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Keywords: *rural industrial, technological, special skill, infrastructure and production.*

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A Study on Technology Problems of Rural Industries in Madurai District

Selvaraj N [α] & Santhanamari R [σ]

Abstract- The rural industrial sector stands next only to agriculture in terms of employment; on value addition its share is about fifty percent of the total value of goods produced in the manufacturing sector and in the matter of exports, its share is more than one third of the total exports made by the country. Outdated technology was a major problem for rural industries in the early years of Independence. Lack of technological improvement resulted in the production of articles which did not command wide consumer preference and they could fetch only low prices. Consequently, the earnings of rural industries were low. After the collection of data, the filled up interview schedules were edited properly. A master table was prepared to sum up all the data. With the help of the master table, classification tables were prepared and they were adopted directly for analysis. The suggestion based on the findings of the study for the growth and development of rural industries in Madurai district can be considered: Outdated technology was identified as a problem of rural industries. The study suggests that governments should redouble their efforts in the provision of infrastructure, especially in the area of technology upgradation of rural industries.

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I. Introduction

The rural industries occupy a premiere position of eminence in the industrial structure of the Indian economy. They provide employment opportunities to a large section of working force and contribute significantly towards the manufacture and export of goods. The rural industrial sector stands next only to agriculture in terms of employment; on value addition its share is about fifty percent of the total value of goods produced in the manufacturing sector and in the matter of exports, its share is more than one third of the total exports made by the country. The rural industrial sector consists of two segments viz. modern and traditional. The village and cottage industries such as handloom, khadi and other allied village industries, handicrafts, Seri-culture and coir form the traditional segment while the modern sector comprises a wide range of modern small scale industries.

II. Statement of the Problem

Rural industries play an important role in employment creation, resource utilization, income generation and in helping to promote changes in a gradual and phased manner. The rural industry in India had particularly emerged as a vibrant and dynamic segment of the economy. It is a matter of pride that India has a distinct position of its own among the developing countries particularly in the area of rural industries. The rural industries sector was developing under the protective umbrella of the government. Since Independence, the government had been adopting protective policies and implementing a number of promotional measures to nurture rural industries sector.

The Government agencies had identified the areas constraining the growth of rural industries as inadequate supply of raw materials, lack of modern technology, insufficient finance and inefficient marketing practices. Hence, the study had been designed to enquire into the present state of affairs of these industries in respect of availability of raw materials, present state of technology, quality of training, finance and marketing. Madurai district had been taken up as a case in point to be chosen to study these problems pertaining to the rural industries.

III. Scope of the Study

This study aims at analyzing the various problems and prospects of rural industrial units in Madurai district including agro and forest-based units, engineering and allied units, textile and polymer-based industrial units, leather and leather-based units, chemical-based units and miscellaneous units situated in rural areas and identifying the factors influencing the growth of them.

IV. Objectives of the Study

The main objectives of the study are to find out the various problems faced by the rural industries and to identify the factors influencing the growth of rural industries in Madurai District. Under these main objectives, the following specific objectives were framed for the present study:

- To study the growth and development of rural industries in Madurai District.
- To examine the technology problem faced by them.
- To identify the factors influencing their growth and
- To offer suggestions based on the findings of the study for their future growth.

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V. Period of the Study

To evaluate the growth and development of rural industries in Madurai district a ten year period from 2009-10 to 2018-19 was chosen.

VI. Collection of Data

The study is empirical in nature based on survey method. The entire data required for the study were collected at three stages. The primary data relating to the rural industries were collected by interviewing the entrepreneurs with the help of an interview schedule. The secondary data relating to the study were obtained from various published and unpublished records, annual reports, bulletins, booklets, journals, magazines, etc,. Lastly, discussions were held with the officials of various departments and with the officials of KVIC, co-operative societies and District Industries Centre. These discussions were helpful in identifying the problems for the study.

VII. Sampling Design

Madurai District had been selected for the study since there were a wide range of rural industrial units which provided considerable employment in and around Madurai. As census sampling survey method is not feasible, it was proposed to follow proportionate convenient sampling method. Out of 1,622 units 240 units, being 15 per cent of the universe, had been selected for this study. The rural industrial units located in Madurai District were agro and forest based, engineering and allied sectors, khadi and polymer based, leather and leather based, chemical based and miscellaneous units.

VIII. Data Processing

After the collection of data, the filled up interview schedules were edited properly. A master table was prepared to sum up all the data. With the help of the master table, classification tables were prepared and they were adopted directly for analysis.

IX. Tools of Analysis

The general plan of analysis ranges from simple descriptive statistics to 'F' test. The extent and variation of growth and development of rural industries were measured through scale and analysis on the basis of the scores of components.

In order to analyze the problems faced by the rural industries, Garrett's ranking technique has been used to rank the important problems faced by the small scale industries. The variables like formal education, nature of units, awareness of government schemes and period of existence were tested with the problems relating to rural industries by using the statistical tool of 'Chi – Square Test'.

a) Chi – Square Test

The Chi – Square test represents a useful method of comparing experimentally obtained data with those expected theoretically. The following formula has been used:

- $$(fo-fe)^2$$
- Chi-square test $(x^2) = \Sigma \frac{(fo-fe)^2}{fe}$
- Where, fo = Observed frequency.
- fe = Expected frequency.
- Degree of freedom (d.f) = (r-1) (c-1)
- If the calculated value was greater than the table value at a particular significant level, say 0.05 level, it was concluded that the factor was dependent on variable for which Chi–Square is computed. If the calculated value was less than the table value, it was concluded that the factor was independent on the variable.

b) Garrett's Ranking Technique

Garrett's Ranking Technique was used to rank the important problems faced by the rural industries. The collected pieces of information from the rural industrial units were arranged and converted into mean score values which were in turn ranked using Garrett's Ranking Technique.

- $$\text{Per cent position} = \frac{100\,(R_{ij}-0.05)}{N_i}$$
- Where,
- R_{ij}: Rank gives for its factor by the j^{th} individual.
- N_{ij}: Number of reasons ranked by the j^{th} individual.
- A factor wise analysis was made. The dependent variable 'growth' was related to independent factors influencing the same. The units were grouped according to these factors. Based on these groups their mean and range of 'growth scores' for each factor group was calculated. In order to find out the significance of the difference between the average, analysis of variance, 'F' test, co-efficient of correlation analysis and partial regression analysis were applied.

X. Limitations

This study pertains to the performance, problems and prospects of the small scale industrial sector in Madurai District during a particular period only. This study is applicable to areas having similar physical, environmental and infrastructural conditions.

XI. Problems Relating to Technology

Outdated technology was a major problem for rural industries in the early years of Independence. Lack of technological improvement resulted in the production

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of articles which did not command wide consumer preference and they could fetch only low prices. Consequently, the earnings of rural industries were low. Further, traditional methods involved very strenuous and tedious operations to manufacture goods. Again, the emergence of the organized sector producing similar articles in a standardized form using modern technology at lower cost posed a serious threat to the survival of rural industries. To make the products of rural industries competitive with those of small and large industries, there was need for modernization of technology. By increasing production, it can enhance the earnings of artisans to a level that makes it attractive for them to continue in their occupations. There was great emphasis on technological aspect of these industries in the successive Five Year Plans. Both the Central and State Governments had established a number of research institutions. Because of the efforts of above research institutions, the production techniques of rural industries had undergone a change. Partial mechanization had taken place in various sectors. The priority of employment generation required the development of widely dispersed, mass consumption of goods produced and labour intensive rural industries.

The problems relating to technology were identified as a) lack of technical improvement b) lack of infrastructure c) increase in cost of production d) low return on investment and e) lack of special skill. The aim of this analysis is to identify the foremost problem related with the technology. Table 1 shows the various problems relating to technology with their mean score and rank.

Table 1: Problems Relating To Technology and their Mean Scores

S.No.	Problem	Mean Score	Rank
1	Lack of technical improvement	63.48	I
2	Lack of infrastructure	47.21	III
3	Increase in cost of production	44.13	IV
4	Low return on investment	39.74	V
5	Lack of special skill	56.19	II

Source: Calculated Data.

It is observed that lack of technical improvement had the highest mean score of 63.48 and it ranked first among the various problems associated with the technology. Lack of special skill with a mean score of 56.19 and lack of infrastructure with a mean score of 47.21 held the second and the third ranks respectively. Increase in cost of production with a mean score of 44.13 held the fourth rank. To analyse further, the problems relating to technology and the calculated mean score values are plotted in Figure 1.

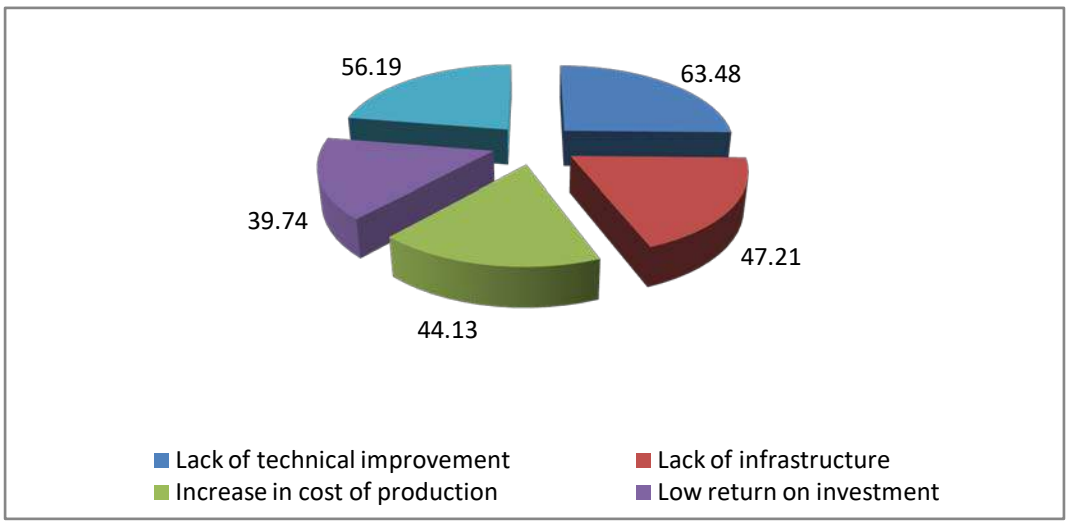


Figure 1: Problems Relating to Technology and their Mean Scores

It could be inferred from the figure that lack of technical improvement was the major problem associated with technology.

a) Formal Education and Problems Relating to Technology

The level of educational qualification acquired by the artisans had been taken into account for the study. Some qualified artisans had the ability to start the

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rural unit and did not want to seek employment with others. By and large, those artisans who had formal qualification realized the need for rapid expansion and modernization of their units. Thus, it was generally believed that qualified artisans could contribute more to the growth of rural industries.

The management of rural industrial units was often left to one man, who operates on a 'rule of thumb' method, leading the business to a short life span. Most of the units became sick because of ineffective management or mismanagement. They did not allow others to take part in the decision-making. When correct decisions were taken, a unit could be run without any difficulty.

The formal educational qualification of the artisans was divided into three sections -namely Illiterate, primary, and secondary school level of education. Problems relating to technology were tested education-wise. For this, it was hypothesized that 'There is a significant relationship between education and problems relating to technology'. The ranking scores of rural units belonging to various educational qualifications of the artisans are furnished in Table 2.

Table 2: Education and Problems Relating to Technology

S.No.	Problem	Illiterate	Primary	Secondary	Total
1	Lack of technical improvement	212	663	209	1084
2	Lack of infrastructure	128	396	124	648
3	Increase in cost of production	132	365	81	578
4	Low return on investment	108	306	50	464
5	Lack of special skill	170	520	136	826
Total		750	2250	600	3600

Source: Calculated Data.
Calculated value of $x^2 = 24.07$
Table value at 5% significant level for 8 d.f = 15.51

The calculated value was greater than the table value. It implied that the hypothesis 'There is a significant relationship between education and problems relating to technology' held good. This confirmed statistically that there is a significant relationship between education and problems relating to technology.

b) *Nature of Units and Problems Relating to Technology*

Problems relating to technology were tested with the nature of units. For this, it was surmised that 'There is a significant relationship between nature of unit and problems relating to technology'. The ranking scores of the units belonging to different forms of organization are furnished in Table 3.

Table 3: Nature of Units and Problems Relating to Technology

S.No.	Problem	Nature of units			Total
		KVIC	Co-operative Societies	Others	
1	Lack of technical improvement	281	546	257	1084
2	Lack of infrastructure	182	339	127	648
3	Increase in cost of production	155	288	135	578
4	Low return on investment	117	225	122	464
5	Lack of special skill	240	447	139	826
	Total	975	1845	780	3600

Source: Calculated Data.
Calculated value of $x^2 = 22.76$
Table value at 5% significant level for 8 d..f = 15.51

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The calculated value was greater than the table value. It implies that the hypothesis 'There is a significant relationship between nature of units and problems relating to technology' held good. This statistically revealed that there is a significant relationship between nature of the units and problems relating to technology.

c) *Awareness of Government Schemes and Problems Relating to Technology*

The awareness of government schemes was tested with problems relating to technology. For this, it is surmised that 'There is a significant relationship between awareness and problems relating to technology'. The ranking scores of the units are furnished in Table 4.

Table 4: Awareness of Government Schemes and Problems Relating to Technology

S.No.	Problem	Awareness		Total
		Aware	Not-aware	
1	Lack of technical improvement	306	778	1084
2	Lack of infrastructure	158	490	648
3	Increase in cost of production	134	444	578
4	Low return on investment	118	346	464
5	Lack of special skill	289	537	826
Total		1005	2595	3600

Source: Calculated Data.
Calculated value of $x^2 = 32.46$.
Table value at 5% significant level for 4 d.f = 9.49.

The calculated value was greater than the table value. It implied that the hypothesis 'There is a significant relationship between awareness and problems relating to technology' held good. Thus, it was statistically revealed that there is a significant relationship between awareness and problems relating to technology.

d) *Period of Existence and Problems Relating to Technology*

The period of existence enhances the mental strength to overcome any problem. To study this factor, the length of the period of existence of the units was divided into three groups as those who have been working for 15 years (short), for 16 years to 25 years (medium) and for 25 years above (long). It is surmised that 'There is a significant relationship between period of existence and problems relating to technology'. The ranking scores of the units are furnished in Table 5.

Table 5: Period of Existence and Problems Relating to Technology

S.No.	Problem	Period of Existence			Total
		Short	Medium	Long	
1	Lack of technical improvement	348	495	241	1084
2	Lack of infrastructure	216	297	135	648
3	Increase in cost of production	192	272	114	578
4	Low return on investment	139	214	111	464
5	Lack of special skill	245	342	239	826
Total		1140	1620	840	3600

Source: Calculated Data.
Calculated value of $x^2 = 22.51$.
Table value at 5% significant level for 8 d.f = 15.51.

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The calculated value was seen to be greater than the table value. It implied that the hypothesis 'There is a significant relationship between period of existence and problems relating to technology' held good. This revealed statistically that there is a significant relationship between period of existence and problems relating to technology.

XII. Findings of the Study

It was observed that lack of technical improvement had the highest mean score of 63.48 and it ranked the first among the various problems associated with the technology. It was concluded that lack of technical improvement was the major problem associated with technology.

XIII. Suggestions

The suggestion based on the findings of the study for the growth and development of rural industries in Madurai district can be considered: Outdated technology was identified as a problem of rural industries. The study suggests that governments should redouble their efforts in the provision of infrastructure, especially in the area of technology up gradation of rural industries.

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