CHAPTER IV
RESEARCH METHODOLOGY

This section provides information on the proposed research process for this research study. A short over view about quantitative and qualitative research, the research process, data collection, reflection on objectivity, reliability and validity as well as criticism towards the chosen methods are presented as under:

4.1 The research process - a short overview

Each research problem is in some way unique, and therefore requires a tailored research procedure. The following flow chart shows the proposed research process for this study.

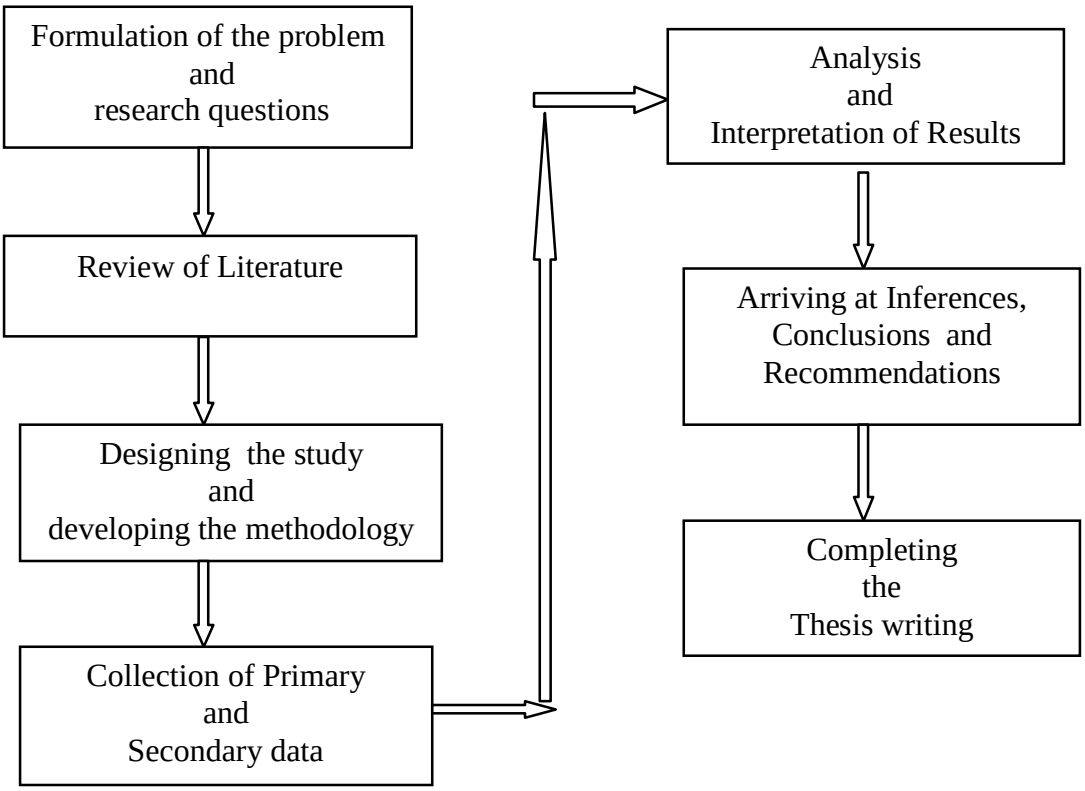

Fig 4.1: Steps undertaken for the Research Process

The first step in doing this study is to identify the business problem. Based on the business problem a literature review is conducted to understand the existing literature in this field of study. During the literature review, gaps in the existing literature is identified. Further studying helped to identify the final gap on which the research will be directed to proceed. Based on the research gaps, research objectives were framed which paved way for generating the research questions.

he purpose of this study is to find answers for the research questions.

4.2 Quantitative and qualitative research

Research methodology is generally divided into quantitative research and qualitative research. Both types of research are used in research design, data collection, analysis, and reporting. The quantitative method allows the measurement of relationships between variables in a systematical and statistical way. The qualitative method, on the other hand is non numeric, in other words, its aim is to understand various behavioral patterns in a natural manner. Hence, it is the most suitable tool for gaining a deeper understanding of a Special Research Problem. According to Bickman and Rog (1997), a researcher has to find the tools which best suit the research questions, context, and resources at hand. Thereby, multiple tools are often needed to research a topic thoroughly and provide results that can be used. Cassell and Symon (1995) points out that a amalgamation of quantitative and qualitative methods in the same study is called the Pragmatic View. Hence, it is implied that proper tools which are available to best serve the research problem should be used. Furthermore, Gordon and Langmaid (1988) inform that the results of quantitative and/or qualitative research might permit various interpretations. In other words, the end results are not absolute since it neither can be termed as the only way nor the result so arrived is the right way. It is left to the researcher to interpret the findings of the research in different ways.

Both types of research have their own strengths and weaknesses. According to Jick (1979), both qualitative and quantitative methods can be considered as a

substitute for each other. Looking at things from several directions, it may provide the researcher with a better view of findings of both the methods (McNeill, 1985). Since one can easily cross verify the data obtained by the application of two or more methods partial views can be prevailed over and it is possible to present a complete and holistic picture which is known as triangulation as per Silverman, (1993).

According to Clarke and Dawson (1999), the confidence level of a researcher in the getting the results is manifold when multiple methods are used instead of relying on the results of only one single method employed.

Moreover, it is advantageous to use of several methods for it would enable the researcher to compensate the weakness of one employed method by the strengths of another one and use his own discretion in arriving at as to which methodology would be more appropriate (McNeill, 1985). This view has been echoed by Gummesson (1991) who points out that reliability can be enhanced by the use of two or more methods for the same research problem. In another study by Clarke and Dawson (1999) who states that triangulation decreases measurement errors and helps in overcoming problems of bias.

Based on the above, it is proposed to use both qualitative and quantitative methods in this study.

4.3 Sample Size:

The Sample size for the study has been arrived using Taro Yamane's formula as:

$$\mathbf{n = N / [\ 1 + N\ (e)^2]}$$

Where:

n = sample size, N = population size i.e.7235 (staff strength employed in UAE by 25 selected EPC Companies executing projects for Oil and Gas Industry in UAE) and e = sampling error assumed as 0.05.

Applying Taro Yamane's formulae to arrive at the sample size for the survey on the Employees of EPC Companies Working in Oil & Gas Industry of UAE, a sample size of 365 is derived for the survey. However, responses could be had from 320 respondents only out of 400 who were issued questionnaires. However, this is sufficient as per findings of various theories discussed in the later pages. Finally, with 320 responses and with a confidence level of 5%, the sample error (confidence interval) worked out to 0.052

4.4 Sampling Method:

All Expatriate employees and Third Country Nationals (TCNs) working in EPC companies of Oil and Gas Industry in the UAE form the Population of this study. Sample has been drawn based on the following procedure:

25 EPC Companies who are in regular business has formed the basis of sample selection. These companies were stratified as Large, Medium and Small. The basis of stratification is as follows:

Company Average Annual turnover for the past three years in INR Crores	**Stratification**
50,001 and above (9 firms)	Large
5,001 to 50,000 (7 firms)	Medium
Up to 5,000 (9 firms)	Small

Table 4.1: Classification of EPC Companies based on Annual Turnover

30% companies in each strata were selected for sampling. The Selection of 30% companies in each strata was based on Probability Sampling Method. Totally 8 companies were selected (3 large; 2 medium and 3 small), details of which appear in the following pages.

The sample size was distributed to the selected 30% companies in each strata proportionately based on Weighted Average Method. The sample selection within each company was done using Convenience Method.

It was focused to get responses from the selected EPC companies based on the stratification design which is proportionate to the UAE staff strength of the selected EPC company. The total sample size arrived at was 365. Questionnaires were sent to 400 respondents. However it was possible to obtain responses only from 320 respondents i.e. 88% of the targeted sample size could be achieved.

4.5 Sample Size:

Various yardsticks were taken into account for arriving at the Sample Size. (Osborne, J et al, 2004 – Sample Size of 1:5); (Rule of 200- Guilford (1954, p. 533) who said that a sample size of 200 is enough to conduct a study, whereas (in MacCallum, Widaman, Zhang & Hong, 1999, p84; and Arrindell & van der Ende, 1985; p. 166) suggested that N should be at least 200 . Considering the above, a Sample size of 320 is adequate.

The following table illustrates the design of the sample:

Top 8 EPC Companies in Oil & Gas Business in UAE					
Segregated List of 8 EPC Companies In Oil & Gas Business into Three Segments - Large, Medium & Small					
Sl.No	**Name of the Company**	**Average Turnover**	**World wide**	**In UAE (Oil & Gas)**	**Sample in Each Company**
	Large Size Companies				
1	Saipem	13,433	46,346	250	24
2	Larsen & Tubro (L&T)	8,992	84,027	550	52
3	Samsung Engineering	8,906	8,300	281	27

	Medium Size Companies				
4	Petrofac	6,462	18,200	700	67
5	Galfar Engineering	979	27,500	600	57
	Small Size Companies				
6	Target Engineering Construction Company L.L.C (TARGET)	351	2,830	480	46
7	Dodsal PTE Ltd Dubai (Dodsal)	575	25,000	520	48
8	TECTON Engineering & Construction L.L.C	114	1,760	450	44
	Total	**39812**	**75,290**	**3,831**	**365**

Table 4.2: List of Top 8 EPC Companies in Oil & Gas Business

4.6 Sampling Unit:

The Sample Statistics represents the EPC Employees of Oil Industry in UAE. The population demographics is given below:

FINAL CONFIGURATION OF SAMPLE

Sl.No	Company	Hard/ email	Online	Total	Required	% of Rqmt
1	Samsung	10	18	28	27	104%
2	Target	7	29	36	46	78%
3	TECTON	21	27	48	44	109%
4	Petrofac	29	26	55	65	85%
5	Saipem	19	4	23	24	96%
6	Dodsal	38	13	51	50	102%
7	L&T	24	16	40	52	77%
8	Galfar	21	18	39	57	68%
	Total	**169**	**151**	**320**	**365**	**88%**

Table 4.3: Population Demographics of EPC Company employees

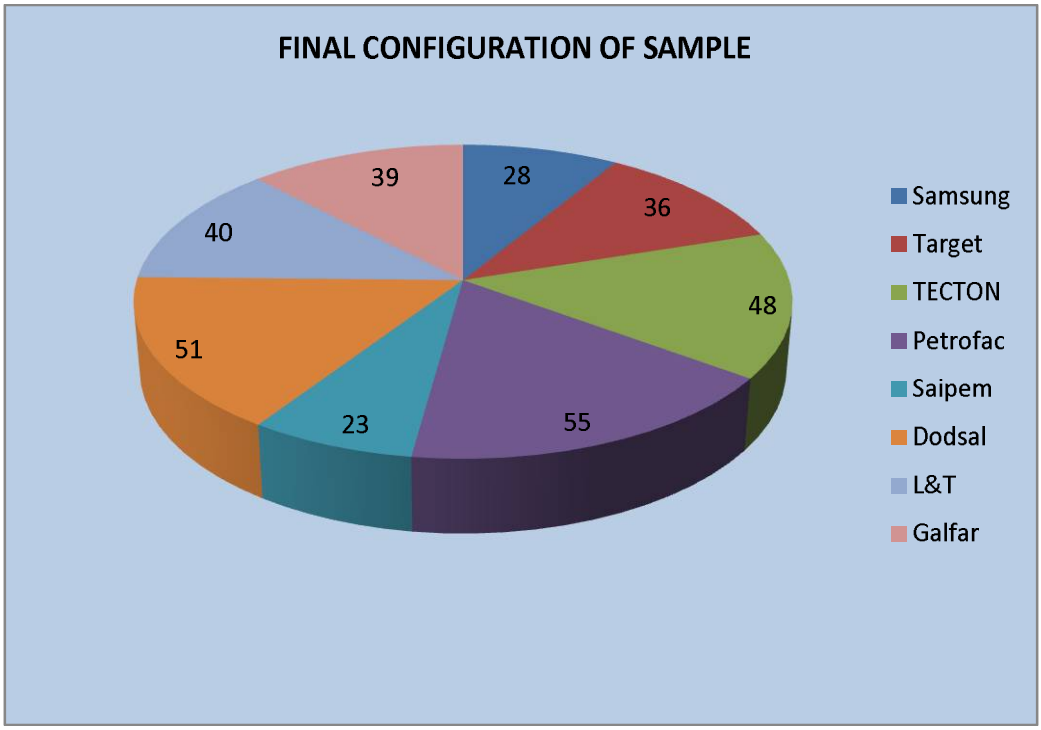

Figure: 4.2 - Final Configuration of Sample

4.7 Summary of Research Methodology

4.7.1 The Research Methodology proposed for objective 1

RO 1	To find out the current level of Employee Satisfaction of TCNs working in EPC Companies of Oil Industry in UAE
Research Design	Descriptive Research Study
Observational Design	1. Variable Identification through Literature Review (Various Facets of Employee Satisfaction) 2. Questionnaire Preparation 3. Pilot testing Questionnaire 4. Administering the Questionnaire to the

	selected Sample
Sampling Design	Stratified Proportional Sampling (strata based on Large, Medium and Small EPC Companies) to select the number of companies in each strata. Within each company the sample size was decided which was proportionate to their UAE staff strength. The sample selection for the decided strength within the company was based on dis-proportionate stratified sampling Sample size estimated based on Taro Yamane's formula was 365 and sample size obtained is 320
Data Analysis	Z test for hypothesis testing, descriptive statistics

Table 4.4: Proposed Research Methodology for RO 1

4.7.2 The Research Methodology proposed for objective 2

RO 2	To find out the current level of Employee Satisfaction of Expatriates working in EPC Companies of Oil Industry in UAE
Research Design	Descriptive Research Study
Observational Design	1. Variable Identification through Literature Review (Various Facets of Employee Satisfaction) 2. Questionnaire Preparation 3. Pilot testing Questionnaire 4. Administering the Questionnaire to the selected sample

Sampling Design	Stratified proportional sampling (strata based on Large, Medium and Small EPC Companies) to select the number of companies in each strata. Within each company the sample size was decided which was proportionate to their UAE staff Strength. The sample selection for the decided strength within the company was based on dis-proportionate stratified sampling Sample size estimated based on Taro Yamane's formula was 365 and Sample size obtained is 320
Data Analysis	Z test for hypothesis testing, descriptive statistics

Table 4.5: Proposed Research Methodology for RO 2

4.7.3 The Research Methodology proposed for objective 3

RO 3	To Suggest the changes that are needed to keep TCNs and Expatriates working in EPC Companies in Oil Industry in UAE satisfied
Research Design	Descriptive Research Study
Observational Design	1. Variable Identification through Literature Review (Various Facets of Employee Satisfaction) 2. Preparation of a single question asking the respondents to suggest changes required to improve satisfaction 3. Selected Questions 8,17,19,24,26 and 27 prompting employees to provide inferences for possible changes 4. Pilot testing of the Questionnaire 5. Administering the Questionnaire to the

	selected Sample 6. Conducting Structured Interviews with top level management of selected EPC Companies
Sampling Design	**Employees' Portion of Sample** Stratified Proportional Sampling (strata based on Large, Medium and Small EPC Companies) to select the number of companies in each strata. Within each company the sample size was decided which was proportionate to their UAE staff Strength. The sample selection for the decided strength within the company was based on disproportionate stratified sampling Sample size estimated based on Taro Yamane's formula was 365 and Sample size Obtained is 320
Sampling Design (Cont'd)	**Employer's Portion of Sample** The EPC companies were stratified as Large, Medium and Small. Since the Employees of Large Companies will have good satisfaction level, they have not been selected in the sample. One Medium size Company and Two Small size Companies were selected. Top Level Employees of these Companies were interviewed to get their inputs on changes that are needed to improve Employee Satisfaction
Data Analysis	Descriptive Statistics. Tabulation of results by combining the responses from Employees and Employers

Table 4.6: Proposed Research Methodology for RO 3

Ethical Considerations:

- The participants were informed the aim of the study, permission for time and information was sought and no invasion into their privacy was made during the course of data collection.
- No pirated software was used to carry out the analysis

4.8 Research Instrument:

A structured Questionnaire was adopted as a research instrument to conduct the study. The Questionnaire had 17 facets of Employee Satisfaction and in total it had 29 questions. The respondents were also asked to give their opinion for 10 additional questions that were prepared based on Psychometrics. The reason for these additional questions was only to check the correctness and consistency of the respondents.

A Structured Interview was administered to Top Level Management Personnel of each of the three EPC Companies. The purpose of this structured interview was to find out the steps taken by those EPC companies to sustain / improve Employee Satisfaction in their respective organizations. These interviews also helped the researcher to understand the aspects of Employee Satisfaction from the Management point of view.

4.8.1 Quality of the Research Instrument:

1. **Reliabilit**y: Reliability refers to the consistency or stability of test scores. The reliability was tested using Cronbach Alpha Method

Cronbach's Alpha was calculated using the formula:

$$\alpha = [K/(K-1)] * \left[1 - \left[\frac{Sum\ of\ item\ variances}{(SD)^2}\right]\right]$$

Where, K (number of questions asked) = number of items = 29

Sum of Item Variances computed = 34.1636

SD^2 = Standard Deviation^2 = Variance = 390.834

Substituting the values in the equation we get:

$$\alpha = [29/(29-1)] * \left[1 - \left[\frac{34.1636}{390.834}\right]\right]$$

Cronbach's alpha = 0.94518

Since the value of Cronbach's alpha is high, it was decided to check the reliability of the tool after removing redundant questions.

In our Research tool - the questionnaire - 29 questions covering the 17 facets of Employee Satisfaction were used. Since the resultant value of Cronbach Alpha was on the higher side, it was decided to test the reliability once again. Hence, 12 questions were removed, retaining only the balance 17 questions for the 17 facets. The following table provides the details of questions that were removed for testing purpose:

Parameter or Facet	Assessed by	Type of Question	Questions Removed
Appreciation	Appreciation level in the company and efforts getting rewarded	2 Questions under this heading. Five point Likert Scale with scores 0 = Not at all; 1 = Rarely; 2 = At times; 3 = Often & 4 = Very often	Second Question Removed
Communication	Transparency in knowing company's information & idea about future plans and cross departmental	2 Questions under this heading. Five point Likert scale with scores 0 = strongly disagree; 1 = Disagree; 2 = Don't know; 3 = Agree and 4 = Strongly Agree	Second Question Removed

	communication		
Co Workers	Respect to co workers in the company and cooperation of co workers in work	2 Questions under this heading. Five point Likert scale with scores 0 = strongly disagree; 1 = Disagree; 2 = Don't know; 3 = Agree and 4 = Strongly Agree	First Question Removed
Pay	Payments when compared to competitor EPC companies	1 Question under this heading. Five point Likert scale with scores 0 = strongly disagree; 1 = Disagree; 2 = Don't know; 3 = Agree and 4 = Strongly Agree	Only 1 question and hence retained
Fringe Benefits	Fringe Benefits and Leave policy followed	2 Questions under this heading. Five point Likert scale with scores 0 = strongly disagree; 1 = Disagree; 2 = Don't know; 3 = Agree and 4 = Strongly Agree	Second Question Removed
Job Conditions	Maintaining work and personal life balance	1 Question under this heading. Five point Likert scale with scores 0 = strongly disagree; 1 = Disagree; 2 = Don't know; 3 = Agree and 4 = Strongly Agree	Only 1 question and hence retained
Nature of work	Resources provided and requirement of	2 Questions under this heading. Five point Likert scale with scores 0 =	Second

	additional training	inadequate; 1 = manageable; 2 = Reasonable; 3 = Adequate and 4 = Abundant for Q1. 2 Questions under this heading. Five point Likert scale with scores 0 = strongly disagree; 1 = Disagree; 2 = Don't know; 3 = Agree and 4 = Strongly Agree for Q 2	Question Removed
Organization	Performance Targets with Manager	1 Question under this heading. Five point Likert scale with scores 0 = strongly disagree; 1 = Disagree; 2 = Don't know; 3 = Agree and 4 = Strongly Agree	Only 1 question and hence retained
Personal Growth	Priority to Training & Development in Company	1 Question under this heading. Five point Likert scale with scores 0 = strongly disagree; 1 = Disagree; 2 = Don't know; 3 = Agree and 4 = Strongly Agree	Only 1 question and hence retained
Policies and Procedures	Pride in companies Mission, Vision and Idea about Company's targets	2 Questions under this heading. Five point Likert scale with scores 0 = strongly disagree; 1 = Disagree; 2 = Don't know; 3 = Agree and 4 = Strongly Agree for Q1 Five point Likert scale with	Second Question Removed

		scores 0 = no idea; 1 = little idea, 2 = reasonable idea; 3 = definite idea and 4 = clear idea for Q2	
Promotional Opportunities	Promotion based on performance, company linking job performance to rewards	2 Questions under this heading. Five point Likert scale with scores 0 = strongly disagree; 1 = Disagree; 2 = Don't know; 3 = Agree and 4 = Strongly Agree	Second Question Removed
Recognition	Recognizing performance	1 Questions under this heading. Five point Likert scale with scores 0 = not at all, 1 = rarely; 2 = At times; 3 = frequently and 4 = always	Only 1 question and hence retained
Security	Measures taken for Safety and security	1 Questions under this heading. Five point Likert scale with scores 0 = very lightly; 1 = lightly; 2 = reasonably; 3 = seriously and 4 = very seriously	Only 1 question and hence retained
Supervision	Team work and cooperation	1 Question under this heading. Five point Likert scale with scores 0 = strongly disagree; 1 = Disagree; 2 = Don't know; 3 = Agree and 4 = Strongly	Only 1 question and hence

		Agree	retained
Work Life Balance	Company response during personal emergencies, stress level, working hours	3 Questions under this heading. Five point Likert scale scores 0 = not bothered; 1 = sending some persons; 2 = check over phone; 3 = depute somebody and go and 4 = being immediately go for Q1. Five point Likert scale with scores 4 = very low; 3 = low; 2 = moderate; 1 = high and 0 = very high for Q2 and Q3	Third question removed
Equality and Respect	Equality, discrimination and harassment	3 Questions under this heading. Five point Likert scale with scores 0 = strongly disagree; 1 = Disagree; 2 = Don't know; 3 = Agree and 4 = Strongly Agree	First and third questions removed
Work environment and safety	Air quality, working space	2 Questions under this heading. Five point Likert scale with scores 0 = strongly disagree; 1 = Disagree; 2 = Don't know; 3 = Agree and 4 = Strongly Agree	First and second questions removed

Table 4.7: Questions for re-calculating Cronbach Alpha

To summarize, Question Nos. 2,4,5,9,12,16,18,24,25,27,28 and 29 were removed and the responses were tested for Cronbach Alpha. The results are as follows:

Sl.No	Description	Cronbach Alpha for 29 questions	Cronbach Alpha for 17 Questions
1	For respondents 1 to 50	0.9274	0.8936
2	For respondents 51 to 100	0.9024	0.8804
3	For respondents 1 to 100	0.92375	0.9003
4	For Total Respondents	0.94518	0.9330

Table 4.8: Cronbach Alpha Results

From the above table it is very evident that the tool is very much reliable even after removing 12 questions. It illustrates the amount of correlation among the variables as all form part of Employee Satisfaction.

Mohsen Tavakol (2011), in his paper "Making Sense of Cronbach Alpha" though talk about the acceptable value of Cronbach alpha as between 0.7 and 0.95, he recommends a value of 0.9.

Further, to test the reliability of high Cronbach Alpha arrived at for 29 questions, another test in a Likert scale of 0 to 4 for 17 questions were taken up , where the maximum mark was 68 (17x4) and the minimum was 0.

The Survey Results (Scores) after removal of 12 questions is also provided in the next chapter Under heading " **5.7A Summary of Survey Scores - Factored for 17 Questions**"

It can be noted from the above that survey scores remain more or less constant for either type questionnaire, in addition to whether it relates to Expats or TCNs or for both put together.

Further, in the earlier pages it was found that Cronbach Alpha for both the questionnaires (with 17 questions as well as 29 questions) were in the vicinity of 0.90, which is in conformity to the recommendation level of Mohsen Tavakol (2011).

Hence, it can be concluded that the research tool is highly realistic and reliable.

4.9 Validity of the test scores

It refers to the accuracy of the inferences or interpretations one makes from the test scores.

4.9.1 Content Validity:

It is to gauze whether the Questionnaire covers all aspects of Employee Satisfaction as discussed in the scientific literature: This Validity of the instrument was tested during Review of Literature by competent and knowledgeable HR fraternity.

4.9.2 Construct Validity:

It refers to what extent practicality of a construct (e.g., practical tests developed from a theory) measure a construct as defined by a theory. It includes all other types of validity. This was tested by panel of experts consisting of Knowledgeable persons from HR Fraternity.

4.9.3 Psychometrics:

To recheck whether the respondents are providing their responses without fear from their company, 10 additional questions related to Employee Satisfaction which was based on Psychometrics was also administrated resulting in the validation of outcome of the survey.

4.9.4 Statistical Test for Validity:

To provide statistical support in addition to validation from HR Experts as well as Psychometric tests, Cohen Kappa Statistic was worked out. Out of

overall sample of 320, two group of samples i.e. Sample 1 (Respondents from 1 to 50) and Sample 2 (Respondents from 101 to 150) were selected and their collective responses was checked for Cohen Kappa Statistic for randomly selected 5 questions 1, 7,10,12 and 18. The k value worked out was 0.783, 0.792, 0.610, 0.719 and 0.845. Thus the validity of test results have been checked.

4.10 Pilot Testing of Questionnaire:

The questionnaire was pilot tested with 15 respondents who represent the sample and with a research consultant to evaluate the effectiveness of the instrument and to identify the anomalies, if any. It was found out that the term 'Third Country Nationals' generated some confusion among respondents, hence a short explanation was provided to respondents while administering the questionnaire.

4.11 Data collection: At the outset, permission was sought from EPC companies to conduct the survey, as the research is based on a very sensitive subject - Employee Satisfaction.

Data collection was done using three modes:

- email mode in which questionnaire was sent to employees (directly or through common friend) and response obtained
- Direct contact mode where respondents were provided with hard copy of questionnaire and asked to provide response
- web survey mode using Survey Planet

Data Collection Spanned for two months (November 2016 and December 2016)