CHAPTER 1
INTRODUCTION
The economic policy of the Government of India sharply focuses attention on the alleviation of poverty through provision of gainful employment to the unemployed in the country. The government attempted to achieve this avowed objective through the development of Small Scale Industries. Since the beginning of the planning, the Industrial Policy statements of the government have rightly recognised the role of Small Scale Industries in the development of the national economy, for they provide large scale employment with relatively small investment and facilitate an effective mobilisation of resources of capital and skill which might otherwise remain unutilised.

**Statement of the Problem**

An industrial unit in which investment on plant and machinery does not exceed three crores of rupees is regarded as a “Small Scale Industrial Unit”\(^1\). However, recently this investment limit has been reduced to one crore rupees through an announcement by the Prime Minister on the floor of Parliament. There were 30.14 lakh Small Scale Industrial units in India during 1997-98\(^2\). Since 1980 the Small Scale Industrial sector is facing the problem of sickness. There were about 2.21 lakh sick Small Scale
Industrial units in India during 1997-98. The major reason for the sickness of Small Scale Industrial units is due to lack of efficiency in their proper maintenance by the entrepreneurs. The study, therefore, on the efficiency of Small Scale Industrial units assumes contemporary relevance.

Efficiency among Small Scale Industrial units is size-specific. The efficiency criterion has a specific connotation when linked with size-specificity of a given Small Scale Industrial unit. In this context, the present study attempts to investigate the efficiency level of two size groups of Small Scale Industrial units.

The measurement of efficiency in the Small Scale Industrial units is a complex phenomenon. However, the efficiency levels of the Small Scale Industrial units can be assessed through the adoption of the tools such as relative labour productivity, relative capital productivity and relative capital intensity indices. These efficiency characteristics or standards are examined in the context of size-wise distribution of Small Scale Industrial units.

The efficiency of Small Scale Industrial units can be measured with the help of the index of relative total factor productivity, which measures the combined effort of labour and capital. Further, efficiency of Small Scale Industrial units can also be measured with the help of the index of relative capacity utilisation in the production process.
For the purpose of analysis the size of a Small Scale Industrial unit is specified on the basis of the investment on Plant and Machinery. Accordingly, the researcher has categorised the Small Scale Industrial units into two 'size' groups: One, Small SSI units with an investment of less than Rs. 5 lakh and Two, Large SSI units with an investment of more than Rs. 5 lakh.

Review of Literature

It is attempted here to give a very brief review of literature which has a direct relevance to the study. Highly adjudged and widely acknowledged studies have been reviewed here.


The studies based on Aggregate data are reviewed in the following paragraphs.
Pioneer work in this field was done by Farrell (1957) who provided the basic conceptual framework for the estimation of efficiency. Farrell's approach consists in considering the input-output ratios for different firms and constructing the free disposal convex hull of the observed ratios. Thus, in this approach the performance of firms is compared with the best practices observed in reality. Farrell's approach has been extended and applied in a number of subsequent studies. The main advantage of this approach is that no functional form is imposed on the data. The disadvantages are that it is based on the restrictive assumption of constant returns to scale and being based on a supported subset of observations and it is susceptible to extreme observations and measurement errors.

One of the earliest studies on the relative efficiency of Small Scale Industries in India was undertaken by Dhar and Lydall (1961). They compared output-capital ratios for a number of reasonably homogeneous industry groups, each depicting size variation. They concluded that modern Small-Scale Industry is fairly capital intensive; that is, these units do not generate more employment per unit of capital than large-scale industry. Dhar and Lydall also found that units pay lower wages to workers and usually concentrated in large, urban areas. They concluded that Small Scale Industries were less efficient as compared to Large Scale Industries and thus
there was no case for giving preferential treatment to modern Small-Scale Industry.

Similar findings were reported in the studies of Hajra and Sandesara. Hajra (1965) used the Census of Manufacturing Industries (CMI) data for seventeen industries for 1955 and 1958. Comparing partial productivity ratios between large and small scale units, he came to the following two conclusions: (i) both labour and capital productivities are low in Small Scale Industries (suggesting, thereby inefficient use of material input).

Using the CMI data for twenty-eight industries for the period 1953-58, Sandesara (1969) undertook a comprehensive study of the relationship between size and various important ratios like the capital-labour ratio and the output-capital ratio. In his work, a positive association was observed between size and the output-capital ratio supporting the conclusion earlier reached by Dhar and Lydall. Sandesara, however, did not find any positive association between size and capital per employee. His findings suggest that, for a given volume of investment, small scale units neither generate more employment nor produce more output compared to large scale units.

Since the findings of Dhar and Lydall, Hajra and Sandesara are in conflict with the conventional view of Small Scale Industry, an explanation for the observed positive relationship between size and output-capital ratio is called for. To provide an explanation of their findings, Dhar and Lydall
pointed out that the modern small scale sector is very different from the traditional small scale sector, which uses family labour and produces traditional products. Modern small scale factories, on the other hand, employ hired labour and use modern machinery to produce modern goods. They are mainly located in urban areas. They get their materials (like steel and chemicals) from far-off places and sell their products widely. They are just like big factories, except that they are small in size and thereby deprive themselves of economies of scale, professional management and multiple shift utilisation. Sandesara also sought the explanation of his results in economies of scale and better managerial ability of the entrepreneurs in large scale units. In his words, 'our results suggest that large units are possibly headed by entrepreneurs who more efficiently combine factors of production-capital and labour. The crucial factor, which could explain our results, may well be the factor of enterprise.

In the studies of Dhar and Lydall, Hajra and Sandesara, employment was taken as the size criterion. This was questioned by Mehta (1969)⁸, who pointed out that the classification of factories based on employment does not show the productivity level of small scale units properly, since sick or ailing large scale units employing only a skeleton staff or new units undergoing teething troubles may get classified in the small size group. For his analysis, Mehta used the Annual Survey of Industries (ASI) data for
thirty-two industries for the period 1960-63. He compared capital-labour, output-labour and output-capital ratios among 'small', 'medium' and 'large' factories classified according to fixed assets and between the census sector and sample sector factories classified according to employment. It was observed in Mehta's study that in almost all cases, the capital-labour ratio rises with size and the output-capital ratio falls with size.

The conflict between the findings of Mehta and those of Dhar and Lydall, Hajra and Sandesara is somewhat baffling. This cannot be attributed to differences in the time period covered in the sources of data. The differences in findings may partly be explained by that while Dhar and Lydall, Hajra and Sandeesara used tool productive capital (fixed plus working) for measuring capital input, Mehta used fixed capital. Since the ratio of working capital to fixed capital is high in small scale units, efficiency comparisons based on fixed capital favour small scale units.

A major limitation of the studies based on the CMI/ASI data is that they cover only those small scale units which are registered as 'factories' under the Factories Act, 1948. A large part of the modern small scale industry is, however, outside the purview of the Factories Act. A census of Small Scale Industrial units was conducted in 1973-74 by the Development Commissioner, Small Scale Industries with 1972, as the reference year. In her study, Bhavani (1980) examines the relationships between the scale of
operation, technology, capital intensity, and relative efficiency, drawing data from the ASI (1973-74) and the Census of Small Scale Industrial Units (CSSI) mentioned earlier. She considers 46 three-digit industries of the National Industrial Classification. She makes a comparison between the census sector of the ASI, the sample sector of the ASI and the CSSI. She finds that, in most cases, labour productivity (value added-labour ratio) and capital intensity (fixed capital-labour ratio) in the census sector (which includes large scale units) exceeds those in the sample sector and the CSSI. The ratio of value added to fixed capital in the census sector exceeds that in the sample sector for thirty-one industries (out of forty-six) and this pattern holds between the census sector and the CSSI for eighteen industries. Bhavani also noted that the ratio of working capital to fixed capital is relatively high in small scale units which suggests that the performance of the Small Scale Industry in regard to capital productivity would turn out to be worse if the ratio of value added to productive capital is considered. Clearly, efficiency comparisons between the census and the sample sectors of the ASI in Bhvani's study do not agree with the results of Mehta's study mentioned earlier, and they are more in line with the findings of Dhar-Lydall and Sandesara. A positive relationship between size and capital productivity is, however, not seen when comparisons are made between the census sector and the CSSI. But, even in this case; it is seen from her estimates that in a fairly large number of Small Scale Industries, accounting
for nearly 40 per cent of the total value added, both capital and labour productivities are lower than those in large scale units.

Using data presented in Annual Survey of Industries for 1960, 1963, 1964 and 1965, Asher (1987) shows that the small scale sector is more efficient. His study shows that the small scale factory combines the largest number of workers with a rupee's worth of fixed capital; that a rupee worth of fixed assets produce almost seven times an output in small as compared to large industries and that the value added by a rupee worth of fixed investment in small factories is at least three times as large as that for a large factory.

In his paper published in 1988, Bishwanath Goldar compares for 37 industries at the three-digit level the technical efficiency of small-scale and large-scale industries for the year 1976-77. He presents estimates of relative labour productivity (relative efficiency) of the modern SSIs. Goldar finds that the SSIs (compared to the large-scale industries) generally have low labour productivity, high capital productivity, low capital intensity (measured as capital per employee) and low total factor productivity. He infers that the modern Small-Scale sector is inefficient relative to the large sector in a large number of industries. He also finds that the relative efficiency of the SSIs varies directly with capital intensity, so that the SSIs cannot be relied upon as a source of efficient employment generation.
SIDBI Report on SSI sector (1999)\textsuperscript{12} measured the efficiency of Small Scale Industries in relation to Large Scale Industries and the efficiency of SSIs is measured in terms of the Index of Total Factor Productivity, which is based on a translog production function characterised by constant returns to scale and a variable elasticity of substitution. This report concluded that at all All India level, the SSI sector is more efficient than the large scale sector.

A limitation of many of the above studies is that they are based on the CMI/ASI, which cover only those units registered under the Factories Act, 1948. Hence, they exclude units, which are really small. Further, assessment of relative technical efficiency, in terms of partial capital and labour productivity, in the majority of the above mentioned studies has serious limitations, analytical and empirical. Partial factor productivities of small and large size-class of firms could differ even when firms attain technical and economic efficiency. Partial factor productivity differences could be due to factor price differences or due to differences in the levels of technology. Secondly, the use of partial capital productivity implicitly assumes that capital is the only scarce resource. It would be meaningful to treat all factor inputs symmetrically - which implies the assumption of positive opportunity costs for all inputs - and consider Total Factor
Productivity (TFP) rather than output-capital ratio as a measure of efficiency of resource utilization.

On the empirical level, observed output-capital ratios between small and large size groups in an industry could differ because of non-constant returns to scale, varying rates of capacity utilization, differences in the degree of vertical integration even with the same technology and equal relative factor prices. Consequently, comparison of estimates of average partial factor productivities based on aggregate data of different size group of firms classified either by employment or by capital in a two or three digit industry group are inappropriate as measures of relative technical efficiency. These inadequacies of estimates of partial factor productivities are applicable to indices of total factor productivity estimated as weighted average of partial capital and labour productivities. In addition, they involve the assumption of competitive equilibrium. In an industry, units operating in the small-scale segment may face competitive conditions but firms in the large-scale segment may enjoy market power. In this case, measured value-added reflects market power rather than technical efficiency. Analogously, estimated Farrell efficient isoquants using average output-capital and output-labour ratios on the basis of aggregate data are inadequate to evaluate relative efficiency. Output-mix of different
segments of two or three digit industry group could be substantially different.

Studies using establishment data in well-defined industries are free from the above limitations. In addition, technical efficiency is measured, in these studies as the ratio of observed output to maximum potential output.

Ho (1980) calculated total factor productivity for the different size classes in each Korean Industry. The results obtained by him are: Out of 138 industries, 88 show greatest efficiency of factor use in the range 50-500 employees. Thirty-two are best below 50 workers, of which 7 are in the class of 5-9 workers. Eighteen are best in the range 500 or more workers.

The rather few industries where small enterprises show up as the most efficient are also rather small industries in terms of employment. For instance, the 16 industries in which enterprises with less than 100 workers account for half or more of the industry employment, and where the apparently most efficient size is 50 workers or less, account for only 7.3 per cent of total factory employment.

Page (1984) investigated the relationship between firm size and technical efficiency in four manufacturing industries of India, namely, Printing, Machine tools, Soap, and Shoes. The sample firms are drawn from a purposive sample survey of manufacturing units conducted during 1979-81. The financial and economic data refer to the 1979-80 financial
year. The bulk of small and medium units are drawn from enterprises located in or near Bombay, Calcutta and Delhi. Large firms are drawn from all regions of India. In effect, the sample has a limited geographical spread. A Translog production function in four factors, namely, capital, skilled and unskilled labour and material is fit to the survey data by linear programming method. The technical efficiency measured as the ratio of actual output to potential output is found to range from 42 per cent in shoes to 69 per cent in Machine tools. Consequently, page interprets the estimates of technical efficiency as indicating substantial scope for improvements in the total factor productivity of firms in the sample.

Goldar (1985) estimates technical efficiency of establishments, within the small scale sector, producing washing soap. Unit level data are obtained from the First census of Small Scale Industrial units (1972). He finds the smaller units to be technically inefficient relative to larger units within the small scale sector.

According to Nagaraj (1985), the plausible reasons for the relatively higher profitability in small scale sector seems to be the lower wages and greater exploitation of labour on the one hand and fiscal concessions on the other.

Little, Muzumdar and Page (1987) utilized the First Census of SSI units (1972) data to study factor substitution and technical efficiency
aspects of sample firms. They fit a value-added Translog production function by linear programming. Their estimates indicate that there is substantial scope for improvement in the total factor productivity of firms in the sample.

Ramaswamy (1990)\textsuperscript{18} estimated the technical efficiency of Modern Small Scale Industries in India by using firm level data and found that there is a positive relationship between firm size and technical efficiency.

Bhavani (1991)\textsuperscript{19} estimated technical efficiency of establishments in four selected industries of the metal products group: (i) Steel trunks, (ii) Structural metal products, (iii) Bolts and nuts, and (iv) Agricultural Hand tools. The data on individual establishments in these four industries is drawn from the First Census of Small Scale Industrial Units (1972). She estimated a Translog production function in three inputs, namely, capital, labour and raw material. Her estimates of average technical efficiency range from 70 per cent to 96 per cent.

Goldar and Agarwal (1992)\textsuperscript{20} estimated firm specific efficiency indices for top 100 engineering firms and found that the efficiency is lower for large public sector firms compared to small firms in the private sector.

The studies of Page (1984) and Little \textit{et al.} (1987) and Goldar and Agarwal (1992) do not support the hypothesis of positive relationship between relative technical efficiency and firm-size measured by

A basic limitation of these eight studies is that they assume that any deviation of a firm's actual output from the maximum potential output based on the best-observed performance in the sample has been due to technical inefficiency. The possibility of deviations due to random factors beyond the control of the individual establishment, like power shortages, raw-material supply breakdowns etc., and errors in the measurement of specified inputs due to problems of measurement are not accommodated.

It is evident from the foregoing review of literature on the subject that for a proper assessment of the relative efficiency of Small Scale Industries, simple comparisons of partial productivities of labour and capital are not enough. For the measurement of the relative efficiency of Small Scale Industries two approaches may be taken - the frontier production function approach and the Total Factor Productivity approach. In the former, a frontier production function is estimated first and then
requirements of labour and capital per unit of output in different size classes are compared to those on the frontier. In the latter, a weighted average of partial productivity indices is taken, the weights being based on the income shares of factors. The present study has taken the Total Factor Productivity approach to measure the efficiency of firms in the Small Scale Industries in Rayalaseema.

Need for the Present Study

It can be observed from the review of literature that all the reviewed studies belongs to either international level or National level. Neither of the studies tries to measure the efficiency of SSI units at the Regional level. The present study assumes importance since it aims to measure the efficiency of SSI units at the regional level - Rayalaseema region of Andhra Pradesh.

Objectives

The primary objective of the present study is to assess the size and efficiency of Small Scale Industrial units in the Rayalaseema region of Andhra Pradesh.

The following are the specific objectives of the study:

1. To review the development of Small Scale Industrial units in India;
2. To assess the development of Small Scale Industrial units in Andhra Pradesh in general and in Rayalaseema region in particular;

3. To examine the trends in the relative labour productivity and capital productivity of Small Scale Industrial units;

4. To estimate the relative efficiency of small scale industrial units in terms of relative total factor productivity; and

5. To assess the efficiency of Small Scale Industrial units in terms of relative capacity utilisation in the production process.

Hypotheses

The following are the hypotheses of the study:

1. Capital intensity in small size SSI units is lower than that of large size SSI units.

2. Labour productivity in the small size SSI units is lower than that of the large size SSI units.

3. Capital productivity in the small size SSI units is lower than that of the large size SSI units.
5. Capacity utilisation in the production process in small size SSI units is lower than that of large size SSI units.

**Scope of the Study**

The present study is, mainly, confined to the Rayalaseema region of Andhra Pradesh. This region consists of four districts: viz., Anantapur, Chittoor, Cuddapah and Kurnool. For the purpose of analysis the study has chosen twelve types of industries viz., Rice Mills, Bakery units, Oil Mills, Ice Factories, Silk Reeling units, Ready Made Garments, Saw Mills, Wooden Furniture units, Slab Polishing units, Granite units, Iron Furniture units, Engineering workshops for which the data on production is available. The reference year for the collection of primary data is 1997-98.

**Data sources and Sample frame**

The study draws data on both primary and secondary sources. The basic sources for secondary data are the Reports of Small Industries Development Bank of India (SIDBI); Reports on Annual Survey of Industries, reports/information available with the Commissioner of Small Scale Industries, Government of Andhra Pradesh, and Annual Reports of District Industries Centres.

The primary data have been collected by the researcher from selected sample units through a pre-tested structured schedule. The sample units
are selected based on stratified random sampling technique. Twelve types of industries are selected based on the working units spread in four districts of Rayalaseema region as the first strata. The sample units are selected randomly from the selected twelve types of industries from all the four districts of Rayalaseema. The sample units covered in each type of industry are 20 units, which are inclusive of 10 units having less than Rs. 5 lakhs as investment and another 10 units having more than Rs. 5 lakhs as investment.

**Tools used**

The data collected has been analysed by using appropriate statistical techniques, like, averages, percentages, annual compound growth rates, index numbers and regression analysis.

In order to estimate the efficiency, index of relative labour productivity, index of relative capital productivity and index of relative total factor productivity have been used. To establish the relationship between value of output and the two inputs (capital and labour), multiple regression analysis is used. In addition, ‘T’ test for calculating regression coefficients and ‘F’ test for coefficient of determination have also been used in the study.
Limitations of the Study

The study suffers from various limitations as detailed below.

1. The study has not covered the entire population of Small Scale Industrial units, due to lack of resources both technical and personnel.

2. In the absence of sufficient studies on the efficiency of Small Scale Industrial units, sizeable secondary data for reference on the subject could not be collected.

3. Data in respect of the value of output, the number of workers employed and the amount of capital invested have not been properly documented by the entrepreneurs in many cases. The information supplied by the entrepreneurs has been mostly, drawn from their memories stored in their minds. The general tendency among the entrepreneurs has been to deflate the value of production and inflate the value of capital invested. However, all attempts have been made to collect the near exact information through informal discussion with the entrepreneurs.

Chapter outline

The study has been presented in six chapters. The first chapter explains the importance of Small Scale Industrial units, the concepts of size and efficiency of Small Scale Industrial units, the Statement of the problem, the need for the present study, its objectives and hypotheses along with the review of literature, the appropriate methodology and scope and limitations of the study. The development of Small Scale Industries and their
importance in the Indian economy has been discussed in the second chapter. An analysis on the development of Small Scale Industries in Andhra Pradesh in general and in Rayalaseema region in particular is presented in the third chapter. The size and efficiency of Small Scale Industrial units in terms of relative labour productivity, relative capital productivity and relative total factor productivity is examined in the fourth chapter. The size and efficiency of Small Scale Industrial units in terms of relative capacity utilisation in the production process is analysed in the fifth chapter. The summary of research findings and conclusions are presented in the sixth and last chapter.
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