METHODOLOGY

Chapter IV

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4.1 Introduction

Research is defined as a scientific and systematic search for pertinent information on a specific topic. It comprises defining and redefining problems, formulating hypothesis or suggested solutions; collecting, organizing and evaluating data, making deductions and reaching conclusions; formulating suggestions on plans for improvement. Research Methodology is a way to systematically solve the research problem (Kothari, 1997). The nature of the problem and the kind of data needed for its solution determine the method of the study.

The present Study has been conducted by assessing the past performance, examining the present status and by giving a projection of the future of the development scenario of the diverse sectors of the Kerala economy. Therefore, the methodology of the present Study is a combination of different approaches to study the past, present and the future. Historical method and descriptive method are employed for the present Study.

Descriptive study is a fact-finding investigation with adequate interpretation. It is designed to gather descriptive information and provides

information for formulating more sophisticated studies. Data are collected by using one or more appropriate methods: observation, interviewing and mailing questionnaire. Descriptive method would be useful for explanation, prediction and awareness.

Historical study is a study of past records and other information sources with a view to reconstructing the origin and development of an institution or a movement or a system and discovering the trends in the past. (Krishnaswami, 1999). It is descriptive in nature and depend upon inferences and logical analysis of recorded data and indirect evidences rather than upon direct observation (Wilkinson, 1996).

The objective is to draw explanations and generalizations from the past trends in order to understand the present and to anticipate the future. Historical study helps us in visualising the society as a dynamic organism and its structures and functions as evolving, steadily growing and undergoing change and transformation (Sjoberg, 1997).

For deriving the industrial development pattern of Kerala since its formation required a thorough and systematic historical study. Books, reports and different types of literature available on industries in various libraries and government departments were referred to find out the facts on industrial development till date in the State.

4.2   Research Design

A research design is a logical and systematic plan prepared for directing a research study. It specifies the objectives of the study, the methodology and techniques to be adopted for achieving the objectives. It constitutes the blueprint for the collection, measurement and analysis of data. A research design is the programme that guides the investigator in the process of collecting, analyzing and interpreting observations (Krishnaswami, 1999)

4.3   Sampling

Empirical field studies require collection of first-hand information or data pertaining to the units of study from the field. The units of study may include geographical areas like districts or industries or households about which information is required, or persons from whom information is available. The aggregate of all the units pertaining to a study is called the population or the universe. A part of the population is known as a sample and the process of drawing a sample is called sampling. In the present study, the population consists of all types of industries situated in the 14 districts of Kerala State.

4.3.1 Sampling Techniques

Sampling techniques or methods may be classified into two generic types: (a) Probability or random sampling, and (b) non-probability or non-

random sampling. Probability sampling is of different types like simple random sampling, stratified random sampling, systematic random sampling, cluster sampling, area sampling etc. The non-probability sampling is classified as convenience or accidental sampling, purposive sampling, quota sampling, snow-ball sampling etc. For the present Study, the stratified random sampling has been used.

4.3.1.1 Stratified Random Sampling

In this method, the population is sub-divided into homogenous groups or strata, and from each stratum, random sample is drawn. Stratification ensures representation to all relevant subgroups of the population. It is useful when different methods of data collection etc. are used for different parts of the population.

4.3.2 Size of the Sample

Kerala State is divided into 14 districts. For the present study, stratified samples were taken from all the districts at an average of 7 industrial units from each district. Samples are taken from small, medium and large industrial units. Government of India has classified the industrial units, based on their level of investment as small (upto Rs. 1 crore), medium (Rs. 1 to 10 crores) and large (above Rs. 10 crores). In the present study, both medium and large scale units are put-together, since the basic characteristics of both

medium and large are the same with regard to management, technology, production, marketing and performance.

The samples are taken from the traditional, manufacturing, service and IT units covering the small, medium and large-scale sector from all the fourteen districts of the State. Break-up of the final sample of the industries is given in the Tables 4.1 and 4.2.

Table 4.1: Break-up of the Final Sample of Industries
(Line of Production)

Types of Industry	Line of production	No. of units	Percentage
a) Traditional	Coir	5	20
	Cashew	13	52
	Handloom	3	12
	Handicrafts	3	12
	Beedi	1	4
	Total	**25**	**100**
b) Manufacturing	Chemicals	1	4
	Rubber	2	8
	Drugs & Pharmaceuticals	4	16
	Plastics	5	20
	Food Processing	7	28
	Minerals & Metals	6	24
	Total	**25**	**100**
c) Services	Hotels	9	36
	Finance	2	8
	Hospital	6	24
	Consultancy	2	8
	Printing	1	4
	Transport	3	12
	Entertainment	2	8
	Total	**25**	**100**
d) Information Technology	Software	21	84
	Hardware	2	8
	ITES	2	8
	Total	**25**	**100**
	Grand Total	**100**	**100**

Table 4.2: Break-up of the Final Sample of Industries
(Size-wise)

Type of Industries	Size of Unit	No. of units	Percentage
a) Traditional	Small	8	32
	Medium/large	17	68
	Total	**25**	**100**
b)Manufacturing	Small	7	28
	Medium/large	18	72
	Total	**25**	**100**
c) Services	Small	4	16
	Medium/large	21	84
	Total	**25**	**100**
d)Information Technology	Small	18	72
	Medium/large	7	28
	Total	**25**	**100**
	Grand Total	**100**	**100**

4.4 Data Collection

Following Data has been collected from the industrial units, like investment particulars, line of production, modernisation, IT usage, diversification, impact of globalisation, awareness of cyber society, and benefits of modernization by IT application. Data were collected by literature search, through questionnaire and by interview with a schedule.

4.4.1 Data Collection Tools

4.4.1.1 Documentary Sources

Govt. publications like the Economic Review of the State Planning Board, Statistics for Planning by the Directorate of Economics and Statistics, Reports of Taskforces on industry, Annual Reports, Brochures, Websites of government institutions etc. are referred.

4.4.1.2 Questionnaire

The mail survey or mail questionnaire is a method of collecting primary data. Questionnaires were sent to the respondents with a request to complete them and return them by post (Krishnaswami, 1999).

In the present Study, the following questionnaires were used for data collection.

1. Questionnaire for traditional industries

2. Questionnaire for manufacturing industries

3. Questionnaire for service industries

4. Questionnaire for IT industries.

Questionnaires were sent to 200 industrialists by selecting 50 units from each of the above four categories. Out of the responses received, a total of 100 samples were selected by taking 25 units from each type of industry.

4.4.1.2.1 Traditional Industries

The traditional industries include mainly the cashew, coir, beedi, artisanal industries, handicrafts, handlooms, tiles etc. Most of these units are of very tiny types which come under the Khadi and Village industries. Most of the owners are less educated and economically poor. They are afraid of, or reluctant to fill up the questionnaire. So, in most cases, details were collected by personal meeting.

4.4.1.2.2 Manufacturing Industries

The manufacturing industries include all goods producing industries other than the traditional types. They are also called modern industries. This category consists of food processing units, chemicals, minerals and metals, rubber processing, wood industries, automobiles etc. Promoters of these units are relatively well educated and willing to provide replies to the questionnaires.

4.4.1.2.3 Service Industries

The service sector consists of Hotels, Hospitals, Printing, Transport, Entertainment (theatres, theme parks etc.), Consultants and Information industries. Most of the industrialists of these units are well educated and aware of the modern trends in their field. Services were included under industries only very recently.

4.4.1.2.4 IT Industries

Information Technology industry includes the information communication technology and IT enabled services (ITES) industries. Hardware and software of computers, call centres, telecom service providers etc. come under this category.

4.4.1.3 Interview

Interviewing may be defined as a two-way systematic conversation between an investigator and an informant, initiated for obtaining information relevant to a specific study (Krishnaswami, 1999)

Interview is often superior to other data gathering methods. People are usually more willing to talk than to write. Interview can add flesh to statistical information. The greatest value of this method is the depth and detail of information that can be secured. Here, the interviewer can improve

the quality of information received. The accuracy and dependability of the answers given by the respondents can be checked by observation and probing.

4.4.1.3.1 Interview Schedule

In order to get further data, with the documentary sources, an interview has been also conducted among the (1) top executives of industries (2) politicians, and (3) bureaucrats of the State Government. The interview schedule has been designed to collect information on the impact of IT on industry, awareness of the emergence of cyber society, nature of industries in cyber society, impact of globalisation and liberalisation, role of service and IT sectors, policy initiatives for service industries etc.

For the present Study, interview with schedule was used to draw out views and ideas from Govt. officials, Bureaucrats, Policy makers, executives, Politicians and from the academicians. Break-up of the personalities are given in the following table.

Table 4 .3: Break-up of the personalities interviewed

Field of Activity / vocation	No. of persons	Percentage
Politicians	6	30
Govt. Officials	6	30
Academicians	2	10
Executives	6	30
Total	**20**	**100**

A field study has also been conducted to get a clear picture of the industrial development of Kerala by visiting a number of units in different parts of the State.

4.5 Variables

On the basis of the data collected using various tools, the following variables were identified for the study.

(i)   Size of the industry – investment

(ii)   Nature of the industry – line of production

(iii)   Present condition of the industry

(iv)   Performance of the units

(v)   Industrial relations / work culture

(vi)   The level of using IT in the units

(vii)   The level of modernisation / automation of the units.

(viii) Expected future trend of the units in capacity expansion / diversification / modernisation

(ix)   Future trend of an industry by 2010

(x)   Future trend of an industry by 2020

(xi) Impact of globalisation and liberalisation

(xii) Impact of ICT on different types of industries

(xiii) Benefits of modernising the line of production using IT

(xiv) Awareness of the emergence of a cyber society

4.6   Analysis of Data

The collected data were analyzed under different tables and by using appropriate statistical tools, like percentage, annual growth rate, compound growth rate, mean rank etc. The data has been analyzed so as to identify major findings and arrive at conclusions, in order to formulate alternate strategies and policies.

4.7   Statistical Techniques

The statistical analysis of data was done with the help of computer with the statistical package for social sciences (SPSS). The following statistical techniques were used for analysis of data.

4.7.1 Percentage analysis

4.7.2 The Z-test

The z-test for significance was used to find out whether significant difference exists among the different types of industries, like traditional

manufacturing , service and IT/ITES industries and between small units and large / medium units.

The z-test was applied using the formula

$$Z = \frac{P_1 - P_2}{\sqrt{P(1-P)\left(\dfrac{1}{n_1} + \dfrac{1}{n_2}\right)}}$$

Where,

P1 = proportion of the first sample

P2 = Proportion of the second sample

n_1 = number of the first proportion

n_2 = number of the second proportion

$$P = \frac{n_1 P_1 + n_2 P_2}{n_1 + n_2}$$

4.7.3 Mann - Whitney Test

The Mann-Whitney test is used for testing differences between means when there are two conditions and different subjects have been used in each condition (Field, 2000). This non-parametric test works on the principle of ranking the data by finding the lowest score and giving it a rank of 1, then finding the next highest score and giving it a rank of 2 and so on. This

process results in high scores being represented by large ranks and low scores being represented by small ranks.

The analysis is then carried out on the ranks rather than the actual data.

The Mann-Whitney test works by looking at differences in the ranked positions of scores in different groups. Therefore, the first part of the output summarises the data after it has been ranked. Specifically, SPSS gives the average and total ranks in each condition

4.7.4 Wilcoxon Test

For the Mann-Whitney test, Wilcoxon developed a different procedure, which can be converted into a Z-Score and, therefore can be compared against critical values of the normal distribution. SPSS provides both statistics and the Z-Score for the Wilcoxon statistic .

4.7.5 Chi-square

The basic Pearson chi-square test detects whether there is a significant association between two categorical variables. Its formula is as follows :

$$\chi^2 = \frac{\Sigma(O_i - E_i)^2}{E_i}$$

O_i is the ith observed frequency, where i = 1, 2, ..., k ;

E_i is the ith expected frequency, where E_i must be > 5

4.7.6 Kruskal - Wallis Test

This test is used to test the null hypothesis that ` k' independent random samples come from identical universes against the alternative hypothesis that the means of these universes are not equal (Kothari, 2000). In this test, the data are ranked jointly from low to high or high to low as if they constituted a single sample. The test statistic is H for this test which is worked out as under.

$$H = \frac{12}{n(n+1)}\sum_{i=1}^{t}\frac{R_i^2}{n_i} - 3(n+1)$$

here, $n = n_1 + n_2 + ... + n_k$ and

Ri being the sum of the ranks assigned to ni observations in the ith sample.

4.7.7 Spearman's Rho Correlation

Spearman's correlation coefficient is a non-parametric statistic and so can be used when the data have violated parametric assumptions and /or the distributional assumptions. Spearman's tests work by first ranking the data, and then applying Pearson's equation to these ranks. Pearson's formula for rho (ρ) is

$$\rho = 1 - \frac{6\Sigma d_i^2}{n(n^2-1)}$$

Where d_i is the difference between the ranks in the ith observation and n, the total number of observations.