METHODOLOGY

CHAPTER - III
METHODOLOGY

The methodology adopted in the current study is discussed under the following heads.

3.1 Location of the study

3.2 Selection of sample

3.3 Database of the study

3.4 Period of study

3.5 Techniques of analysis

3.6 Limitations of the study

3.1 Location of the study

Coimbatore district, which lies in the western part of Tamil Nadu bordering the western ghats, is surrounded by The Nilgiris in the west and southwest, Erode district in the north and Dindigul district in the east. Coimbatore District has two revenue divisions namely Coimbatore and Pollachi, six taluks namely Coimbatore (North), Coimbatore(South), Mettupalayam, Sulur, Pollachi and Valparai, 12 blocks and 227 panchayat villages. The city is divided into 100 wards and these wards are grouped into five zonal ward committee. The district has a geographical area of 7469 sq.kms. The decadal growth rate of population during 1981-91 was 14.65 percent, 20.4 percent during 1991-2001 and 17.64 percent during 2001-2011. The work participation rate is 39.8 percent. Coimbatore district is fed with water from Noyal, Siruvani, Bhavani and Amaravathi. Siruvani, world's second purest water body is the main source of water in the city. Coimbatore city known as the ‘Manchester of South India’ is the district headquarters of Coimbatore district. The Salient features of Coimbatore district is summarized in table 3.1.1.

The economy of Kongu Nadu is multifaceted with strong binding between agriculture and industries. Agriculture is still the major occupation in the district as in any other part of the country. General trade attracts people from all over the state including

the neighbouring state of Kerala. The district is home to almost 50 percent of the poultry population of Tamil Nadu.

TABLE 3.1.1

STATISTICAL INDICATORS OF COIMBATORE DISTRICT – 2011

Statistical Indicators	
Population (persons)	3,458,045
Male (persons)	1,729,297
Female (persons)	1,728,748
Density of population (sq.km)	731
Area (sq.km)	4,732
Literacy (persons)	2,635,907
Male literates (persons)	1,394,790
Female literates (persons)	1,241,117
Literacy rate (percent)	83.98
Total workers (persons) (2001 census)	937314
Male workers (persons)	627693
Female workers (persons)	309621
Rural workers (persons)	436831
Urban workers (persons)	500483
Cultivators(persons)	98364
Agricultural labourers(persons)	211056
Household Indusrty(persons)	30381
Other workers(persons)	510302
Marginal workers (persons)	87211
Work participation rate(percent)	39.8
Sex ratio (female per 1000 males)	1000

Source: Census of India, 2011

The growth of the district is sustained by a variety of industrial activities, with textiles being the core activity in the district. It houses numerous textile mills and small engineering units. There are 36579 industrial units in Coimbatore district. The

establishment of South India Textile Research Association (SITRA) and the South India Mills Association (SIMA) has helped the growth of textiles by contributing to the development of new design, marketing etc. Next to textiles, the manufacture of motor and pumps for domestic and agricultural use are taking place in and around the district. Besides, wet grinders are also manufactured here. Coimbatore is famous for Schools, Universities, Engineering Colleges, Medical, Management Schools, Textiles- Yarn, Knitted Garments, Handlooms, Textile Machinery, Motors, Pumps, Industrial goods, Cotton, Tea, and Software.

The district has a good network of roads. Town buses connect all important places in and around the town. There are four national highways passing through Coimbatore district with a total length of 330200 kms and the length of state highways is 4058.03 kms. Coimbatore is connected by rail route to other states, the total length being 580.33 kms, of which 410.33 kms are broad-gauge and 170 kms are meter-gauge lines. Coimbatore has an airport, and the telecommunication is well developed in the district.

The health care industry in Coimbatore has witnessed a tremendous growth in the last decade. The districts health department is amongst the best in terms of implementing government – initiated health schemes. Fast pace of industrialization, spiraling population and the increase in the health awareness have led to the growth of the health care industry in Coimbatore. The city stands second to Chennai in Tamil Nadu for highly affordable and quality health care deliveries of international standards. Coimbatore is also well-known for its exclusive super-specialty hospitals. To name a few major hospitals, Kuppusamy Naidu Hospital, PSG Hospital, KG Hospital, The Kovai Medical Center and Hospital, Ganga Hospital, Gem Hospital and The Eye Foundation and Sankara Eye Clinic for Ophthalmology to name a few (www.coimbatorecity.com).

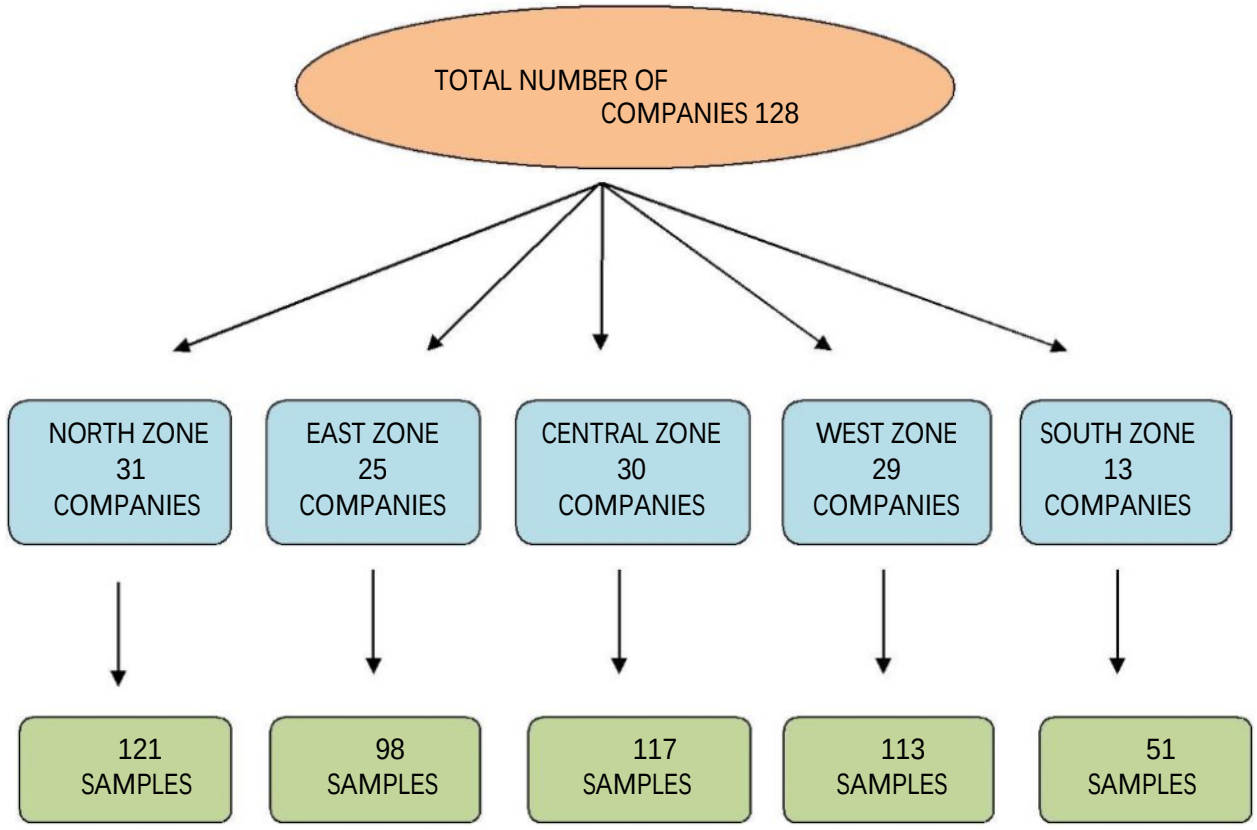
Coimbatore is also emerging as an IT and BPO city. The IT industry in Coimbatore is nascent compared to its textile and manufacturing industries, with Cognizant Technology Solutions, Perot Systems, Robert Bosch Engineering, 365 media and Business Solutions Lts, Cybernet – Slash Support (CSS Corp) and KGISL to name a few.No complete statistical information is available on the number of employees in ITES organization in the Coimbatore city. This fact provided an added necessity to

undertake the present study on ITES employees in Coimbatore city. The findings of the study will provide a meaningful contribution to the literature on gender discrimination and would help in making suitable policy decisions.

3.2 Selection of Sample

The location of the study was confined to Coimbatore city. According to Software Technology Parks of India (http://www.chennai.stpi.in/data_coimbatore.html) there are about 128 ITES companies in Coimbatore spread all the five zones namely North (31 companies), South (13 companies), Central (30 companies), East (25 companies) and West (29 companies). By adopting stratified proportional sampling technique the sample of 500 were distributed across the zones which include 121 from North, 51 from South, 98 from East, 113 from West and 117 from Central zone. Equal representations of 250 male and female respondents were selected. This is schematically represented in figure 3.1.1

Figure 3.1.1



In each zone the samples were selected by adopting incidental purposive sampling technique. The term incidental sampling is applied to those samples that are taken because they are most readily available. A common strategy of purposive sampling is to pick up cases that are judged to be typical of the population, in which one is interested, assuming that errors of judgment in selection will tend to counter balance each other if sufficiently large sample is taken.

3.3 Database of the Study

The study was based on primary data. The primary data was collected with the help of a questionnaire, which includes questions on demographics, employment details, working conditions, promotional details, relationships (including any form of harassment), discrimination, benefits, problems and job satisfaction which was collected from both men and women ITES employees. The schedule was first pre-tested with few selected sample units and based on their responses the questions were reformulated and the final interview schedule used in the study is given in Annexure I.

3.4 Period of study

Data for the study were collected from the sample respondents by administering a pretested questionnaire during the period August 2012 - January 2013.

3.5 Techniques of analysis

Besides averages, percentages and graphs, the following techniques were applied.

Chi-square test

The test is one of the simplest and most widely used non-parametric tests in statistics. The quantity describes the magnitude of the discrepancy between theory and observation and is symbolized as

$$= \Sigma(O-E)^2 / E$$

where O refers to observed frequency and E refers to expected frequency.
In the present study, chi-square test was applied

- To find the association between the gender and selected social factors like religion, community, type of family, size of family, marital status, age and dependents in the family.

- To find out the association between the gender and selected economic factors like education, income, saving and debt.
- To determine the level of association between the monthly income of the respondents based on gender with selected social and economic variables namely age, educational status, marital status and type of family.
- To find out the association between the gender and selected employment factors like respondents experience, average experience of team members, nature of work, working in the job they wanted and teamwork pressure.
- To find out the association between the gender and issues related to training.
- To determine the level of association between the gender and the working conditions.
- To find out the association between the gender and equal opportunities variables.

Multiple regressions using step-wise method

Multiple regression analysis is a statistical technique which is used to analyse the relationship between a single dependent (criterion) variable and several independent (predictor) variables. Its basic formulation is

$$Y = b_0+b_1X_1+b_2X_2+\ldots\ldots+ b_nX_n +e$$

where Y- dependent variable, $X_1\ldots.. X_n$ independent variables, b_0 intercepts, b_i coefficient of the independent variable (i=1, 2….n) and e-random component

Step wise regression includes regression models in which the choice of the predictive model is carried out by an automatic procedure (Dragier & Smith, 1981).usually this takes the form of a sequence of F tests but other techniques such as t-tests, adjusted R square, Akaike information criterion etc., are possible. The main approaches are forward selection, backward elimination or combination of the above methods. In the present study forward selection was used which involves starting with no variable in the model, trying out the variable one by one and including them if they are statistically significant. This is an automatic procedure for statistical model selection in cases where there are large number of potential explanatory variables and no

underlying theory to base model selection. Multiple regression analysis was applied to find out the extent of influence of selected social and economic factors on monthly income earned by the respondents.

Garrett's Rating Scale

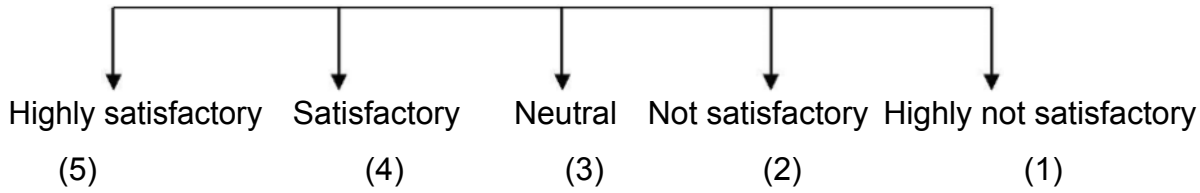
To find out the strength of each factor in motivating the selected sample groups to undertake job, Garrett's rating scale technique was used. From the ranks given for each factor, percent positions were calculated by using the formula.

Percent position=100*(R-0.5)/N

where R is the rank assigned and N is the number of items ranked. The percent position was then converted into scores using Garrett's scores table (Garrett H, 2005). Garrett's Rating Scale was applied to find out the reasons for shifting the organization based on gender of the respondents.

Likert's summated scale

The Likert summated scaling technique was used to scale the characteristics of facilities, benefits, job satisfaction and problems at workplace. In the Likert scale, the respondent is asked to respond to each of the statements in terms of several degrees, usually five degrees of agreement or disagreement.



Each point on the scale carries a score. Response indicating the least favorable degree of satisfaction is given the least score (say1) and the most favourable is given the highest score (say 5). These score values are normally not printed on the instrument but are shown here just to indicate the scoring pattern. The Likert's scaling technique thus assigns a scale value to each of five responses. The same thing is done in respect of each and every statement in the instrument. This way the instrument yields a total score for each respondent, which would then measure the respondent's favourableness toward the given point of view. Likert's summated scale was applied to

find the opinion of employees on various dimensions of gender discrimination and to find the determinants of job satisfaction.

Kruskal-wallis H test

The Kruskal-wallis one-way analysis of variance or the H-test helps in testing the null hypothesis that k independent random sample come from identical population against the alternative hypothesis that the mean of these samples are not equal. The test statistics is given by

$$K = (N-1)\frac{\sum_{i=1}^{g} n_i(\bar{r}_{i\cdot} - \bar{r})^2}{\sum_{i=1}^{g}\sum_{j=1}^{n_i}(r_{ij} - \bar{r})^2},$$

where n_i is the number of observations in group i , r_{ij} is the rank (among all observations) of observation j from group I, N is the total number of observations across all groups and

$$\bar{r}_{i\cdot} = \frac{\sum_{j=1}^{n_i} r_{ij}}{n_i}$$

$$\bar{r} = \tfrac{1}{2}(N+1)$$

is the average of all the r_{ij}. Chi-square with k-1 (number of groups-1) degrees of freedom can be used to approximate the significance level for the test. Kruskal-wallis H test was applied to find out whether the scores assigned for the reasons for shifting the organization differed significantly.

Cronbach's alpha

Cronbach's alpha evaluates the unidimensionality of a set of scale items. It's a measure of the extent to which all the variables in a scale are positively related to each other. In fact, it is really just an adjustment to the average correlation between every variable and every other. The formula for alpha is

$$\alpha_{s\,\text{tan}\,dardized} \quad \frac{K.\bar{r}}{(1+(K-1).\bar{r})}$$

where k is the number of variables and $\bar{r}$ is the average correlation among all pairs of variables. Cronbach's alpha values ranges from 0 to 1. The higher the score, the more reliable the generated scale is. Nunnally (1978) has indicated 0.7 to be an acceptable reliability coefficient but lower thresholds are sometimes used in the literature. In the

study, the reliability testing was done for factors related to satisfaction of team work, for the facilities provided at work place, benefits provided at work place, factors more enjoyable at work place and the problems at work place.

Factor analysis

Factor analysis is a generic name given to a class of multivariate statistical methods whose primary purpose is to define the underlying structure in a data matrix. Broadly speaking, it addresses the problem of analyzing the structure of the interrelationships (correlations) among a large number of variables by defining a set of common underlying dimensions, known as factors. With factor analysis, the researcher can first identify the separate dimensions of the structure and then determine the extent to which each variable is explained by each dimension. Once these dimensions and the explanation of each variable are determined, the two primary uses for factor analysis, namely summarization and data reduction can be achieved. In summarizing the data, factor analysis derives underlying dimensions that, when interpreted and understood, describe the data in a much smaller number of concepts than the original individual variables.

Factor analysis was used in the present study to identify the underlying pattern of relationship between the various dimensions of satisfaction from team work, facilities at work place, benefits, factors enjoyable at work place, job satisfaction and problems at workplace, and whether these factors can be grouped in terms of a composite variable.

Logistic regression analysis

The logistic regression is one that specifies a functional relationship between a basically dichotomous dependent variable and categorical or metric scaled independent variables. In fact it is a method of multivariate analysis of the multiple regression model designed to deal with the situation when we have only the measurement of presence or absence, occurrence or non-occurrence of some factors. Logistic regression is concerned with modeling the odds of dependent variable and the parameters for logistic are most easily interpreted as they are expressed as odd ratios.

The basic form of logistic function is

$$P = \frac{1}{1 + e^{-z}}$$

when numerator and denominator of the right side of the above equation are multiplied by e^z, the logistic function can be expressed in the following manner

$$P = \frac{\exp(z)}{1 + \exp(z)}$$

where z is the predictor variable and e is the base of natural logarithm, equal to 2.71828. Above equation is bi-variate. If z is a linear function of a set of predictor variables then:

$$Z = b_o + b_1X_1 + b_2X_2 + \ldots\ldots\ldots\ldots + b_kX_k$$

This expression is substituted in the formula for logistic function in the above equation. Thus the function becomes

$$P = \frac{1}{1 + e^{-(b_o + b_1x_1 + b_2x_2 + \ldots\ldots\ldots\ldots\ldots + b_kx_k)}}$$

In the analysis, both logistic regression coefficients and odd ratios are used. Odd ratios in the ratio of the probablity of the event occuring to the probablity of the event not occuring and is denoted as :

$$\text{Log}\ \frac{p_i}{1 - p_i} = b_o + b_1x_1 + b_2x_2 + \ldots\ldots\ldots\ldots\ldots + b_kx_k + e$$

where P_i - Probablity of the event occuring;

b_o - Constant term;

X_1 to X_k - independent variables;

b_1 to b_k - unknown regression coefficients associated with the independent variables x_1 to x_k ; and

e - error term representing unobserved variables that influence dependent variable.

The quantity p / 1 – p is called the odds; hence the quantity Ln (P_i /1 – P) called the log odds or the logit of p. The coefficients are estimated using the method of maximum likelihood method. Logistic regression analysis was applied to study the barriers women face in the workplace.

To carry out the above analysis SPSS 16 version was used and techniques are elaborated in chapter IV, 'Results and Discussion'.

Path analysis

Path analysis is a straightforward extension of multiple regressions. Its aim is to provide estimates of the magnitude and significance of hypothesized causal connections between sets of variables. This is best explained by considering a path diagram. Path analysis is used to describe the directed dependencies among a set of variables. In addition to being thought of as a form of multiple regression focusing on causality, path analysis can be viewed as a special case of structural equation modeling (SEM) – one in which only single indicators are employed for each of the variables in the causal model. That is, path analysis is SEM with a structural model, but no measurement model. Other terms used to refer to path analysis include causal modeling, analysis of covariance structures, and latent variable models. Its aim is to provide estimates of the magnitude and significance of hypothesised causal connections between sets of variables, which is best explained by a path diagram.

To construct a path diagram the names of the variables are written, arrow is drawn from one variable to other variable which it affects. One can distinguish between input and output path diagrams. An input path diagram is one that is drawn beforehand to help plan the analysis and represents the causal connections that are predicted by the hypothesis.

An output path diagram represents the results of a statistical analysis, and shows what was actually found. The objective of path analysis is to understand the pattern of correlations among the variables and explain the variations with the model specified. The path of the model is shown by a square and an arrow, which shows the causation. Regression weight is predicted by the model. The goodness of fit statistic is calculated in order to see the fitting of the model. Path analysis was applied to evaluate

the views of female employees on how perceived gender discrimination has affected their professional career. Path model was executed by using VPLS programme.

3.7 Limitations of the study

- The study was based on primary data, which has its own limitations.
- To have accuracy in the data collected cross checking was carried out. Though inaccuracy in the given data was minimized the data could not be considered as 100 percent correct.
- The present study relies only on the information gathered through surveys, observations and personal interviews, which are subject to bias. As with most empirical studies, the sample size and spectrum of respondents is a limitation.
- The study area was confined to one small township. Thus the results of the study are applicable only to similar kind of situation analysis.
- The study pertains to a certain time period. The result may not be valid for over a longer period of time due to fast changing socio-economic and socio-cultural setting in the study area.
- Because of limitation of time and other resources involved in research, the present study was restricted to a limited number of samples. The result drawn from this study, therefore may have limited application i.e., it cannot be assumed to provide information, capable of generalization over other regions and could have regional biasness, but surely the broad similarities specific to a particular gender, will provide some insight to the study

But these limitations in no way negate the findings of the study and offer scope for further research in future.