APPENDICES
APPENDIX 1

SCHEDULE TO SMALL INDUSTRIALISTS IN THE INDUSTRIAL ESTATES
(Tick the appropriate box wherever necessary)

I. BASIC INFORMATION

Industrial estate with address:

1.0 INTRODUCTION

1.1 Name and address of the Unit:

1.2 Date of commencement of work:

1.3 Status:  □ Sole Proprietorship  □ Partnership
            □ Private Ltd. Company

1.4 Products Manufactured by the unit (Specify)

: 1. __________________________

: 2. __________________________

1.5 Initial Capital Invested:
   (i.e. investment in plant, equipment and machinery)

1.6 The nature of activity is:

1.7 Factors for the location of the Unit:

1.8 Mention the initial difficulties faced in setting up the units:
II PROBLEMS

2.0 PHYSICAL ACCOMMODATION AND INFRASTRUCTURE

2.1 What is the size of area occupied by your unit?

2.2 State the mode of acquisition of Industrial shed:

2.3. a) Name the common service facilities availed by you in your estate?

b) Are they adequate?: □ Yes □ No

c) If not, what are the arrangements made by you?

d) Give your suggestions to improve common service facilities?

2.4 What are the facilities extended by the Government to your unit?

☐ Machines on hire purchase
☐ Concessions & Subsidies
☐ Loan at cheap rate of interest
☐ Quota and permit for raw material
☐ Training facility
☐ Warehousing
☐ Preference in purchase of finished product
☐ None of the above

2.5 What are the problems faced in factory accommodation?

2.6 Suggest measures to overcome the above problems:

3.0 POWER

3.1 What is the total power consumed by your unit per annum (in '000 Units):

3.2 Do you still feel that the power-cut is a major hindrance to the normal functioning?

☐ Yes □ No
3.3 When regular power supply is not obtained, what other arrangements have been made?

3.4 What percentage of the total expenditure on power you spend on the following?

   a) Electricity from TNEB: 
   b) Hiring/Maintaining the Generator: 

   Total: 100%

3.5 What sort of power problems do you face?

- [ ] Difficult to get power connections
- [ ] Inadequate Power Supply
- [ ] Frequent voltage fluctuation
- [ ] Higher and uneconomic power tariff
- [ ] Irregular Power Supply
- [ ] Any other (Specify)

3.6 What suggestions you offer in overcoming power problem:

4.0 FINANCE

4.1 Source of Finance:

- [ ] Own Funds
- [ ] Commercial Banks
- [ ] Financial Institutions
- [ ] Friends and Relatives

4.2 State the quantum of working capital required by you per annum

4.3 (a) Do you avail subsidies and concession [ ] Yes [ ] No

(b) If yes, state whether it is:

- [ ] Capital Subsidy
- [ ] Sales Tax subsidy
- [ ] Excise Exemption
- [ ] Power subsidy
- [ ] Export concessions
- [ ] Any Other
(c) Do you face difficulties in getting subsidies?

☐ Yes  ☐ No

(d) If yes, state the reasons therefor:

4.4 What are the financial problems faced by you?

☐ Lack of adequate and timely finance
☐ Exorbitant rate of interest when borrowed from Private Sources
☐ Delays in the settlement of bills by customers
☐ Difficulty in meeting the security requirements of lending institutions
☐ Any other specified

4.5 How will you overcome the above problems?

5.0 MARKETING

5.1 What is the extent of market for your production?

☐ Local  ☐ Local and Regional
☐ Regional and National  ☐ International

5.2 How do you sell your Product?

☐ Direct  ☐ Through Intermediaries
☐ Through Government - NSIC, SIDCO etc.

5.3 How does your unit popularise its products?

☐ Press media  ☐ Outdoor publicity
☐ Audio-visual methods  ☐ Dealers
☐ Any other (Specify)

5.4 a) Do you export your products?  ☐ Yes  ☐ No

b) What is the share of exports to the total turnover of your unit in a year?

☐ Upto 25 percent  ☐ 25-50 percent
5.5 (a) Do you face any marketing problem? □ Yes □ No

(b) If yes, Specify

□ Lack of adequate orders  □ Excessive Government regulations
□ Competition  □ Delayed Payments from customers

(c) Suggest measures in solving the above problems:

6.0 RAW MATERIALS

6.1 Basic raw materials used:

a) ________________________
   b) ________________________

6.2 Source of supply of raw materials:

□ Government - NSIC, SIDCO, SAIL etc.  □ Private parties
□ Any other (Specify)

6.3 (a) Do you depend on imported raw material? □ Yes □ No

(b) If yes, name the agencies:

6.4 (a) What is the amount of wastage of raw material in manufacturing process per annum?

(b) Specify the causes for the wastage?

6.5 (a) Do you face difficulties in acquiring raw materials?

□ Yes □ No

(b) If yes, specify the problems:

(c) Offer suggestions in solving the raw material problem
7.0 LABOUR AND EMPLOYMENT

7.1 State the number of workers employed by you:

<table>
<thead>
<tr>
<th>Category</th>
<th>Nos.</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Skilled and Technical</td>
<td></td>
</tr>
<tr>
<td>b) Unskilled personnel</td>
<td></td>
</tr>
<tr>
<td>c) Administrative Staff</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
</tr>
</tbody>
</table>

7.2 How are they recruited?

- [x] Direct Recruitment
- [x] Through Employment Exchange
- [ ] Both
- [ ] Any other source (Specify)

7.3 Personnel are generally drawn:

- [x] Locally
- [ ] Outside District
- [ ] Outside State

7.4 The attitude of your workers is:

- [x] Somewhat satisfactory
- [ ] Least satisfactory

7.5 What are the problems faced regarding labour?

- [x] Inefficient labour
- [ ] Not getting adequate skilled labour
- [ ] High rate of absenteeism and turnover
- [ ] Growing militancy among workers
- [ ] High labour cost
- [ ] Indiscipline among workers

7.6 Give suggestions for overcoming the labour problems

8.0 PRODUCTION

8.1 What is the value of production of your unit per annum? (in Rupees)

8.2 What is the extent of capacity utilised now?

- [x] Upto 50 percent
- [ ] 50 - 75 percent
- [ ] 75 - 100 percent
8.3 How many shifts in the production are carried out?

- One shift
- Two shifts
- Three shifts

8.4 The production problems faced by your unit are:

- Non-availability of adequate raw materials
- Inadequate Working Capital
- Irregular power supply
- Delayed payment from customers
- High rate of absenteeism

8.5 Suggest measures to tackle the production problems:

9.0 GENERAL

9.1 State the attitude of the Government towards small scale industries:

- Co-operative
- Non-Co-operative

9.2 a) Specify the benefits derived as a member of the Industrial Estates Manufacturers' Association:

- Dissemination of information on latest technology
- Representing the SSI's interest at Government level
- Encouraging new entrepreneurs
- Export promotion measures
- Conducting fairs and exhibitions
- Any other (Specify)

b) The role of the Association should be:
9.3 The general problem faced by you in running the unit:

☐ Unfavourable business conditions
☐ Political manipulations
☐ Improper and inadequate maintenance of IEs
☐ Any other (Specify)

9.4 Give your esteemed opinions on changes needed:

Station:
Date:

Name and Position of the Respondent

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Salem - 636 011.
APPENDIX 2

SCHEDULE TO SMALL INDUSTRIALISTS OUTSIDE THE INDUSTRIAL ESTATES
(Tick the appropriate box wherever necessary)

I. BASIC INFORMATION

1.0 INTRODUCTION

1.1 Name and address of the Unit :

1.2 Date of commencement of work :

1.3 Status : □ Sole Proprietorship □ Partnership
□ Private Ltd. Company

1.4 Products Manufactured by the unit (Specify)

: 1. ........................................................................................................

2. ........................................................................................................

1.5 Initial Capital Invested :
(i.e. investment in plant, equipment and machinery)

1.6 The nature of activity is :

1.7 Factors for the location of the Unit :

1.8 Mention the initial difficulties faced in setting up the units:

II PROBLEMS

2.0 PHYSICAL ACCOMMODATION AND INFRASTRUCTURE

2.1 What is the size of area occupied by your unit ?

2.2 State the mode of acquisition of Industrial Plot :
2.3 What are the facilities extended by the Government to your unit?

☐ Machines on hire purchase  ☐ Concessions & Subsidies
☐ Loan at cheap rate of interest
☐ Quota and permit for raw material  ☐ Training facility
☐ Warehousing
☐ Preference in purchase of finished product  ☐ None of the above

2.4 What are the problems faced in factory accommodation?

2.5 Suggest measures to overcome the above problems:

3.0 POWER

3.1 What is the total power consumed by your unit per annum (in '000 Units):

3.2 Do you still feel that the power cut is a major hindrance to the normal functioning?

☐ Yes  ☐ No

3.3 When regular power supply is not obtained, what other arrangements have been made?

3.4 What percentage of the total expenditure on power you spend on the following?

a) Electricity from TNEB :

b) Hiring/Maintaining the Generator :

Total :100%

3.5 What sort of power problems do you face?

☐ Difficult to get power connections
☐ Inadequate Power Supply
☐ Frequent voltage fluctuation
☐ Higher and uneconomic power tariff
☐ Irregular Power Supply
☐ Any other (Specify)
3.6 What suggestions you offer in overcoming power problem:

4.0 FINANCE

4.1 Source of Finance:

- [ ] Own Funds
- [ ] Financial Institutions
- [ ] Commercial Banks
- [ ] Friends and Relatives

4.2 State the quantum of working capital required by you per annum

4.3 (a) Do you avail subsidies and concession

- [ ] Yes
- [ ] No

(b) If yes, state whether it is:

- [ ] Capital Subsidy
- [ ] Sales Tax subsidy
- [ ] Excise Exemption
- [ ] Power subsidy
- [ ] Export concessions
- [ ] Any Other

(c) Do you face difficulties in getting subsidies?

- [ ] Yes
- [ ] No

4.4 What are the financial problems faced by you?

- [ ] Lack of adequate and timely finance
- [ ] Exorbitant rate of interest when borrowed from Private Sources
- [ ] Delays in the settlement of bills by customers
- [ ] Difficulty in meeting the security requirements of lending institutions
- [ ] Any other specified

4.5 How will you overcome the above problems?

5.0 MARKETING

5.1 What is the extent of market for your production?

- [ ] Local
- [ ] Regional and National
- [ ] Local and Regional
- [ ] International
5.2 How do you sell your Product?

☐ Direct
☐ Through Intermediaries
☐ Through Government - NSIC, SIDCO etc.

5.3 How does your unit popularise its products?

☐ Press media
☐ Outdoor publicity
☐ Audio-visual methods
☐ Dealers
☐ Any other (Specify)

5.4 a) Do you export your products? ☐ Yes ☐ No

b) What is the share of exports to the total turnover of your unit in a year?

☐ Upto 25 percent ☐ 25-50 percent

5.5 a) Do you face any marketing problem? ☐ Yes ☐ No

(b) If yes, Specify

☐ Lack of adequate orders
☐ Excessive Government regulations
☐ Competition
☐ Delayed Payments from customers

(c) Suggest measures in solving the above problems

6.0 RAW MATERIALS

6.1 Basic raw materials used: a) __________________________

b) __________________________

6.2 Source of supply of raw materials:

☐ Government - NSIC, SIDCO, SAIL etc. ☐ Private parties
☐ Any other (Specify)

6.3 a) Do you depend on imported raw material? ☐ Yes ☐ No

(b) If yes, name the agencies:
6.4  (a) What is the amount of wastage of raw material in manufacturing process per annum?
(b) Specify the causes for the wastage?

6.5  (a) Do you face difficulties in acquiring raw materials?
   □ Yes □ No
(b) If yes, specify the problems
(c) Offer suggestions in solving the raw material problem

7.0   LABOUR AND EMPLOYMENT
7.1 State the number of workers employed by you: Nos.
   a) Skilled and Technical : __________________
   b) Unskilled personnel : __________________
   c) Administrative Staff : __________________
   Total : __________________

7.2 How are they recruited?
   □ Direct Recruitment □ Through Employment Exchange
   □ Any other source (Specify) □ Both

7.3 Personnel are generally drawn:
   □ Locally
   □ Outside District □ Outside State

7.4 The attitude of your workers is:
   □ Satisfactory □ Somewhat satisfactory
7.5 What are the problems faced regarding labour?

- Inefficient labour
- Not getting adequate skilled labour
- High rate of absenteeism and turnover
- Growing militancy among workers
- High labour cost
- Indiscipline among workers

7.6 Give suggestions for overcoming the labour problems

8.0 PRODUCTION

8.1 What is the value of production of your unit per annum? (in Rupees)

8.2 What is the extent of capacity utilised now?

- Upto 50 percent
- 50 - 75 percent
- 75 - 100 percent

8.3 How many shifts in the production are carried out?

- One shift
- Two shifts
- Three shifts

8.4 The production problems faced by your unit are:

- Non-availability of adequate raw materials
- Irregular power supply
- Delayed payment from customers
- High rate of absenteeism
- Inadequate working capital

8.5 Suggest measures to tackle the production problems:

9.0 GENERAL

9.1 State the attitude of the Government towards small scale industries:

- Co-operative
- Non-Co-operative
9.2 a) Specify the benefits derived as a member of SSI Association:

- Dissemination of information on latest technology
- Representing the SSI's interest at Government level
- Encouraging new entrepreneurs
- Export promotion measures
- Conducting fairs and exhibitions
- Any other (Specify)

b) The role of the Association should be:

9.3 The general problem faced by you in running the unit:

- Political manipulations
- Improper and inadequate maintenance of IEs
- Unfavourable business conditions
- Political instability
- Any other (Specify)

9.4 Give your esteemed opinions on changes needed:

Station:

Name and Position of the Respondent:

Date:

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## APPENDIX 3

### RAW DATA SHEET FOR TREND VALUES OF THE GROWTH OF SSI SECTOR IN INDIA

### COMPUTATION FOR TREND VALUES FOR GROWTH IN NO. OF UNITS BY THE METHOD OF LEAST SQUARES

<table>
<thead>
<tr>
<th>Year</th>
<th>No. of Units (in Lakhs)</th>
<th>Deviations from Middle year</th>
<th>XY</th>
<th>X²</th>
<th>Yₑ</th>
</tr>
</thead>
<tbody>
<tr>
<td>1983</td>
<td>10.59</td>
<td>-4</td>
<td>-42.36</td>
<td>16</td>
<td>14.33</td>
</tr>
<tr>
<td>1984</td>
<td>11.58</td>
<td>-3</td>
<td>-34.74</td>
<td>9</td>
<td>14.49</td>
</tr>
<tr>
<td>1985</td>
<td>12.42</td>
<td>-2</td>
<td>-24.84</td>
<td>4</td>
<td>14.65</td>
</tr>
<tr>
<td>1987</td>
<td>14.64</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>14.97</td>
</tr>
<tr>
<td>1988</td>
<td>15.83</td>
<td>1</td>
<td>15.83</td>
<td>1</td>
<td>15.13</td>
</tr>
<tr>
<td>1989</td>
<td>17.12</td>
<td>2</td>
<td>34.24</td>
<td>4</td>
<td>15.29</td>
</tr>
<tr>
<td>1990</td>
<td>18.26</td>
<td>3</td>
<td>54.78</td>
<td>9</td>
<td>15.45</td>
</tr>
<tr>
<td>1991</td>
<td>19.40</td>
<td>4</td>
<td>77.60</td>
<td>16</td>
<td>15.61</td>
</tr>
<tr>
<td>1992</td>
<td>21.71</td>
<td>5</td>
<td>108.55</td>
<td>25</td>
<td>15.77</td>
</tr>
<tr>
<td></td>
<td>( \sum Y = 164.72 )</td>
<td>( \sum X = 0 )</td>
<td>( \sum XY = 18.03 )</td>
<td>( \sum X^2 = 110 )</td>
<td>( \text{a} )</td>
</tr>
</tbody>
</table>

The equation of the straight line :

\[
Yₑ = a + bx
\]

\( N = 11 \); \( \sum Y = 164.72 \)
\[ \Sigma X = 0; \quad \Sigma XY = 18.03 \quad \Sigma X^2 = 110 \]

\[ a = \frac{\Sigma Y}{N} \quad \frac{164.72}{11} = 14.97 \]

\[ b = \frac{\Sigma XY}{\Sigma X^2} \quad \frac{18.03}{110} = 0.16 \]

\[ Y_c = a + bx \]

\[
\begin{align*}
1982 & \quad = 14.97 + 0.16 (-5) \quad = 14.17 \\
1983 & \quad = 14.97 + 0.16 (-4) \quad = 14.33 \\
1984 & \quad = 14.97 + 0.16 (-3) \quad = 14.49 \\
1985 & \quad = 14.97 + 0.16 (-2) \quad = 14.65 \\
1986 & \quad = 14.97 + 0.16 (-1) \quad = 14.81 \\
1987 & \quad = 14.97 + 0.16 (0) \quad = 14.97 \\
1988 & \quad = 14.97 + 0.16 (1) \quad = 15.13 \\
1989 & \quad = 14.97 + 0.16 (2) \quad = 15.29 \\
1990 & \quad = 14.97 + 0.16 (3) \quad = 15.45 \\
1991 & \quad = 14.97 + 0.16 (4) \quad = 15.61 \\
1992 & \quad = 14.97 + 0.16 (5) \quad = 15.77 \\
1995 & \quad = 14.97 + 0.16 (8) \quad = 16.25
\end{align*}
\]
COMPUTATION FOR TREND VALUES OF GROWTH IN EMPLOYMENT
BY THE METHOD OF LEAST SQUARES

<table>
<thead>
<tr>
<th>Year</th>
<th>Employment (in Lakhs)</th>
<th>Deviations from Middle year X</th>
<th>XY</th>
<th>X²</th>
<th>Y,</th>
</tr>
</thead>
<tbody>
<tr>
<td>1982</td>
<td>75.0</td>
<td>-5</td>
<td>-375.0</td>
<td>25</td>
<td>72.7</td>
</tr>
<tr>
<td>1983</td>
<td>79.0</td>
<td>-4</td>
<td>-316.0</td>
<td>16</td>
<td>78.7</td>
</tr>
<tr>
<td>1984</td>
<td>84.2</td>
<td>-3</td>
<td>-252.6</td>
<td>9</td>
<td>84.6</td>
</tr>
<tr>
<td>1985</td>
<td>90.0</td>
<td>-2</td>
<td>-180.0</td>
<td>4</td>
<td>90.6</td>
</tr>
<tr>
<td>1986</td>
<td>96.0</td>
<td>-1</td>
<td>-96.0</td>
<td>1</td>
<td>96.5</td>
</tr>
<tr>
<td>1987</td>
<td>101.4</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>103.0</td>
</tr>
<tr>
<td>1988</td>
<td>107.0</td>
<td>1</td>
<td>107.0</td>
<td>1</td>
<td>108.0</td>
</tr>
<tr>
<td>1989</td>
<td>113.0</td>
<td>2</td>
<td>226.0</td>
<td>4</td>
<td>114.4</td>
</tr>
<tr>
<td>1990</td>
<td>119.6</td>
<td>3</td>
<td>358.8</td>
<td>9</td>
<td>120.4</td>
</tr>
<tr>
<td>1991</td>
<td>126.2</td>
<td>4</td>
<td>504.8</td>
<td>16</td>
<td>126.3</td>
</tr>
<tr>
<td>1992</td>
<td>135.8</td>
<td>5</td>
<td>679.0</td>
<td>25</td>
<td>132.3</td>
</tr>
<tr>
<td></td>
<td>N = 11</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>∑Y = 1127.2</td>
<td>∑X = 0</td>
<td>∑XY = 656</td>
<td>∑X² = 110</td>
<td>-</td>
</tr>
</tbody>
</table>

1995 |                                  |                               |       |    | 150.2 |

The equation of the straight line:

\[ Y_e = a + bx \]

\[ N = 11; \quad \sum Y = 1127.2 \]

\[ \sum X = 0; \quad \sum XY = 656 \quad \sum X^2 = 110 \]

\[ a = \frac{\sum Y}{N} = \frac{1127.2}{11} = 102.5 \]

\[ b = \frac{\sum XY}{\sum X^2} = \frac{656}{110} = 5.96 \]

\[ Y_e = a + bx \]
<table>
<thead>
<tr>
<th>Year</th>
<th>Value</th>
<th>Change</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>1982</td>
<td>72.7</td>
<td>-5.96</td>
<td>102.5</td>
</tr>
<tr>
<td>1983</td>
<td>78.7</td>
<td>-4.96</td>
<td>102.5</td>
</tr>
<tr>
<td>1984</td>
<td>84.6</td>
<td>-3.96</td>
<td>102.5</td>
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<tr>
<td>1985</td>
<td>90.6</td>
<td>-2.96</td>
<td>102.5</td>
</tr>
<tr>
<td>1986</td>
<td>96.5</td>
<td>-1.96</td>
<td>102.5</td>
</tr>
<tr>
<td>1987</td>
<td>103.0</td>
<td>0.00</td>
<td>102.5</td>
</tr>
<tr>
<td>1988</td>
<td>108.0</td>
<td>5.96</td>
<td>102.5</td>
</tr>
<tr>
<td>1989</td>
<td>114.4</td>
<td>8.96</td>
<td>102.5</td>
</tr>
<tr>
<td>1990</td>
<td>120.4</td>
<td>6.96</td>
<td>102.5</td>
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<tr>
<td>1991</td>
<td>126.3</td>
<td>7.96</td>
<td>102.5</td>
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<tr>
<td>1992</td>
<td>132.3</td>
<td>8.96</td>
<td>102.5</td>
</tr>
<tr>
<td>1995</td>
<td>150.2</td>
<td>8.96</td>
<td>102.5</td>
</tr>
</tbody>
</table>
The equation of the straight line:

\[ Y_c = a + bx \]

\[ N = 11; \quad \sum Y = 146978 \]
\[ \sum X = 0; \quad \sum XY = 226188 \quad \sum X^2 = 110 \]

\[ a = \frac{\sum Y}{N} = \frac{146978}{11} = 13361.64 \]

\[ b = \frac{\sum XY}{\sum X^2} = \frac{226188}{110} = 2056.25 \]
\[ Y_c = a + bx \]

1982 \[ \rightarrow = 13361.64 + 2056.25 (-5) = 3080 \]

1983 \[ \rightarrow = 13361.64 + 2056.25 (-4) = 5137 \]

1984 \[ \rightarrow = 13361.64 + 2056.25 (-3) = 7193 \]

1985 \[ \rightarrow = 13361.64 + 2056.25 (-2) = 9249 \]

1986 \[ \rightarrow = 13361.64 + 2056.25 (-1) = 11305 \]

1987 \[ \rightarrow = 13361.64 + 2056.25 (0) = 13362 \]

1988 \[ \rightarrow = 13361.64 + 2056.25 (1) = 15418 \]

1989 \[ \rightarrow = 13361.64 + 2056.25 (2) = 17474 \]

1990 \[ \rightarrow = 13361.64 + 2056.25 (3) = 19530 \]

1991 \[ \rightarrow = 13361.64 + 2056.25 (4) = 21587 \]

1992 \[ \rightarrow = 13361.64 + 2056.25 (5) = 23643 \]

1995 \[ \rightarrow = 13361.64 + 2056.25 (8) = 29812 \]
COMPUTATION FOR TREND VALUES OF GROWTH IN VALUE OF OUTPUT BY THE METHOD OF LEAST SQUARES

<table>
<thead>
<tr>
<th>Year</th>
<th>Value of Output (Rs. in Crores) Y</th>
<th>Deviations from Middle year X</th>
<th>XY</th>
<th>X²</th>
<th>Yc</th>
</tr>
</thead>
<tbody>
<tr>
<td>1982</td>
<td>32600</td>
<td>-5</td>
<td>-16300</td>
<td>25</td>
<td>13755</td>
</tr>
<tr>
<td>1983</td>
<td>35000</td>
<td>-4</td>
<td>-14000</td>
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<td>4</td>
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<td>5</td>
<td>856400</td>
<td>25</td>
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<tr>
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<td>( \sum Y = 948068 )</td>
<td>( \sum X = 0 )</td>
<td>( \sum XY = 1593532 )</td>
<td>( \sum X^2 = 110 )</td>
<td>( \sum Y_c = )</td>
</tr>
<tr>
<td>1995</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>202082</td>
</tr>
</tbody>
</table>

The equation of the straight line:

\[ Y_c = a + bx \]

\[ N = 11; \ \sum Y = 948068 \]

\[ \sum X = 0; \ \sum XY = 1593532 \]

\[ \sum X^2 = 110 \]

\[ a = \frac{\sum Y}{N} = \frac{948068}{11} = 86188 \]

\[ b = \frac{\sum XY}{\sum X^2} = \frac{1593532}{110} = 14486.7 \]
$Y_c = a + bx$

1982: $y = 86188 + 14486.7 \cdot (-5) = 13755$

1983: $y = 86188 + 14486.7 \cdot (-4) = 28241$

1984: $y = 86188 + 14486.7 \cdot (-3) = 42728$

1985: $y = 86188 + 14486.7 \cdot (-2) = 57215$

1986: $y = 86188 + 14486.7 \cdot (-1) = 71701$

1987: $y = 86188 + 14486.7 \cdot (0) = 86188$

1988: $y = 86188 + 14486.7 \cdot (1) = 100675$

1989: $y = 86188 + 14486.7 \cdot (2) = 115161$

1990: $y = 86188 + 14486.7 \cdot (3) = 129648$

1991: $y = 86188 + 14486.7 \cdot (4) = 144135$

1992: $y = 86188 + 14486.7 \cdot (5) = 158622$

1995: $y = 86188 + 14486.7 \cdot (8) = 202082$
### COMPUTATION FOR TREND VALUES OF GROWTH IN VALUE OF EXPORTS BY THE METHOD OF LEAST SQUARES

<table>
<thead>
<tr>
<th>Year</th>
<th>Value of Exports (Rs. in Crores) ( Y )</th>
<th>Deviations from Middle year ( X )</th>
<th>( XY )</th>
<th>( X^2 )</th>
<th>( Y_e )</th>
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</thead>
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<tr>
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<td>2071</td>
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<td>-10355</td>
<td>25</td>
<td>230</td>
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<td>9</td>
<td>2107</td>
</tr>
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<td>-2</td>
<td>-5106</td>
<td>4</td>
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<td>-2785</td>
<td>1</td>
<td>3983</td>
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<tr>
<td>1987</td>
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<td>0</td>
<td>0</td>
<td>4922</td>
</tr>
<tr>
<td>1988</td>
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<td>4373</td>
<td>1</td>
<td>5860</td>
</tr>
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<td>1989</td>
<td>5490</td>
<td>2</td>
<td>10980</td>
<td>4</td>
<td>6798</td>
</tr>
<tr>
<td>1990</td>
<td>7626</td>
<td>3</td>
<td>22878</td>
<td>9</td>
<td>7737</td>
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<td>9100</td>
<td>4</td>
<td>36400</td>
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<td>5</td>
<td>61500</td>
<td>25</td>
<td>9613</td>
</tr>
<tr>
<td></td>
<td>( \sum Y = 54138 )</td>
<td>( \sum X = 0 )</td>
<td>( \sum XY = 103213 )</td>
<td>( \sum X^2 = 110 )</td>
<td></td>
</tr>
<tr>
<td>1995</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>12428</td>
</tr>
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</table>

The equation of the straight line:

\[
Y_e = a + bx
\]

\[
N = 11; \quad \sum Y = 54138
\]

\[
\sum x = 0; \quad \sum xy = 103213 \quad \sum x^2 = 110
\]

\[
a = \frac{\sum Y}{N} = \frac{54138}{11} = 4921.64
\]

\[
b = \frac{\sum xy}{\sum x^2} = \frac{103213}{110} = 938.3
\]
\( Y_c = a + bx \)

1982  \( y = 4921.64 + 938.3 \times (-5) = 230 \)

1983  \( y = 4921.64 + 938.3 \times (-4) = 1168 \)

1984  \( y = 4921.64 + 938.3 \times (-3) = 2107 \)

1985  \( y = 4921.64 + 938.3 \times (-2) = 3045 \)

1986  \( y = 4921.64 + 938.3 \times (-1) = 3983 \)

1987  \( y = 4921.64 + 938.3 \times (0) = 4922 \)

1988  \( y = 4921.64 + 938.3 \times (1) = 5860 \)

1989  \( y = 4921.64 + 938.3 \times (2) = 6798 \)

1990  \( y = 4921.64 + 938.3 \times (3) = 7737 \)

1991  \( y = 4921.64 + 938.3 \times (4) = 8675 \)

1992  \( y = 4921.64 + 938.3 \times (5) = 9613 \)

1995  \( y = 4921.64 + 938.3 \times (8) = 12428 \)
APPENDIX 4

RAW DATA SHEET FOR TREND VALUES OF THE GROWTH OF SSI SECTOR IN TAMIL NADU

COMPUTATION FOR TREND VALUES OF THE GROWTH IN NUMBER OF SSI UNITS BY THE METHOD OF LEAST SQUARES

<table>
<thead>
<tr>
<th>Year</th>
<th>No. of Units</th>
<th>Deviations from Middle Year</th>
<th>XY</th>
<th>X²</th>
<th>Yc</th>
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<tbody>
<tr>
<td>1982</td>
<td>42252</td>
<td>-5</td>
<td>-211260</td>
<td>25</td>
<td>35806</td>
</tr>
<tr>
<td>1983</td>
<td>46378</td>
<td>-4</td>
<td>-185512</td>
<td>16</td>
<td>45763</td>
</tr>
<tr>
<td>1984</td>
<td>57471</td>
<td>-3</td>
<td>-172413</td>
<td>9</td>
<td>55719</td>
</tr>
<tr>
<td>1985</td>
<td>63829</td>
<td>-2</td>
<td>-127658</td>
<td>4</td>
<td>65678</td>
</tr>
<tr>
<td>1986</td>
<td>71774</td>
<td>-1</td>
<td>-71774</td>
<td>1</td>
<td>75633</td>
</tr>
<tr>
<td>1987</td>
<td>81769</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>85589</td>
</tr>
<tr>
<td>1988</td>
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<td>1</td>
<td>91397</td>
<td>1</td>
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</tr>
<tr>
<td>1989</td>
<td>102224</td>
<td>2</td>
<td>204448</td>
<td>4</td>
<td>105503</td>
</tr>
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<td>1990</td>
<td>113365</td>
<td>3</td>
<td>340095</td>
<td>9</td>
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</tr>
<tr>
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<td>127202</td>
<td>4</td>
<td>508808</td>
<td>16</td>
<td>125416</td>
</tr>
<tr>
<td>1992</td>
<td>143821</td>
<td>5</td>
<td>719105</td>
<td>25</td>
<td>135373</td>
</tr>
</tbody>
</table>

\[ N=11 \quad \sum y = 941482 \quad \sum x = 0 \quad \sum xy = 1095236 \quad \sum x^2 = 110 \quad - \]

1995
\[ 684714 \]

The equation of the straight line trend is:

\[ Y_c = a + bx \]
\[ \sum x = 0 \]
\[ a = \frac{\sum y}{N} \; ; \; b = \frac{\sum xy}{\sum x^2} \]
\[ \sum y = 941482 \]
\[ N = 11 \]
\[ \sum xy = 1095236 \quad \sum x^2 = 110 \]
\[ a = \frac{941482}{11} = 85589.3 \]
\[ b = \frac{1095236}{110} = 9956.7 \]
\[ Y_c = a + bx \]

1982 \(- Y_c = 85589.3 + 9956.7 (-5) = 35806 \)
1983 \(- Y_c = 85589.3 + 9956.7 (-4) = 45763 \)
1984 \(- Y_c = 85589.3 + 9956.7 (-3) = 55719 \)
1985 \(- Y_c = 85589.3 + 9956.7 (-2) = 65676 \)
1986 \(- Y_c = 85589.3 + 9956.7 (-1) = 75633 \)
1987 \(- Y_c = 85589.3 + 9956.7 (0) = 85589 \)
1988 \(- Y_c = 85589.3 + 9956.7 (1) = 95546 \)
1989 \(- Y_c = 85589.3 + 9956.7 (2) = 105503 \)
1990 \(- Y_c = 85589.3 + 9956.7 (3) = 115459 \)
1991 \(- Y_c = 85589.3 + 9956.7 (4) = 125416 \)
1992 \(- Y_c = 85589.3 + 9956.7 (5) = 135373 \)
1995 \(- Y_c = 85589.3 + 9956.7 (8) = 684714 \)
### COMPUTATION FOR TREND VALUES OF THE GROWTH IN VALUE OF OUTPUT IN SSI UNITS BY THE METHOD OF LEAST SQUARES

<table>
<thead>
<tr>
<th>Year</th>
<th>Average Value of Output (Rs. in Lakhs)</th>
<th>Deviations from Middle Year</th>
<th>XY</th>
<th>X²</th>
<th>Yₑ</th>
</tr>
</thead>
<tbody>
<tr>
<td>1982</td>
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<td>25</td>
<td>2.23</td>
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<tr>
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<td>-3</td>
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<td>9</td>
<td>3.09</td>
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<td>3.15</td>
<td>-2</td>
<td>-6.3</td>
<td>4</td>
<td>3.52</td>
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<td>5.04</td>
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<td>1</td>
<td>3.95</td>
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<td>5.91</td>
<td>1</td>
<td>4.81</td>
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<td>26.50</td>
<td>25</td>
<td>6.53</td>
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</table>

\[ \sum y = 48.18 \quad \sum x = 0 \quad \sum xy = 47.27 \quad \sum x^2 = 110 \]

\[ N=11 \]

The equation of the straight line trend is:

\[ Yₑ = a + bx \]

\[ \sum x = 0 \]

\[ a = \frac{\sum y}{N} \quad b = \frac{\sum xy}{\sum x^2} \]

\[ \sum y = 48.18 \quad N = 11 \]

\[ \sum xy = 47.27 \quad \sum x^2 = 110 \]
\[ a = \frac{48.18}{11} = 4.38 \]
\[ b = \frac{47.27}{110} = 0.43 \]
\[ Y_t = a + bx \]

\begin{align*}
1982 & \quad = 4.38 + 0.43 (-5) = 2.23 \\
1983 & \quad = 4.38 + 0.43 (-4) = 2.67 \\
1984 & \quad = 4.38 + 0.43 (-3) = 3.09 \\
1985 & \quad = 4.38 + 0.43 (-2) = 3.52 \\
1986 & \quad = 4.38 + 0.43 (-1) = 3.95 \\
1987 & \quad = 4.38 + 0.43 (0) = 4.38 \\
1988 & \quad = 4.38 + 0.43 (1) = 4.81 \\
1989 & \quad = 4.38 + 0.43 (2) = 5.24 \\
1990 & \quad = 4.38 + 0.43 (3) = 5.67 \\
1991 & \quad = 4.38 + 0.43 (4) = 6.1 \\
1992 & \quad = 4.38 + 0.43 (5) = 6.53 \\
1995 & \quad = 4.38 + 0.43 (8) = 7.82
\end{align*}
### COMPUTATION FOR TREND VALUES OF THE GROWTH IN EMPLOYMENT IN SSI UNITS BY THE METHOD OF LEAST SQUARES

The equation of the straight line trend is:

\[ y_t = a + bx \]

**Table**

<table>
<thead>
<tr>
<th>Year</th>
<th>Average Employment (in Lakhs) Y</th>
<th>Deviations from Middle Year X</th>
<th>XY</th>
<th>X²</th>
<th>Yₑ</th>
</tr>
</thead>
<tbody>
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<td>( N = 11 )</td>
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<td></td>
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<tr>
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<td>( \sum y = 105.44 )</td>
<td>( \sum x = 0 )</td>
<td>( \sum xy = 69.96 )</td>
<td>( \sum x^2 = 110 )</td>
<td></td>
</tr>
</tbody>
</table>

\[ Yₑ = \frac{\sum y}{N}; \quad b = \frac{\sum xy}{\sum x^2}; \quad a = \frac{\sum y}{N} \]

\[ \sum y = 105.44; \quad N = 11; \quad \sum xy = 69.96; \quad \sum x^2 = 110 \]

**Result**

\[ Yₑ = 14.68 \]
\[
a = \frac{105.44}{11} = 9.59
\]
\[
b = \frac{69.96}{110} = 0.636
\]
\[
Y_c = a + bx
\]
\[
\begin{align*}
1982 & \quad Y_c = 9.59 + 0.636 (-5) = 6.41 \\
1983 & \quad Y_c = 9.59 + 0.636 (-4) = 7.05 \\
1984 & \quad Y_c = 9.59 + 0.636 (-3) = 7.68 \\
1985 & \quad Y_c = 9.59 + 0.636 (-2) = 8.32 \\
1986 & \quad Y_c = 9.59 + 0.636 (-1) = 8.95 \\
1987 & \quad Y_c = 9.59 + 0.636 (0) = 9.59 \\
1988 & \quad Y_c = 9.59 + 0.636 (1) = 10.23 \\
1989 & \quad Y_c = 9.59 + 0.636 (2) = 10.86 \\
1990 & \quad Y_c = 9.59 + 0.636 (3) = 11.50 \\
1991 & \quad Y_c = 9.59 + 0.636 (4) = 12.13 \\
1992 & \quad Y_c = 9.59 + 0.636 (5) = 12.77 \\
1995 & \quad Y_c = 9.59 + 0.636 (8) = 14.68
\end{align*}
\]
COMPUTATION FOR TREND VALUES OF THE GROWTH IN PRODUCTIVE CAPITAL EMPLOYED IN SSI UNITS BY THE METHOD OF LEAST SQUARES

<table>
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<tr>
<th>Year</th>
<th>Average Productive Capital (Rs. in Lakhs) Y</th>
<th>Deviations from Middle Year X</th>
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<th>X^2</th>
<th>Y_c</th>
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<tbody>
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<tr>
<td>1988</td>
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<td>1</td>
<td>2.14</td>
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<tr>
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<td>4</td>
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<td>19</td>
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<td>25</td>
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<tr>
<td>1995</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>3.64</td>
</tr>
</tbody>
</table>

\[
N = 11 \quad \Sigma y = 21.17 \quad \Sigma x = 0 \quad \Sigma xy = 23.54 \quad \Sigma x^2 = 110
\]

The equation of the straight line trend is:

\[
Y_c = a + bx
\]

\[
\Sigma x = 0
\]

\[
a = \frac{\Sigma y}{N} \quad b = \frac{\Sigma xy}{\Sigma x^2}
\]

\[
\Sigma y = 21.17 \quad N = 11
\]

\[
\Sigma xy = 23.54 \quad \Sigma x^2 = 110
\]
\[ a = \frac{21.17}{11} = 1.925 \]
\[ b = \frac{23.54}{110} = 0.214 \]
\[ Y_c = a + bx \]

1982: \[ Y_c = 1.925 + 0.214(-5) = 0.86 \]
1983: \[ Y_c = 1.925 + 0.214(-4) = 1.07 \]
1984: \[ Y_c = 1.925 + 0.214(-3) = 1.28 \]
1985: \[ Y_c = 1.925 + 0.214(-2) = 1.50 \]
1986: \[ Y_c = 1.925 + 0.214(-1) = 1.71 \]
1987: \[ Y_c = 1.925 + 0.214(0) = 1.93 \]
1988: \[ Y_c = 1.925 + 0.214(1) = 2.14 \]
1989: \[ Y_c = 1.925 + 0.214(2) = 2.35 \]
1990: \[ Y_c = 1.925 + 0.214(3) = 2.57 \]
1991: \[ Y_c = 1.925 + 0.214(4) = 2.78 \]
1992: \[ Y_c = 1.925 + 0.214(5) = 3.00 \]
1995: \[ Y_c = 1.925 + 0.214(8) = 3.64 \]
APPENDIX 5

RAW DATA SHEET FOR TREND VALUES OF THE ASSISTANCE PROVIDED BY SIDCO

COMPUTATION FOR TREND VALUES (BY THE METHOD OF LEAST SQUARES) FOR QUANTUM OF RAW MATERIALS DISTRIBUTED

<table>
<thead>
<tr>
<th>Year</th>
<th>Quantum of Raw Materials (mts) Y</th>
<th>Deviations from Middle Year X</th>
<th>XY</th>
<th>X²</th>
<th>Yᵣ</th>
</tr>
</thead>
<tbody>
<tr>
<td>1983</td>
<td>33841</td>
<td>-4.5</td>
<td>-152284.5</td>
<td>20.25</td>
<td>27817</td>
</tr>
<tr>
<td>1984</td>
<td>30430</td>
<td>-3.5</td>
<td>-106505</td>
<td>12.25</td>
<td>31050</td>
</tr>
<tr>
<td>1985</td>
<td>33213</td>
<td>-2.5</td>
<td>-83032.5</td>
<td>6.25</td>
<td>34282</td>
</tr>
<tr>
<td>1986</td>
<td>42069</td>
<td>-1.5</td>
<td>-63103.5</td>
<td>2.25</td>
<td>37515</td>
</tr>
<tr>
<td>1987</td>
<td>39096</td>
<td>-0.5</td>
<td>-19548</td>
<td>0.25</td>
<td>40747</td>
</tr>
<tr>
<td>1988</td>
<td>33600</td>
<td>0.5</td>
<td>16800</td>
<td>0.25</td>
<td>43980</td>
</tr>
<tr>
<td>1989</td>
<td>39793</td>
<td>1.5</td>
<td>59689.5</td>
<td>2.25</td>
<td>47212</td>
</tr>
<tr>
<td>1990</td>
<td>46381</td>
<td>2.5</td>
<td>115952.5</td>
<td>6.25</td>
<td>50444</td>
</tr>
<tr>
<td>1991</td>
<td>64739</td>
<td>3.5</td>
<td>226586.5</td>
<td>12.25</td>
<td>53677</td>
</tr>
<tr>
<td>1992</td>
<td>60471</td>
<td>4.5</td>
<td>272119.5</td>
<td>20.25</td>
<td>56909</td>
</tr>
<tr>
<td>N = 10</td>
<td>$\sum y = 423633$</td>
<td>$\sum x = 0$</td>
<td>$\sum xy = 266674.5$</td>
<td>$\sum x^2 = 82.5$</td>
<td>-</td>
</tr>
<tr>
<td>1995</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>66606</td>
</tr>
</tbody>
</table>

The equation of the straight line trend is:

$$Y_c = a + bx$$

$$\sum x = 0$$

$$a = \frac{\sum y}{N}; \quad b = \frac{\sum xy}{\sum x^2}$$
\[
\begin{align*}
\sum y &= 423633 \quad N = 10 \\
\sum xy &= 266674.5 \sum x^2 = 82.5 \\
a &= \frac{423633}{10} = 42363.3 \\
b &= \frac{266674.5}{82.5} = 3232.42 \\
y_c &= a + bx \\
1983 - Y_c &= 42363.3 + 3232.42 (-4.5) = 27817 \\
1984 - Y_c &= 42363.3 + 3232.42 (-3.5) = 31050 \\
1985 - Y_c &= 42363.3 + 3232.42 (-2.5) = 34282 \\
1986 - Y_c &= 42363.3 + 3232.42 (-1.5) = 37515 \\
1987 - Y_c &= 42363.3 + 3232.42 (-0.5) = 40747 \\
1988 - Y_c &= 42363.3 + 3232.42 (0.5) = 43980 \\
1989 - Y_c &= 42363.3 + 3232.42 (1.5) = 47212 \\
1990 - Y_c &= 42363.3 + 3232.42 (2.5) = 50444 \\
1991 - Y_c &= 42363.3 + 3232.42 (3.5) = 53677 \\
1992 - Y_c &= 42363.3 + 3232.42 (4.5) = 56909 \\
1995 - Y_c &= 42363.3 + 3232.42 (7.5) = 66606 \\
\end{align*}
\]
**COMPUTATION FOR TREND VALUES FOR VALUE OF RAW MATERIALS DISTRIBUTED BY THE METHOD OF LEAST SQUARES**

The equation of the straight line trend is:

\[ Y_c = a + bx \]

\[ \sum x = 0 \]

\[ a = \frac{\sum y}{N} \quad b = \frac{\sum xy}{\sum x^2} \]

\[ \sum y = 338 \quad N = 10 \]

\[ \sum xy = 523 \quad \sum x^2 = 82.5 \]
\[
\begin{align*}
a &= \frac{338}{10} = 33.8 \\
b &= \frac{523}{82.5} = 6.34 \\
Y_c &= a + bx
\end{align*}
\]

\[
\begin{align*}
1983 & \quad Y_c = 33.8 + 6.34 (-4.5) = 5 \\
1984 & \quad Y_c = 33.8 + 6.34 (-3.5) = 12 \\
1985 & \quad Y_c = 33.8 + 6.34 (-2.5) = 18 \\
1986 & \quad Y_c = 33.8 + 6.34 (-1.5) = 24 \\
1987 & \quad Y_c = 33.8 + 6.34 (-0.5) = 31 \\
1988 & \quad Y_c = 33.8 + 6.34 (0.5) = 37 \\
1989 & \quad Y_c = 33.8 + 6.34 (1.5) = 43 \\
1990 & \quad Y_c = 33.8 + 6.34 (2.5) = 50 \\
1991 & \quad Y_c = 33.8 + 6.34 (3.5) = 56 \\
1992 & \quad Y_c = 33.8 + 6.34 (4.5) = 62 \\
1995 & \quad Y_c = 33.8 + 6.34 (7.5) = 81
\end{align*}
\]
COMPUTATION FOR TREND VALUES FOR MARKETING ASSISTANCE PROVIDED BY THE METHOD OF LEAST SQUARES

<table>
<thead>
<tr>
<th>Year</th>
<th>Quantum of Assistance (mts) $Y$</th>
<th>Deviations from Middle Year $X$</th>
<th>$XY$</th>
<th>$X^2$</th>
<th>$Y_c$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1983</td>
<td>2178</td>
<td>-4.5</td>
<td>-9801</td>
<td>20.25</td>
<td>3078</td>
</tr>
<tr>
<td>1984</td>
<td>2654</td>
<td>-3.5</td>
<td>-9289</td>
<td>12.25</td>
<td>3146</td>
</tr>
<tr>
<td>1985</td>
<td>3464</td>
<td>-2.5</td>
<td>-8660</td>
<td>6.25</td>
<td>3215</td>
</tr>
<tr>
<td>1986</td>
<td>4156</td>
<td>-1.5</td>
<td>-6234</td>
<td>2.25</td>
<td>3283</td>
</tr>
<tr>
<td>1987</td>
<td>4367</td>
<td>-0.5</td>
<td>-2183.5</td>
<td>0.25</td>
<td>3352</td>
</tr>
<tr>
<td>1988</td>
<td>4429</td>
<td>0.5</td>
<td>2214.5</td>
<td>0.25</td>
<td>3420</td>
</tr>
<tr>
<td>1989</td>
<td>2680</td>
<td>1.5</td>
<td>4020</td>
<td>2.25</td>
<td>3489</td>
</tr>
<tr>
<td>1990</td>
<td>3219</td>
<td>2.5</td>
<td>8047.5</td>
<td>6.25</td>
<td>3557</td>
</tr>
<tr>
<td>1991</td>
<td>2667</td>
<td>3.5</td>
<td>9334.5</td>
<td>12.25</td>
<td>3626</td>
</tr>
<tr>
<td>1992</td>
<td>4045</td>
<td>4.5</td>
<td>18202.5</td>
<td>20.25</td>
<td>3694</td>
</tr>
<tr>
<td></td>
<td>$\sum y = 33859$</td>
<td>$\sum x = 0$</td>
<td>$\sum xy = 5651.5$</td>
<td>$\sum x^2 = 82.5$</td>
<td>-</td>
</tr>
<tr>
<td>1995</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3900</td>
</tr>
</tbody>
</table>

The equation of the straight line trend is:

$$Y_c = a + bx$$

$$\Sigma x = 0$$

$$a = \frac{\Sigma y}{N} ; \quad b = \frac{\Sigma xy}{\Sigma x^2}$$

$$\Sigma y = 33859 \quad N = 10$$

$$\Sigma xy = 5651.5 \quad \Sigma x^2 = 82.5$$

$$a = \frac{33859}{10} = 3385.9$$
\[ b = \frac{5651.5}{82.5} = 68.5 \]

\[ Y_c = a + bx \]

\begin{align*}
1983 & \rightarrow Y_c \quad 3385.9 + 68.5 (-4.5) = 3078 \\
1984 & \rightarrow Y_c \quad 3385.9 + 68.5 (-3.5) = 3146 \\
1985 & \rightarrow Y_c \quad 3385.9 + 68.5 (-2.5) = 3215 \\
1986 & \rightarrow Y_c \quad 3385.9 + 68.5 (-1.5) = 3283 \\
1987 & \rightarrow Y_c \quad 3385.9 + 68.5 (-0.5) = 3352 \\
1988 & \rightarrow Y_c \quad 3385.9 + 68.5 (0.5) = 3420 \\
1989 & \rightarrow Y_c \quad 3385.9 + 68.5 (1.5) = 3489 \\
1990 & \rightarrow Y_c \quad 3385.9 + 68.5 (2.5) = 3557 \\
1991 & \rightarrow Y_c \quad 3385.9 + 68.5 (3.5) = 3626 \\
1992 & \rightarrow Y_c \quad 3385.9 + 68.5 (4.5) = 3694 \\
1995 & \rightarrow Y_c \quad 3385.9 + 68.5 (7.5) = 3900
\end{align*}
### COMPUTATION FOR TREND VALUES FOR THE VALUE OF MARKETING ASSISTANCE PROVIDED BY THE METHOD OF LEAST SQUARES

<table>
<thead>
<tr>
<th>Year</th>
<th>Value of Marketing assistance (Rs. in Crores) Y</th>
<th>Deviations from Middle Year X</th>
<th>XY</th>
<th>X²</th>
<th>Yc</th>
</tr>
</thead>
<tbody>
<tr>
<td>1983</td>
<td>3</td>
<td>-4.5</td>
<td>-13.5</td>
<td>20.25</td>
<td>2.8</td>
</tr>
<tr>
<td>1984</td>
<td>5</td>
<td>-3.5</td>
<td>-17.5</td>
<td>12.25</td>
<td>4.4</td>
</tr>
<tr>
<td>1985</td>
<td>6</td>
<td>-2.5</td>
<td>-15.0</td>
<td>6.25</td>
<td>6.1</td>
</tr>
<tr>
<td>1986</td>
<td>7</td>
<td>-1.5</td>
<td>-10.5</td>
<td>2.25</td>
<td>7.7</td>
</tr>
<tr>
<td>1987</td>
<td>9</td>
<td>-0.5</td>
<td>-4.5</td>
<td>0.25</td>
<td>9.3</td>
</tr>
<tr>
<td>1988</td>
<td>13</td>
<td>0.5</td>
<td>6.5</td>
<td>0.25</td>
<td>10.9</td>
</tr>
<tr>
<td>1989</td>
<td>11</td>
<td>1.5</td>
<td>16.5</td>
<td>2.25</td>
<td>12.5</td>
</tr>
<tr>
<td>1990</td>
<td>14</td>
<td>2.5</td>
<td>35</td>
<td>6.25</td>
<td>14.2</td>
</tr>
<tr>
<td>1991</td>
<td>12</td>
<td>3.5</td>
<td>42</td>
<td>12.25</td>
<td>15.8</td>
</tr>
<tr>
<td>1992</td>
<td>21</td>
<td>4.5</td>
<td>94.5</td>
<td>20.25</td>
<td>17.4</td>
</tr>
<tr>
<td></td>
<td>N = 10</td>
<td>Σy = 101</td>
<td>Σx = 0</td>
<td>Σxy = 133.5</td>
<td>Σx²=82.5</td>
</tr>
<tr>
<td>1995</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The equation of the straight line trend is:

\[ Y_e = a + bx \]

\[ \Sigma x = 0 \]

\[ a = \frac{\Sigma y}{N} \quad \text{and} \quad b = \frac{\Sigma xy}{\Sigma x^2} \]

\[ \Sigma y = 101 \quad N = 10 \]

\[ \Sigma xy = 133.5 \quad \Sigma x^2 = 82.5 \]
\[ a = \frac{101}{10} = 10.1 \]
\[ b = \frac{133.5}{82.5} = 1.62 \]
\[ Y_c = a + bx \]

<table>
<thead>
<tr>
<th>Year</th>
<th>( Y_c )</th>
<th>Calculation</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1983</td>
<td>( Y_c )</td>
<td>10.1 + 1.62 (-4.5)</td>
<td>2.8</td>
</tr>
<tr>
<td>1984</td>
<td>( Y_c )</td>
<td>10.1 + 1.62 (-3.5)</td>
<td>4.4</td>
</tr>
<tr>
<td>1985</td>
<td>( Y_c )</td>
<td>10.1 + 1.62 (-2.5)</td>
<td>6.1</td>
</tr>
<tr>
<td>1986</td>
<td>( Y_c )</td>
<td>10.1 + 1.62 (-1.5)</td>
<td>7.7</td>
</tr>
<tr>
<td>1987</td>
<td>( Y_c )</td>
<td>10.1 + 1.62 (-0.5)</td>
<td>9.3</td>
</tr>
<tr>
<td>1988</td>
<td>( Y_c )</td>
<td>10.1 + 1.62 (0.5)</td>
<td>10.9</td>
</tr>
<tr>
<td>1989</td>
<td>( Y_c )</td>
<td>10.1 + 1.62 (1.5)</td>
<td>12.5</td>
</tr>
<tr>
<td>1990</td>
<td>( Y_c )</td>
<td>10.1 + 1.62 (2.5)</td>
<td>14.2</td>
</tr>
<tr>
<td>1991</td>
<td>( Y_c )</td>
<td>10.1 + 1.62 (3.5)</td>
<td>15.8</td>
</tr>
<tr>
<td>1992</td>
<td>( Y_c )</td>
<td>10.1 + 1.62 (4.5)</td>
<td>17.4</td>
</tr>
<tr>
<td>1995</td>
<td>( Y_c )</td>
<td>10.1 + 1.62 (7.5)</td>
<td>22.3</td>
</tr>
</tbody>
</table>
APPENDIX 6

RAW DATA SHEET FOR STATISTICAL COMPUTATIONS PERTAINING TO VARIOUS TOOLS USED IN CHAPTER 5

APPENDIX 6.1

INITIAL CAPITAL INVESTMENT BY THE SAMPLE UNITS
COMPUTATION TABLE FOR MEAN TEST

<table>
<thead>
<tr>
<th>Initial Capital (Rs. in Lakh)</th>
<th>f_1</th>
<th>f_2</th>
<th>f_3</th>
<th>m</th>
<th>d</th>
<th>t_{d_1}</th>
<th>t_{d_2}</th>
<th>t_{d_3}</th>
<th>t_{d_4}</th>
<th>t_{d_5}</th>
<th>t_{d_6}</th>
<th>t_{d_7}</th>
<th>t_{d_8}</th>
<th>t_{d_9}</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 5</td>
<td>9</td>
<td>6</td>
<td>2</td>
<td>2.5</td>
<td>-1.75</td>
<td>-15.75</td>
<td>-10.5</td>
<td>-3.5</td>
<td>3.063</td>
<td>27.57</td>
<td>18.38</td>
<td>6.13</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 - 15</td>
<td>26</td>
<td>9</td>
<td>8</td>
<td>10.0</td>
<td>-1</td>
<td>-26</td>
<td>-9</td>
<td>-8</td>
<td>1</td>
<td>26</td>
<td>9</td>
<td>8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15 - 25</td>
<td>53</td>
<td>17</td>
<td>22</td>
<td>20.0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>25 - 35</td>
<td>24</td>
<td>6</td>
<td>6</td>
<td>30.0</td>
<td>1</td>
<td>24</td>
<td>6</td>
<td>6</td>
<td>1</td>
<td>24</td>
<td>6</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>35 - 45</td>
<td>8</td>
<td>2</td>
<td>2</td>
<td>40.0</td>
<td>2</td>
<td>16</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>32</td>
<td>8</td>
<td>8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>120</td>
<td>40</td>
<td>40</td>
<td>-</td>
<td>-1.75</td>
<td>-9.5</td>
<td>-1.5</td>
<td>-</td>
<td>109.57</td>
<td>41.38</td>
<td>28.13</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

f_1 denotes the no. of eng. units in the IEs
f_2 denotes the no. of non-eng. units in the IEs
f_3 denotes the no. of eng. units outside the IEs
σ_1 denotes the standard deviation of eng. units in IEs
σ_2 denotes the standard deviation of non-eng. units in IEs
σ_3 denotes the standard deviation of eng. units outside IEs.
N_1 denotes the total no. of eng. units in IEs.
N_2 denotes the total no. of non-eng. units in IEs.
N_3 denotes the total no. of eng. units outside IEs
Z_{01} denotes the significant difference between the means of eng. units and non-eng. units of IEs.
$Z_{0.02}$ denotes the significant difference between the means of eng. units in and outside of IEs.

\[
\bar{X}_1 = \text{Average Initial Capital of Engineering units in IEs}
\]

\[
\bar{X}_2 = \text{Average Initial Capital of Non-Engineering units in IEs}
\]

\[
\bar{X}_3 = \text{Average Initial Capital of Engineering units outside IEs}
\]

\[
\bar{X}_1 = A + \frac{\sum f_1 d}{N_1 x i} = 20 + \frac{-1.75}{120} x 10 = 19.85
\]

\[
\bar{X}_2 = A + \frac{\sum f_2 d}{N_2 x i} = 20 + \frac{-9.5}{40} x 10 = 17.63
\]

\[
\bar{X}_3 = A + \frac{\sum f_3 d}{N_3 x i} = 20 + \frac{1.5}{40} x 10 = 19.63
\]

\[
\sigma_1 = \sqrt{\frac{\sum f_1 d^2}{N_1} - \left(\frac{\sum f_1 d}{N_1}\right)^2 x i}
\]

\[
= \sqrt{\frac{109.57}{120} - (-1.75/120)^2 x 10}
\]

\[
= 9.555
\]

\[
\sigma_2 = \sqrt{\frac{\sum f_2 d^2}{N_2} - \left(\frac{\sum f_2 d}{N_2}\right)^2 x i}
\]

\[
= \sqrt{\frac{41.38}{40} - (-9.5/40)^2 x 10}
\]

\[
= 9.889
\]

\[
\sigma_3 = \sqrt{\frac{\sum f_3 d^2}{N_3} - \left(\frac{\sum f_3 d}{N_3}\right)^2 x i}
\]

\[
= \sqrt{\frac{28.13}{40} - (-1.5/40)^2 x 10}
\]

\[
= 9.999
\]
MEAN TEST TO FIND SIGNIFICANT DIFFERENCE BETWEEN THE MEAN

\[ Z_{O_1} = \frac{\left| \bar{X}_1 - \bar{X}_2 \right|}{\sqrt{\sigma_1^2/N_1 + \sigma_2^2/N_2}} \]

\[ = \frac{19.85 - 17.63}{\sqrt{(9.555^2/120) + (9.889^2/40)}} \]

\[ = 1.24 < 1.96 \]

\[ Z_{O_2} = \frac{\left| \bar{X}_1 - \bar{X}_3 \right|}{\sqrt{\sigma_1^2/N_1 + \sigma_3^2/N_3}} \]

\[ = \frac{19.85 - 19.63}{\sqrt{(9.555^2/120) - (9.999^2/40)}} \]

\[ = 0.122 < 1.96 \]

COMBINED AVERAGE INITIAL CAPITAL

\[ \bar{X}_{123} = \frac{(\bar{X}_1N_1) + (\bar{X}_2N_2) + (\bar{X}_3N_3)}{N_1 + N_2 + N_3} \]

\[ = \frac{(19.85 \times 120) + (17.63 \times 40) + (19.63 \times 40)}{120 + 40 + 40} \]

\[ = 19.362 \]
### APPENDIX 6.2

#### SIZE OF AREA OCCUPIED BY THE SAMPLE UNITS

**COMPUTATION TABLE FOR TEST FOR MEAN**

<table>
<thead>
<tr>
<th>Size of Area (Sq.ft.)</th>
<th>$t_1$</th>
<th>$t_2$</th>
<th>$t_3$</th>
<th>$m$</th>
<th>$d$</th>
<th>$d^2$</th>
<th>$t_3d$</th>
<th>$t_3d^2$</th>
<th>$t_3d^3$</th>
<th>$t_3d^4$</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-2000</td>
<td>5</td>
<td>2</td>
<td>2</td>
<td>1000</td>
<td>-2</td>
<td>4</td>
<td>-10</td>
<td>-4</td>
<td>-4</td>
<td>20</td>
</tr>
<tr>
<td>2000-4000</td>
<td>4</td>
<td>4</td>
<td>5</td>
<td>3000</td>
<td>-1</td>
<td>1</td>
<td>-4</td>
<td>-5</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>4000-6000</td>
<td>6</td>
<td>5</td>
<td>9</td>
<td>5000</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>6000-8000</td>
<td>7</td>
<td>5</td>
<td>8</td>
<td>7000</td>
<td>1</td>
<td>1</td>
<td>7</td>
<td>5</td>
<td>8</td>
<td>7</td>
</tr>
<tr>
<td>8000-10000</td>
<td>68</td>
<td>10</td>
<td>12</td>
<td>9000</td>
<td>2</td>
<td>4</td>
<td>136</td>
<td>20</td>
<td>24</td>
<td>272</td>
</tr>
<tr>
<td>10000-12000</td>
<td>30</td>
<td>14</td>
<td>4</td>
<td>11000</td>
<td>3</td>
<td>9</td>
<td>90</td>
<td>42</td>
<td>12</td>
<td>270</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>120</td>
<td>40</td>
<td>40</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>219</td>
<td>59</td>
<td>38</td>
<td>573</td>
</tr>
</tbody>
</table>

- $N_1$ = total number of eng. units in IEs.
- $N_2$ = total number of non. eng units in the IEs.
- $N_3$ = total number of eng. units outside IEs.
- $\overline{X}_1$ = mean size of area occupied by eng. units in IEs.
- $\overline{X}_2$ = mean size of area occupied by non-eng. units in the IEs.
- $\overline{X}_3$ = mean size of area occupied by eng. units outside IEs.
- $\sigma_1$ = std. deviation of eng. units in the IEs.
- $\sigma_2$ = std. deviation of non eng. units in the IEs.
- $\sigma_3$ = std. deviation of eng. units outside in the IEs.
- $Z_{01}$ = Test for mean size of area occupied between eng. units and Non-eng. units in the IEs.
\( Z_{0.2} = \) Test for mean size of area occupied between eng. units in the IEs and eng. units outside IEs.

\[
\bar{X}_1 = A + \sum f_i d / N_1 x i \\
= 5000 + 219 / 120 \times 2000 \\
= 8650 \text{ sq.ft.}
\]

\[
\bar{X}_2 = A + \sum f_i d / N_2 x i \\
= 5000 + 59 / 40 \times 2000 \\
= 7950 \text{ sq.ft.}
\]

\[
\bar{X}_3 = \sum f_i d / N_3 x i \\
= 5000 + 35 / 40 \times 2000 \\
= 6750 \text{ sq.ft.}
\]

**COMBINED MEAN SIZE OF AREA OCCUPIED**

\[
\bar{X}_{123} = (\bar{X}_1 N_1) + (\bar{X}_2 N_2) + (\bar{X}_3 N_3) / N_1+N_2+N_3 \\
= (865x120) + (7950 x 40) + (6750 x 40) / 120+40+40 \\
= 8130 \text{ sq.ft.}
\]

\[
\sigma_1 = \sqrt{\sum f_i d^2 / N_1 - (\sum f_i d/N_1)^2} x i \\
= \sqrt{573/120 - (219/120)^2} \times 2000 \\
= 2404
\]
\[ \sigma_2 = \sqrt{\frac{\sum f_x d^2}{N_2} - (\frac{\sum f_x d}{N_2})^2} \times i \]
\[ = \sqrt{183/40 - (59/40)^2} \times 2000 \]
\[ = 3098 \]

\[ \sigma_3 = \sqrt{\frac{\sum f_x d^2}{N_3} - (\frac{\sum f_x d}{N_3})^2} \times i \]
\[ = \sqrt{105/40 - (35/40)^2} \times 2000 \]
\[ = 2727 \]

**TEST FOR MEAN SIZE OF AREA OCCUPIED BETWEEN ENG. AND NON-ENG. UNITS IN THE IEs**

\[ Z_{o1} = \frac{|\bar{X}_1 - \bar{X}_2|}{\sqrt{\sigma_1^2/N_1 + \sigma_2^2/N_2}} \]
\[ = \frac{|8650 - 7950|}{\sqrt{(2404)^2/120 + (3098)^2/40}} \]
\[ = 1.3 < 1.96 \]

**TEST FOR MEAN SIZE OF AREA OCCUPIED BETWEEN ENG. UNITS IN IEs AND ENG. UNITS OUTSIDE IEs**

\[ Z_{o2} = \frac{|\bar{X}_1 - \bar{X}_3|}{\sqrt{\sigma_{12}/N_1 + \sigma_3^2/N_3}} \]
\[ = \frac{|8650 - 6750|}{\sqrt{(2404)^2/120 + (2727)^2/40}} \]
\[ = 3.93 > 1.96 \]
APPENDIX 6.3

POWER CONSUMPTION BY SAMPLE UNITS PER ANNUM
COMPUTATION TABLE FOR TEST FOR MEAN

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Power Consumed (000 units)</th>
<th>( f_1 )</th>
<th>( f_2 )</th>
<th>( m )</th>
<th>( d )</th>
<th>( d^2 )</th>
<th>( f_1d )</th>
<th>( f_2d )</th>
<th>( f_1d^2 )</th>
<th>( f_2d^2 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0 - 150</td>
<td>22</td>
<td>6</td>
<td>75</td>
<td>-2</td>
<td>4</td>
<td>-44</td>
<td>-12</td>
<td>48</td>
<td>24</td>
</tr>
<tr>
<td>2</td>
<td>150 - 300</td>
<td>38</td>
<td>2</td>
<td>225</td>
<td>-1</td>
<td>1</td>
<td>-38</td>
<td>-2</td>
<td>78</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>300 - 450</td>
<td>50</td>
<td>21</td>
<td>375</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>4</td>
<td>450 - 600</td>
<td>5</td>
<td>3</td>
<td>525</td>
<td>1</td>
<td>1</td>
<td>5</td>
<td>3</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>5</td>
<td>600 - 750</td>
<td>4</td>
<td>6</td>
<td>675</td>
<td>2</td>
<td>4</td>
<td>8</td>
<td>12</td>
<td>16</td>
<td>24</td>
</tr>
<tr>
<td>6</td>
<td>750 - 900</td>
<td>1</td>
<td>2</td>
<td>825</td>
<td>3</td>
<td>9</td>
<td>3</td>
<td>6</td>
<td>9</td>
<td>18</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>120</td>
<td>40</td>
<td>-66</td>
<td>7</td>
<td>156</td>
<td>71</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\( N_1 \) denotes total No. of eng. units in the IEs

\( N_2 \) denotes total No. of eng. units outside IEs

\( f_1 \) denotes No. of eng. units in the IEs

\( f_2 \) denotes No. of eng. units outside IEs

\( \bar{X}_1 \) denotes the average power consumed per annum by eng. units in IEs.

\( \bar{X}_2 \) denotes the average power consumed per annum by eng. units outside in IEs.

\[
\bar{X}_1 = A + \frac{\sum f_1d}{N_1} \times i \\
= 375 + \frac{(-66/120)}{150} \\
= 292.5
\]
\[ \bar{X}_2 = A + \sum f_d d / N_2 \times i \]
\[ = 375 + (7/40) \times 150 \]
\[ = 401.25 \]
\[ \bar{X}_{12} = (\bar{X}_1 N_1) + (\bar{X}_2 N_2) / N_1 + N_2 \]
\[ = (292.5 \times 120) + (401.25 \times 40) / 120 + 40 \]
\[ = 319.69 \]
\[ \sigma_1 = \sqrt{\sum f_1 d^2 / N_1 - (\sum f_1 d / N_1)^2} \times i \]
\[ = \sqrt{156/120 - (-66/120)^2} \times 150 \]
\[ = 149.81 \]
\[ \sigma_2 = \sqrt{\sum f_2 d^2 / N_2 - (\sum f_2 d / N_2)^2} \times i \]
\[ = \sqrt{71/40 - (7/40)^2} \times 150 \]
\[ = 198.11 \]
\[ Z_o = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\sigma_1^2 / N_1 + \sigma_2^2 / N_2}} \]
\[ = \frac{|292.5 - 401.25|}{\sqrt{(149.81)^2/120 + (198.11)^2 / 40}} \]
\[ Z_o = 3.18 > 1.96 \]
### APPENDIX 6.4

**QUANTUM OF WORKING CAPITAL REQUIRED PER ANNUM**

**COMPUTATION TABLE FOR THE TEST FOR MEAN**

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Working Capital Per annum (Rs. in Lakhs)</th>
<th>$m$</th>
<th>$f_1$</th>
<th>$f_2$</th>
<th>$f_3$</th>
<th>$d$</th>
<th>$d^2$</th>
<th>$f_1d$</th>
<th>$f_2d$</th>
<th>$f_3d$</th>
<th>$f_1d^2$</th>
<th>$f_2d^2$</th>
<th>$f_3d^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0 - 20</td>
<td>10</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>-3</td>
<td>9</td>
<td>-6</td>
<td>-6</td>
<td>-6</td>
<td>18</td>
<td>18</td>
<td>18</td>
</tr>
<tr>
<td>2</td>
<td>20 - 40</td>
<td>30</td>
<td>2</td>
<td>4</td>
<td>4</td>
<td>-2</td>
<td>4</td>
<td>-4</td>
<td>-8</td>
<td>-8</td>
<td>8</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>3</td>
<td>40 - 60</td>
<td>50</td>
<td>5</td>
<td>6</td>
<td>6</td>
<td>-1</td>
<td>1</td>
<td>-5</td>
<td>-6</td>
<td>-6</td>
<td>5</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>4</td>
<td>60 - 80</td>
<td>70</td>
<td>17</td>
<td>15</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>5</td>
<td>80 - 100</td>
<td>90</td>
<td>59</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>59</td>
<td>3</td>
<td>2</td>
<td>59</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>6</td>
<td>100 - 120</td>
<td>110</td>
<td>21</td>
<td>4</td>
<td>18</td>
<td>2</td>
<td>4</td>
<td>42</td>
<td>8</td>
<td>36</td>
<td>84</td>
<td>16</td>
<td>72</td>
</tr>
<tr>
<td>7</td>
<td>120 - 140</td>
<td>130</td>
<td>8</td>
<td>5</td>
<td>3</td>
<td>3</td>
<td>9</td>
<td>24</td>
<td>15</td>
<td>9</td>
<td>72</td>
<td>45</td>
<td>27</td>
</tr>
<tr>
<td>8</td>
<td>140 - 160</td>
<td>150</td>
<td>6</td>
<td>1</td>
<td>2</td>
<td>4</td>
<td>16</td>
<td>24</td>
<td>4</td>
<td>8</td>
<td>96</td>
<td>16</td>
<td>32</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>120</td>
<td>40</td>
<td>40</td>
<td>-</td>
<td>134</td>
<td>10</td>
<td>35</td>
<td>342</td>
<td>120</td>
<td>173</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
TEST FOR MEAN OF QUANTUM OF WORKING CAPITAL REQUIRED PER ANNUM

\( N_1 \) denotes total number of eng. units in the IEs.

\( N_2 \) denotes total number of non-eng. units in the IEs.

\( N_3 \) denotes total number of eng.units outside IEs.

\( f_1 \) denotes number of eng.units in the IEs.

\( f_2 \) denotes number of non-eng. units in the IEs.

\( f_3 \) denotes number of eng. units outside IEs.

**\( t_{o1} \) - test for significant difference between eng. and non-eng. units in IEs**

\[
 t_{o1} = \frac{\left| \overline{X}_1 - \overline{X}_2 \right|}{S \sqrt{\frac{1}{N_1} + \frac{1}{N_2}}}
\]

\[ S^2 = \frac{N_1 \sigma_1^2 + N_2 \sigma_2^2}{N_1 + N_2} - 2 \]

\[ S = \sqrt{\frac{N_1 \sigma_1^2 + N_2 \sigma_2^2}{N_1 + N_2}} - 2 \]

**\( t_{o2} \) - test for significant difference between eng. units in and outside IEs**

\[
 t_{o2} = \frac{\left| \overline{X}_1 - \overline{X}_3 \right|}{S \sqrt{\frac{1}{N_1} + \frac{1}{N_3}}}
\]

\[ S_2 = \frac{N_1 \sigma_1^2 + N_3 \sigma_3^2}{N_1 + N_3} - 2 \]

\[ S = \sqrt{\frac{N_1 \sigma_1^2 + N_3 \sigma_3^2}{N_1 + N_3}} - 2 \]

\[
 \overline{X}_1 = A + \sum f_i d / N_1 x i
\]

\[
 = 70 + \frac{134}{120} \times 20 = 92
\]

\[
 \overline{X}_2 = A + \sum f_i d / N_2 x i
\]

\[
 = 70 + \frac{10}{40} \times 20 = 75
\]
\[ \bar{X}_3 = A + \sum f_i d / N_3 x i \]
\[ = 70 + 35/40 \times 20 = 87.5 \]
\[ \sigma_1 = \sqrt{\sum f_i d^2 / N_1} - (\sum f_i d / N_1)^2 x i \]
\[ = \sqrt{342/120} - (134/120)^2 \times 20 \]
\[ = 25.322 \]
\[ \sigma_2 = \sqrt{\sum f_i d^2 / N_2} - (\sum f_i d / N_2)^2 x i \]
\[ = \sqrt{120/40} - (10/40)^2 \times 20 \]
\[ = 34.278 \]
\[ \sigma_3 = \sqrt{\sum f_i d^2 / N_3} - (\sum f_i d / N_3)^2 x i \]
\[ = \sqrt{173/40} - (35/40)^2 \times 20 \]
\[ = 37.733 \]
\[ t_{o_1} = |\bar{X}_1 - \bar{X}_2| / S \sqrt{1/N_1 + 1/N_2} \]
\[ \text{where } S = \sqrt{N_1 \sigma_1^2 + N_2 \sigma_2^2 / N_1 + N_2 - 2} \]
\[ S = \sqrt{120 \times 25.322^2 + (40 \times 34.278^2) / 120 + 40 - 2} \]
\[ = 25.832 \]
\[ t_{o_1} = \frac{|92 - 75|}{25.832 \sqrt{1/120 + 1/40}} \]
\[ = 3.60 > 1.96 \]
$$t_{o_2} = \frac{|\overline{X}_1 - \overline{X}_3|}{\sqrt{\frac{1}{N_1} + \frac{1}{N_3}}}$$

where $S = \sqrt{N_1 \sigma_1^2 + N_3 \sigma_3^2} / N_1 + N_3 - 2$

$$S = \sqrt{(120 \times 25.322^2) + (40 \times 37.733^2)} / 120 + 40 - 2$$

$$= 26.928$$

$$t_{o_2} = \frac{|92 - 87.5|}{26.928 \sqrt{1/120 + 1/40}}$$

$$t_{o_2} = 0.92 < 1.96$$
APPENDIX 6.5

COMPUTATION TABLE FOR TEST FOR MEAN DIFFERENCE
ON WASTAGE OF RAW MATERIALS

(Rs. in Lakh)

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Amount of Wastage per Annum</th>
<th>( f_1 )</th>
<th>( f_2 )</th>
<th>( m )</th>
<th>( d )</th>
<th>( d^2 )</th>
<th>( f_1d )</th>
<th>( f_2d )</th>
<th>( f_1d^2 )</th>
<th>( f_2d^2 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0 - 2</td>
<td>11</td>
<td>6</td>
<td>1</td>
<td>-4</td>
<td>16</td>
<td>-44</td>
<td>-24</td>
<td>176</td>
<td>96</td>
</tr>
<tr>
<td>2</td>
<td>2 - 4</td>
<td>15</td>
<td>7</td>
<td>3</td>
<td>-2</td>
<td>4</td>
<td>-30</td>
<td>-14</td>
<td>60</td>
<td>28</td>
</tr>
<tr>
<td>3</td>
<td>4 - 6</td>
<td>1</td>
<td>6</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>4</td>
<td>6 - 8</td>
<td>74</td>
<td>18</td>
<td>2</td>
<td>4</td>
<td>148</td>
<td>36</td>
<td>296</td>
<td>72</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>8 - 10</td>
<td>19</td>
<td>3</td>
<td>4</td>
<td>16</td>
<td>76</td>
<td>12</td>
<td>304</td>
<td>48</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>120</strong></td>
<td><strong>40</strong></td>
<td></td>
<td></td>
<td></td>
<td><strong>150</strong></td>
<td><strong>10</strong></td>
<td><strong>836</strong></td>
<td><strong>244</strong></td>
</tr>
</tbody>
</table>

\( f_1 \) denotes number of eng. units in the IEs.  
\( f_2 \) denotes number of eng. units outside the IEs.  
\( N_1 \) denotes total number of eng. units in the IEs.  
\( N_2 \) denotes total number of eng. units outside the IEs.  
\( \bar{X}_1 \) denotes the mean wastage of raw material of eng. units in the IEs.  
\( \bar{X}_2 \) denotes the mean wastage of raw material of eng. units outside the IEs.  

\[
Z_0 = \left| \bar{X}_1 - \bar{X}_2 \right| \left( \sqrt{\frac{\sigma_1^2}{N_1} + \frac{\sigma_2^2}{N_2}} \right)
\]

\[
\bar{X}_1 = A + \frac{\sum f_1d}{N_1}
\]

\[
= 5 + \frac{150}{120}
\]

\[
= Rs. 6.25 \text{ lakhs}
\]
\[ \bar{X}_2 = A + \sum f_2 d/N_2 \]
\[ = 5 + 10/40 \]
\[ = \text{Rs. 5.25 lakhs} \]
\[ \sigma_1 = \sqrt{\frac{\sum f_1 d^2/N_1}{\sum f_1 d/N_1} - \left(\sum f_1 d/N_1\right)^2} \]
\[ = \sqrt{836/120 - (150/120)^2} \]
\[ \sigma_1 = 2.325 \]
\[ \sigma_2 = \sqrt{\frac{\sum f_2 d^2/N_2}{\sum f_2 d/N_2} - \left(\sum f_2 d/N_2\right)^2} \]
\[ = \sqrt{244/40 - (10/40)^2} \]
\[ \sigma_2 = 2.457 \]
\[ Z_o = \left| 6.25 - 5.25 \right| \]
\[ \frac{\text{-----------------------------}}{\sqrt{(2.325^2/120) + (2.457^2/40)}} \]
\[ Z_o = 1 / \sqrt{0.0450 + 0.1509} \]
\[ Z_o = 2.26 > 1.96 \]
BI-SERIAL CORRELATION AND TEST FOR SIGNIFICANCE DIFFERENCE AS REGARDS EMPLOYMENT POTENTIAL ON THE BASIS OF INITIAL CAPITAL EMPLOYED.

I. TEST FOR SIGNIFICANT DIFFERENCE BETWEEN ENG. AND NON-ENG. UNITS IN IEs

\[ r_1 = \frac{[(M_{1p} - M_{2p}) \times \sigma_{12}] \times p q}{u} \]

\( M_1 \) = Mean of employment potential on the basis of initial capital employed of eng. units in IEs.

\( M_2 \) = Mean of employment potential on the basis of initial capital employed of non eng. units in IEs.

\( p \) = \( \frac{4803}{4803 + 977} \)

\( q \) = 1 - 0.83 = 0.17

\( u \) = 0.2516

\( SE_1 = \sqrt{pq / u - r_1^2 / \sqrt{N}} \)

\( N \) = 5780

\( Z_1 = r_1 - 0 / SE_1 \)
<table>
<thead>
<tr>
<th>S.No.</th>
<th>Initial Capital Employed (Rs. in Lakhs)</th>
<th>m</th>
<th>$f_1$</th>
<th>$f_2$</th>
<th>$f_3$</th>
<th>$d$</th>
<th>$d^2$</th>
<th>$f_1d$</th>
<th>$f_2d$</th>
<th>$f_3d$</th>
<th>$f_1d^2$</th>
<th>$f_2d^2$</th>
<th>$f_3d^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0-5</td>
<td>2.5</td>
<td>130</td>
<td>107</td>
<td>116</td>
<td>-1.75</td>
<td>3.06</td>
<td>-227.5</td>
<td>-187.25</td>
<td>-203</td>
<td>397.8</td>
<td>327.42</td>
<td>354.96</td>
</tr>
<tr>
<td>2</td>
<td>5-15</td>
<td>10</td>
<td>1394</td>
<td>321</td>
<td>176</td>
<td>-1</td>
<td>1</td>
<td>-1394</td>
<td>-321</td>
<td>-176</td>
<td>1394</td>
<td>321</td>
<td>176</td>
</tr>
<tr>
<td>3</td>
<td>15-25</td>
<td>20</td>
<td>2729</td>
<td>211</td>
<td>284</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>4</td>
<td>25-35</td>
<td>30</td>
<td>288</td>
<td>182</td>
<td>512</td>
<td>1</td>
<td>1</td>
<td>288</td>
<td>182</td>
<td>512</td>
<td>288</td>
<td>182</td>
<td>512</td>
</tr>
<tr>
<td>5</td>
<td>35-45</td>
<td>40</td>
<td>262</td>
<td>156</td>
<td>32</td>
<td>2</td>
<td>4</td>
<td>524</td>
<td>312</td>
<td>64</td>
<td>1048</td>
<td>624</td>
<td>128</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>4803</td>
<td>977</td>
<td>1120</td>
<td>-</td>
<td>-</td>
<td>-809.5</td>
<td>-14.25</td>
<td>197</td>
<td>3127.8</td>
<td>1454.42</td>
<td>1170.96</td>
</tr>
</tbody>
</table>

$f_1$ denotes the no. of personnel employed by Eng. units in IEs.

$f_2$ denotes the no. of personnel employed by Non-Eng. units in IEs.

$f_3$ denotes the no. of personnel employed by Eng. units outside IEs.

$N_1$ denotes total no. of personnel employed in Eng. units in IEs.

$N_2$ denotes total no. of personnel employed in Non-Eng. units in IEs.

$N_3$ denotes total no. of personnel employed in Eng. units outside IEs.
II. TEST FOR SIGNIFICANCE BETWEEN ENG. UNITS IN AND OUTSIDE IEs.

\[ r_2 = \frac{\mathcal{M}_{1p} - \mathcal{M}_{3q}}{\sigma_{13}} \times pq / u \]

\( M_1 \) = Mean of employment potential on the basis of initial capital employed of eng. units in IEs.

\( M_3 \) = Mean of employment potential on the basis of initial capital employed of eng. units outside IEs.

\[ p = \frac{4803}{(4803 + 1120)} \]
\[ = \frac{4803}{5923} \]
\[ = 0.81 \]

\[ q = 1 - 0.81 \]
\[ = 0.19 \]

\[ u = 0.2709 \]

\[ SE_2 = \sqrt{pq / u} \times r_2^2 / \sqrt{N} \]

\[ N = 5923 \]

\[ Z_2 = r_2 - 0 / SE_2 \]

\[ M_1 = A + \sum f_1 d / N_1 \times i \]
\[ = 20 + \frac{-809.5}{4803} \times 10 \]
\[ = 18.31 \]

\[ M_2 = A + \sum f_2 d / N_2 \times i \]
\[ = 20 + \frac{-14.25}{977} \times 10 \]
\[ = 19.85 \]
\[ M_3 = A + \frac{\sum f_3 d}{N_3 x i} \]
\[ = 20 + \frac{197}{1120} \times 10 \]
\[ = 21.76 \]

\[ \sigma_1 = \sqrt{\frac{\sum f_1 d^2}{N_1} - \left(\frac{\sum f_1 d}{N_1}\right)^2} \times i \]
\[ = \sqrt{\frac{3127.8}{4803} - \left(\frac{-809.5}{4803}\right)^2} \times 10 \]
\[ = 7.89 \]

\[ \sigma_2 = \sqrt{\frac{\sum f_2 d^2}{N_2} - \left(\frac{\sum f_2 d}{N_2}\right)^2} \times i \]
\[ = \sqrt{\frac{1454.42}{977} - \left(\frac{-14.25}{977}\right)^2} \times 10 \]
\[ = 12.2 \]

\[ \sigma_3 = \sqrt{\frac{\sum f_3 d^2}{N_3} - \left(\frac{\sum f_3 d}{N_3}\right)^2} \times i \]
\[ = \sqrt{\frac{1170.96}{1120} - \left(\frac{197}{1120}\right)^2} \times 10 \]
\[ = 10.07 \]

**COMBINED MEAN**

a. \[ M_{12} = \frac{(M_1 N_1) + (M_2 N_2)}{N_1 + N_2} \]
\[ = \frac{(18.31 \times 4803) + (19.85 \times 977)}{4803 + 977} \]
\[ M_{12} = 18.57 \]

b. \[ M_{13} = \frac{(M_1 N_1) + (M_3 N_3)}{N_1 + N_3} \]
\[ = \frac{(18.31 \times 4803) + (21.76 \times 1120)}{4803 + 1120} \]
\[ M_{13} = 18.96 \]
COMBINED STANDARD DEVIATION

a. $\sigma_{12} = \sqrt{N_1 \sigma_1^2 + N_2 \sigma_2^2 + N_1 d_1^2 + N_2 d_2^2} / (N_1 + N_2)$ 

$d_1 = M_1 - M_{12}$

$= 18.31 - 18.57$

$= -0.26$

$d_2 = M_2 - M_{12}$

$= 19.85 - 18.57 = 1.28$

$b. \sigma_{13} = \sqrt{N_1 \sigma_1^2 + N_3 \sigma_3^2 + N_1 d_1^2 + N_3 d_3^2} / (N_1 + N_3)$ 

$d_1 = M_1 - M_{13}$

$= 18.31 - 18.96$

$= -0.65$

$d_3 = M_3 - M_{13}$

$= 21.76 - 18.96$

$= 2.8$

$\sigma_{13} = \sqrt{(4803 \times 7.89^2) + (1120 \times 10.07^2) + (4803 \times -0.65^2) + (1120 \times 2.8^2)} / (4803 + 1120)$
\[ \sigma_{13} = 71.48 \]

\[ r_1 = \frac{M_{1p} - M_{2p}}{\sigma_{12} x pq / u} \]

\[ = \frac{[(18.31 \times 0.83 - 19.85 \times 0.83) / 77.22] \times 0.83 \times 0.17 / 0.2516}{0.0093} \]

\[ SE_i = \sqrt{pq/u} \frac{r_1^2}{\sqrt{N}} \]

\[ N = 5780 \]

\[ SE_i = \frac{\sqrt{0.83 \times 0.17 / 0.2516 - 0.0093^2}}{\sqrt{5780}} \]

\[ = 0.00331 \]

\[ Z_1 = r_1 - 0 / SE_i \]

\[ = 0.0093 - 0 / 0.0033 \]

\[ = 2.82 \]

\[ Z_1 = 2.82 > 1.96 \]

\[ r_2 = \frac{M_{1p} - M_{3p}}{\sigma_{13} x pq / u} \]

\[ r_2 = \frac{[(18.31 \times 0.81) - (21.76 \times 0.81) / 71.48] \times (0.81 \times 0.19) / 0.2709}{-0.022} \]
\[ SE_2 = \sqrt{pq/u - \tau^2} \]
\[ \frac{\text{--------------------------}}{\sqrt{N}} \]
\[ N = 5923 \]

\[ SE_2 = \frac{\sqrt{0.81 \times 0.19 / 0.2709} - (-0.022^2)}{\sqrt{5923}} \]

\[ = 0.0188 \]

\[ Z_2 = \frac{\tau - 0}{SE_2} \]

\[ = \frac{-0.022 - 0}{0.0188} \]

\[ Z_2 = 1.17 < 1.96 \]
APPENDIX 6.7

COMPUTATION TABLE FOR TEST FOR MEAN VALUE OF PRODUCTION PER ANNUM

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Value of production (Rs. in Lakhs)</th>
<th>$f_1$</th>
<th>$f_2$</th>
<th>$f_3$</th>
<th>$M$</th>
<th>$d$</th>
<th>$\sigma_1$</th>
<th>$f_1d$</th>
<th>$f_2d$</th>
<th>$f_3d$</th>
<th>$f_1d^2$</th>
<th>$f_2d^2$</th>
<th>$f_3d^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0 - 30</td>
<td>12</td>
<td>5</td>
<td>1</td>
<td>15</td>
<td>-1</td>
<td>1</td>
<td>-12</td>
<td>-5</td>
<td>-1</td>
<td>12</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>30 - 60</td>
<td>17</td>
<td>4</td>
<td>4</td>
<td>45</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>60 - 90</td>
<td>81</td>
<td>29</td>
<td>11</td>
<td>75</td>
<td>1</td>
<td>1</td>
<td>81</td>
<td>29</td>
<td>11</td>
<td>81</td>
<td>29</td>
<td>11</td>
</tr>
<tr>
<td>4</td>
<td>90 - 120</td>
<td>10</td>
<td>2</td>
<td>24</td>
<td>105</td>
<td>2</td>
<td>4</td>
<td>20</td>
<td>4</td>
<td>48</td>
<td>40</td>
<td>8</td>
<td>96</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>120</td>
<td>40</td>
<td>40</td>
<td>89</td>
<td>28</td>
<td>58</td>
<td>133</td>
<td>42</td>
<td>108</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- $f_1$ denotes number of eng. units in the IEs.
- $f_2$ denotes number of non eng. units in the IEs.
- $f_3$ denotes number of eng. units outside the IEs.
- $N_1$ denotes total number of eng. units in IEs.
- $N_2$ denotes total number of non-eng. units in the IEs.
- $N_3$ denotes total number of eng. units outside the IEs.
- $\overline{X}_1$ denotes mean value of production per annum of eng. units in the IEs.
- $\overline{X}_2$ denotes mean value of production per annum of non-eng. units in the IEs.
- $\overline{X}_3$ denotes mean value of production per annum of eng. units outside the IEs.
- $\sigma_1$ denotes standard deviation of eng. units in IEs, as regards value of production per annum.
- $\sigma_2$ denotes standard deviation of non-eng. units outside IEs as regards the value of production per annum.
- $\sigma_3$ denotes the standard deviation of eng. units outside the IEs regarding the value of production.

\[
Z_{c1} = \frac{|\overline{X}_1 - \overline{X}_2|}{\sqrt{\sigma_1^2/N_1 + \sigma_2^2/N_2}}
\]

$Z_{c1}$ = test for mean of the value of production per annum between eng. and non eng units in the IEs.

\[
Z_{c2} = \frac{|\overline{X}_1 - \overline{X}_3|}{\sqrt{\sigma_1^2/N_1 + \sigma_3^2/N_3}}
\]

$Z_{c2}$ = test for mean of the value of production per annum between eng. units within and outside the IEs.

Required values are: $\overline{X}_1$, $\overline{X}_2$, $\overline{X}_3$, $\sigma_1$, $\sigma_2$, $\sigma_3$

\[
\overline{X}_1 = A + \sum f_i d / N_1 \times i + 45 + 89/120 \times 30
\]

\[
\overline{X}_2 = \text{Rs. 67.25 lakhs}
\]
\[ \bar{X}_2 = \bar{A} + \frac{\sum d}{N} \times i \quad 45 + \frac{28}{40} \times 30 \]
\[ = \text{Rs. 66 lakhs} \]
\[ \bar{X}_3 = \bar{A} + \frac{\sum d}{N} \times i \quad 45 + \frac{58}{40} \times 30 \]
\[ = \text{Rs. 88.5 lakhs} \]
\[ \sigma_1 = \sqrt{\frac{\sum d^2}{N} - \left(\frac{\sum d}{N}\right)^2} \times i \quad 133/120 - (89/120)^2 \times 30 \]
\[ = 22.41 \]
\[ \sigma_2 = \sqrt{\frac{\sum d^2}{N} - \left(\frac{\sum d}{N}\right)^2} \times i \quad 42/40 - (28/40)^2 \times 30 \]
\[ = 22.45 \]
\[ \sigma_3 = \sqrt{\frac{\sum d^2}{N} - \left(\frac{\sum d}{N}\right)^2} \times i \quad 108/40 - (58/40)^2 \times 30 \]
\[ = 23.19 \]
\[ Z_{01} = \frac{|67.25 - 66|}{\sqrt{(22.41)^2/120} + (22.45)^2/40} \]
\[ = 0.30 < 1.96 \]
\[ Z_{02} = \frac{|67.25 - 88.5|}{\sqrt{(22.41)^2/120} + (23.19)^2/40} \]
\[ = 5.05 > 1.96 \]
### APPENDIX 6.8

**EXTENT OF CAPACITY UTILISED**

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Extent of Capacity Utilised (%)</th>
<th>$f_i$</th>
<th>$f_i$</th>
<th>$Cf_i$</th>
<th>$Cf_2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0 - 50</td>
<td>4</td>
<td>2</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>50 - 75</td>
<td>108</td>
<td>7</td>
<td>112</td>
<td>9</td>
</tr>
<tr>
<td>3</td>
<td>75 - 100</td>
<td>8</td>
<td>31</td>
<td>120</td>
<td>40</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>120</td>
<td></td>
<td>40</td>
<td></td>
</tr>
</tbody>
</table>

Median percentage of capacity utilised:

- $M_1$ be median percentage of capacity utilised in the case of eng. units in IEs.
- $M_2$ be median percentage of capacity utilised in the case of eng. units outside IEs.

Let $N_1$ be total number of eng. units in IEs.

Let $N_2$ be total number of eng. units outside IEs.

\[
M_1 = L + \frac{N_1}{2} - \frac{Cf_i}{cf_1} x i
\]

\[
= 50 + 60 - 4/108 \times 25
\]

\[
= 63\%
\]

\[
M_2 = L + \frac{N_2}{2} - \frac{Cf_i}{cf_2} x i
\]

\[
= 75 + 20.9/31 \times 25
\]

\[
= 83.9\%
\]
### APPENDIX 6.9

**COMPUTATION TABLE FOR BI-VARIATE CORRELATION BETWEEN CI AND CU**

<table>
<thead>
<tr>
<th>Mid Y</th>
<th>CI</th>
<th>0 - 5</th>
<th>5 - 15</th>
<th>15 - 25</th>
<th>25 - 35</th>
<th>35 - 45</th>
<th>fx</th>
<th>X - X - X / 12.5</th>
<th>Xfx</th>
<th>Xfx</th>
<th>Yfxy</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>25</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 - 50</td>
<td>75</td>
<td>25</td>
<td>312</td>
<td>-</td>
<td>-</td>
<td>35</td>
<td>-3</td>
<td>-105</td>
<td>315</td>
<td>867</td>
<td></td>
</tr>
<tr>
<td>50 - 75</td>
<td>32</td>
<td>42</td>
<td>133</td>
<td>87</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>75 - 100</td>
<td>-24</td>
<td>5</td>
<td>3</td>
<td>121</td>
<td>181</td>
<td>38</td>
<td>2</td>
<td>76</td>
<td>152</td>
<td>40</td>
<td></td>
</tr>
<tr>
<td>fy</td>
<td>-11</td>
<td>-8</td>
<td>4</td>
<td>0</td>
<td>4</td>
<td>-</td>
<td>-</td>
<td>-29</td>
<td>467</td>
<td>907</td>
<td></td>
</tr>
<tr>
<td>Y = Y</td>
<td>30</td>
<td>38</td>
<td>54</td>
<td>31</td>
<td>160</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Yfxy</td>
<td>-11</td>
<td>-8</td>
<td>4</td>
<td>0</td>
<td>4</td>
<td>-</td>
<td>-</td>
<td>-29</td>
<td>467</td>
<td>907</td>
<td></td>
</tr>
<tr>
<td>XY</td>
<td>231</td>
<td>520</td>
<td>12</td>
<td>0</td>
<td>144</td>
<td>907</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>907</td>
</tr>
</tbody>
</table>

**CI** : Capital Invested  
**CU** : Capacity Utilised

\[
r = \frac{N \sum XYfxy - (\sum XfX) (\sum YfY)}{\sqrt{\{N \sum X^2fX - (\sum XfX)^2\} \{N \sum Y^2fY - (\sum YfY)^2\}}
\]

\[
= \frac{160 \times 907 - (-29) (-345)}{\sqrt{160 \times 467 - 29^2 \{160 \times 3871 - (-345)^2\}}}
\]

\[
= 0.702769
\]

\[
t_{0.1} = \left| r \right| n^{\frac{1}{2}} / (1-r^2)^{\frac{1}{2}}
\]

\[
= 0.702769 \times \sqrt{160} / (1-(-702769)^2)^{\frac{1}{2}} = 12.5 > 1.96
\]
## APPENDIX 6.10

**COMPUTATION TABLE FOR BI-VARIATE CORRELATION BETWEEN CI AND EP**

<table>
<thead>
<tr>
<th>Mid</th>
<th>2.5</th>
<th>10</th>
<th>20</th>
<th>30</th>
<th>40</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>CI</th>
<th>0-5</th>
<th>5-15</th>
<th>5-15</th>
<th>25-35</th>
<th>35-45</th>
<th>fx</th>
<th>X=X-89.5/20</th>
<th>Xfx</th>
<th>XYbxy</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.5</td>
<td>34</td>
<td>632</td>
<td>538</td>
<td>446</td>
<td>15</td>
<td>-4</td>
<td>60</td>
<td>240</td>
<td>208</td>
</tr>
<tr>
<td>29.5</td>
<td>22</td>
<td>26</td>
<td>632</td>
<td>538</td>
<td>446</td>
<td>15</td>
<td>-4</td>
<td>60</td>
<td>240</td>
</tr>
<tr>
<td>49.5</td>
<td>22</td>
<td>126</td>
<td>84</td>
<td>84</td>
<td>20</td>
<td>-2</td>
<td>-40</td>
<td>80</td>
<td>128</td>
</tr>
<tr>
<td>69.5</td>
<td>22</td>
<td>24</td>
<td>38</td>
<td>38</td>
<td>5</td>
<td>-1</td>
<td>-5</td>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td>89.5</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>43</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>109.5</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>25</td>
<td>1</td>
<td>25</td>
<td>25</td>
<td>26</td>
</tr>
<tr>
<td>129.5</td>
<td>22</td>
<td>106</td>
<td>176</td>
<td>176</td>
<td>39</td>
<td>2</td>
<td>78</td>
<td>156</td>
<td>64</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Y</th>
<th>Y = y-30/2.5</th>
<th>Yfy</th>
<th>Yfy</th>
<th>Yfy</th>
<th>Yfy</th>
</tr>
</thead>
<tbody>
<tr>
<td>-11</td>
<td>-8</td>
<td>-4</td>
<td>0</td>
<td>4</td>
<td>-</td>
</tr>
<tr>
<td>-22</td>
<td>-288</td>
<td>-120</td>
<td>0</td>
<td>204</td>
<td>-226</td>
</tr>
<tr>
<td>242</td>
<td>2304</td>
<td>480</td>
<td>0</td>
<td>816</td>
<td>3842</td>
</tr>
<tr>
<td>-22</td>
<td>224</td>
<td>128</td>
<td>0</td>
<td>-28</td>
<td>302</td>
</tr>
</tbody>
</table>

CI : Capital Invested  EP : Employment Potential
$r = \frac{N_{\text{E}} \times x_{\text{E}} - (N_{\text{E}} x_{\text{E}}) (E_{\text{F}} x_{\text{F}}) - (E_{\text{F}} y_{\text{F}})}{\sqrt{(160 \times 302 - (-41)^2) (160 \times 3842 - (-226)^2)}}$

$= \frac{30054 \times 497999 \times 563644}{0.1661698}$

$= 2.13 > 1.96$

$\frac{r}{\sqrt{1 - r^2}} = 2.13 > 1.96$
APPENDIX 7

SUBSIDY FOR SMALL INDUSTRIES IN TAMIL NADU

SPECIAL SUBSIDY FOR SELECTED CATEGORIES OF INDUSTRIES

Eligible Industries

New or existing small scale units taking up substantial expansion/diversification in the following category: 1) leather industry 2) electronics industry 3) auto ancillaries 4) drugs and pharmaceuticals 5) Solar energy equipment 6) gold and diamond jewellery for export only 7) jute processing industry in 6 taluks viz., Ambasamudram (Nellai kattabomman dist.) Madurai (Madurai dt.) Musiri (Trichy dt.) Kumbakonam (Tanjore dt.) Chenglepattu (Chengai Anna dt.) and Panruti (South Arcot dt.) 8) Pollution control equipment a) Sports good and accessories (b) Cost effective building materials like aluminium, PVC doors and windows, window frames etc. Food processing Industries.

The existing industries which undertake expansions/diversification without any limit to the numbers of expansion/diversification are eligible for subsidy with effect from 1.4.91.
QUANTUM OF SUBSIDY

20 per cent of the capital investment up to a ceiling of Rs.35 lakh for electronics, Rs.20 lakh for leather and Rs.15 lakh for other industries (exclusive of value of second hand machinery) with effect from 1.4.91.

ELIGIBLE AREA

This subsidy will be available to industrial units irrespective of their location subject to the condition that where backward area subsidy is available, this subsidy will become part of such subsidy.

LOW TENSION POWER TARIFF SUBSIDY

1. QUANTUM OF SUBSIDY

Available for three years from the date of commencement of production at the rate of 30 per cent of the actual energy charges paid for the first year, 20 per cent for the second year and 10 per cent for the Third year.

2. ELIGIBLE UNITS

All registered small scale industries which commenced production on or after 1.1.80 and which consume Low Tension power and all industries using L.T. Power irrespective of the fact whether the industry happens to be small or medium or large with effect from 1.4.88.
3. ELIGIBLE AREAS

All over the state excluding the areas falling under the MMDA/Urban Land Tax Jurisdiction and Urban Land Ceiling Jurisdiction namely Madras and its environs of 15 kms. and Towns of Coimbatore, Madurai, Salem and Tiruchirappalli with a 8 km. belt area.

GENERAL SUBSIDY

1. QUANTUM OF SUBSIDY

15 per cent of the cost of the generator subject to a maximum of Rs.5 lakhs.

2. ELIGIBLE UNITS

All high tension/low tension power consuming units which have installed generator for their captive use on or after 22.5.89. Generator purchase for replacement of old generator also eligible subject to some condition.
APPENDIX 8

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