CHAPTER - III

FACTOR PRODUCTIVITY FOR THE INDUSTRIAL SECTORS -
A COMPARATIVE STUDY FOR GUJARAT STATE VS. ALL INDIA

3.1. Introduction

In a developing country, industrial sectors are the most essential as the developing part of the economy. Industrial revolution aptly called industrialisation can be considered to bring in change in the human life. The other sectors of the economy i.e. Agriculture, retail trade, banking, communication and transportation services are also on the tide of industrialisation e.g. the increase in agricultural yield may be due to the development in chemicals and fertilizers. The industry thrives on the perfect co-ordination and co-operation of the investors and the working class. In general, we may consider two types of production factors viz. labour and capital. One may conclude that India is a country having labour intensive industrial base. The role of labour (skilled and unskilled) in any industry can be considered as an excel, on which the wheel of the industrial machinery revolves and the labour pours his sweat as lubricant to run industry smoothly. So labour is a part of the scientific accuracy in technological innovations. Precision and workmanship are of chief importance in
productivity of goods and services. Because of the dissatisfaction of labour due to lower wages, the trend of workers' strikes have caused many industrial hazards. This could be achieved only when the workers are satisfied and paid adequately for the labour, they put in.

To study the output-input relations in the industry for visualising the growth of an economy, the productivity is an essential and fundamental concept. As defined by Kendrick (1956) and (1961), the ratio of output to particular input may be termed as the partial productivity measure. Jackson and Silver (1979) have analysed an interesting problem of measuring labour productivity.

A number of further studies are made, in this context on Indian data, some of which are mentioned here. Arun Ghosh (1984), Salkrishna (1963), Brahmananda (1982), Shivamaggi etc. (1968) have contributed to define and analyse the productivity ratios. A study of industrial indicators in large scale industries is made by Rajkrishana and Mehta (1968), Ghoshal etc. (1964) and Singh (1966) have also contributed to study the pattern of wages and productivity in Indian industries. Mahesh Bhatt and Chawda (1976) have contributed to visualize industrial growth in Gujarat State. A study of profitability ratios and efficiency measure are done by Jani and Jaiswal (1975, 1978) for the certain major industries in India.
In this chapter, the partial productivity measures are defined and analysed for the industrial sector of Gujarat State vs. India as a whole.

In this chapter, the following measures are computed:

1. Labour productivity
2. Capital productivity, and
3. Capital - output co-efficient

Conclusions are drawn on the basis of the above analysis and the respective measures are also compared by defining Relative Partial Labour Productivity (RPLP) and Relative Partial Capital Productivity (RPCP) measures.

3.2 Notations

The notations used in this chapter are as under:

\[ V_t = \text{Value added by manufacturer during the year } t \] (in lakhs ₹) \[(t = 0,1,2,\ldots,20)\]

\[ W_t = \text{Wages and salaries paid to the employees during the year } t \] (in lakhs ₹) \[(t = 0,1,2,\ldots,20)\]

\[ N_t = \text{Number of mandays employed during the year } t \] (in lakhs) \[(t = 0,1,2,\ldots,20)\]

\[ C_t = \text{Total productive capital employed during the year } t \] (in lakhs ₹) \[(t = 0,1,2,\ldots,20)\]
FCₜ = Fixed capital invested during the year t (in lakhs Rs.) (t = 0, 1, 2, ..., 20)

**NOTE:**

\[ t₀ \Rightarrow \text{the year 1960-61} \]
\[ t₁ \Rightarrow \text{the year 1961-62} \]
\[ t₂₀ \Rightarrow \text{the year 1980-81} \]

3.3 **Labour Productivity:**

Labour productivity is measured by value added per unit of labour input. Changes in labour productivity are measured by changes in 'real' value added relative to the changes in labour inputs. Labour productivity can be measured in value terms i.e. wages and salaries per VAM (and VAM per wages and salaries). It is also desirable to measure the labour input with regard to the number of man-days (assumed to be 8 hours a day) worked during the period under consideration. This converts the measurement of labour input from a stock of workers to a flow of workers days per period. Value added per man-day is a partial measure of labour productivity which is satisfactory for the most of the purposes. Both the types of labour productivity measures for the industrial sector of Gujarat State as well as the same for all India as a whole are computed.
Thus in this section, the following measures of labour productivity ratios are considered:

(i) VAM per wages and salaries, and
(ii) VAM per man-days

(i) VAM per wages and salaries

In order to know the net output per unit of labour input in value terms, the series is calculated by the formula:

\[(LP)^W_t = \frac{V_t}{W_t} \quad (t = 0, 1, 2, 3, \ldots, 20)\]

This series gives the labour productivity in monetary units. The indices of the above series are also calculated, and they are denoted by \(I_t (L)^W\), which represent the indices of labour productivity in value terms for the year \(t\). These indices are calculated from the formula:

\[I_t (L)^W = \left(\frac{(LP)^W_t}{(LP)^W_0}\right) \times 100 \quad (t = 0, 1, 2, 3, \ldots, 20)\]

The denominator gives the labour productivity in the base year.

The above formula (3.1) gives the labour productivity measure in value terms at current prices.
for the successive years. In order to have a more realistic comparison at constant prices, the method of double deflation is used i.e. VAM series is deflated by the wholesale price index and the series of wages and salaries is deflated by the consumer price index. If we intend to relate the measure of real value added to the productive use of labour, then the method of double deflation can be said to be an appropriate one. The value of the series of labour productivity at constant prices and their indices can be calculated as above using the formula (3.1) and (3.2) respectively, which can be denoted by \((LP)^d_t\).

In order to have a comparison between the two industrial sectors i.e. Gujarat State and all India, the series of relative partial labour productivity \((RPLP)^w_t\) is computed for the succeeding years. This may be given by

\[
(RPLP)^w_t = \frac{(LP)^w_t \text{ for the industrial sector of Gujarat State}}{(LP)^w_t \text{ for the industrial sector of all India}}
\]

\[(t = 0, 1, 2, 3, \ldots, 20)\]

\[\text{..................(3.3)}\]

The above series at constant prices is denoted by \((RPLP)^w_t\).
Labour Productivity for the Industrial Sector of Gujarat State:

For the labour productivity series for the industrial sector of Gujarat State as a whole at current prices, the mean, S.D., C.V. and range are 1.9042, 0.2891, 15.18 and 0.8642 respectively, but the same values at constant prices are 1.8637, 0.311, 16.69 and 0.9674 respectively. Thus the average labour productivity at current prices is 1.9042 whereas at constant prices it is 1.8637, which means that on an average, if one rupee is spent for the labour, the value of net output is nearly doubled at current as well as at constant prices. From the indices of labour productivity for the industrial sector of Gujarat State at current prices, it can be seen that the maximum rise is about 42% during the year 1974-75 and the lowest reduction is about 9% during the year 1968-69 as compared to the year 1960-61. At constant prices, the maximum rise is about 43% in the year 1979-'80 and the lowest reduction is about 15% in the year 1966-'67 as compared to the base year.

The AGR during the period 1960-'65 has gone down by about 1% and about 2% per year at current and at constant prices respectively. During the years 1970-'75 the AGR at current prices has gone up by about 6.5% per year while at constant prices, it has gone up by about
6% per year. During the span of 21 years, the AGR has gone up by about 1.2% per year at current prices whereas, it has gone up by about 1.5% per year at constant prices. The C3R during the span of 21 years have gone up by about 0.05% and 0.07% per year at current and at constant prices respectively.

The trend values for the series of labour productivity for the industrial sector of Gujarat State at current and at constant prices are given in the col. (3) and col. (5) respectively of table - 3.1 and these values at constant prices are plotted in the diagram-3.1. At current prices, the trend series reflect a decreasing pattern upto the year 1968-'69. It has declined by about 2% in the year 1968-'69 as compared to the year 1962-'63. After these years, the trend values show an increasing pattern. The maximum rise is about 36% in the 1978-'79 as compared to the year 1962-'63. This series at constant prices also reflects the decreasing trend up to the year 1967-'68. The lowest reduction is in the year 1964-'65, which is about 5% as compared to the year 1962-'63. The maximum rise is about 43% in the year 1978-'79 as compared to the year 1962-'63.
For the labour productivity series for the industrial sector of India as a whole at current prices, the mean, S.D., C.V. and range are 1.8239, 0.1158, 6.35 and 0.4541 respectively, while the same values at constant prices are 1.7689, 0.1335, 7.54 and 0.5826 respectively. From the average productivity, it may be concluded that if on an average one rupee is spent for the employees, the net output becomes nearly double at current as well as at constant prices. From the indices of this series, at current prices, it can be observed that the maximum rise is in the year 1978-79, which is about 15% as compared to the year 1960-61 and the lowest reduction is in the year 1968-69, which is about 11% as compared to the base year. At constant prices, the maximum rise is about 17% in the year 1978-79 and the lowest reduction is about 15% in the year 1966-67 as compared to the year 1960-61.

The A3R during the period 1960-65 at current prices has gone up by about 0.2% per year, while at constant prices, it has gone down by about 0.6% per year. During the span of 21 years, the A3R has gone up by about 0.4% per year at current prices, while it has gone up by about 0.2% per year at constant prices.
The CGR during the year 1965-70 at current prices has gone down by about 0.1% per year. While at constant prices, it has gone up by about 0.2% per year. The CGR during the span of 21 years has gone up by about 0.01% per year both at current as well as at constant prices.

The trend values for this series at current and at constant prices are also obtained and they are given in the col. (7) and col. (9) respectively of table - 3.1. These values at constant prices are plotted in the diagram - 3.1. The trend values at current prices show that there is a decreasing trend up to the year 1972-73. The lowest reduction is about 8% in the year 1969-70. During the year 1972-73, the trend value at current prices has declined by nearly about 1% as compared to the year 1962-63. After this year, the trend values reflect an increasing trend. The maximum rise is in the year 1978-79 which is about 9% as compared to the year 1962-63. The trend values at constant prices are showing almost the declining trend up to the year 1971-72. After this year, the trend values are increasing. The maximum rise in the trend values is about 12% in the year 1978-79, whereas the lowest reduction is about 6% in the year 1967-68 as compared to the year 1962-63.
Relative Partial Labour Productivity (RPLP)

For the series of relative partial labour productivity at current prices, the mean, S.D., C.V. and range are 1.0413, 0.1069, 10.27 and 0.3514 respectively, while the same at constant prices are 1.0401, 0.1138, 10.85 and 0.3515 respectively. It means that on an average, labour productivity for the industrial sector of Gujarat State is better to some extent as compared to the same for the industrial sector of India as a whole. From the series of RPLP, it can be seen that the RPLP is less than one during the period 1960-'68 both at current as well as at constant prices. This shows that the performance of the industrial sector at State level is poor during the said period with respect to labour productivity as compared to the same at the national level. The lowest reduction is about 6% in the year 1964-'65 both at current as well as at constant prices as compared to the base year. The maximum rise is about 31% in the year 1977-'78 at current as well as at constant prices as compared to the year 1960-'61.

The AGR during the period 1960-'65 have done down by about 1.25% per year, both at current and at constant prices. During the period 1970-'75, the AGR has boosted by about 3% both at current as well as
at constant prices. During the span of 21 years, the AGR has gone up by about 0.75% per year and about 1.25% per year respectively at current and at constant prices. The CGR during the span of 21 years has also gone up by about 0.35% per year at current prices, while it has gone up by about 0.5% per year at constant prices.

The trend values are obtained for both the above series at current and at constant prices, which are given in the col.(11) and (13) respectively of table - 3.1. The trend values indicate that the maximum rise is about 26% in the year 1975-76 at current prices but the same at constant prices is about 27% in the year 1978-'79 as compared to the year 1962-'63. As a whole there is an increasing trend both at current as well as at constant prices.
(ii) **VAM per Man days**

In order to know the net output per mandays in value terms this series is calculated from the formula:

\[
(LP)_t^n = \frac{V_t}{N_t} \quad (t = 0, 1, 2, 3, \ldots, 20)
\]

...........................................(3.4)

The indices of the above series are also computed and they are denoted by \( I_t (L)_n \), which represent the indices of partial labour productivity in value terms for the year \( t \). These indices are calculated from the formula

\[
I_t (L)_n = \frac{(LP)_t^n}{(LP)_0^n} \times 100 \quad (t = 0, 1, 2, 3, \ldots, 20)
\]

...........................................(3.5)

The above formula gives the labour productivity measure at current prices for the successive years. In order to convert the series at constant prices, deflated VAM series is divided by mandays for the succeeding years, and their indices can be calculated by using the formula (3.5)

The relative partial labour productivity ratios are obtained for the comparison between the two industrial sectors and these are denoted by \( (RPLP)_n \).
This may be given by:

\[(RPLP)_t^n = \frac{(LP)_t^n}{(LP)_t^n}\]

for the Industrial sector of Gujarat State

\[(LP)_t^n\]

for the industrial sector of all India.

\((t = 0,1,2,3,\ldots,20)\)

\((3.6)\)

The above series at constant prices is denoted by

\((RPLP)_t^n\).

Labour Productivity (VAM per mandays) for the Industrial Sector of Gujarat State

For the series of labour productivity for the industrial sector of Gujarat State at current prices, the mean, S.D., C.V. and range are 31.09, 17.34, 55.79 and 57.66 per manday respectively, while the same values at constant prices are 13.28, 2.33, 17.54 and 7.30 Rs. per manday respectively. From the series at current prices, it can be seen that the value of net output per manday has increased by about 139% in the year 1970-'71 and it has increased by about 463% in the year 1980-'81, which is the maximum rise as compared to the year 1960-'61. At constant prices, it has reduced by about 6% in the year 1968-'69, whereas the lowest reduction is about 10% in the year 1966-'67 as compared to the year 1960-'61. The maximum rise in this series at constant prices is about 56% in the year 1974-'75 as compared to the same in the base year.
The AGR during the period 1960-65 at current prices has boosted by about 4.3% per year, but at constant prices, it has reduced by about 1.3% per year. During the period 1970-'75, the AGR has boosted by about 49% per year and about 5% per year at current and at constant prices respectively. During the span of 21 years the AGR at current prices has gone up by about 22% per year, but the same at constant prices has gone up only by about 2% per year. The CGR during the span of 21 years has gone up by about 0.4% per year and about 0.07% per year at current and at constant prices respectively.

The trend values are computed both at current and at constant prices and they are given in the col.(3) and col.(5) respectively of table - 3.2. These values at constant prices are plotted in the diagram - 3.2.

The trend value at current prices has increased by about 104%, but at constant prices, it has increased by about 24% in the year 1970-'71 as compared to the year 1962-'63. The maximum rise in the trend values are about 337% and about 40% at current and at constant prices respectively, in the year 1978-'79 as compared to the year 1962-'63. As a whole, there is an increasing trend for the labour productivity series.
Labour Productivity (VAH per mandays) for the Industrial Sector of All India

For the labour productivity series for the industrial sector of India as a whole at current prices, the mean, S.D., C.V. and range are 30.54, 15.40, 50.42 and 47.67 Rs. per manday respectively, while the same values at constant prices are 13.23, 1.81, 11.41 and 4.40 Rs. per manday respectively. From the series at current prices, it can be observed that the net output per manday has increased by about 142% in the year 1971-'72 as compared to the base year. In the year 1980-'81, it has increased by about 407%, which indicates the maximum rise as compared to the year 1960-'61. At constant prices the lowest reduction is about 4% in the year 1966-'67 and the maximum rise is about 33% in the year 1974-'75 as compared to the base year.

The AGR during the period 1960-'65 at current prices has boosted by about 6% per year, but the same at constant prices has reduced very marginally by about 0.05% per year. During the period 1965-'70, the AGR have boosted by about 11% per year and about 5% per year respectively at current and at constant prices. The AGR during the span of 21 years has gone up by about 19% per year at current prices, while it has gone up only
by about 0.5% per year at constant prices. The CGR during the span of 21 years has also gone up by about 0.4% per year and 0.03% per year at current and at constant prices respectively.

The trend values at current and at constant prices are given in the col. (7) and col. (9) respectively of table - 3.2. The trend values at constant prices are plotted in the diagram - 3.2. The trend values have increased by about 96% and about 20% at current and at constant prices respectively, in the year 1970-'71 as compared to the year 1962-'63. The maximum rise in the trend values at current prices is about 272% in the year 1978-'79, but the same at constant prices is about 26% during the year 1973-'74 as compared to the year 1962-'63. As a whole there is an increasing trend at current as well as at constant prices.

**Relative Partial Labour Productivity (RPLP)**

For the relative series of labour productivity at current prices, the mean S.D., C.V. and range are 0.9935, 0.1017, 10.24 and 0.4426 Rs. per manday respectively, while the same at constant prices are 1.0003, 0.1055, 10.55 and 0.4465 respectively. From the series, it can be observed that the relative labour productivity has reduced by about 7% in the year 1968-'69 both at current as well as at constant prices as compared to the year
During the year 1975-'76, it has reduced by about 18% both at current as well as at constant prices, which is the lowest reduction as compared to the year 1960-'61. The maximum rise in this series at current and at constant prices is about 28% in the year 1977-'78 as compared to the year 1960-'61. In the year 1980-'81, the relative labour productivity has increased by about 11% at current prices and about 21% at constant prices as compared to the year 1960-'61.

The AGR during the period 1960-'65 has gone down by about 1.3% per year both at current as well as at constant prices. During the period 1970-'75, it has gone up by about 3% per year at current as well as at constant prices. During the period 1975-'81, the AGR has boosted by about 6% per year at current prices and about 8% per year at constant prices. The overall growth rate during the years 1960-'81 have gone up by about 0.5% per year and about 1% per year respectively at current and at constant prices. The CGR during the span of 21 years has gone up by about 0.01% per year at current prices and about 0.04% per year at constant prices.

The trend values are obtained for the above series at current and at constant prices and they are given in the col. (11) and col. (13) respectively of
table 3.2. The trend values indicate a reduction up to the year 1968-'69, which is about 1% both at current as well as at constant prices as compared to the year 1962-'63. The lowest reduction is about 3% in the year 1965-'66 at current as well as at constant prices as compared to the year 1962-'63. The maximum rise in the trend values at current prices is about 18% while at constant prices it is about 20% in the year 1978-'79 as compared to the year 1962-'63.
3.4 Capital Productivity:

In order to find out the value of net output (VAM) per one rupee invested in the industrial sector as a whole, the measure of capital productivity is defined here. It is obtained by dividing the value added by manufacturer by the total productive capital employed in the industrial sector as a whole.

Thus,

\[
(CP)_t = \frac{V_t}{C_t} \quad (t = 0, 1, 2, 3, \ldots, 20)
\]

(3.7)

The above series is computed for the industrial sector of Gujarat State as well as the same for India as a whole for the year \( t \).

The indices of the above series are also computed and they are denoted by \( I_t \), which represents the indices of capital productivity for the year \( t \). These indices are given by the formula:

\[
I_t (C) = \frac{(CP)_t}{(CP)_0} \times 100 \quad (t = 0, 1, 2, 3, \ldots, 20)
\]

(3.8)

The above formula (3.7) gives the capital productivity measure at current prices for the successive years. However, in order to have a more realistic comparison at constant prices, VAM series is deflated by wholesale price index with the base year 1960-61 and deflated series of capital productivity and its indices are obtained by using the formula (3.7) and (3.8) respectively.
In order to have a comparison between the two industrial sectors as a whole, the series of relative partial capital productivity (RPCP) for the succeeding years is obtained. This may be given by the formula.

\[
(RPCP)_t = \frac{(CP)_t \text{ for the industrial sector of Gujarat State}}{(CP)_t \text{ for the industrial sector of all India}}
\]

(t = 0, 1, 2, 3, ..., 20)

\[(3.9)\]

The above series at constant prices is also obtained here by using the formula (3.9). It can be denoted by \((RPCP)_t^{(d)}\).

**Capital Productivity for the Industrial Sector of Gujarat State:**

For the capital productivity series for the industrial sector of Gujarat State at current prices the mean, S.D., C.V. and range are 0.3580, 0.0751, 20.98 and 0.3354 respectively, while the same values at constant prices are 0.2055, 0.1317, 64.08 and 0.5302 respectively. Thus if one rupee is invested in the industrial sector of Gujarat State as a whole, the value added by manufacturer on an average is about 36 paisa per year at current prices, but the same at constant price is about 25 paisa per year. From the indices at current prices, it is observed that the lowest reduction is about 56% during the year 1968-’69 as compared to the year 1960-’61.
while at constant prices, the lowest reduction is about 89% during the year 1980-'81 as compared to the year 1960-'61.

The AGR for the capital productivity of the industrial sector at state level, during the year 1960-'65 at current prices has gone down by about 8.5% per year, while at constant prices, it has gone down by about 11% per year. During the year 1970-'75, the AGR at current prices, has gone up by about 3% per year, whereas it has gone down by about 6.4% per year at constant prices. During the span of 21 years, the AGR has gone down by about 2.5% per year and about 4.5% per year at current and at constant prices respectively. The CGR during the span of 21 years has also gone down by about 0.2% per year at current prices and about 0.5% per year at constant prices.

The trend values for the series of capital productivity at current and at constant prices are obtained and they are given in col. (3) and col. (5) respectively of table - 3.3. The trend values at constant prices are plotted in the diagram. The trend values have declined by about 27% and about 77% at current and at constant prices respectively in the year 1978-'79, which are the lowest reduction as compared
to the year 1962-’63. As a whole, there is a declining trend for the series of capital productivity for the industrial sector of Gujarat State.

**Capital Productivity for the Industrial Sector Of All India**

For the capital productivity series for the industrial sector of all India as a whole at current prices, the mean S.D., C.V. and range are 0.2947, 0.0593, 20.13 and 0.2043 respectively, but the same values at constant prices are 0.1626, 0.10, 61.04 and 0.3749 respectively. Thus for the investment of one rupee in the industrial sector of all India as a whole, the value added by manufacturer on an average is about 29 paisa per year at current prices, but the same at constant prices is about 16 paisa only per year. From the indices of this series at current prices, it can be observed that the capital productivity has reduced by about 40% during the year 1980-’81 as compared to the year 1960-’61. The lowest reduction in the year 1967-’68 is about 47% as compared to the base year. At constant prices, the capital productivity has reduced by about 87%, which is the lowest reduction in the year 1980-’81 as compared to the year 1960-’61. As a whole, capital productivity is more or less decreasing.
The AGR for the capital productivity for the industrial sector at national level, during the period 1960-'65, at current prices has gone down by about 7% per year, while the same at constant prices has gone down by about 10% per year. During the period 1970-'75 at current prices the AGR has gone up by about 5.7% per year, while it has gone down by about 5% per year at constant prices. During the span of 21 years, the AGR has gone down by about 2% per year and about 4% per year at current and at constant prices respectively.

The CGR during the period 1970-'75 has gone up by about 1% per year at current prices and it has gone down by about 1% per year at constant prices. During the span of 21 years, the CGR has gone down by about 0.11% per year and about 0.44% per year at current and at constant prices respectively.

The trend values for the series of capital productivity for the entire industrial sector of all India are obtained both at current and at constant prices, and they are given in the col. (7) and col. (9) respectively of table-3.3. These values at constant prices are also plotted in the diagram-3.3. The trend value has declined by about 29% in the year 1970-'71, as compared to the year 1962-'63. The lowest trend value at current prices is about 33% in the year 1968-'69, while in the year 1980-'81, the trend value has declined by about 16% as
compared to the year 1962-'63. At constant prices, the trend value has declined by about 75%, which is the lowest reduction in the year 1980-'81 as compared to the year 1962-'63. As a whole, there is a declining trend for the capital productivity series.

**Relative Partial Capital Productivity (RPCP)**

For the series of relative partial productivity at current prices, the mean S.D., and C.V. and range are 1.2247, 0.1521, 12.42 and 0.6091 respectively, but the same values at constant prices are 1.2490, 0.1141, 9.13 and 0.3640 respectively. From the above figures, it may be concluded that the performance of the industrial sector of Gujarat State is relatively better w.r.t. capital productivity as compared to the industrial sector of India as a whole. From the RPCP series at current prices, it can be observed that the maximum rise is about 3% in the year 1966-'67 and the lowest reduction is about 42% in the year 1976-'77 as compared to the year 1960-'61. At constant prices, the maximum rise is about 3% in the year 1966-'67 and the lowest reduction is about 24% in the year 1978-'79 as compared to the base year.
The AGR during the period (1960-65) has gone down by about 2.2% per year both at current as well as at constant prices. The AGR has gone down by about 2% per year during the period 1970-75. The overall growth rate during the span of 21 years, has gone down by about 1% per year both at current as well as at constant prices. The CGR during the span of 21 years has gone down by about 0.07% per year and 0.05% per year at current and at constant prices respectively.

The trend values are obtained for the series RPCP at current and at constant prices and they are given in the col. (11) and col. (13) respectively of table - 3.3. From the trend values at current prices it can be seen that the trend values have declined by about 13% at current prices in the year 1977-78, but at constant prices, it has reduced by about 5% in the year 1978-79 which are the least as compared to the year 1962-63. The maximum rise in the trend value is about 11% both at current as well as at constant prices in the year 1971-72 as compared to the year 1962-63.
### Table - 3.3

#### Capital Productivity

<table>
<thead>
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<th>Year</th>
<th>Gujarat State</th>
<th>All India</th>
</tr>
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<tbody>
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<td></td>
<td>Current prices</td>
<td>Trend</td>
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<td>1960-'61</td>
<td>0.5942</td>
<td>*</td>
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<tr>
<td>1961-'62</td>
<td>0.5346</td>
<td>*</td>
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<td>1971-'72</td>
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<td>0.3450</td>
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<tr>
<td>1972-'73</td>
<td>0.3376</td>
<td>0.3559</td>
</tr>
</tbody>
</table>

**Year**
- 1963-'64: 1963-1964
- 1964-'65: 1964-1965
- 1965-'66: 1965-1966
- 1972-'73: 1972-1973

**Notes:**
- Current prices are in 1960-61 Constant prices.
- Trend values are calculated from 1960-61 to 1972-73.
3.5 **Capital - Output Co-efficient**

In order to find out the value of net output per fixed capital investment in the industrial sector as a whole, the measure of capital-output co-efficient is defined here. It is obtained by dividing the VA\(_{h}\) by the fixed capital employed in the industrial sector as a whole. It is expressed by the symbol \((CE)_t\) and is given from the formula:

\[
(CE)_t = \frac{V_t}{(FC)_t} \quad (t = 0,1,2,3............20)
\]

The above co-efficient gives the net value added in production for an investment of one rupee in the industries.

The above formula gives the capital output co-efficient measure and the indices of this series are given by

\[
I (CE)_t = \frac{(CE)_t}{(CE)_0} \times 100 \quad (t = 0,1,2,3,............20)
\]

The above formula \((3.10)\) gives the capital output co-efficient series at current prices. In order to have a more realistic comparison, the series at constant prices obtained by the deflated VA\(_{h}\) series is divided by the fixed capital, and the indices of the deflated series are computed by using formula \((3.11)\).
In order to have a comparison between two industrial sectors as a whole, the series of relative capital output co-efficient (RCOC) is obtained for the succeeding years. This may be given by the formula.

$$(RCOC)_t = \frac{(CE)_t \text{ for the Industrial sector of Guj. State}}{(CE)_t \text{ for the Industrial sector of all India}}$$

$$(t = 0, 1, 2, 3, \ldots, 20)$$

Capital-Output co-efficient for the Industrial Sector of Gujarat State

For the series of capital-output co-efficient for the industrial sector of Gujarat State at current prices the mean, S.D., C.V. and range are 0.4884, 0.1373, 28.11 and 0.6138 respectively, while the same values at constant prices are 0.2861, 0.2090, 73.07 and 0.8244 respectively. From the series at current prices, it can be observed that the capital-output co-efficient has reduced by about 57% in the year 1980-'81 as compared to the year 1960-'61. The lowest reduction is about 67% in the year 1968-'69 as compared to the base year.

At constant prices, the capital-output co-efficient has reduced by about 72% in the year 1970-'71 and by about 90% in the year 1980-'81, which is the lowest reduction as compared to the year 1960-'61.
The A3R for this series during the period 1960-'65 at current prices has gone down by about 10% per year but the same at constant prices has done down by 12% per year. During the period 1970-'75 the AGR at current prices has gone up by about 4% per year, while it has gone down by about 6% per year at constant prices. The AGR during the span period (1960 - '81) has gone down by about 2.7% per year and by about 4.3% per year, at current and at constant prices respectively. The C3R during the span of 21 years at current prices has gone down by about 0.2% per year, while at constant prices, it has gone down by about 0.5% per year.

The trend values for this series both at current and at constant prices are given in the col.(3) and col.(5) respectively of table - 3.4 and these values at constant prices are plotted in the diagram - 3.4. The trend value at current prices has reduced by about 34% in the year 1978-'79. The lowest reduction in the trend value at current prices is about 38% in the year 1968-'69, as compared to the year 1962-'63. The trend values at constant prices have reduced by about 60% in the year 1970-'71, and it has reduced by about 79% which is the least in the year 1978-'79 as compared to the year 1962-'63. As a whole, the trend values for the capital-output co-efficient for the industrial sector of Gujarat State shows the declining trend both at current as well as at constant prices.
Capital - Output Co-efficient for the Industrial Sector of All India

For the series of capital-output co-efficient for the industrial sector of India as a whole, at current prices, the mean, S.D., C.V. and range are 0.4106, 0.0978, 23.82 and 0.3710 respectively, but the same values at constant prices are 0.2349, 0.1598, 68.02 and 0.5904 respectively. From the series at current prices, it can be seen that the ratio of VAM per fixed capital has declined by 45% in the year 1980-'81, while it has reduced by about 55% which is the lowest reduction in the year 1968-'69 as compared to the year 1960-'61. At constant prices, the lowest reduction is about 88% in the year 1980-'81 as compared to the same in the base year.

The AGR for the capital output co-efficient series for the industrial sector at national level, during the period 1960-'65 have gone down by about 8% per year and about 11% per year, at current and at constant prices respectively. During the period 1970-'75, the AGR at current prices has boosted by about 9% per year, whereas at constant prices, it has gone down by about 3% per year. During the span of 21 years, the AGR at current prices and at constant prices have gone down by about 2% and about 4% per year respectively. The CGR during the span of 21 years have gone down by about 0.1% per year and 0.5% per year respectively, at current and at constant prices.
The trend values for the above series at current and at constant prices are given in the col. (7) and col. (9) respectively of table - 3.4. The trend values at constant prices are plotted in the diagram - 3.4. The trend value at current prices has reduced by about 28% but at constant prices, it has reduced by about 78%, which is the least in the year 1978-'79 as compared to the year 1962-'63. The lowest reduction at current prices is about 41% in the year 1968-'69 as compared to the year 1962-'63. As a whole, there is a declining trend in the series of capital-output co-efficient for the industrial sector of India as a whole.

Relative Capital-Output Co-efficient

For the series of relative capital-output co-efficient at current prices, the mean, S.D., C.V. and range are 1.1874, 0.1234, 10.39 and 0.3977 respectively, while the same values at constant prices are 1.1944, 0.1179, 9.87 and 0.3987 respectively. From the above series, it can be seen that the relative capital-out co-efficient has increased by about 2.3% at current as well as at constant prices during the year 1970-'71 as compared to the base year. This shows that the value added by manufacturer per fixed capital in the industrial sector at state level is higher as compared to the national level.
During the year 1980-'81, it has reduced by about 23% at current prices, whereas at constant prices, it has reduced by about 15% as compared to the year 1960-'61. The lowest reduction in this series is about 27% at current as well as at constant prices during the year 1978-'79 as compared to the year 1960-'61.

The AGR during the period 1960-'65 has gone down by about 2.5% per year both at current as well as at constant prices. During the period 1965-'70, the AGR has gone up only by about 0.04% per year at current as well as at constant prices. The AGR during the period 1975-'81 at current prices has gone up by about 1% per year, whereas the same at constant prices has gone up by about 2.5% per year. The AGR during the span of 21 years has gone down by about 1% per year at current prices, but it has gone down by 0.7% per year at constant prices. The CGR during the span of 21 years has gone down by about 0.06% per year at current prices and 0.04% per year at constant prices.

The trend values are also obtained at current as well as at constant prices and they are represented in the col. (11) and col. (13) respectively of table-3.4. From the series of trend values, it can be observed that, the trend values at current as well as at constant prices reflect more or less an increasing
trend up to the year 1972 - '73. The maximum rise in the trend value is about 8% during the year 1971 - '72 both at current as well as at constant prices as compared to the year 1962-'63. The lowest reduction in the trend values is in the year 1977-'78, which is about 9% at current prices and 8% at constant prices as compared to the year 1962-'63.

3.6 Concluding Remarks:

On the basis of the above analysis at macro-level, it may be concluded that the Labour Productivity (VAM per wages and salaries) is relatively higher in the industrial sector of Gujarat State than that of India as a whole. The labour productivity (VAM per mandays) reflects an increasing trend for both the industrial sectors at state and at the national levels, but the relative labour productivity has a declining trend up to the year 1968-'69 as compared to the year 1962-'63. The capital productivity reflects declining trend for both the industrial sectors of Gujarat State as well as the same for India as a whole. This may not be considered to be a very healthy sign for the industrial sectors of the economy. On the basis of the trend of relative capital productivity, it may be worthwhile to conclude that the capital productivity is higher in the industrial sector of Gujarat State than that of the industrial sector...
of India as a whole. From the series of capital output co-efficient, it may be concluded that it shows almost declining trends, but it exhibits relatively more or less increasing trend. It may also be concluded that some incentives given to the labour in the form of additional wages may help in turn to increase the labour productivity. Similarly if the capital productivity increases it may help to induce the net value added as compared to the per-capita capital investment.
<table>
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