CHAPTER 4

RESEARCH METHODOLOGY

4.0 INTRODUCTION

In this chapter the methods adopted to conduct the present study is discussed. This section describes, the research design, Sampling techniques, data collection methods, details of sources of data collection, a framework for analysis, the process of data analysis, field of the study and the period of the study and the statistical tools used to analyse the data.

4.1 RESEARCH DESIGN

A Descriptive research design has been employed in this study. A descriptive study describes the nature and characteristics of the population or phenomenon being studied. The present study describes the employee’s views on organizational factors, individual factors and suggestion system factors towards the effectiveness of suggestion system.

4.2 SAMPLING DESIGN

Sampling design includes the Sampling Universe, Sampling frame, sampling method and the determination of sample size.
4.2.1 Sampling Universe

Sampling Universe describes about the population of the study. The population of the study consists of 21000 employees working in various functional departments of the selected three car manufacturing companies in Chennai. These three selected car manufacturing companies, namely, Hyundai Motors, Ford Motors and Renault Motors are selected based on the criteria like Annual capacity is above 2 laks, Multinational companies and Offer economy cars with 4 laks to 6 laks budgets. The following table shows the population distribution of the three selected companies:

Table 4.1 Population distribution of the Respondents

<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>Name of the Car manufacturing company</th>
<th>Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Hyundai Motors</td>
<td>11000</td>
</tr>
<tr>
<td>2</td>
<td>Ford Motors</td>
<td>6000</td>
</tr>
<tr>
<td>3</td>
<td>Renault India (Pvt) motors</td>
<td>4000</td>
</tr>
</tbody>
</table>

4.2.2 Sampling Frame

To achieve the objectives of the study, the sampling frame is drawn from the population. The sampling frame of the study includes those employees who are employed in production and manufacturing department of the three multinational car manufacturing organizations involved in the study.
4.2.3 Sampling Method

An unbiased selection of samples is important for the study so that the sample represents the population conceptually. Simple Random Sampling Method is therefore used to get the data from the samples. This method is used because it assigns equal probability to each unit of the population to be included in the sample.

4.2.3 Determination of Sample size

The study is based on a sample frame of three multinational car manufacturing organizations in Chennai. The research study deployed a simple random sampling technique to ensure that the respondents are representing from each population group. To determine the sample size from a large population the formula is adopted as proposed by Cochran, W.G. (1963) to select the sample of the three multinational car manufacturing organizations:

\[
n = \frac{n_0}{1 + \frac{n_0 - 1}{N}}\]

Where

- **n** - Sample size
- **N** - Population size
- **n₀** - \(Z^2pq / e^2\)
- **Z** - Confidence level
- **P** - Proportion of the population (assumption is 50%)
- **Q** - 1 - p
- **N** - Population size

\(Z\) value for 95% confidence level is 1.96
In order to find out the sample size, \( n_0 \) value is calculated as given below:

\[
n_0 = \frac{Z^2pq}{e^2}
\]

\[
n_0 = (1.96)^2 \times .50 \times .50 / (.05)^2
\]

\( n_0 = 384 \)

**Sample size of Hyundai**

<table>
<thead>
<tr>
<th>Population (N)</th>
<th>( n_0 )</th>
<th>Sample size</th>
<th>Therefore the Sample size for Hyundai is 370</th>
</tr>
</thead>
<tbody>
<tr>
<td>11000</td>
<td>384</td>
<td>384/1+ (384 – 1)/11000</td>
<td>370</td>
</tr>
</tbody>
</table>

**Sample size of Ford Motors**

<table>
<thead>
<tr>
<th>Population (N)</th>
<th>( n_0 )</th>
<th>Sample size</th>
<th>Therefore the Sample size for Ford Motors is 361</th>
</tr>
</thead>
<tbody>
<tr>
<td>6000</td>
<td>384</td>
<td>384/1+ (384 – 1)/6000</td>
<td>361</td>
</tr>
</tbody>
</table>

**Sample size of Renault India (Pvt) limited**

<table>
<thead>
<tr>
<th>Population (N)</th>
<th>Sample size</th>
<th>Therefore the Sample size for Renault India (Pvt) limited is 350</th>
</tr>
</thead>
<tbody>
<tr>
<td>4000</td>
<td>384/1+ (384 – 1)/4000</td>
<td></td>
</tr>
</tbody>
</table>

The above formula states that, 370 samples are taken from Hyundai motors, 361 samples are taken from Ford Motors and 350 samples are taken from Renault India (Pvt) limited in order to select proportionally to select the samples from all the three.
sample organisations. The total sample size includes all three sample organizations together is 1081. The following Table 4.2 shows the sample distribution of the three selected companies:

<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>Name of the Car manufacturing company</th>
<th>Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Hyundai Motors</td>
<td>370</td>
</tr>
<tr>
<td>2</td>
<td>Ford Motors</td>
<td>361</td>
</tr>
<tr>
<td>3</td>
<td>Renault India (Pvt) motors</td>
<td>350</td>
</tr>
</tbody>
</table>

Table 4.2  Sample distribution of the Respondents

4.3  DATA COLLECTION

Data for the study are collected through primary and secondary sources to identify the employee’s views on organizational factors, individual factors and suggestion system towards the effectiveness suggestion system.

4.3.1  Sources of Data

The present study is carried out by using both primary and secondary sources of data.

**Primary data:** The major source of the data used to carry out the analysis of the present study is primary data. Survey method is adopted to collect the primary data from the selected 1081 samples with the help of a structured questionnaire consisting of 130 questions.

**Secondary data:** The secondary data is used in this study are collected from the national and international journals, published and unpublished thesis,
dissertation, magazines to review the existing research on employee’s suggestion system. Web sites are referred to collect data, related to profiles of the companies and industry. The text book also referred from the area of Organisational behavior, Human resource Management, Total Quality Management, Creativity and Innovation to present the theoretical perspectives of variables of the present study. In addition, Research methodology books are referred to identify the rules of determining sample size, sampling technique and tools for data analysis.

4.3.2 Tool for data collection / Research Instrument

The researcher adopted a self- administered questionnaire as a research instrument based on the prior research. The primary data is collected using structured questionnaire from employees consists of four major sections in order to achieve the research objectives. A five point Likert scale is used to measure the employee’s opinion on organizational factors, individual factors and suggestion system factors and its impact on the effectiveness of suggestion system in the three multinational car manufacturing organizations. The structured questionnaire consists of the following sections.

Section A - Demographic profile of the respondents: This section deals with optional type questions to ascertain the details related to demographic backgrounds of employees of the three multinational car manufacturing companies which are covering age, education, experience, income, nature of employment, educational qualification, marital status etc., with total of eight nominal scale questions.

Section B - Respondents opinion about organizational factors: This section consists of forty Likert’t type scale questions covering major components
of organizational factors about what the respondents opinion about the organizational culture, organizational climate, top management commitment and supervisor support impact on suggestion system.

**Section C - Respondents opinion towards Individual factors:** This section focuses on employee’s opinion on Individual factors such as creative behavior, initiative behavior and motivation impact on suggestion system with thirty two Likert scale questions.

**Section D - Respondent's opinion towards suggestion system factors:** This section consists of the questions covering the major area of this research with forty one Likert scale, seven nominal scale and 2 ordinal scale questions related to employee perception towards the administration of the suggestion system.

### 4.3.3 Pre-Testing and Pilot Study

From the three sample automobile organizations, 40 respondents from each company are selected for the pilot study. The questionnaire is distributed to 120 respondents for pre testing the research instrument in order to ensure the reliability and validity of the questionnaire/research instrument. The purpose of the pilot study is to review whether the research instrument is correctly framed in an understandable manner. The unstructured interview is conducted with the selected sample respondents after the pilot study, suggestions of the selected sample respondents are considered and necessary modifications are incorporated in the questionnaire after the pilot study.
4.3.4 Reliability and Validity of the Research Instrument

The reliability of all variables of the research instrument/questionnaire is tested through computing Cronbach’s Alpha and the results are presented in Table 4.3.

Table 4.3 The Cronbach’s reliability coefficient of study variables

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Variables</th>
<th>No. of Items</th>
<th>Cronbach's Alfa (α)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td><strong>Organisational Factors</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>organizational culture</td>
<td>10</td>
<td>.839</td>
</tr>
<tr>
<td>2</td>
<td>Organizational climate</td>
<td>11</td>
<td>.887</td>
</tr>
<tr>
<td>3</td>
<td>Top management commitment</td>
<td>07</td>
<td>.847</td>
</tr>
<tr>
<td>4</td>
<td>Supervisor support</td>
<td>12</td>
<td>.884</td>
</tr>
<tr>
<td>II</td>
<td><strong>Individual Factors</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Creative behavior</td>
<td>07</td>
<td>.844</td>
</tr>
<tr>
<td>2</td>
<td>Initiative behavior</td>
<td>16</td>
<td>.909</td>
</tr>
<tr>
<td>3</td>
<td>Employee Motivation</td>
<td>09</td>
<td>.885</td>
</tr>
<tr>
<td>III</td>
<td><strong>Suggestion system Factors</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Suggestion submission</td>
<td>13</td>
<td>.767</td>
</tr>
<tr>
<td>2</td>
<td>Suggestion evaluation</td>
<td>11</td>
<td>.854</td>
</tr>
<tr>
<td>3</td>
<td>Suggestion selection</td>
<td>17</td>
<td>.894</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>113</strong></td>
<td><strong>.933</strong></td>
</tr>
</tbody>
</table>

Source: Primary data

The above table shows the Cronbach’s alpha value for overall questionnaire is 0.933 indicating that the level of internal consistency is Excellent. The Cronbach’s alpha value is varying from 0.767 for suggestion submission variables to 0.909 for initiative behavior variable dimensions. The result of
Cronbach’s alpha exceeds 0.70 as suggested by Hair, J. F., et al. (2007) reveals that the reliability of the research instrument is good for all the variables. Content validity is examined through the opinion of employees in the automobile industry by a pilot study.

4.4 FRAMEWORK FOR ANALYSIS

The aim of the present study is to identify the factors that contributing towards the “Effectiveness of Employee suggestion System in Automobile Industry”. In this study the effectiveness of suggestion system is discussed based on the employee’s participation in the system and their willingness to offer suggestions. Therefore, the study centers the Individual Factors viz., creative behaviour, initiative behaviour and motivation as dependent variables and Organisational factors and suggestion system factors as independent variables.

The present study is carried out to find out the impact of organizational factors and suggestion system factors on individual factors that influencing employees to participate in the suggestion system. In addition, the study also compares the contribution of these three factors towards the effectiveness of suggestion system. The conceptual framework of the present study is developed around these three factors that are supposed to influence the effectiveness of suggestion system. The following figure shows the proposed conceptual framework as given in Figure 3.7 (chapter 3) of this study:
4.4.1 Research Hypothesis

In order to validate the proposed research framework as given in the above figure the following hypotheses are framed and tested on the collected data.

**Hypothesis – 1**: There is no significant variation in the perception of suggestion system factors dimensions between different clusters of the employees.

**Hypothesis – 2**: There is no significant correlation among Individual Factors.

**Hypothesis – 3**: There is no significant impact of organizational factors on individual factors.
Hypothesis – 4: There is no significant impact of suggestion system factors on individual factors.

Hypothesis – 5: There is no significant contribution of Organizational factor, individual factor and suggestion system factor towards the effectiveness of suggestion system.

4.4.2 Variables of the study and Operational Definition of the variables

Organisational factors: Organizational factors refer to the organizational practices that affect the employee’s participation in the suggestion system.

- **Organisational culture:** Organisational Culture is a set of beliefs, values in which the behavior and attitude towards the suggestion system is determined.

- **Organizational climate:** Organisational climate is an employee’s perception of organizational environment that influence employee’s willingness to involve in the suggestion system.

- **Top Management Commitment:** Involvement of top management people in the implementation of suggestion system, allocation of resource and motivating employee participation in the suggestion system

- **Supervisor’s support:** Supervisor’s support refers to the extent to which the supervisor values their employees’ ideas and suggestions.

Individual Factors: Individual factors are individual characteristics which influence behaviour and attitude of employees towards the suggestion system.
- **Creative behavior:** Creative behaviour is a unique pattern of response of creative thinking that results in generating new and creative ideas.

- **Initiative behaviour:** Initiative Behaviour refers to an employee’s actions to take initiative to come up with a new ideas and suggestions.

- **Employee Motivation:** Stimulate employee’s interest and commitment towards a suggestion system by offering rewards and recognition.

**Suggestion system Factors:** The suggestion system factors are involved in the effective administration process in suggestion system.

- **Suggestion submission:** Suggestion submission is the process of submitting ideas and suggestions to the suggestion system administrator.

- **Suggestion evaluation:** Suggestion evaluation is the process of screening and scrutinizing suggestion and filters the best suggestions and ideas.

- **Suggestion selection and implementation:** Suggestion selection & Implementation refers to the process of selecting, executing and implementing the selected suggestion.
4.5 DATA PROCESSING AND ANALYSIS

The collected data are entered and analyzed using version 16.0 of SPSS Package. In order to determine the organizational factors, individual factors and suggestion system factors are perceived as more important to the effectiveness of suggestion system the data are analysed by adopting various statistical tools.

4.5.1 Tools for data analysis

The tools mentioned below are employed to analyse the data with reference to the specific objectives of the study. The statistical tools used in the analysis of the data includes Descriptive statistics, cluster analysis, Reliability analysis, factor analysis, Discriminant analysis, Independent sample t-test, One-way ANOVA, Correlation, Regression analysis and Structural Equation Modeling.

4.5.1.1 Descriptive statistics / percentage Analysis

Descriptive statistics are used to describe the demographic profile of the sample on the basis of Age, Qualification, Income, Marital status, Length of services, Types of employment and Type of work by employing Frequency and Percentage analysis.

Percentage = Number of respondents/ Total number of respondents *100.

4.5.1.2 Cluster Analysis

Cluster analysis is carried out to reduce many categories of the respondents based on into a few categories. K-means cluster analysis is used through hierarchical cluster analysis and the respondents are classified based on the cluster.
The demographic variables such as Age group, educational qualification, experience level and monthly income of the employees are included in the cluster analysis.

4.5.1.3 Cronbach’s alpha Reliability analysis

Cronbach alpha is computed to test the reliability of all scales used in the research instrument. Hair, J. F., et al. (2007) recommended that an alpha coefficient of 0.70 and above is considered an acceptable to validate the reliability of the scale.

4.5.1.4 Factor analysis

Principal component factor analysis with varimax rotation method is conducted to extract the factors or major dimensions of variables. In the present study, factor analysis is conducted on the collected data with the aim of reducing 113 Likert’s scale statements into few factors. For conducting a factor analysis, Kaiser-Meyer Olkin (KMO) test and Bartlett’s test is examined to determine the adequacy of sample size and correlation among variables for conducting a factor analysis.

The KMO values describe the proportion of variance in the variables that might be caused by underlying factors. The KMO measure of sampling adequacy (MSA) value should be near to 1.00 or must be greater than 0.50 indicates that the factor analysis may be useful. Likewise, Bartlett’s Test of Sphericity is carried out with the significance level must not exceed 0.05 (p<0.05) indicates the presence of correlations among the variables for conducting a factor analysis.

After examining the KMO and Bartlett’s test, the factor analysis is executed to extract the various factors using principal Component Analysis is the
method of extraction and Varimax is the rotation method. As per the Kaiser criterion only factors with eigenvalues greater than 1 are retained for further analysis.

4.5.1.5 Discriminant Analysis

Discriminant analysis is multivariate techniques used to identify predictor variables, which are significantly contributing to differentiate various clusters of the respondents. For the present study, the discriminant analysis is used to identify the dimensions of suggestion system factors which are more discriminating power among different clusters of the respondents, selected for the study. It is expected that the discriminant analysis results will supplement the Independent sample t-test and One–way ANOVA.

4.5.1.6 Independent Sample t-test

The Independent sample test is a statistical hypothesis test which identifies the significance of difference between two sample means / groups. Independent sample t-test is applied when there is a two level of categorical independent variable and a normally distributed interval dependent variable. In this present study, Independent sample t-test is used to assess the variation in employee perception towards suggestion system factor dimensions between two groups of respondents like educational qualification and experience level employees.

4.5.1.7 One-Way ANOVA

A one-way analysis of variance (ANOVA) is used to identify the significance of difference between two or more than two sample means / groups. It is an extension of t-test, which provides whether or not the means of more than two groups are all equal. The present study used analysis of variance to examine the
differences in employee’s perception towards suggestion system factors dimensions between different age group and nature of employment of the respondents

4.5.1.8 Correlation

Correlation analysis is performed to identify the linear relationship between variables using Pearson correlation. Correlation between the variables is investigated to test if the relationship among the variables is significant. The concept of the relationship represented by the correlation coefficient (r) describes the nature of relationship between two variables.

The value of correlation coefficient (r) can range from -1 to +1, with +1 indicating a perfect positive relationship, 0 indicating no relationship and -1 indicating a perfect negative or inverse relationship. If the significance level is less than 0.05 then the correlation is significant and the two variables are linearly related. Correlation analysis in the present study is used to assess the relationship among individual factor variables.

4.5.1.9 Regression Analysis

The relationship between a dependent variable and an independent variable is called Regression. The relationship between one dependent variable and more than one independent variable is known as multiple regressions. Multiple Regression analysis (both enter and step method) is used in this study to measure the relationship between dependent variable individual factors and the independent variables organizational and suggestion system factors. The coefficient of determination ($R^2$) is the measure of the proportion of the variance of the dependent variable that is explained by the independent variables.
The coefficient can vary between 0 and 1. Higher the value of $R^2$, greater the explanatory power of the regression equation and therefore the better the prediction of the dependent variable. A standardized coefficient beta is used to explain how strongly the organizational factors and suggestion system factors predict employee’s Individual factors to participate in the suggestion system.

4.5.1.10 Structural Equation Modeling (SEM)

Structural Equation Modeling (SEM) is a multivariate statistical procedure that is used to test how well the observed variables represent the latent variables or constructs. Second-order Confirmatory Factor Analysis (CFA) is conducted to validate the latent variables of the study. In the present study, SEM is used to test the proposed research model showing the influence of organizational factor and suggestion system factor on individual factors and these factors contribute in the effectiveness of suggestion system.

4.6 AREA OF THE STUDY AND PROFILE OF THE STUDY ORGANISATIONS

The field of the area selected for this research study is Chennai. Chennai is also called the “Detroit of India” and it is a major hub of Indian automobile industry. A major cluster of India's automobile manufacturing industry is based in and around the Chennai. Chennai is the biggest automobile region of the country with 35% of the revenue share and accounts for 60% of the country’s automotive exports.
4.6.1 Profile of the study organizations

4.6.1.1 Hyundai Motors Limited

Hyundai Motor Company a South Korea’s leading car maker entered the Indian Automobile market in 1996 with a wholly owned subsidiary unit under the name of Hyundai Motors India Limited (HMIL) and the plant is located in Irungattukottai, near Chennai. Initially, the plant invested more than Rs.2500 crores and started operation with a capacity of making 120000 cars and 130000 engine transmission units per annum. In February 2008, HMIL commenced its second plant adjoin with the first plant, to produce an additional 300000 car per annum. The total production capacity of HMIL’s raised to 600000 cars per annum.

Hyundai Motors India limited is the country’s number one passenger car exporter and the second largest car manufacturer in India. It currently exports car to more than 100 countries including Europe, Africa, Middle East, Asia and Australia. It currently markets ten models of passenger cars across the segment like Eon, Santro, i10, Grand i10, i20, Xcent, Verna, Elantra, Sonata and Santa Fe. To sustain in its growth and expansion plans, HMIL currently has 407 dealers and more than 1,085 service points across India.

4.6.1.2 Ford India

Ford Motors Company is the world’s second largest car maker after General Motors from the United States of America. In 1995, Ford Motors Company entered to Indian market by a joint venture with Mahindra & Mahindra to assemble and distribute the Ford Escort. Following changes in equity holding in 1999, the company is renamed as Ford India. Ford India is a wholly-owned subsidiary of Ford Motors Company, currently operates a manufacturing unit with an investment of
US$ 354 million at Maraimalai Nagar near Chennai, which produces six models of passenger car across the segment like Ford Figo, Ford Fiesta, Ford Classic, Ford Endeavour and the Ford Eco Sport.

In addition, Ford India is investing US$ 1 billion to build a state-of-the-art integrated manufacturing facility in Sanand, Gujarat which schedule to operate by 2015. It can increase the Ford India manufacturing capacity to produce 610,000 engines and 440,000 vehicles per annum. Ford India is constantly expanding its dealership with 304 sales and service centre in 164 cities across the country to support its continuous extensive demand.

4.6.1.3 Renault India (Pvt) Limited

Renault India Pvt Ltd a wholly owned subsidiary of Renault Nissan Automotive India Private limited located its manufacturing facility in Oragadam, near Chennai with a capacity of 200000 cars per annum. Currently, Renault India offers five passenger car models across the segmentation in the Indian market such as Scala, Fluence, Koleos, Duster and, Pulse.

In September 2008, Renault India opened its fifth global vehicle design studio in Mumbai, the first vehicle design studio set up by a foreign manufacturer in India. The design studio is integral to Renault’s success in India as one of its functions is to monitor customer trends and customise global products for India. As of May 2011, Renault India has 16 dealerships in 16 cities across 9 states and 2 Union Territories of India.
4.7 CONCLUSION

This chapter is discussed in detail about the methodology adopted to carry out the present study. This included research design, population, sample design and sample, data collection tools, framework for analysis, hypothesis and tools used for data analysis. Finally, this chapter concludes with the area of the study and profile of the study organisations.
REFERENCES


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5. www.renault.co.in