income increases, DMC decreases).

In computer sector, a positive relationship exists between DME and size of companies in terms of total income as total income increases, DMC increases. As the sector is facing a keen competition since 1987, was caught in deep recession in the market in the year 1988-89, presently cut-throat keen competition exists in the market, customers have become quite quality conscious, and to survive in the market, companies are maintaining and adhering to the stringent quality parameters in the manufacturing processes. This has resulted in direct variation in DME as activities increase i.e. total income.

Administrative and Selling Expenses Behaviour

As telecommunication sector requires huge amount of investment in build infrastructure, a positive relationship exists between administrative and selling expenses (ASE) and size of companies in terms of share capital, capital employed, total income and...
inventory (as share capital, capital employed, total income and inventory increase, AS&E increases). The telecommunication equipment is named with uninterrupted services around the clock. So, the after-sales services network is required to be strengthened in such a way that prompt services can be provided to customers. For this purpose, sample companies are maintaining rich spare stores at all locations i.e. at regional offices, branch offices and service centres. This has also resulted into increase in capital employed and share capital.

In computer sector, a negative relationship exists between AS&E and size of companies in terms of capital employed and total income (as capital employed and total income increases, AS&E decreases).

Number of companies engaged in computer sector have appointed dealers and/or service agents at important locations all over the country. Nowadays, number of individuals and/or private units are operating within the country to provide after-sales services for the computer equipments. This has resulted into huge expenses on sales and service ends, so AS&E decrease as income increases. The big size companies in terms of capital employed are also operating their sales and service network through retail outlets and/or dealers at important locations, so AS&E decreases as capital employed increases.

Finance Costs Behaviour

In both referred sector i.e. telecommunication and computers, a positive relationship exist between finance cost (FC) and inventory (as inventory level increase, finance costs increase).
The analysis reveals that companies are more dependent on borrowed funds in relative term i.e. in telecommunication sector 84 per cent of capital employed is funded by borrowed funds and in computer sector 80 per cent of capital employed is funded by borrowed funds in the year 1989-90. For funding the inventory, companies are using borrowed fund which costs them more compared to their own capital. So, as inventory level increases, FC increases.

In both referred sectors, a negative relationship exists between FC and total income (as income increases, FC decreases). The analysis reveals that among total net assets, capital assets constitute about 44 per cent in telecommunication sector and 26 per cent in computer sector in the year 1989-90. The periodic costs of financing of capital assets remain fixed, constant and unaffected by the level of activity i.e. total income. This has resulted into decrease in FC as total income increases.

The finance cost is nearly 1.1 per cent of total income in telecommunication sector and 3 per cent of total income in computer sector. The basic reason for the high finance cost (interest and financial charges) in telecommunication sector in comparison to computer sector, is that the buyers of the computer equipments are spread in all market segments e.g. private sector, public sector undertakings, government undertakings, educational institutions, traders, individual persons etc. so that the companies are in a position to ask and have 50 per cent or more than 50 per cent as an advance at the time of procuring orders for the equipments. The credit is not normally given to the buyer except few cases where credit is given on a very short period.
The buyers of the telecommunication equipment are industrial organisations both in private and public sector undertakings. As the equipment is one type of industrial goods and is a part of fixed plant of the organisation, the companies are not in a position to ask and have more than 50 per cent as an advance at the time of procuring orders for the equipments. The usual term offered to the customer is for a long period i.e., 1 to 3 months. Because of this peculiar position of the companies engaged in telecommunication sector, they are borrowing money, for meeting the working capital requirement, from the money market which costs them more. So, the interest and financial charges are higher for companies engaged in telecommunication sector in comparison to companies engaged in computer sector.
COST ACCOUNTING SYSTEM

To study the costing system adopted by companies engaged in telecommunication and computer sector, researcher had visited number of companies, operating in the state of Gujarat, Maharashtra and Karnataka. The researcher had access to two companies, one pertains to computer sector and another pertains to telecommunication sector. One company had allowed to study the system in depth while the other had certain reservations for sharing their internal costing system.

The study shows that costing system adopted by both sectors are on the same line i.e. job costing, because both sectors belong to the assembly type of manufacturing, manufacturing customised product(s) and manufacturing processes are also same.

An attempt has been made to elaborate and describe the costing system adopted by telecommunication and computer sector of electronic industries.

COST IN GENERAL

Cost is defined as resources sacrificed to achieve a specific objective. Corporate cost objectives are to develop and maintain costing for an organisation at large and product costing in particular.

To fulfil the corporate cost objectives, sample companies have developed cost accounting by expense items, departments and product. Cost accounting by expense items and departments are achieved by adopting integral accounting system, which is discussed in detail.
For each assembly a job order number is allotted by the manufacturing support department. Each assembly has a unique assembly code for compilation of cost data.

For ease of cost data collection and identification of the point of occurrence of direct costs and/or indirect costs, the departments have been grouped into different cost centres.

COST CENTRES

A cost centre is a place of activity with a clearly defined physical boundaries of work, where certain specified activities are carried out by consuming different kind of resources in varying amount, with the objective of achieving results in conformity with the corporate objective.

For the purpose of implementing proper and accurate costing system, the activities are divided into four parts i.e. production cost centres, service cost centres, staff cost centres and research and development centre.

Production Cost Centres

The name of production cost centres with reference to the processes covered are as under:

<table>
<thead>
<tr>
<th>Name of Cost Centre</th>
<th>Mfg. Processes covered</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Input testing</td>
<td>Incoming inspection</td>
</tr>
<tr>
<td>(2) PCBs preparation</td>
<td>PCBs baking</td>
</tr>
<tr>
<td>(3) Components forming</td>
<td>Components forming</td>
</tr>
<tr>
<td>(4) Package assembly</td>
<td>Package assembly</td>
</tr>
<tr>
<td>(5) Soldering</td>
<td>Soldering</td>
</tr>
</tbody>
</table>
### Name of Cost Centre | Mfg. Processes covered
---|---
(6) Packages preparation | Lead cutting, back package, washing
(7) Package testing | Package testing
(8) Mechanical assembly | Mechanical assembly, wiring
(9) Integration | Integration
(10) Configuration testing | Configuration testing
(11) Equipment testing | Equipment testing, packing

### Service Cost Centres

1. **Factory Management**:
   1. Manufacturing support department
   2. Production planning and service department

2. **Materials Management**:
   1. Materials administration
   2. Stores
   3. Purchase

3. **Utilities**:
   1. Air conditioning plant - Factory

4. **Personnel**:
   1. Time keeping department
   2. Staff canteen - Factory
   3. Staff medical room

### Staff Cost Centres

1. **Administration**:
   1. General administration
   2. M.D.'s office
   3. Chief Executive's office
   4. E.D.F.
   5. Finance and accounts
   6. Costing and pricing
   7. Staff canteen - Office
   8. Air conditioning plant - Office
(2) Marketing:

1. Sales Administration and Distribution
   i. Factory and head office
   ii. Regional office(s)

2. Installation and Commissioning
   i. Factory and head office
   ii. Regional office(s)

3. After-sales Services
   i. Factory and head office
   ii. Regional office(s)
   iii. Service centre(s)

Research and development centre

SYSTEM

The costs of the organisation are divided into the following four main cost elements:

1. Materials consumption costs
2. Direct costs or Conversion costs
3. Indirect costs or Overhead
4. Research and development costs

Materials Consumption Costs

Materials consumption costs for each cost centre are directly available from the Materials issue slip. Materials consumption includes raw materials, mechanical parts, bought out items and traded items.

Direct Costs or Conversion Costs

Costs which are identifiable with particular production cost centre are known as direct costs or conversion costs of the concerned production cost centre.

The direct costs include consumables, depreciation of plant and...
machineries and other capital items, manpower costs and power costs etc.

Indirect Costs or Overhead

Costs which are identifiable with particular service cost centre and staff cost centre are known as indirect service costs (service overhead) and indirect staff costs (staff overhead) respectively.

The indirect costs include consumables, depreciation of plant and machineries and other capital items, manpower costs, power costs, staff and labour welfare expenses, expenditure on repairs and maintenance, travelling and conveyance expenses, stationery and printing etc.

Indirect service costs or service overhead

Indirect service costs or service overhead are classified and grouped into two types i.e. factory overhead, and materials overhead.

Factory overhead comprises of the expenses incurred at the factory to maintain and sustain manufacturing activities, other than expenses identifiable to the production cost centres. It also includes the expenses incurred maintaining and maintaining uninterrupted and quality flow of production.

Materials overhead comprises of the expenses incurred for procurement, storage, insurance premium of raw materials and supplies during transit and storage, issuance of materials to user departments, handling of raw materials and supplies, work-in-process, finished stock and other materials.
Indirect staff costs or staff overhead

Indirect staff costs or staff overhead are classified and grouped into two types i.e. administration overhead, and marketing overhead.

Administration overhead comprises of the expenses incurred for directing the organisation and controlling the operation of a company which is not related directly to research and development, production, selling and distribution activities etc. It also includes the expenses incurred for maintaining the time keeping department as well as expenses incurred for the general benefits of the employees of the company at large, e.g. staff canteen, staff medical room and first-aid medical hall etc.

Marketing overhead are classified and grouped into three types i.e. selling overhead, installation overhead, and after-sales overhead.

Selling overhead comprises of the expenses incurred for creating and stimulating demand and of securing orders, such as advertisement, cost of sales engineers, sales agents etc. as well as expenses incurred in the process which begins with making the equipment produced available for despatch and despatch it to the customer’s site e.g. warehouse and storage expenses, packing and shipping expenses etc.

Installation overhead means installation and commissioning expenses incurred at customer’s site to make equipment workable.

After-sales overhead comprises of the expenses incurred for providing after sales services to the customer during the
warranty period as well as during the annual maintenance contract period, such as administration expenses of service centres, cost of service engineers, cost of materials or spares used for servicing of equipment etc.

Research and Development Costs

Research and development cost comprises of the expenses incurred for searching new or improved products, new application of materials or new or improved design or Packages and/or Mechanical assembly; expenses incurred for putting the result of research on trial production to prove the result of research etc. Research is carried out by the research staff of the company, working in research and development centre.

COSTING SYSTEM EXPLAINED

Materials Accounting

In referred sectors, material's cost represent a significant proportion of total costs of production. There is also a wide range in the relative values of individual material.

The materials cost is ascertained from two primary documents i.e., the Supplier's invoice setting out the value of goods purchased and the Material issue slip detailing the materials issued to the production. Companies are keeping tight control over the more valuable items e.g., active devices such as ICs, digital ICs, memory i.e., diodes, memory varistors etc., and passive devices such as resistors, capacitors, etc.,

The basic accounting record for materials is the Stores ledger, which contains an account for each item held in stock. As
number of items held in stocks are more, companies have computerised inventory system, so that materials control and accounting is proper and perfect. The stores account is credited with materials received and debited with issues from stock and/or stores to the cost centres and/or user departments.

The companies are maintaining up to date records showing receipts, issues, and balances, both in quantity and value for each and every item of material stocked.

In the Stores ledger, debits are raised from Materials receipt report and Materials return slip, and credits are raised from Materials issue slip.

Labour Accounting

Labour cost is relatively more significant within the context of direct costs and indirect costs in the referred sectors.

By establishing one-to-one relationship between employee and cost centre, it is possible to allocate employees cost to the cost centre where he/she is working. Costing department is allotting the cost centre to which employee belongs to for each and every employee of the company, based on a detailed organisation layout submitted by the personnel department and concerned department(s).

As well as, based on link established between cost centre and direct costs and cost centre and indirect costs, it is possible to identify and accumulate categorywise conversion costs and overhead.

Accounting of Depreciation
Every company is maintaining adequate records in respect of its fixed assets. These records are indicating the cost of each item of asset including installation charges. In any case of installation, the rate of depreciation and the name of cost centre where asset is installed and utilised. For the purpose of cost accounting the accepted practice in the sector is to consider depreciation at the rate of 20% (straight line method) for all equipments as the chances of getting the equipment technologically obsolescent are more.

Accounting of Royalties or Technical Aid Payments

Adequate records are maintained showing the royalty paid or any other payment made to the foreign collaborators in terms of agreements entered into with them. Such records are kept separately in respect of each foreign collaborator. The basis of calculating the royalty for the relevant period is indicated in the costs record.

In the referred sectors, payment of royalty is based either on the units sold or on units produced. In some cases, it is charged as a percentage of value added.

When it is charged as a percentage of value added; the definition of value added is specified in the terms of agreement e.g., it is stated that value added is the difference between net sales realisation and raw materials cost. In this case, the items covered under raw materials are also specified separately. When royalty is payable as a percentage of value added or fixed amount per unit sold, the royalty expenses is charged on selling overhead.

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When it is charged as a fixed amount per unit produced, the royalty expenses is treated as a direct charge to the production.

**Accounting of Interest Charges**

Interest is paid on borrowed capital. Capital can be borrowed for funding the working capital as well as for installing the required plant and machineries.

In the referred sectors, it is believed that all capital requirements are met from long-term finance sources i.e. loans from financial institutions, debentures, fixed deposits; whereas, all working capital requirements are met from short-term finance sources i.e. overdraft from bank, inter corporate deposits, cash credits from banks. Interest paid or payable on capital expenditure finance via long-term loans or debentures and/or working capital loans via short-term loans are treated as an administration overhead.

**Compilation of Production Data**

Costing department is maintaining adequate records in respect of production. On the basis of daily production reports received from the production planning and service department, department-wise production records are maintained. The production records are containing all information relating to production of the department; i.e. date of production, job order number, assembly code and assembly description, package code and package description, quantity produced, processing hours in terms as well as per unit of quantity produced, number of components per package and total components.
COMPILATION OF COST STATISTICS BY INTEGRAL ACCOUNTING

For the purpose of efficient and effective cost accounting system and product costing system in particular, the sample companies have established "Cost accounting by expense item, department and product". For effective cost accounting system, classification and accumulation of cost data is based on occurrence of cost; rather than to allocate and apportion them on some hypothetical base. With the help of computer and application programmes, it is possible for the companies to analyse and accumulate cost data cost centre-wise.

The aim of cost accounting system is to compile costs by cost centre. For example, costs are often routinely traced to a cost centre, the smallest segment of an activity or an area of responsibility for which costs are incurred. The accumulation of costs by cost centre is the prime task of costing department in the sample companies.

In the integral accounting system, same prime documents are used for financial accounts as well as for cost accounts. At the time of considering accounting entries costing person decides the point of occurrence of cost and in turn cost centre for which cost is incurred.

Compilation of Overhead

Cost Centre and Direct Cost

A direct link is established between cost centre and direct cost. For the purpose of identification of direct cost, production cost centre-wise, companies have named each direct cost, cost centre-wise. Costing department has developed a table stating
production cost centre name, production department name, and name of direct costs of that department, which is as under :

<table>
<thead>
<tr>
<th>Name of Production Cost Centre</th>
<th>Name of Production Department</th>
<th>Name of Direct Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Input testing</td>
<td>Input testing</td>
<td>Testing direct cost</td>
</tr>
<tr>
<td>2) PCB’s preparation</td>
<td>Assembly</td>
<td>Assembly direct cost</td>
</tr>
<tr>
<td>Components forming</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Package assembly</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3) Soldering</td>
<td>Soldering</td>
<td>Soldering direct cost</td>
</tr>
<tr>
<td>4) Package preparation</td>
<td>Preparation</td>
<td>Preparation direct cost</td>
</tr>
<tr>
<td>5) Package testing</td>
<td>Package</td>
<td>Package direct cost</td>
</tr>
<tr>
<td>6) Mechanical assembly</td>
<td>Mechanical</td>
<td>Mechanical direct cost</td>
</tr>
<tr>
<td>7) Integration</td>
<td>Integration</td>
<td>Integration direct cost</td>
</tr>
<tr>
<td>8) Configuration testing</td>
<td>Configuration and equipment</td>
<td>Equipment testing</td>
</tr>
<tr>
<td></td>
<td></td>
<td>direct cost</td>
</tr>
<tr>
<td>9) Equipment testing</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Cost Centre and Indirect Cost :

Tables are prepared by costing department, describing the types of service overhead and staff overhead in detail, with particular reference of cost centres forming part of each category of overhead, which are as under :

1. Service Overhead :

Service overhead are classified into two types i.e., factory overhead, and materials overhead.
Overhead category

Cost centres forming part of overhead category.

1) Factory overhead

Factory Management:
- Manufacturing support department
- Production planning and service

Utilities:
- Air conditioning plant - Factory

Personnel:
- Time keeping department
- Staff canteen - Factory
- Staff medical room

2) Materials overhead

Materials Management:
- Materials administration
- Stores and purchase

3) Staff Overhead:

Staff overhead are classified into two types i.e. administration overhead, and marketing overhead. Marketing overhead are further classified into three types i.e. selling overhead, installation overhead, and other sales overhead.

Overhead category

Cost centres forming part of overhead category.

1) Administration overhead

Administration:
- General administration
- H.O.'s office
- Chief Executive's office
- E.O.T.
- Finance and accounts
- Costing and pricing
- Staff canteen - Office
- Air conditioning plant - Office

2) Marketing overhead

1) Selling overhead

Sales Administration and Distribution
- Factory and head office
- Regional office(s)

II) Installation overhead

Installation and Commissioning
- Factory and head office
- Regional office(s)

- 125 -
iii) After sales - 
overhead

- Factory and head office
- Regional offices:
- Service centre(s)

Research and Development Cost

The expenses incurred for carrying out research and development activities, at research and development centres are accumulated separately, and are known as research and development cost.

Adequate records showing the details of expenses incurred by the company for the development of new products, new designs, etc., are maintained by and through this department.

The R and D expenditure is in the nature of pre-production costs and there is considerable time lag between the incidence of expenditure and the realisation of benefits.

The companies are amortizing the cost of R and D in next three years. The amortized value of R and D cost is omitted from the calculation of the cost of production. It is always treated as an item of Costing profit and loss account.

CLASSIFICATION, ALLOCATION AND APPORTIONMENT OF EXPENSES

Expenses are classified into a number of specified heads so that items of expenses of a similar nature may be grouped together under one head. This is the smallest sub-division of expenses made for the purpose of accounting and control. Expenses are collected and classified by using the prime documents of financial accounts i.e. payment vouchers, journal vouchers, debit notes and credit notes.
Departmentalisation of Expenses

The next step in the cost accounting and control, is to allocate the expenses to cost centres and summing up the expenses cost centre wise as well as account head wise. This is known as Departmentalisation of expenses.

Absorption of Expenses by Product

All products and/or jobs pass through one or more production cost centres. The expenses pertaining to a cost centre are ultimately charged to or absorbed in the costs of the products and/or jobs that pass through it, in such a manner that the cost of each unit of production of the cost centre includes an equitable share of the total expenses of that production department.

For the purpose of absorption of expenses in the costs of jobs and/or products, overhead rates related to suitable bases are determined, for each and every conversion cost and overhead.

Bases for Conversion Costs Absorption:

Considering the nature of operations, processes and workflow, the following bases are used by company for absorption of each type of conversion costs.

<table>
<thead>
<tr>
<th>Name of Conversion Costs</th>
<th>Bases for absorption</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Testing</td>
<td>Testing hours OR Number of components tested</td>
</tr>
<tr>
<td>2) Assembly</td>
<td>Processing hours OR Number of components mounted or inserted</td>
</tr>
<tr>
<td>3) Soldering</td>
<td>Processing hours OR Number of packages soldered</td>
</tr>
<tr>
<td>4) Preparation</td>
<td>Processing hours OR Number of packages prepared</td>
</tr>
</tbody>
</table>
### Name of Conversion Costs

<table>
<thead>
<tr>
<th>Name of Conversion Costs</th>
<th>Prices for absorption</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Package</td>
<td>Processing hours OR Number of packages tested</td>
</tr>
<tr>
<td>2) Mechanical</td>
<td>Processing hours</td>
</tr>
<tr>
<td>3) Integration</td>
<td>Processing hours OR Number of products integrated</td>
</tr>
<tr>
<td>4) Configuration and equipment testing</td>
<td>Processing hours OR Number of products tested</td>
</tr>
</tbody>
</table>

The company, which has not established Technical Efficiency Organization (T.E.O.), has adopted number of components mounted, number of packages and number of products as a base for calculating conversion cost recovery rate.

**Calculation of Conversion Costs or Direct Costs Absorption Rate and Conversion Costs or Direct Costs Absorption in Costs of Product:**

The basic procedure is to divide the amount of departmental conversion costs by the total number of units of the base selected.

The rate so obtained is multiplied by the units of the base contained in each individual product and job, in order to arrive at the conversion costs of each unit of output.

**Conversion Costs Recovery Rate**

Departmental Conversion Rate = \( \frac{\text{Conversion costs of the department}}{\text{Total quantum of base}} \)

**Conversion Costs Absorption in a Product**

\[ \text{Conversion Costs Absorption in a Product} = \text{Departmental \times Units of conversion contained in the product} \]
Overhead Absorption Rates and Absorption of Indirect Costs or Overhead in Costs of Product:

<table>
<thead>
<tr>
<th>Service Overhead or Staff Overhead</th>
<th>Basis of absorption</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Materials overhead</td>
<td>Percentage of raw materials and components consumption</td>
</tr>
<tr>
<td>2) Factory overhead</td>
<td>Percentage of operating costs. Operating costs means sum of raw materials and components consumption, direct conversion costs and materials overhead.</td>
</tr>
<tr>
<td>3) Administration overhead</td>
<td>Percentage of works costs. Works costs means operating costs plus factory overhead.</td>
</tr>
<tr>
<td>4) Marketing overhead</td>
<td>Percentage of cost of production. Costs of production means works costs plus administration overhead.</td>
</tr>
</tbody>
</table>

COST ASCERTAINMENT

Cost ascertainment refers to the technique and process of ascertaining the costs, i.e., cost of company and products.

The procedural aspects and methods followed by the sample companies for ascertaining the costs have been discussed in details in earlier parts.

By taking into consideration, processes and work flow, companies are doing cost calculation on yearly basis. Similarly the production cycle time as well as specific operational problems, are considered by companies for adopting yearly actual costing system.

STANDARD COSTING

Companies are adopting standard costing system for the
product(s). The mixture of standard and actual costing system for the final product(s), for the simplification and summarization is adopted.

This combination of a system is operated by taking care of the following points:

1. Standard costs are calculated for sub-assemblies and/or finished product(s) in advance. Such costs are calculated based on past performances and are estimated for next year. The calculations are mainly based on past historical performances and are calculated in the nature and style of actual costs only, but they are used for next predetermined period. Such costs are mainly for parts, sub-assemblies and finished products in advance.

2. The costs are estimated by estimating all components or costs.

3. The costs are estimated only for the needed sub-assemblies and/or finished product(s).

4. For the purpose of estimating the material cost, the rate per unit for all parts are estimated by taking into consideration actual rate prevailed as on date and expected variations in the rate in near future. The required quantities for each part in an assembly are available from standard part list (Bill of materials) and/or from production planning and service department.

5. The direct conversion costs and production are estimated for each and every production department in consultation with the marketing department and annual budget. The estimated direct conversion cost absorption rate is calculated by dividing the amount of estimated departmental conversion cost by the total number of units of the base selected for the estimated production.
The estimated rate so obtained is multiplied by the units of the base contained in each individual sub-assembly and/or finished products in order to arrive at the estimated conversion costs of each sub-assembly and/or finished products.

The estimated costs are mainly useful for valuing the stock of sub-assemblies as well as for compiling the costs of finished products(s) in time. The estimated costs are used as a base at the time of deciding the prices of the product(s).

The variance between actual costs and standard or estimated costs of sub-assemblies or assemblies are calculated and compiled separately for each year. The significant variances in costs are analyzed and reported to the management. The variances are treated as items of Costing profit and loss account.

CONCLUSIONS

The study reveals that the sample companies have installed well defined cost accounting system. For ease of cost data collection, and identification, of the point of occurrence of costs, the activities of the company have been grouped into different cost centers, and main elements of costs have been decided by the sample companies. For ascertaining of the costs of the company and products, the procedural aspects and methods, followed are well defined by the sample companies.

The sample companies are using standard costing system for the valuation of sub-assemblies in stock as well as for monitoring the performance of company, department(s), and product(s).
COSTS CALCULATIONS

GENERAL VIEW

The analysis and study reveals that, more or less the manufacturing processes for telecommunication equipment and computer equipment manufacturing and/or assemblies are same, which has already been discussed in detail in Chapter 17. The cost accounting system adopted by both referred sectors are same, the infrastructural facilities i.e. capital plants and machineries are also more or less similar except for the package testing department, where only specific machines are required for both referred sectors.

An attempt has been made in the study, based on a detailed examination of the costing system and empirical data, to calculate the Standard (National or Estimated) costs and Actual costs of the company and in the product for the year (a period of twelve months).

Standard company’s cost data and product cost data are used for number of purposes within the company and externally. As the referred sectors have become more competitive and complex, product cost information takes on an even greater role in helping the management of the company to determine external and internal prices for product(s), decide on new product introduction and product abandonments, and to identify improvement opportunities for product line and product mix.

The variance between actual costs and standard costs of product(s) are calculated and compiled separately for a year.
CALCULATION OF COSTS OF COMPANY AND PRODUCT(S)

The researcher has selected three models from each referred sector i.e. telecommunication and computer sector. The names of models are as under:

For Telecommunication sector:

i. EPABX - 150 lines
ii. EPABX - 250 lines
iii. MODEM

For Computer sector:

i. PC - XT
ii. Mini Computer
iii. Mainframe Computer

To compile and calculate the costs of the company and of the product, researcher has considered a year as a period of costs computation.

Costs Components

Following costs components are considered at the time of calculating and compiling the product costs for each model of product(s):

1. Raw materials and components consumption
2. Direct conversion costs
3. Materials overhead
4. Factory overhead
5. Administration overhead
6. Marketing overhead
Sequence and Methodology

The following sequence and methodology is used to calculate and compile the standard and actual costs of the company and of the products i.e. six models (three models of telecommunication equipments and three models of computer equipments), in line with cost accounting system as discussed in this chapter.

1. Raw materials and components consumption costs:

The raw materials and components consumption costs is calculated by categorizing the raw materials and components into:

i. Active devices and components i.e. VIF ICs, MOS ICs, transistors arrays, hybrid ICs, RAM ICs, ROM ICs, SR ICs, MOS CPU ICs, INF ICs, digital ICs, transistors, photocouplers, oscillators, capacitors etc.

ii. Passive devices and components i.e. rectifying diode, signal diode, zener diode, varistors, LED, resistors etc.

iii. Printed circuit boards (PCBs)

iv. Wire wound components and other components i.e. transformers, delay line, coils, heat sinks, switches, relays etc.

v. Connectors i.e. LCD, fuse, circuit breakers, wire, shrinkable tubes, connectors, crimp terminals, fuse holders, IC sockets etc.

vi. Other mechanical and bought out items i.e. cabinet, power supply, MDF and bays etc.

vii. Peripherals i.e. visual display units, key boards, printers etc.

The summarized workings of standard and actual materials
2. Compilation of departmental direct Costs:
   i. Capital investment costs - departmentwise are compiled and depreciation is calculated on it. The detailed workings of the same are exhibited in Proforma No. II.1 to II.15.
   ii. Power costs - departmentwise are compiled and calculated which are exhibited in Proforma No. III.1 and III.2.
   iii. Manpower costs - departmentwise for all categories of employees are calculated and exhibited in Proforma No. IV.1 to IV.30.
   iv. Departmentwise direct costs for both referred sectors are calculated and exhibited in Proforma No. V.1 to V.4.
   v. Conversion costs recovery rate are calculated and exhibited in Proforma No. VI.1 and VI.2.
   vi. Overhead absorption rates for both referred sectors are calculated and exhibited in Proforma No. VII.1 to VII.4.
   vii. Conversion costs absorption by each model of products are calculated and exhibited in Proforma No. VIII.1 to VIII.12.
   viii. Product costs for each model of products are calculated and exhibited in Proforma No. IX.1 to IX.12.

Summary of costs of product and variance analysis

The summarized statement showing the costs of sales of each model of product - standard, actual and variance are presented in Table 5.3.
The difference between the standard, set up for an element of expenditure or costs, and the actual, performance recorded is called variance - the measure of deviation of actuals from standards. In case of expenditure or costs, if the actual is more than the standard, it called adverse variance, denoted by negative sign (−), as it adversely affects the company, causing lower profit from the standard planned profit. Similarly, when the actual expenditure is less than the corresponding standard expenditure, it results in favourable variance, denoted by positive sign (+).

The major cost componentwise variance analysis are done for each model of equipment, which are exhibited in Proforma No. 5.1 to 5.6.

The adverse and/or favourable variance in costs of sales for each
The model of product(s) is required to be analysed componentwise. The detailed analysis will highlight the areas where the remedial actions are required. It is also required that such type of analysis should be done immediately, and to be reported to the concerned management level so that prompt actions can be initiated, to stop the such type of variances, and to have reasonably correct standard or estimated costs for future references.

Just a variance in materials cost or conversion cost or in expenditure does not give any clue to control but only locates the source - each variance is to be analyzed up to component levels and causes are decided, so as to pinpoint the responsibility with the ultimate objective of achieving cost control. Once the elementwise main variance is computed, by splitting it up, it is possible to find out what ultimately caused to that variance. The most troublesome aspect of feedback is to decide when a variance is significant enough to warrant management’s attention. For some items, a small deviation may prompt follow-up. For other items, a minimum amount of 5, 10, or 25 percent deviation from standard may necessary before investigations commence.

So, in short, variance analysis can be conducted at various levels of details, depending on managers’ preferences. In the case of regular variances, it is must for a management, to decide the standards at attainable level inspite of an arbitrary level.

CONCLUSIONS

Based on practical costing system and empirical data, costs for the company and finished products have been calculated and presented in this study. Three models from each sector has been selected and cost (both standard and actual), have been calculated.
MARKET STRUCTURE

The telecommunication equipments and computer equipments are of the nature of capital items for purchaser or customer. These are the durable goods that are worn down only through two or more years of use and part of whose cost is charged off each year as depreciation. These are most expensive single items that the company is likely to buy; they become part of the company's fixed plant, having to be replaced only when they are worn out or become relatively inefficient.

The telecommunication and computer equipments are needed by private sector, public sector undertakings etc.. The equipments manufacturers are few in number while the customers or purchasers are many in number. Here, the large share of the market is accounted for by a few large manufacturers. Here, one dominant company sets a price which is followed by other companies in the sector. There is no agreement for other companies to follow the price leadership but they usually do, because the events causing costs increase to leader or dominant company, trigger the costs increase to other companies in the sector(s) with more or less magnitude.

The demand for equipments are derived rather than primary. The purchaser is much more concerned with finding the equipment that performs the best function for a given cost or performs the function at a given level for the minimum cost. Any personal preferences or affinities felt by the buyer toward one equipment or another are totally irrelevant.
Purchaser is fully aware about competing vendors, their products, and their terms of sale agreement. Purchaser has intellectual command on various technicality of the product which he wants to buy, e.g., the calculation speeds for computer equipment and uninterrupted data and/or voice transmission capacity for telecom equipment etc..

The purchaser's decision is influenced by the number of factors, i.e., 1) price of the equipment, 2) technical performance e.g., calculation speed of the computer, memory capacity of the equipment, compatibility of the equipment, continuous functioning of the equipment, voice loss of the telecom equipment, uninterrupted flow of data and/or voice transmission of telecom equipment etc., 3) reliability of the equipment i.e. quality consciousness image in the market for the company's product, quality assurance, brand name etc., 4) services e.g. meeting with customer's complaint and after sales services, the availability of spares and immediate actions for upkeep the customer's equipment etc., 5) advertising and packaging of the product.

PRICING

Price assuming paramount importance in present situation, the basic reason for the same is that purchaser specifies the product characteristic i.e. quality, reliability and continuity of functionings of the equipment and also the major service requirements i.e. delivery time, after sales services etc..

The determination of product price is more important here, because the products are like custom products for atleast two reasons. First, because custom products are not standardised, management has to arrive at a new price for each such type of
Product prices cannot be set simply by matching the price offered by competitors for similar types of products, because the competitors' prices are not known. Second, price is the most important method of competition in the manufacture of custom products; competing through product differentiation is impossible because the physical characteristics and service requirements for the products are specified by the customer. Another important characteristic of pricing custom products is the frequency with which such decisions must be made.

In this sector(s) prices are fairly rigid for the pricing 'season', as the members of the sector learn that in the long term sharp price competition usually harms all companies.

The sample companies have considered a year (period of twelve months) as a best pricing 'season', to estimate the cost of the product(s) and to adopt the same for pricing decision. The sample companies are reluctant to change prices in response to fluctuation in demand and costs, a reluctance has led companies to a well defined pricing 'season' during which prices do not normally change, companies normally make some allowances in setting prices for cost changes which might occur during the season, as a result of wage bargainings, changes in input costs etc.,

Prices are being set for a season, and being adjusted at the beginning of a new season for any change in costs that have been incurred.

Pricing Options

The study reveals that cost is an important determinant of basic
price for companies engaged in referred sectors.

For fixation of price based on costs, any of the following methods may be used:

1. Total Costs or Full Costs method: Under this method, selling price is based on total costs. To arrive at the selling price all components of costs are added, may also include opportunity costs, if any, and estimated or desired percentage of profit.

2. Conversion Cost method: This method of pricing is based on the concept that profit should be related to the services performed i.e. value added in the form of conversion cost. Conversion cost is the sum total of direct expenses including wages and production overhead in connection with converting raw materials into partly or fully finished product. This method is generally adopted in case of job work contracts.

3. Return on Investment method: This method based on cost plus desired rate of return on capital employed in financing the production and sale.

4. Marginal Cost method: Marginal cost being cost directly pertaining to a particular product, represent the minimum price line for that product and prices may be fixed at a level above the marginal cost.

5. Differential Cost method: Under this method, selling price is based on differential cost, which results from the adoption of an alternative course of action or increase in an activity.

6. Standard or Estimated Costs method: Under this method, selling price is based on standard or estimated costs, which resulted from determination of fairly accurate estimates of
costs.

7. Learning Curve method: Under this method, product pricing is based on production efficiency due to longer run of manufacturer (longer batch quantity) and repeat operations.

The various methods of pricing mentioned above should not be taken as exclusive. In fact, while dealing with pricing problems, the management of the sample company is making best use of all the techniques.

Prevailing Pricing Method

The sample companies engaged in both sectors, feels that full costs combined with Estimated costs is an extremely practical tool for arriving at a competitive price quotation.

The sample companies engaged in both sectors are normally setting their prices for the product(s) or equipment(s) by adopting mixture of Full costs method and Standard or Estimated costs. Typically, all estimated costs are included, including a usually arbitrary allocation of overhead made on the basis of expected operating levels for a period or year.

The estimated profit or mark-up is added in total estimated costs for determination of selling price of the product. The profit or mark-up is added to the total costs as a percentage of total cost of sales or as a percentage of sales price. The mark-up vary according to company's need to obtain order and the strategic importance of the order for future.

Types of Prices:

The companies engaged in both sectors, are adopting estimated
full costs based pricing, and setting out the desirable goals for price to attain. The companies which are not leading in the sector, are differentiating their product(s) from the low-priced product(s) with which it is competing, for example by quality assurance, speed, compatibility with different available latest technologies, warranty period, after sales services etc. Product differentiation has the general effect of impeding substitution and hence of increasing the pricing discretion of the individual supplier.

In practice, companies are used to have three types of prices for a product, i.e., list prices, below list prices and strategic prices, which will be used by the concerned authorities of the company by taking into consideration number of factors e.g., the financial position of the company at a particular point of time, the strategic importance of the order, the credit-worthiness of the order, the chances to penetrate into the new market segment etc.

1) List Prices (LP):

These are the quotation prices used by sales personnel at large for quoting to the customers' or prospective customers', and largely orders are booked at this prices. The list price is usually have a good percentage of mark-up, on estimated costs of the equipment, which has been decided by the management of company by taking into consideration estimated sufficient return on investment and future diversification plans etc.

2) Below List Prices (BLP):

These are the discounted quotation prices (prices after reducing certain percentage as discount from the quotation...
prices). These prices can be quoted only by the Marketing Manager and at these prices order can be booked by Marketing Manager only (a specific justification note is to be prepared and forwarded to the Managing Director of the company by Marketing Manager).

3) Strategic Prices (SP):

These are the prices 1) with very nominal mark-up or 2) at the level of full costs of the product or 3) below than the full costs of the product. Generally, at this prices orders can be booked only when order is of the strategic importance e.g., credit-worthiness order, order which can be useful to penetrate into the new market segment etc. These prices can be used by Managing Director only (a post approval of the Board of Directors is required for the such type of order).

Key Factors to be kept in mind:

Following key factors are to be kept in mind by the company's management at the time of deciding the pricing strategy:

1. Information about industry:

Because of imperfect competition in the industry, pricing cannot be done in vacuum, it is important for the management, to have solid, current information about the industrial environment in which the company is operating, current economic conditions, for both the national economy and their particular industry, the existence of excess capacity in the industry, and the current state and rate of technological changes in the industry. Using this information, management must decide whether or not the current, short-term economic situation requires the (temporary) modification of its full-cost pricing formulae. Data about the
industry will also permit management to evaluate its own productive efficiency against that of its competitors; an inefficient producer will not be able to charge a higher price simply because he needs it in order to cover his greater costs.

2. Calculation of the Costs of the Product:

One of the basic requirements of a full-cost pricing is that costs of the product should be calculated or estimated by adopting scientific study and should be done very systematically.

3. The Volume Assumptions:

The allocation of costs requires not only the selection of a basis of allocation but also an assumption regarding the volume of production over which the costs are to be spread. The price formulae should be based on some estimate of normal volume which represents the approximate utilization of capacity that a company could expect to achieve in the long-run. Clearly, trying to change the volume assumption to reflect current economic circumstances only causes the pricing formulae to produce prices that move in the wrong direction.

4. Adaption of changing circumstances:

The most important aspect of pricing formulae is that they are made to be changed. If the price formulae is not successful when measured by these standards, it should be changed. Perhaps the best, and certainly the easiest, way to modify a pricing formulae is in terms of the profit allowance (profit mark-up) that is added to the total costs. The profit allowance can be easily raised or lowered, and has the effect of an across-the-board price reduction or increase, with the amount of the change reflecting the current economic situation. Recognizing this need
Pricing formulae are imperfect tools at best, but when carefully developed by well informed management they can be vital tools for increasing profits.

CONCLUSIONS

One dominating company sets a price based on estimated costs, which is followed by other companies in the sector. The customer is fully aware about competing products, and their terms of sale agreement. The customer's decision is influenced by number of factors i.e. price of the equipment, technical performance e.g. speed, memory, compatibility of the equipment etc., reliability of the equipment, after sales services, advertising, and packing of product.

The companies taken in the sample, are adopting mixture of full costs and standard costs for arriving at a competitive price quotation. In practice, companies are used to have three types of prices for a product i.e. list price, below list price, and strategic price, which will be used by the concerned authorities of the company.

At the time of deciding the prices for the product(s), company's management is considering current status and position of the national economy, industrial environment in which company is operating, assuming the volume or production for the future period etc.. Once the prices have been decided, management is regularly reevaluating the prices of the product(s).
REFERENCES


2. Ibid., pp. 24-25 and 812-813

3. Ibid., p. 21


8. Ibid., pp. 1.11 - 1.12

9. Ibid., pp. 1.11 - 1.17

10. Ibid., pp. 16.29 - 16.31


14. Ibid., pp. 8.18 - 8.19

15. Ibid., p. 9.1

16. Ibid., p. 1.4


19. Ibid., p. 27


