Chapter - III
Research Methodology

CHAPTER 3

RESEARCH METHODOLOGY

The term research denotes the process of discovery of any specified subject matter. According to J.W. Best (1999) "Research is considered to be a systematic, formal, intensive process of carrying on the scientific method of analysis. Research is a methodical structure of investigation usually ensuing in formal record of procedures and report of results or conclusions". The most disciplined way of conducting the research was evident from many literatures, which strictly follow research ethics such as literature review, research design, sampling technique, data collection method and its validation. The following sections explain the research methodology applied in this research.

3.1. Research Design

The research design denotes the overall stratagem which helps to assimilate the diverse components of the study. The researcher has laid the short note on how the design has been formulated using various methods and statistical tools.

3.2 Source of Data

Primary data and secondary data are used.

3.3 Sampling Method

It is a practice of statistical significance where the focus is the selection of a subset of individuals from within a population and helps to estimate characteristics of the whole population. The women employees in leadership role among the IT/ITeS Sector are the target population. In Indian context, the women employees are majorly employed in the IT/ITeS Sector and empowered as leaders. The disparity among Tier-1 and Tier-2 city selection is naturally be neutralised by the IT/ ITeS employees. Therefore, the desired population is well defined and reachable in the respective destinations. Due to two independent destinations, probability-based stratified random sampling technique with equal sample proportion was applied.

3.4 Area of the Study

This study is executed at Bengaluru and Coimbatore. Bengaluru stands first among the Top Five - Information Technology (IT) destinations of India. Therefore, any research related to IT industry conducted at Bengaluru can reveal the real-time scenario. Similarly, Coimbatore

stands first among the Tier-2 City based on its revenue generation in IT industry, India. Therefore, both areas are having potential to validate this research and provide some new insights for betterment.

Almost all the leading IT companies like, Accenture, Oracle, Cognizant, Capgemini, HCL, Infosys, Wipro, TCS, IBM, and Robert Bosch, Ericson etc., located in Bengaluru. All these companies always are part of the Top 50 IT companies in Bengaluru list. The first special economic zone was Coimbatore TIDEL Park. The IT/ITeS Sectors such as Tata Consultancy Services, Cognizant Technology Solutions, Robert Bosch, DELL, HCL, Wipro, Payoda Technologies, Techno Soft Global Service Pvt, KGISL, Rathinam IT park and CSS Corp Pvt Ltd, etc. have made their mark. All these companies are the part of the top IT companies in Coimbatore list (Wikipedia).

3.5 Sample Size

The population comprises of middle-level executives, team leaders, project leaders, subject matter experts. According to Women and IT Scorecard report by NASSCOM-2018, India has 1.3 million women employees in IT/ITES Sector and only 2% of women are employed as middle manager level in more than 40% of Indian companies. Therefore, the target population is 26000 (13 lakh women workforces' $\times$ 2% in the target designation).

Figure 7: Women and IT Scorecard Report
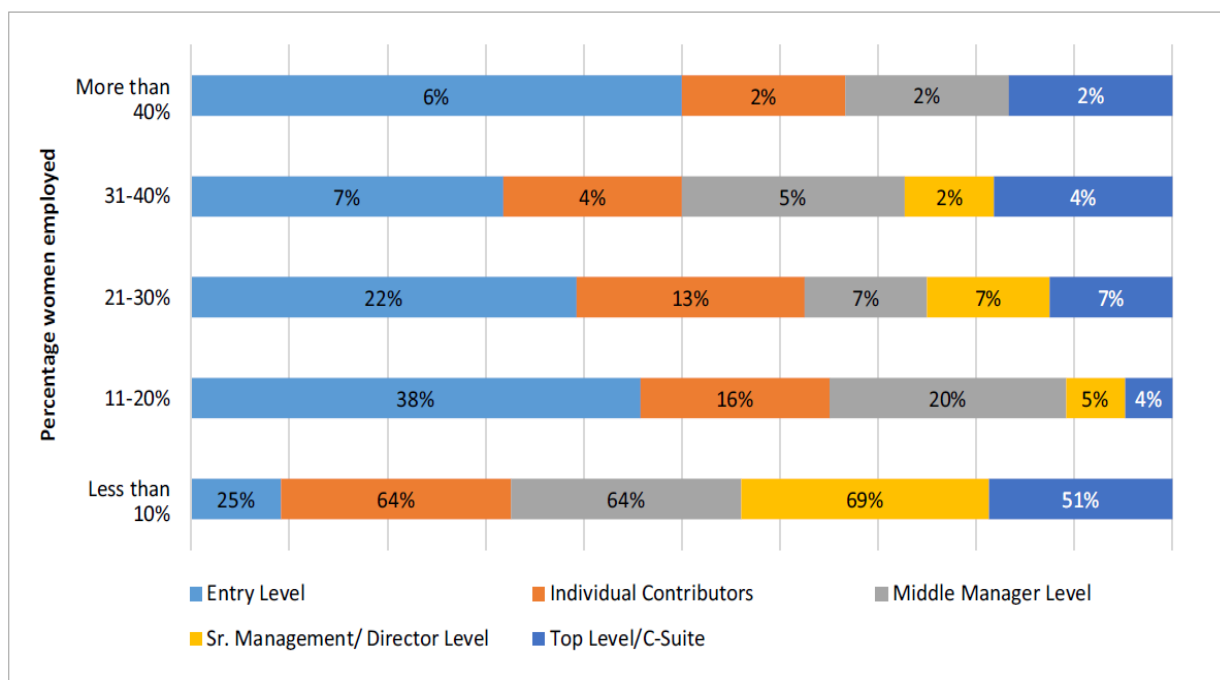
Source: GSM-IT SURVEY 2017

An equal proportion of sample is suggested to balance the inferiority or superiority of the data point. The sample size is estimated using the following formula.

$$S = \frac{Z^2 \times p \times (1-p)}{C^2}$$

$$N = \frac{S}{1 + \frac{S-1}{POP}}$$

Where, Z = Z value, p = percentage picking a choice, c = confidence interval, expressed as decimal, POP = population.

$$x = Z \left(\frac{c}{100}\right)^2 \times r \times (100 - r)$$

$$E = Sqrt \left(\frac{(N-n) \times x}{n(N-1)}\right)$$

$$n = \frac{N \times x}{\left((N-1)E^2 + x\right)}$$

Where, N = population size, r = fraction of responses, Z(c/100) = critical value for the confidence level c. The subsequent parameters are given to the formula; confidence interval = 4.9, confidence level = 95%, population = 26000. The result reveals as minimum of **394 samples required** for this study at the desired settings. Stratified sampling technique is applied with equal sample proportion and each location is considered as separate strata. Hence, 197 samples were required for each cluster. 500 questionnaires targeted were sent by email via google form and directly distributed among women leaders who are in executory level and operative level of Bengaluru and Coimbatore IT/ITeS industry. Only 444 respondents filled up the questionnaires, in which 8 were eliminated due to incomplete information. A total of 436 samples were collected from two destinations such as Bengaluru (203 samples) and Coimbatore (233 samples). In order to balance the sample proportion, 203 samples on each stratum are finally selected for analysis. Among the overall samples collected for this study, the response rate was 97%, which is complete and valid for analysis.

3.6 Framework of the Questionnaire:

A structured questionnaire has been prepared consisting of 83 constructs, which are based on the previous research studies and were distributed among the selected respondents from IT/ITeS Sector of Bengaluru and Coimbatore to study the socio-psychological barriers faced by women leaders and various strategies adopted to overcome these barriers in their leadership position. The following table presents the variables and the sources of variables used in the study.

Table 3: List of Variables and its Sources

S.No.	Variables	Source
1	Sociological Barriers	Eagly & Sczesny (2017), Kirai and Kobia (2012), Abolade (2014), Schwanke (2013), Broughton and Miller (2009)
2	Psychological Barriers	Jakobsh (2012), Barreto, Ryan and Schmitt (2009), Afza and Newaz (2008), Mathew and Panchanatham (2011), Nandy et al., (2014)
3	Strategies	Vivien K.G. Lim and Thompson S.H. Teo (1996), Rensburg (2013), PritiShah (2015), Yousefi et.al., (2017), Chisholm Burns et al., (2017).

Barriers and strategies are measured using 5-point Likert scale (5 = strongly agree, 4 = agree, 3 = neutral, 2 = disagree, 1 = strongly disagree). The survey questionnaire is given in the Appendix.

3.7 Pilot Study

Hassan et al., (2006) states "a pilot study certainly brings about some improvements in tool". So a pilot study was conducted as a preliminary step to test the feasibility of the survey, find out the extent of cooperation of the respondents and decide on the procedure and tools of data collection. For this research, the researcher has visited few IT companies, distributed questionnaire and interacted with respondents through the discussions, opinions and sharing of information, to women leaders who are involved in the executive level and operative level in various IT companies and the researcher decided to proceed with the data collection. Pilot test

was conducted with 75 respondents and the data were analysed using Statistical Package for Social Science (SPSS) software.

3.8 Reliability

Reliability is the extent to which the measurement of the constructs gives consistent results. The Cronbach's Alpha was used to measure the reliability of the constructs. The commonly accepted measure of internal consistency is Cronbach's alpha. The value of an alpha is .70 is the minimum acceptable standard for demonstrating internal consistency (Kennedy et al., 2002). According to H. E. Garret (1959), a test score is called reliable when we have reasons for believing the scores to be stable and trustworthy. The Cronbach's Alpha coefficient results reveal that the all instrument was found to be greater than 0.89, which is highly reliable and depicts that the reliability of the coefficient value is at acceptance level. The table below shows that each variable's Cronbach's Alpha of this study indicating high consistency.

Table 4: Reliability Statistics

Variables of the study	No. of Items	Cronbach's Alpha
Sociological Barriers	13	0.893
Psychological Barriers	42	0.940
Strategies	28	0.930

3.9 Data Collection

Data collection entailed obtaining the relevant information in a systematic way. The primary data collection was done through online survey method and direct survey method. The questionnaire was administered during August 2018- March 2019. The researcher initially approached the Human Resource (HR) administrator to get the permission for collection of data from their employees. After getting the approval, the researcher met potential respondents and explained about the research. Finally, the data was collected from the respondents on a free and fair basis.

3.10. Tools and Methods of Data Analysis

The study used the following tools and techniques for data analysis.

3.10.1. Classification of Data

The data was collected through questionnaires and tabulated. The data has been classified based on age, marital status, educational qualification, mother tongue, area of the respondents, nature of family, levels of management, monthly income, total experience and experience in the current position.

3.10.2. Framework of Data Analysis

Statistical package for social science (IBM SPSS Statistics 21) was used to analyse the data. It was used for analysing data, functions for recording data and computing new variables as well as merging and aggregating data files.

3.10.3. Statistical Tools for Analysis

The data collected from sample were suitably tabulated and used in the appropriate place for interpretation. Statistical tools were used to analyze the data include Simple Percentage Analysis, Cross tabulation, Descriptive Statistics, ANOVA, t-Test, Correlation and Structural Equation Modeling using Smart PLS. The primary data collected were analysed by using the following statistical tools.

3.10.3.1. Percentage Analysis:

It is the method to represent raw structure of data as a percentage for better understanding on the collected data. This was done for the demographic profile and the socio-economic profile.

3.10.3.2. Cross Tabulation:

Cross tabulation describes the interaction between two categorical variables. This was done for the demographic and socioeconomic profile of the respondents.

3.10.3.3. Descriptive Statistics:

The descriptive statistics tool was used to find mean and standard deviation; it shows highest and lowest mean scores of the variables. Descriptive method displays the univariate summary statistics for several variables in a single table and calculates standardized values.

3.10.3.4. One-way Analysis of Variances (ANOVA):

In statistics, ANOVA is a group of statistical models and it is used to examine the differences between group means and their associated procedures (such as variation among and between groups) in which the pragmatic variance in a particular variable is partitioned into components attributable to different sources of variation. ANOVA was done to find the significance between demographic profile and socio-economic profile with sociological barriers, psychological barriers and various strategies.

3.10.3.5. t-Test

It is a statistical examination of two populations' means. Independent t-Test is useful for determining if there is a difference in the mean scores of 2 groups. Two-sample t-test examines whether two samples are different from each other and is commonly used when the variances of two normal distributions are unknown and when an experiment uses a small sample size. t-Test is usually used to determine whether the mean of a population significantly differs from a specific value (called the hypothesized mean) or from the mean of another population. In this study t-Test was done to find out the significance between area of the respondents with sociological barriers, psychological barriers and strategies.

3.10.3.6. Correlation

Correlation between the variables was analyzed to test if the association among the characteristics were significant. Correlation is a statistical device which helps in analyzing the covariation of two or more variables. Two variables are said to be correlated if changes in one variable are associated with the changes in the other variable. Correlation is statistical techniques that show whether and how strongly pair strongly pairs of variables are related. It describes the degree of relationship or association between two variables. The associations between the variables are represented by the correlation coefficient (r). The correlation coefficient depicts the strength of the association that exists between the variables. The value can range from -1 to +1 with+1 representing a perfect positive relationship, 0 representing a positive relationship and -1 representing a perfect negative relationship. The study on Correlation was done to find the relationship between the sociological and psychological barriers. Average values of the variables were taken for the calculation. Correlation was measured using Pearson Correlation.

3.10.3.7. Structural Equation Modeling using SPLS Path Modeling.

Smart PLS is the one of the popular software applications for Partial Least Squares Structural Equation Modeling (PLS-SEM). This was developed by Ringle, Wende & Will (2005) and it has a friendly user interface and advanced reporting features. It is a broadly used technique in business management domain (Garces-Ayerbe et al., 2012; Workman 2012).

SEM is most suitable for this study due to the interdependent nature of the research variables of this study. This technique is more advanced than others as it allows for specification and testing of complex path models and is considered more rigorous and flexible than the comparable techniques (Kelloway, 1998). In SEM model, a variable is either exogenous or endogenous. A variable can technically act either as an independent or a dependent variable for different parts of the model depending on the SEM design; thus, providing a path i.e. arrows pointing to it from another variable. Smart PLS is opted where the relationships are complex with limited support from existing literature. Since the present study tries to explore an area which is relatively less researched in India, it was decided to use Smart PLS SEM for testing theoretical framework. It is helps to find the sequential effect of the sociological and psychological barriers with strategies adopted to overcome these barriers.