ABSTRACT

Industrial Productivity modelling enables analysis and prediction of performance of Industrial systems, either structurally or in the time dependent form. It is a useful tool to planners, policy makers, economists and entrepreneurs.

There are a number of methods available to analyse the dynamic characteristics or performance of Industrial Systems. In all these cases, the main objective is to analyse and find ways and means of improving the performance of the system under consideration.

In that respect, the present work is unique in the sense that it is exhaustive and at the same time simple. It also has scope for framing a simple quantitative forecasting model for a short run analysis.

Four Industrial Sectors, Chemical, Sugar, Cement and Paper were considered for analysis in the present work. Mathematical models representing these industrial sectors, considered as systems, were developed by Production Function approach. These models or production functions correlating the value of production $Q$, total capital employed TCE, pay roll, PR and resources, RE are as follows.

For the Chemical Industry Sector
\[ Q = 2.69 \times (TCE)^{0.203} \times (PR)^{0.615} \times (RE)^{0.263} \]

For the Sugar Industry Sector
\[ Q = 1.55 \times (TCE)^{0.348} \times (PR)^{0.163} \times (RE)^{0.539} \]

For the Cement Industry Sector
\[ Q = 1.355 \times (TCE)^{0.168} \times (PR)^{0.245} \times (RE)^{0.566} \]
For the Paper Industry Sector

\[ Q = 1.051 \cdot (TCE)^{0.143} \cdot (PR)^{0.241} \cdot (RE)^{0.671} \]

Another benefit of the present analysis of productivity modelling is prediction of the future performance viz. forecasting.

Forecasting equations are derived from Production Functions, and these equations can be used to predict increase or decrease in the value of production quantitatively.

They are:

For Chemical Industry Sector

\[ \Delta Q = 0.21 \Delta (TCE) + 11.44 \Delta (PR) + 0.35 \Delta (RE) \]

For the Sugar Industry Sector

\[ \Delta Q = 0.4 \Delta (TCE) + 2.4 \Delta (PR) + 0.46 \Delta (RE) \]

For the Cement Industry Sector

\[ \Delta Q = 0.20 \Delta (TCE) + 4.1 \Delta (PR) + 1.3 \Delta (RE) \]

For the Paper Industry Sector

\[ \Delta Q = 0.21 \Delta (TCE) + 2.6 \Delta (PR) + 0.98 \Delta (RE) \]

The forecasting equations were verified with the available results for the four sectors. In all the cases, on the average, the error was observed to be within 10%.