CHAPTER 5
RESEARCH METHODOLOGY

5.1 INTRODUCTION
The present chapter is devoted to describe the method, procedure and techniques used to achieve the objective of the study. This chapter covers research design, determination of sample size, sampling design, questionnaire design, administration and structure of the questionnaire, scoring of the questionnaire, psychometric checks, reliability, validity, and primary data, secondary data, period of the study, Framework of analysis, statement of hypothesis and statistical tools used for the data analysis are presented here.

5.2 Research Design
The study is descriptive in nature. It attempts to describe the impact of training and development programme and employees’ work related attitude such as organizational commitment, job satisfaction and job involvement. The stratified random sampling technique has been used to select the employees from the selected IT companies for the study.

5.3 Data collection methods
There are two types of data collection method being used in our current study, which are primary data and secondary data.

5.3.1 Primary data
The researcher has used both primary and secondary data. Data that have been collected from first-hand-experience is known as primary data. Primary data in this research are concerned with the survey instrument. The primary data was collected from the 1000 employees who are working in IT companies at
Chennai. The designed questionnaire was circulated by the researcher through the HR managers of the selected five IT companies in Chennai city.

5.3.2 Secondary Data

The primary data was supplemented by a spate of secondary sources of data. The secondary data pertaining to the study was gathered from the web portals of Department of Information Technology, IT Development Board, CRIS-INFAC, CMIE, ELCOT, STPI, CII, Publications from various IT associations like NASSCOM. The above mentioned sources were very useful in writing introduction and industry profile chapters. Latest information was gathered from well-equipped libraries in Chennai, Coimbatore, Bangalore, and from internet web resources. The secondary data were used to identify the research gap through the literature survey from various national and international journals, magazines, periodicals, books and newspapers.

5.3.3 Period of the Study

The duration of the study was divided into four stages in a period of four years. In the first stage, the collection of literature was done. In the second stage, the preparation of the questionnaire and its pre-testing with limited employees was completed. In the third stage, the data collection, processing and analysis of data was done and in the final stage, the preparation of the thesis was done. The primary data were collected for the period of six months i.e. June 2013 to December 2013.

5.4 Sampling Design

Sampling is a process of selecting a sufficient number of elements from a population. It increases the probability of results obtained from sample to be attributable to the population.
For this research, the IT companies are selected by a research terminology, by selecting the top five IT companies, which come under the top 20 ranking companies for the past five years in the IT industry as mentioned in the NASSCOM (The National Association of Software and Services Companies) website. As per the NASSCOM list the top five IT companies listed are TCS, Infosys, Wipro, HCL and Tech Mahindra.

5.4.1 Target Population

According to Sekaran and Bougie (2010), population is the entire group of people, events or things that researchers wish to investigate on. For the present study, Chennai City of Tamilnadu State was purposively selected as it is one of the hubs of IT companies in India. So, in this research, target population is the total number of employees working in IT companies located in Chennai city.

5.4.2 Sampling Frame and Sampling Location

Sekaran and Bougie (2010) stated that sampling frame is the sample that is drawn from a list of population elements that usually might be different from the target population in actual practices.

The sampling frame for the research is the employees who are employed in Information Technology sector. We narrow down the amount of employees by focusing only on those who work in TCS, Infosys, Wipro, HCL and Tech Mahindra located in Chennai city.

5.4.3 Sampling Elements

The respondents for our study are those who are employed in TCS, Infosys, Wipro, HCL and Tech Mahindra & Mahindra IT systems located in Chennai city. We target fairly all the employees from these IT companies, in other words, our respondents consist of employees from all hierarchy level (i.e. junior, middle, senior level) in the IT companies, which include the employees working in technical and non-technical departments in IT Companies.
5.4.4 Sampling Technique

There are two types of sampling method which are probability sampling and non-probability sampling. For probability sampling, each of the element in the target population has an equal probability of being chosen as the sample for the survey conducted. Probability sampling is scientific, operationally convenient and simple in theory, and the results obtained from this method are more generalizable toward the target population. For non-probability sampling, each of the elements in the sampling frame does not have an equal chance to be chosen as the sample. Admittedly this method is simpler and convenient to operate however the results obtained cannot be confidently generalised to the population.

One thousand sample respondents were selected by using stratified random sampling method from the selected five IT companies where 200 sample respondents were selected from each company and where (n) 1000 samples were collected for conducting the study.

5.4.5 Determination of Sampling Size

A population is defined as the “total collection of individuals or objects that forms the focus of the research” whereas the sample is “a selected part or a subset of the population (Pretorius 1995). According to Pretorius (1995), research is generally conducted to make inferences about the population based on the information available about the sample, in order to make inferences from the sample to the population.

A number of formulae have been formulated for determining the sample size depending upon the availability of information. The researcher has used the below mentioned formulae for calculation of sample size for an unknown population.

\[ \text{Sample size } n = \left( \frac{Z \sigma}{E} \right)^2 \]

Where, \( Z \) = Standardized value corresponding to a confidence level of 95% = 1.96
S  = Sample SD from pilot study of 50 sample = 0.8066
E  = Acceptable error 5% = 0.05

Hence

\[
\text{Sample size } n = \left( \frac{1.96 \times 0.8066}{0.05} \right)^2
\]

= 999.7435 ~ 1000

Where n = 1000

5.5 Research Instrument

5.5.1 Questionnaire Design

The researcher attempted by all means to identify the suitable structured questionnaire developed by the eminent researchers in the chosen research topic, even though there are enormous structured questionnaires available in the preferred research area, but the researcher was not able to find the appropriate questionnaire in the chosen research context in IT sector. i.e. the association between impact of training and development programmes towards employees’ work related attitude in IT sector. In addition to that, the most of the structured questionnaire available are not having suitable questions related to IT sector environment. Hence the researcher has developed the new survey instrument and also verified the reliability, validity and content validity of the designed questionnaire after the pilot study and appropriate changes were made to improve the quality of the survey instrument.

Moreover, the impact of training and development scale was framed on the basis of Kirkpatrick model of training evaluation, job satisfaction scale was developed on the basis of Frederick Hertzberg’s two factor theory, whereas the organization commitment scale was sourced from three-component Meyer and Allen model, and Job involvement scale was formed on the basis of Lodahal and Kejner Model.
5.5.2 Administration of the Questionnaire

The questionnaire can be administered individually or in group. In order to make the IT employees feel free, the manager’s presence was kept away. Moreover, the respondents should remain incognito. This gave them greater sense of security. The time generally taken for completion of one questionnaire was thirty minutes. The purpose of the questionnaire was to measure impact of training and development programme and employees’ work related attitude after attaining the training and development programme in the IT sector.

5.5.3 Pilot Test

The questionnaire meant for the respondents was pre-tested with 50 employees from the selected IT Company. After pre-testing, necessary modifications were made in the questionnaire to fit in the track of the present study. Finally, the questionnaire was checked by the reliability test for the fifty samples. As per the test for reliability, a high scale reliability alpha = 0.9345 for the section pertaining to impact of training programmes, alpha = 0.9263 for the section of job satisfaction and 0.9412 for the section of employee’s performance and alpha = 0.9549 for the section of Organizational commitment.

5.6 Constructs Measurement (Scale and Operational Definitions)

5.6.1 Scoring of the Questionnaire

The scale against which the respondents indicated the extent of agreement / disagreement with reference to the characteristics of his/her organization is defined by the following five categories.

- Strongly agree  - 5
- Agree          - 4
- Neutral        - 3
- Disagree       - 2
- Strongly disagree - 1
To find out the raw scores for each employee, the scores of all items in the questionnaire answered by him/her were added. This gave the score of that particular employee regarding his/her evaluate effectiveness of the training attended and employees’ work related attitude after attaining the training programme.

5.6.2 Scaling Technique

Nominal scale and Likert’s scale have been used in this study when the questionnaire was developed.

5.6.2.1 Nominal Scale

Nominal scale is simply a system of assigning number symbols to events in order to label them. Nominal scales provide convenient ways of keeping track of people, objects and events. This scale is used for the demographic and training details section of the questionnaire where the questions are categorized variables.

5.6.2.2 Likert’s Scale

In a Likert’s scale, the respondent is asked to respond to each of the statements in terms of several degrees, usually five degrees of agreement or disagreement. At one extreme of the scale there is strong agreement with the given statement and at the other, strong disagreement, and between them lie immediate points. Five point Likert’s scale (5- Strongly Agree, 4- Agree, 3- Neutral, 2-Disagree, 1- Strongly Disagree) was used for all dimensions except demographic profile and training details section which consists of its own choice.

5.7 Standard Measurements of Variables

This study utilized six section questionnaires viz. Personal details, impact of training programme, job satisfaction, organizational commitment, job involvement and opinion towards training based on the most recent or
contemporary and appropriate theories related to each exogenous variables and endogenous variables in order to achieve the purpose of the study.

5.7.1 Personal details

The first section of the questionnaire included a demographic profile and training details based on the purpose of the demographic and training questions to identify the respondents’ demographic characteristics training details. These parameters included; Age, Sex, Marital Status, Educational Qualification, Department, Designation, Total work Experience, Salary, Methods Used for Training, Number of Promotions Received, Need for Additional Training Programmes, Number of Training Programmes Attended, Training Practices Reduces Human Cost, Management Uses Latest Technologies for Training, Training and Developmental Activities Maintain Employee Retention Rate.

5.7.2 Impact of Training Programme

The second section of the survey questionnaire consisted of twenty five items. It’s for measuring the impact of training programme attended by the employees. A five point Likert type scale (1 – Strongly Disagree, 2 – Disagree, 3 – Neutral, 4 – Agree, 5 – Strongly Agree) was used to measure the perceived level of impact of training programme among the IT employees.

5.7.3 Job Satisfaction Scale

The third section of the survey questionnaire consisted of twenty items. The aim was to measure the level of job satisfaction of employee’s. A five points Likert type scale (5 – Highly Satisfied, 4 – Satisfied, 3 – Neutral, 2 – Dissatisfied, 1 – Highly Dissatisfied) was used to evaluate the level job satisfaction among the IT employees.
5.7.4 **Organizational Commitment Scale**

The fourth section of the survey instrument consisted of fifteen items. The aim of the scale was to measure the psychological state that characterizes the employees’ relationship with the organization. A five points Likert type scale (1 – Strongly Disagree, 2 – Disagree, 3 – Neutral, 4 – Agree, 5 – Strongly Agree) was used to measure the level of organizational commitment among employees’ those who are working in IT at Chennai.

5.7.5 **Job Involvement Scale**

The fifth section of the survey instrument consisted of twenty five items. The aim of the scale was to measure the immediate improvement in the knowledge, skill and ability to carry out job related work and its relationship with the organization on their performance. A five points Likert type scale (1 – Strongly Disagree, 2 – Disagree, 3 – Neutral, 4 – Agree, 5 – Strongly Agree) was used to measure the level of job involvement those who are working in IT Company at Chennai.

5.8 **Data Processing**

After collecting all the questionnaires from the respondents, data processing step is then taken before any analysis being implemented. The data preparation process consists of checking, editing, coding, and transcribing. Meanwhile, all the unusual responses are identified.

Before checking all the collected questionnaires, we counted and numbered every questionnaire to assure the required amount of questionnaires is being returned by the respondents. After that, we checked the all data that we had collected to ensure that all the questions inside the questionnaire were being filled up completely by the respondents without any omission. Any incomplete questionnaire found would then be taken out. Next, we did coding, data entry, editing, and data transformation for all the remaining survey questionnaires.
5.8.1 Coding

This step is taken in order to key the data into the Statistical Package for Social Sciences (SPSS) system. We assigned the code to each participant’s response. For instance, in Section A- Personal Particulars under department, we assigned “1” to technical department and “2” to non-technical. While for the question of work experience, we assigned “1” to “3” for all the responses.

Apart from that, we attributed “1” for male and “2” for female. For the questions in Section B, D and E, started the code from “1” to “5” for all the responses, whereas “1” symbolizes strongly disagree and “5” symbolizes strongly agree. In Section C Job Satisfaction, we started the code from “1” to “5”, here “1” symbolizes highly dissatisfied and “5” symbolizes highly satisfied.

5.8.2 Data Entry (Transcribing) and Editing

Once all the questions’ responses had eventually been coded, we began to enter all the data into the SPSS database. This process is also known as transcribing (Malhotra, 1993). Before running the reliability test, we carried out the editing tasks towards all the responses. We attempted to detect and correct the problems, such as illogical, inconsistent, or illegal responses.

Illogical response is the response that is given by the respondent which looks significantly different from others’ responses. Sometimes, this respondent is known as outlier. While, inconsistent responses happened when the respondents’ responses that is incoherent with other information provided. Also, it is possible that the inconsistent responses are caused by bias. As a result, we need to edit the inconsistent responses provided by the respondents.

Meanwhile, illegal codes are values that are not indicated in the coding instructions provided. The best mean to solve this problem is through the use of computer to generate frequency distribution and then look for the illegal codes.
5.8.3 Data Transformation

Additionally, we also carried out data transformation after data entry and editing. Data transformation is a data coding variation, which is the process of altering the original numerical representation of a quantitative value to another value (Sekaran and Bougie, 2010). The data transformation was not required in this research, because all the questions are in positive forms.

5.9 Data Analysis

According to Zikmund et al. (2010), data analysis is defined as the reasoning application which helps the researchers to understand the data that have been collected. The purpose to implement data analysis is to examine and model the data by assigning facts and figure to answer research problem. Also, it highlights the useful information by recommending assumptions to take advantage of the collected data in order to solve some specific problem, such as addressing the research problem.

The computer software that has been applied to analyze the collected data is SPSS. SPSS provides us many types of analysis that is very helpful in our current research. Typically, there are three types of analysis that is required in our research, which are descriptive analysis, scale measurement, and inferential analysis.

The core of the study is “employees’ work related attitude towards the training and development programme in IT sector at Chennai city”, hence the study centers on the dependent variable viz., employee work related attitude and its relationship with the related independent variables such as organizational commitment, job satisfaction and job involvement. The study also attempts to find the impact of training and development programme by using Kirkpatrick four level of evaluation model.
5.9.1 Descriptive Analysis

Descriptive analysis is used in order to clarify and describe the characteristics of the variables of interest in a situation (Sekaran and Bougie, 2010). Besides, Zikmund defined descriptive analysis as the elementary transformation of data in a way that illustrate the fundamental characteristic, such as central tendency and variability. Generally, mean, median, mode, variance, range, and standard deviation are widely applied in describing the descriptive statistic. The advantage of using descriptive analysis is that it helps to summaries the sample and measure. It also forms basic quantitative data analysis with simple graphics analysis.

In this research, Descriptive analyses were done for the responses derived from ‘Section A’ Personal details of the respondents by using tabulation method with frequency and percentage.

5.9.2 Scale Measurement- Reliability Test

5.9.2.1 Psychometric Checks

As mentioned earlier, a structured questionnaire developed by the researcher was used as the instrument for data collection for the study. Items selected for the constructs were mainly adopted from prior studies to ensure content validity. However, the instrument was validated for the main study with a size of 1000 respondents.

5.9.2.2 Reliability

Reliability, also called consistency and reproducibility, is defined in general as the extent to which a measure, procedure, or instrument yields the same result on repeated trials (Carmines & Zeller, 1979). It can be used to assess the degree of consistence among multiple measurements of variables (Hair, Anderson, Tathman, & Black, 1998). The internal reliability of the measurement models was tested using Cronbach’s alpha and Fornell’s composite reliability (Fornell and Larcker 1981). The Cronbach’s reliability coefficients of all
variables should be higher than the minimum cut-off score of 0.70 (Nunnally 1978; Nunnally and Bernstein, 1994). The questionnaire meant for the respondents was pre-tested with 50 employees from the selected IT Company. After pre-testing, necessary modifications were made in the questionnaire to fit in the track of the present study. Finally, the questionnaire was checked by the reliability test for the fifty samples. As per the test for reliability, a high scale reliability alpha = 0.9345 for the section pertaining to impact of training programmes, alpha = 0.9263 for the section of job satisfaction and 0.9412 for the section of job involvement and alpha = 0.9549 for the section of organizational commitment.

5.9.2.3 Validity

A scale is said to be valid if it measures correctly what it is expected to measure. In other words, a scale is valid only when it is real and correct. The validity of a questionnaire relies first and foremost on reliability. If the questionnaire cannot be shown to be reliable, there is no discussion of its validity. Researchers use different methods of establishing the validity of the instrument which they have developed. They are: content validity, convergent validity, discriminate validity and nomological validity. In the present study the content validity was established. It is given in the following section.

5.9.2.4 Content Validity

For the content validity, a thorough review of the literature was conducted. As mentioned earlier, all items of the constructs have been drawn from well-established studies to ensure content validity. The questionnaire was also reviewed by a panel of experts i.e. Senior IT Professionals and Human resource managers working in the IT sector and academicians. The changes suggested by the panel members were incorporated to improve both the content and clarity of the questionnaire. The instrument was tested through two stages. In the first stage, two English faculty members reviewed the instrument to ensure the clarity of
items and the accuracy of the language. In the second stage, a panel of experts was selected to establish face and content validity of the instrument. The panel of experts consisted of six individuals, two senior IT Professionals, two human resource managers of the IT companies, who had earlier participated in the instrument development and two senior academicians.

5.10 HYPOTHESES DEVELOPMENT

5.10.1 Demographic variables and impact of training and development:

According to (Mohinder Chand, Ankush Amhardar, 2010; Allan bird, Susan Heinbuch and Roger Dundar, 1993; Dr. Ludy Balatbat, 2010; Yuhafan Diana H.wa and Connie K. Haley, 2011) all this study has been conducted with demographic variables to investigate the impact of training and development programme.

**H0:** There is no association between demographic variables and training and development practices support business goals of the organization.

**H1:** There is an association between demographic variables and training and development practices support business goals of the organization.

5.10.2 Demographic variables and work related attitude of employees:

There is a closest connection between demographic variables and work related attitude of employees in the study conducted by Fiona Edgar & Alan Geare (2004) where the authors found that employee demography, especially gender, ethnicity and employment sector, does influence employee attitudes. According to Dr. Nasser S. Al-Kahtani (2012) Study to explore relationship between demographic variables and work related variables among employees which focused a positive relationship between them. It has been found by many researchers across different time periods
that demographic variables and have an impact on work related attitude of employees (Sarath, P & Raju, S, 2013; Christine M. Riordan and Lynn Mcfarlane Shore, 1997; James E. Martin, Robert P. Michel, 1999) the results revealed that there is a strong influence of demographic variables on job satisfaction, organizational commitment, job attitudes.

**H0:** There is no significant difference between demographic variables with respect to employees’ work related attitude towards training and development programme.

**H1:** There is a significant difference between demographic variables with respect to employees’ work related attitude towards training and development programme.

### 5.10.3 Job involvement and Organizational commitment:

There is a closest connection between job involvement and organizational commitment noted in a study by E.J. Lumley, M. Coetzee, R. Tladinyane & N. Ferreira (2011), where the authors found an association between job involvement and organizational commitment. This shows that there is a positive relationship between job involvement and organizational commitment.

**H0:** There is no association between level of job involvement and level of organizational commitment.

**H1:** There is an association between level of job involvement and level of organizational commitment.

### 5.10.4 Job satisfaction and Organizational commitment:

According to M Sheik Mohamed, M Mohideen Abdul Kader and H. Anisa (2012) the study investigate the relationship between organizational commitment and job satisfaction which shows positive inter-relationship. It has been found by many

**H0:** There is no association between level of job satisfaction and level of organizational commitment.

**H1:** There is an association between level of job satisfaction and level of organizational commitment.

### 5.10.5 Job involvement and Job satisfaction:

According to Muhammad Ahsan and Naeem Ullah (2014) examines the relationship between human attitudinal and behavioral factor of job involvement and job satisfaction which shows positive relationship. It has been found by many researchers (Dr. Nazir Ahmad Gilkar, and Javid Ahmad Darzi, 2013; Beeler, Jesse D; Hunton, James E; Wier, Benson, 1997; Mughees Uddin Siddiqui, 2014; Anita Sharma, 2014) that there is an association between job involvement and job satisfaction.

**H0:** There is no association between level of job involvement and level of job satisfaction.

**H1:** There is an association between level of job involvement and level of job satisfaction.

### 5.11 Statement of Hypothesis

On the basis of the review of literature given in chapter 2 and theoretical framework described in Chapter 3, the following hypotheses were developed:
The following hypotheses are formulated for the present study:

**H1:** There is no association between the demographic variables and the impact of training and development programmes.

**H2:** There is no association between demographic variables and work related attitude of employees towards training and development programme in IT Sector.

**H3:** There is no association between level of job involvement and level of job satisfaction.

**H4:** There is no association between level of job involvement and level of organizational commitment.

**H5:** There is no association between level of job satisfaction and level of organizational commitment.

**H6:** There is no significant difference between mean ranks towards factors affecting impact of training and development programmes.

**H7:** There is no significant difference between mean ranks towards factors influencing job involvement.

**H8:** There is no significant difference between mean ranks towards factors of job satisfaction.

**H9:** There is no significant difference between mean ranks towards factors affecting organizational commitment.

**H10:** There is no significant difference between mean ranks towards factors influencing employees’ work related attitude.

**H11:** Employees’ work related attitude is not having positive impact with various dimensions like impact of training and development programmes job
satisfaction, organizational commitment and job involvement among the IT employees.

5.12 Statistical Tools for Data Analysis

The requirement and importance of statistics is escalating, especially in social sciences and management research. It is important to recognize an appropriate statistical design which brings solutions to the entire research hypotheses. Statistics are the tools used to check our facts about the data.

Tools for data analysis includes

- Frequency distribution
- Chi square
- t test
- ANOVA
- Friedman test
- Correlation
- Multiple regression analysis
- Factor analysis
- Structural equation modeling

5.12.1 Frequency distribution

A frequency table is a simple way to display the number of occurrences of a particular value or characteristic.

5.12.2 Chi-square

A Chi-square is a statistical measure used in the context of sampling analysis for comparing a variance to a theoretical variance. As a non-parametric
test, it can be used to determine if categorical data shows dependency or the two classifications are independent. It can also be used to make comparisons between theoretical populations and actual data when categories are used. Thus, the chi-square test is applicable in large number of problems. The test is, in fact, a technique through the use of which it is possible for all researchers to (1) test the goodness of fit (2) test the significance of association between two attributes, and (3) test the homogeneity or the significance of population variance.

5.12.3 Independent samples t test

The independent samples t test allows researcher to evaluate the mean difference between two populations using the data from two samples. This test is used in situations where a researcher has no prior knowledge about either of the two populations being compared. The general purpose of the independent samples t test is to determine whether the sample mean difference obtained is a real difference between the two populations or simply the result of sampling error.

5.12.4 ANOVA

Analysis of variance procedures are powerful parametric methods for testing the significance of differences between sample means where more than two conditions are used, or even when several independent variables are involved. ANOVA makes it feasible to appraise the separate or combined influences of several independent variables on the experimental criterion (Mouton & Marais 1990). ANOVA test was therefore used to identify whether there is a statistical significant difference between the demographical variables and impact of training and development programme, employees work related attitude.
5.12.5 The Friedman test

The Friedman test is a test for comparing three or more related samples and which makes no assumptions about the underlying distribution of the data. The data is set out in a table comprising n rows by k columns. The data is then ranked across the rows and the mean rank for each column is compared.

5.12.6 Correlation

Degree and type of relationship between any two or more quantities (variables) in which they vary together over a period; for example, variation in the level of expenditure or savings with variation in the level of income. A positive correlation exists where the high values of one variable are associated with the high values of the other variable(s). A 'negative correlation' means association of high values of one with the low values of the other(s). Correlation can vary from +1 to -1. Values close to +1 indicate a high-degree of positive correlation, and values close to -1 indicate a high degree of negative correlation. Values close to zero indicate poor correlation of either kind, and 0 indicates no correlation at all. While correlation is useful in discovering possible connections between variables, it does not prove or disprove any cause-and-effect (causal) relationships between them.

5.12.7 Multiple regression analysis

Multiple regression analyses the common and separate influences of two or more variables on a dependent variable (Kerlinger 1986), and it is used to establish the extent to which various differing variables add to predict another variable (Guyatt et al 1995). Multiple regression was therefore used to study the dependent variable (Job Involvement) is statistically significance on the variance in independent variables such as organizational commitment, overall impact of training and development and job satisfaction.
Factor analysis

A factor is an underlying dimension that accounts for several observed variables. There can be one or more factors, depending upon the nature of the study and the number of variables involved in it. Factor analysis involves many terminologies which are presented in this subsection for better understanding of the related techniques.

Correlation coefficients matrix is the original observations between different pairs of input variables. Factor loadings matrix representing the correlation between different combinations of variables and factors. Communality is the sum of squares of the factor loadings of the variable ‘i’ on all factors. Eigen value is the sum of squares of the factor loadings of all variables on a factor.

After obtaining factor loadings, one should examine whether the factor loading matrix possesses a simple structure. If a factor loading matrix has a simple structure, it is easy to make interpretations about the factors. If there is no simple structure, then the n – dimensional space of the factors should be rotated by an angle such that the factor loadings are revised to have a simple structure which will simplify the process of interpretation of the factors. Such rotation is called rotation of factors. A simple structure means that each variable has a very high factor loading (as high as 1) on one of the factors and very low factor loading (as low as 0) on other factors. The communalities of each variable before and after factor rotation will be the same. The popular methods of rotation of factors are varimax method and promax method. Varimax method of factor rotation employs orthogonality between different pairs of factors axes. This means that the angles between different pairs of factors axes are 90° even after rotation. The promax method employs oblique rotation. This means that the angles between different pairs of factors axes are not 90° after rotation. Both the techniques aim at better interpretations.
5.12.9 Structural Equation Modeling (SEM)

An explanation for the use of Structural equation modeling with AMOS and methods to assess construct validity and reliability for all measures is addressed in this study. The research or model describes the causal relationship among reaction to training programme, skills acquisition, behavioural change, effect of training, organizational commitment, Job Involvement and job satisfaction. These paths are related to with causal processes. Thus the Structural Equation Modeling (SEM) approach was necessary in order to examine these variables. The data analysis was carried out by means of SPSS (statistical package for the social science, version 20) and AMOS 20 (analysis of movement structure, version 20) software packages for windows.

Structural Equation Model (SEM) with AMOS 20 software provided several indicators to assess fit. The confirmatory factor analysis showed the acceptable model fit by including the normal fit index (NFI), the comparative fit index (CFI), the root mean square error of approximation (RMSEA), hypothesis model (Research model) based on the research hypothesis and review of the theoretical and empirical literature, the hypothesis model was examined in this study. There are two latent variables; impact of training and development and employees’ work related attitude to explore the cause and effect relationship among these variables in the hypothesized model.

SEM is a statistical methodology with a confirmatory approach to analyze multivariate data (Byrne 2001). The general SEM model is composed of two sub models; a measurement model and a structural model. James et al (1982) recommended the measurement model testing first, followed by full structural model testing.

Statistical significance for all analysis was set at less than 0.05. The measurement model identifies relationships between the observed and latent
variables. By means of CFA, the measurement model provides the link between scores on an instrument and the constructs that they are designed to measure. Hence structural model identifies the causal relationships among the latent variables and specify that particular latent variables directly or indirectly influence certain other latent variables in the model (Byrne 2001).