RESEARCH METHODOLOGY

3.1 Introduction

Research is considered as an endeavour to arrive at answers to intellectual and practical problems through the application of scientific methods to the knowable universe. Research is an academic activity and as such the term should be used in a technical sense.

The Advanced learner’s Dictionary of current English lays down the meaning of research as a “careful investigation or inquiry especially through search for new facts in any branch of knowledge (Kothari, 2004). According to Clifford Woody, research comprises defining and redefining problems, formulating hypothesis or suggested solutions; collecting, organizing, and evaluating data; making deductions and reaching conclusions; and at last carefully testing the conclusions to determine whether they fit the formulating hypothesis (Goel, 2002). The research process consists of various decision stages involved in a research project and the relationship between these stages. Good business research is based on sound reasoning. Competent researchers and astute managers alike practices thinking habits that reflect sound reasoning and finding correct premises, testing the connections between their facts and assumptions, making claim based on adequate evidence. In the reasoning process, induction and deduction, observation and hypothesis testing can be combined in a systematic way (Cooper and Schindler, 2010).

The previous chapter discussed about the literature related to this study. This chapter starts with the process of identification of objectives through research gaps in literature review. Another important issue is to analyze whether the kind of discussion made in this study can be generalized across the industries and the firms therein or whether certain factors are more relevant, useful or important in respect of the organizations selected for the study.

The chapter explains the methodology adopted and the methods employed for the study giving appropriate justification for the same. The chapter begins with statement of the objective of the study, formulation of hypotheses followed by scope of study, further the
research design adopted for the study is discussed along with the research approach, sampling plan and statistical tools used for the data analysis, methodology adopted, the chapter plan and limitation of the study.

3.2 Hypotheses

The study has six main hypotheses:

H1. Proper HR planning helps in improving the effectiveness of the organization in terms of increased productivity and reduced manpower wastage.

H2 Human Resource Planning dimensions are significantly related to stability index and labour productivity.

H3. The employees in the organization differ in their perception age-wise on various dimensions of HR planning process.

H4. The employees in the organization differ in their perception on the basis of qualification on different dimensions of HR planning process.

H5. The employees in the organization differ in their perception on the basis of experience on different dimensions of HR planning process.

H6. The employees in the organization differ in their perception on the basis of position, on different dimensions of HR planning process.

3.3 Scope of the Study

The present study was conducted in two steel plants at Kalinga Nagar Industrial complex, out of which one is a joint sector with Government of Odisha, Neelachal Ispat Nigam Limited (NINL) and the other one is a private sector, Rohit FerroTech Limited (RFTL). Both the steel plants are located at Jajpur, Odisha, India.

Temporal Scope: Secondary data regarding human resource planning have been collected for a period of five years. In some cases data have been collected for 10 years. The primary data have been collected through questionnaire during January 2015 to August 2015.
**Geographical Scope:** The organizations selected are located at Kalinga Nagar Industrial Complex, Jajpur, Odisha. This location is now becoming the industrial hub of eastern India as many steel plants are already set up and some of them are in the pipeline.

**Functional Scope:** The objectives of the study are to find out the developments in organizational effectiveness by proper utilization of human resources. Therefore a number of variable have been used to measure the impact of human resource planning (HRP), through perception analysis of executives and non-executives.

### 3.4 Research Design

Research design specifies the methods and procedures for conducting a research work. Research design is the plan, structure and strategy of investigation conceived so as to obtain answers for research questions (Kerlinger, 1986). The appropriate design depends on the research objectives and the required data in attending the same. There is a series of debate regarding better or appropriate research design. It appears to take place at two levels: philosophical and practical (e.g. methodological and methods).

At the philosophical level epistemological issues predominate, while at practical level issues on the choice of specific methods or tools were addressed. In designing a study, choices have to be made at both levels (Creswell, 1994).

**Research Design (A Combination Approach)**

Two extreme points of view can be identified in the research methodology: quantitative and qualitative. Those who take the first approach, agree that there is a similarity between social and natural phenomena. And similar methods can be used to study both phenomena. They favour the positivistic quantitative methodology in social science research. Bryman (1998) indicated that the quantitative research approach is characterized by operational definition, objectives, hypotheses, tests, causality, replicability etc.

Those who take the second approach believe that social approach is inappropriate for study of social phenomena. They favour a humanistic quantitative methodology. This study is both qualitative and quantitative in nature. It makes an attempt to analyse the variables that aimed to measure the impact of human resources planning (HRP).
3.5 Sampling

The sample consists of 130 executives and 70 non-executives. The respondents were selected on the basis of stratified random sampling technique followed by purposive selection. A total of 270 questionnaires were administered. After continuous follow up requests, only 200 were received back, which were found to be complete and correct. Care has been taken to ensure that the sample covers almost all important departments of the plants. The sample consists of both executives and non-executives. From executives, the respondents belong to middle level and junior level management i.e. from E1 to E6 grade, and from non-executives all grades of employees are taken for the study i.e. from S0 to S11. The primary data have been collected from 158 respondents from NINL and 42 respondents from RFTL.

3.6 Sources of Data Collection

The data have been collected from both primary and secondary sources. The primary data have been collected through structured questionnaires distributed personally to the respondents in some cases, telephonic interview was used to collect the data. The secondary data were collected from company’s official records, websites, company in-house journals, HR departments of respective plants, magazines, newspapers, leaflets etc.

3.6.1 Data Period

The study has been carried out in the steel plants between 2013-15. The primary data have been collected during January to August 2015. Secondary data for a period of
five years have been collected personally during frequent visits to the plants. In some cases, data for 10 years have been collected in NINL.

3.6.2 Data Analysis

The Primary data obtained through questionnaire administration were processed and analysed with the help of technical processing to avoid errors and mismatch. The following statistical tools have been used for data analysis and interpretation. The primary data thus collected have been processed using SPSS, version 20. Relevant statistical tools were applied to draw meaningful conclusions.

3.6.2 (a) KMO and Bartlett’s Test

The **Kaiser-Meyer-Olkin (KMO)** is used to measure of sample adequacy (MSA) for variable xj. It is calculated by using the formula

$$ KMO_j = \frac{\sum_{i=j}^{n} r_{ij}^2}{\sum_{i=j}^{n} r_{ij}^2 + \sum_{i=j}^{n} u_{ij}^2} $$

where the correlation matrix is $R = [rij]$ and the partial covariance matrix is $U = [uij]$. The overall KMO will measure the sample adequacy which will take over all combinations and $i \neq j$.

KMO always receives values between 0 and 1. A value nearer 0 implies that the sum of the partial correlations are large and compared to the sum of the correlations, indicating that the correlations are extensive and so are not clustering among a little variables, indicating a problem for factor analysis. On the other hand, a value near 1 indicates a good fit for factor analysis.

3.6.2(b) Mean

The statistical mean refers to the mean or average that is used to derive the central tendency of the data in question. It is determined by adding all the data points in a population and then dividing the total by the number of points. The resulting number is known as the mean or the average. Sample mean (denoted $\bar{x}$).
Chapter - 3

Research Methodology

Formula for Mean

\[ \bar{X} = \frac{\Sigma X}{N} \]

Where:

- \( \bar{X} \) is the symbol for the mean.
- \( \Sigma \) is the symbol for summation.
- \( X \) is the symbol for the scores.
- \( N \) is the symbol for the number of scores.

3.6.2(c) Standard Deviation

The standard deviation is a measure of the spread of scores within a set of data. In statistics, the standard deviation (SD, also represented by the Greek letter sigma \( \sigma \) or \( s \)) is a measure that is used to quantify the amount of variation or dispersion of a set of data values. A low standard deviation indicates that the data points tend to be close to the mean (also called the expected value) of the set, while a high standard deviation indicates that the data points are spread out over a wider range of values. Usually, everyone is interested in the standard deviation of a population. However, it is often presented with data from a sample only; it can estimate the population standard deviation from a sample standard deviation. These two standard deviations - sample and population standard deviations - are calculated differently. In statistics, we are usually presented with having to calculate sample standard deviations, and so this is what this thesis will focus on, although the formula for a population standard deviation is also shown.

The sample standard deviation formula is:

\[ s = \sqrt{\frac{\Sigma (X - \bar{X})^2}{n - 1}} \]

where,

- \( s \) = sample standard deviation
- \( \Sigma \) = sum of...
- \( \bar{X} \) = sample mean
- \( n \) = number of scores in sample.

The population standard deviation formula is:
\[
\sigma = \sqrt{\frac{\sum (X - \mu)^2}{n}}
\]

where,
- \(\sigma\) = population standard deviation
- \(\sum\) = sum of...
- \(\mu\) = population mean
- \(n\) = number of scores in sample

3.6.2(d) ANOVA

Analysis of variance (ANOVA) is a collection of statistical models used to analyze the differences among group means and their associated procedures such as "variation" among and between groups, developed by statistician and evolutionary biologist Ronald Fisher. In the ANOVA setting, the observed variance in a particular variable is partitioned into components attributable to different sources of variation. In its simplest form, ANOVA provides a statistical test of whether or not the means of several groups are equal, and therefore generalizes the t-test to more than two groups. ANOVAs are useful for comparing or testing three or more means or groups or variables for statistical significance. It is conceptually similar to multiple two-sample t-tests, but is less and is therefore suited to a wide range of practical problems.

3.6.2 (e) One-Way ANOVA

The one-way analysis of variance (ANOVA) is used to determine whether there are any significant differences between the means of three or more independent (unrelated) groups. The one-way ANOVA compares the means between the groups and determines whether any of those means are significantly different from each other. Specifically, it tests the null hypothesis:

\[H_0: \mu_1 = \mu_2 = \mu_3 = \cdots = \mu_k\]

Where, \(\mu\) = group mean and \(k\) = number of groups. If, however, the one-way ANOVA returns a significant result, it is to accept the alternative hypothesis (\(H_A\)), which is that there are at least 2 group means that are significantly different from each other.
At this point, it is important to realize that the one-way ANOVA is an omnibus test statistic and cannot tell about which specific groups were significantly different from each other only that at least two groups were. To determine which specific groups differed from each other, there is a need to use a Post Hoc test.

3.6.2 (f) Post Hoc Test.

Post Hoc test analyses are usually concerned with finding patterns and/or relationships between subgroups of sampled populations that would otherwise remain undetected and undiscovered a scientific community to rely strictly upon a priori statistical methods.

Post hoc tests are designed for situations in which the researcher has already obtained a significant omnibus F-test with a factor that consists of three or more means and additional exploration of the differences among means is needed to provide specific information on which, means are significantly different from each other.

3.6.2(g) Tukey’s HSD Test.

Tukey’s test was developed in reaction to the LSD (Least Significance Difference) test and studies have shown the procedure accurately maintains alpha levels at their intended values as long as statistical model assumptions are met (i.e., normality, homogeneity, independence). Tukey’s HSD (Honest Significance Difference) was designed for a situation with equal sample sizes per group, but can be adapted to unequal sample sizes as well (the simplest adaptation uses the harmonic mean of n-sizes as n*).

The formula for Tukey’s is: \( HSD = \frac{q\sqrt{MSE}}{n^*} \)

where \( q \) = the relevant critical value of the studentized range statistic and
\( n^* \) is the number of scores used in calculating the group means of interest.

Calculation of Tukey’s for the present example produces the following:

\[ HSD = \frac{q\sqrt{MSE}}{n^*} = \frac{3.830 .975}{10} = 1.1957 \]

The \( q \) value of 3.83 is obtained by reference to the studentized range statistic table looking up the \( q \) value for an alpha of .05, df = \( k = 32, k = p = r = 4. \) Thus the differences
in the table of mean differences below that are marked by the asterisks exceed the HSD critical difference and are significant at $p < .05$. Note that two differences significant with LSD are now not significant.

### 3.7 Organization of the Study

The study is divided into the following chapters.

**Chapter 1**  The introductory chapter deals with background of the study, problem statement, rationale of the study, objectives, significance of the study and brief theoretical framework.

**Chapter 2**  deals with the related literature overview and ends with the gap identification.

**Chapter 3**  discusses about detail research methodology adopted for the research

**Chapter 4**  gives an overview of organizations under study.

**Chapter 5**  deals with human resource planning process in the organizations under study i.e. both HRIS, HR demand and HR supply forecasting.

**Chapter 6**  discusses the performance appraisal, training and development and career development processes in the organizations.

**Chapter 7**  analyses the views of employees demographically on different dimensions of HR planning process.

**Chapter 8**  the study reveals important findings and makes recommendations for betterment of the process and future implications.

### 3.8 Limitations

Due to constraints of money and time the researcher could not cover more number of steel plants for wider scope of analysis. The busy employees of NINL and RFTL were reluctant and felt disturbed sometimes while answering to the questionnaire. The HR department was maintaining little reservation to share all the data with a view to maintain organizational secrecy. The authenticity of primary data is a question mark as many factors might have influenced the perception of the employees. However sufficient care has been taken to ensure the free and frank expression of opinions by the respondents.
Reference


