CHAPTER IV

RESEARCH METHODOLOGY

4.1 OVERVIEW OF THE PHARMACEUTICAL INDUSTRY IN INDIA

4.2 PHARMACEUTICAL INDUSTRY IN GOA: THE SUNRISE INDUSTRY

4.3 SETTING OF THE PRESENT RESEARCH

4.4 SAMPLE OF THE STUDY

4.5 INSTRUMENTS USED FOR DATA COLLECTION

4.6 METHOD OF DATA COLLECTION

4.7 OBJECTIVES OF THE RESEARCH

4.8 STATISTICAL TECHNIQUES USED FOR DATA ANALYSES

4.9 RESEARCH HYPOTHESES

4.10 CONCLUSIONS
4.1 OVERVIEW OF THE PHARMACEUTICAL INDUSTRY IN INDIA

The pharmaceutical industry is perhaps among a few sectors in the Indian economy whose foundation is built on the process of internationalization (isid.org.in). During the first stage of internationalization, 1947-1969, inward FDI and imports served as the initial channels of overseas business links for the industry. Since then the internationalization profile of the industry has undergone significant changes over time. Now domestic pharmaceutical companies are leading this process by adopting a host of new strategies like exports, green field direct investments abroad, acquiring overseas companies, contract manufacturing and research and strategic alliances with global firms. Thus the Indian pharmaceutical industry from a mere importer and distributor of drugs and pharmaceuticals has moved to an innovation – driven cost effective producer of quality drugs.

Today, India is considered to be amongst the largest manufactures of pharmaceuticals, accounting for nearly 8.5 per cent of the world’s pharmaceutical production (indiaimage.nic.in). In fact India is now the fifth largest producer of drugs and pharmaceuticals after USA, Japan, Europe and China (Singh, 2004). Despite price regulations, which restrict margins and limit the investible funds available for research, Indian companies have been able to develop cost competitive technologies, which enables them to compete internationally. The industry has achieved global recognition as a “low cost producer of quality bulk drugs and formulations”.

182
Several factors make the Indian pharmaceuticals an industry to reckon with, namely (www.domain_b.com):

- Self-reliance - displayed by the production of 70 per cent of bulk drugs and almost the entire requirement of formulations within the country
- Low cost of production
- Low research and development costs
- Innovative Scientific manpower
- Strength of National Laboratories

The drugs and pharmaceutical industry in India has come a long way in the past 100 years (Divatia, 2004). It has achieved considerable progress since Independence. The pharmaceutical industry which was dominated by multinational companies (MNCs) in the 1950s, witnessed a fall in their market share to 75 percent by the end of 1970s because of the public sector companies like IDPL, HAL etc. were established in the 1960s, and 70s. During the 1980s and 1990 many public sector units entered the industry and started controlling a significant share in the market. By the turn of the century the share of MNCs declined to 50 percent.

From total import dependence in the initial years, this industry has made rapid strides in the production of bulk drugs and formulations. The exports have shown considerable growth in the past few years. The industry is a global industry driven by the need to conquer diseases and improve upon the existing treatment. The emphasis on research inputs is continuously increasing.
The Indian pharmaceutical sector is witnessing tremendous growth with contract research and clinical trials businesses taking wing, and the new patent regime opening new avenues for players in the country (www.domain_b.com). The country's pharmaceutical market is a US $7.3 billion opportunity with the domestic retail market expected to cross the US $10 billion mark in 2010 and would be worth an estimated US $12-13 billion in 2012. The Indian pharmaceutical industry today is in the front rank of India's science-based industries with wide ranging capabilities in the complex field of drug manufacture and technology. The sector is estimated to be worth US $6 billion, and growing at over 13 per cent annually. Indian pharmaceutical companies now supply almost all the country's demand for formulations and nearly 70 per cent of demand for bulk drugs. The pharmaceutical industry in India manufactures large number of drugs and formulations with continuous research being done in these units. The range of products manufactured include antibiotics, sulpha drugs, vitamins, analgesics antipyretics, steroids, anti-dyslectic drugs, anti-TB drugs, anti-malarial drugs, anti-dysentery vaccines, cardiovascular drugs, hormones, drugs for HIV/AIDS – almost every drug is manufactured in India (Divatia, 2004).

The Indian pharmaceutical industry ranks 17th with respect to export value of bulk actives and dosage (www.domain_b.com). Exports constitute nearly 40 per cent of the production, with formulations contributing 55 per cent and bulk drugs 45 per cent. According to the Pharmaceutical Export Promotion Council (Pharmexcil), the pharmaceutical exports in 2007-08 stood at US$ 6.68 billion against US$ 5.73 billion in 2006-07, recording a growth rate of 16 per cent. The industry has been clocking export growth rate, recording 18 per cent, 23 per cent and 17 per cent growth rates during 2006-07, 2005-06, and 2004-05, respectively.
The industry has an Indian Pharmaceutical Alliance (IPA) an industry body representing research based pharma companies and includes CIPLA, Ranbaxy, Dr. Reddy’s Laboratories, Wockhardt, Lupin, Torrent, Alembic, Sun Pharma, Zydus Cadila, Unichem and Nicholas Piramal (Divatia, 2004). They account for 30 percent of market share of pharmaceuticals, 90 percent of total pharma research and development, expenditure of about Rs. 3000 crores and roughly 27 percent of exports. The research has been recognized by International Generic Pharmaceutical Alliance (IGPA). This alliance includes off patent drug manufacturers from US, Canada and Europe and India that is the first country outside the developed world to have been admitted in IGPA. It has been observed that the turn over of many of the pharmaceutical units is quite high, for instance pharmaceutical companies like Ranbaxy (8 percent share), Glaxo (4.02 percent), Cipla (4.87 percent), Dr. Reddy’s Laboratories (5.79 percent) and Lupin (3.31 percent) alone shared over 25 percent of production in 2001-02. Some of these units have set up joint ventures abroad in various countries including some of the developed countries like UK, USA, Sweden, Germany, Switzerland, Nepal, China, South Africa, Russia, Vietnam. Units like Lupin, Cipla have marketing rights in the respective countries.

The exports of pharmaceuticals have witnessed 20 percent growth in the past decade. The large companies like Cipla, Zydus Cadilla, Ranbaxy, Wockhardt have made exports in sizeable quantities. Thus India not only exports pharmaceutical products all over the world but a few companies have established their presence in advanced markets as well (indiaimage.nic.in). Since the late nineties, Indian drug companies have been acquiring foreign companies primarily to get immediate access to overseas generic markets (Dagar, 2006). Overseas acquisitions aren’t a novelty for the domestic drug industry. Its puny size ($6.5 billion) when compared to the global market opportunities of $500 billion, has for
long ensured that Indian pharma companies kept their eyes on overseas markets. Wockhardt has made four overseas acquisitions pumping $300 million; Dr. Reddy's Laboratories acquired Betapharm, the fourth largest pharmaceutical company in Germany for $777 million in 2006. The overseas investment of pharmaceutical sector was $1,580.36 million in 2005-06.

In the pharmaceutical industry today, there are world-class drug manufacturers in India who are globally competitive, produce for the domestic market and have made a sizeable contribution to the country's export value. The major concentration of drug industry in India is in the States of Maharashtra, Gujarat, Andhra Pradesh, Punjab, Goa, Tamil Nadu and Madhya Pradesh.

4.2 PHARMACEUTICAL INDUSTRY IN GOA: THE SUNRISE INDUSTRY
The genesis of the pharmaceutical industry in Goa, after liberation, commenced in the late 1960's with the establishment of pharmaceutical companies such as Cater Wallace, Kare Laboratories Private Limited, Geno Pharmaceuticals Limited, Centaur Pharmaceuticals Limited and Merit Pharmaceuticals Limited. The growth of the pharmaceutical industry was very slow in Goa, post liberation because of a number of reasons such as lack of appropriate infrastructure, inadequate availability of industrial land, power and water supply, shortage of skilled labour, want of technical manpower and above all entrepreneurship of the right mettle. It suffered from a high technological obsolescence both in terms of the therapeutic affectivity of its chemical molecule and also the delivery system through which it is administered. Moreover the choice of manufacturing, technology and products, demands shrewd entrepreneurial judgement. An entrepreneur to
be successful in a pharmaceutical venture has to possess an extraordinary blend of technical understanding, market judgement and financial perspicacity (Salgaocar, 1992).

The major growth in the pharmaceutical sector in Goa started in late 1990’s (Kare, 2004). The five years tax holiday for Goa announced in the Union budget in the year 1993, which was further extended to the period up to 31-3-2004, as per section 80-IB (4) of the Income Tax Act, gave further impetus to the development of the pharmaceutical sector in Goa. From 1995 onwards an all round development took place and today pharmaceutical industries have over 120 registered units employing approximately 20,000 people directly, besides an additional 2000 to 3000 are employed in the marketing of pharmaceutical products (Salgaocar, 1992). A number of ancillary units such as packaging, printing and allied industries have started to meet the requirements of the pharmaceutical industry, where the employment is also quite large. The pharmaceutical industry in Goa has emerged as a major component in the industrial development of the State (Kare, 2004).

With the conducive environment in the State a large number of pharmaceutical units have found Goa to be an attractive destination for investment. The availability of appropriate space either in the government industrial estates or outside with well supplied power, water and transport facilities; abundance of skilled labour – pharmacy graduates, managers, engineers and technicians – who have the required skills in manufacturing, organization, management, have attracted pharmaceutical companies to Goa. Moreover the clean natural environment, establishment of convenient and fast communication, as well as transit links with the rest of the country and the world, coupled with government incentives for setting up industries, makes Goa the most ideal and sought-after location
for setting up of a pharmaceutical industry for any desiring entrepreneur. Several small, medium, large and joint ventures in pharmaceuticals have come to be established in Goa, during the last 30 years or so creating the scenario, as it exists today.

Goa has emerged as a hub for pharmaceutical companies. It is the sunrise industry of the State. Goa has been able to attract big Indian and Multinational pharmaceutical companies between the decade of 1993-2003 (Salgaocar, 1992). These include big names like Glenmark, Zydus Cadila Health Care Limited, Unichem, Lupin, Ratio Pharma, Watson, Ranbaxy, Aventis, Cipla, Wyeth Limited, Abbott India Pharmaceuticals Limited. Most of the pharmaceutical units in Goa manufacture basically pharmaceutical formulations in various dosage forms like tablets, liquid orals, small as well as large volume parenterials, dry powder parentheticals, capsules, ointments. The Government of Goa is not encouraging the manufacture of bulk drugs because it is feared that these are polluting industries. The turnover of the pharmaceutical industry in Goa is Rs. 5000/- crores per annum. The exports of this industry are Rs. 3000/- crores. The magnitude of the industry has catalyzed a number of ancillary and service units in and around Goa. This eases the availability of most types of packaging material, consumables and allied services necessary for the smooth running of the industry. Simultaneously, traders trading in a variety of raw materials, chemicals, packaging material and other consumables, which contribute to the productivity and progress of the industry, have set up shop in Goa. All these activities are generating more employment, industrialisation and elevating the quality of life in Goa.
4.3 SETTING OF THE PRESENT RESEARCH

Goa, a tiny emerald land on the west coast and the 25th State in the Union of India, has emerged as one of the most developed States in India. The Confederation of Indian Industry has ranked Goa as one of the best in India with respect to investment, environment and infrastructure. India Today in its Sixth State of States Report ranked Goa as the number one State, among the small States in India, on the indicators of health, education, and finance; second on infrastructure and third on investment environment (Aiyar, 2008). The State is amongst the most preferred investment destinations in the country - with foreign direct investment inflows from January 2000 to May 2007 amounting to US $183 million. Goa's GDP recorded an impressive growth of 8.84 per cent between 1999-2000 and 2005-06, to reach US $2.41 billion (www.ibef.org).

Since liberation of the State in 1961, the efforts of the Government of Goa in establishing various State corporations, implementing policies including fiscal incentives made Goa emerge as the most ideal State to invest in. The Government of Goa, Daman and Diu established the Goa Daman and Diu Industrial Development Corporation (GDDIDC) in February 1966 under the provisions of Goa, Daman and Diu Industrial Development Act, 1965 with the aims and objectives of securing and assisting industrial areas and industrial estates in Goa (GCCI, 2005). One of the important activities of the Corporation is to identify land of sizeable area for setting up of industrial estates. In pursuance of the above objectives the GDDIC now christened the Goa Industrial Development Corporation (GIDC) has so far established twenty industrial estates in Goa, covering all eleven talukas. These industrial estates are situated in Tuem, Colvale, Tivim, Bicholim, Mapusa, Pilerene, Honda, Pissurlem, Corlim, Kundaim, Madkaim, Bethora, Sancoale, Verna, Shiroda, Margao, Kakoda, Cuncolim, Sanguem, and Canacona. In these estates 782 sheds
have been constructed and allotted in 2002-2003 (Economic Survey, 2002-2003). Open
developed plots are given on long lease basis with easy annual installments, initially for a
period of 30 years, which can be extended to 90 years. The plot size ranges from 600m²
to 2000m². The industrial estates are well planned with roads and with clear access to the
plots. The common facilities provided in all these industrial estates are canteen, ESI
housing tenements, post-offices, banks, public pay phone booth facility, crèche and other
basic requirements (GCCI, 2005).

Around 1975 the Government of Goa established the Economic Development
Corporation (EDC) with the objective of accelerating industrialization in Goa. The EDC
identified pharmaceuticals as one of the thrust industries to zero their ‘entrepreneurship–
attracting campaign’. The EDC, which is the State Finance Corporation of Goa, has
extended its financial assistance to the pharmaceutical industry in Goa. In 1999 the EDC
has provided financial assistance to this industry to the tune of Rs. 8.19 crores that is 3.54
percent of the total EDC lending to industries in Goa (GCCI, 1999).

Moreover, the New Industrial Policy Document (2003-04) announced by the Government
of Goa identified pharmaceuticals, drugs and biotech industries as one of the thrust areas.
The pharmaceutical industry is expected to achieve the mission of the Industrial Policy
(2003-04) which is to ensure accelerated industrial development, catalyze economic
growth, protect environment and above all create sustainable employment to local youth

Furthermore the development of the pharmaceuticals sector received a boost in the State
due to the 5-year tax holiday announced in the Union Budget in the year 1993, which was
further extended upto 31-3-2004, as per section 80-IB (4) of the Income Tax Act.
Consequently the State has been able to attract the big-wigs in the pharmaceutical sector such as Cipla Limited, Sonafi Aventis Pharmaceuticals Limited, Watson Limited, Wyeth Limited, Abbott India Limited, Ratio Pharma India Private Limited, Glenmark Laboratories Private Limited, Lupin Laboratories Limited, Ranbaxy Laboratories Limited, Zydus Cadila Health Care Limited, Blue Cross Laboratories Limited, Okasa Private Limited, Wallace Pharmaceuticals Private Limited, Geno Pharmaceuticals Limited, Centaur Pharmaceuticals Limited, Nestor Pharmaceuticals Limited and so on. The pharmaceutical industry is the second largest employer after the mining industry in the State. It is the sunrise industry of the State.

Against this background and considering the vital role of pharmaceutical companies in Goa, the researcher for the purpose of the study, selected the pharmaceutical industry in Goa - Indian and multinational pharmaceutical companies - situated in industrial estates in Goa. The researcher intends to compare the labour welfare facilities provided in these pharmaceutical companies and the job satisfaction experienced by their employees.

4.4 SAMPLE OF THE STUDY

For the purpose of the study the researcher selected four major industrial estates that house a large number of pharmaceutical companies in Goa. These industrial estates situated in the districts of North Goa and South Goa are Tivim, Pilerne and Kundaim, Verna industrial estates respectively. Among the North Goa industrial estates, Tivim industrial estate has a total of five Indian pharmaceutical companies and the Pilerne industrial estate houses two Indian pharmaceutical companies. In South Goa, in the Kundaim industrial estate there are six Indian pharmaceutical companies and in the Verna industrial estate there are twenty-four pharmaceutical companies: nineteen Indian and five multinational companies. However a total of five Indian pharmaceutical companies and
five multinational pharmaceutical companies were studied from these estates. This comprises 27 percent of the pharmaceutical companies established in the four industrial estates selected for the study. On the basis of confidentiality promised to the pharmaceutical companies by the researcher, the study will not mention the names of the companies studied.

The universe of the study comprised of 20,000 employees working in the pharmaceutical companies in Goa. The population of the study was 841 employees working in the ten selected pharmaceutical companies in Goa (five Indian and five Multinational pharmaceutical companies). On the basis of proportionate stratified sampling, workers and managers were selected from these Indian pharmaceutical companies and multinational pharmaceutical companies in Goa. The sample represents 20 percent, of managers and workers in each of the selected pharmaceutical companies in Goa. The total sample of the study included 201 respondents, which comprises 24 percent of the population of the study. In Indian pharmaceutical companies the sample comprised of 115 respondents and that in multinational pharmaceutical companies were 86 respondents.

Table 1 presents an overview of the sample of the study.

Table 1

Sample of the Study (N=201)

<table>
<thead>
<tr>
<th></th>
<th>Indian Pharmaceutical Companies</th>
<th>Multinational Pharmaceutical Companies</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Managers</td>
<td>Workers</td>
</tr>
<tr>
<td>Males</td>
<td>20</td>
<td>44</td>
</tr>
<tr>
<td>Females</td>
<td>16</td>
<td>35</td>
</tr>
<tr>
<td>Total</td>
<td>36</td>
<td>79</td>
</tr>
</tbody>
</table>
Profile of the Sample Studied

Profile of Managers
The managers studied were well-qualified holding Bachelors and Masters Degrees. These included Bachelor in Pharmacy, Bachelor of Science along with additional qualifications in Masters degree in Science, Masters in Business Administration/Management, Diploma in Mechanical Engineering. The managers were holding designations as human resource managers, personnel administration managers, quality control managers, quality assurance managers, assistant managers, assistant production managers and production managers.

Profile of Workers
Workers who formed the sample were those who passed Standard XII, Science/Commerce graduates, Diploma holders from the Industrial Training Institutes and Diploma holders in Pharmacy. The workers in the sample were analysts, stores-in-charge, chemists, microbiological chemists, quality control chemists, production chemists, accounts assistant, office assistant, security supervisor, housekeeping supervisor, dispensing pharmacist, stores officer and operators.

Personal Features of the Sample
The personal attributes of the sample studied included their age, gender and experience in the present job. The age of the sample revealed that the age range was quite wide. There were young employees whose age was 23 years and then there are those who were working even at the age of 55 years. The average age for the sample (N=201) in the selected pharmaceutical companies in Goa was 31.47 years. In the Indian pharmaceutical
companies (N= 115) the average age was 31.1 years and in multinational pharmaceutical companies (N= 86) the average age 32.28 years.

Even when the experience in the present job was considered for the study, it was observed that the employees in these pharmaceutical companies had an experience ranging between 5 years to 29 years. The average years of experience of the employees studied (N=201) was 9.05 years. While in the Indian pharmaceutical companies (N= 115) the average years of experience in the present job was 8.56 years and in the multinational pharmaceutical companies (N= 86) the average years of experience in the job, of the employees studied was 9.72 years.

In the total sample selected (N=201) while considering the gender of the respondents, the total number of males was 120, while the total number of females was 81. In the Indian pharmaceutical companies in Goa of the sample studied (N=115) the males were 64 in number and the female respondents were 51. In the multinational pharmaceutical companies in Goa of the sample studied (N= 86) there were 56 males and 30 female respondents.

4.5 INSTRUMENTS USED FOR DATA COLLECTION

Two instruments were administered to the managers and workers in the Indian pharmaceutical companies and multinational pharmaceutical companies in the four industrial estates (Tivim, Pilerne, Kundaim, and Verna) selected for the study. The Labour Welfare Inventory constructed and standardized by S. K. Srivastava (2002) and the standardized scale constructed by Dr. Rita Shresthya and H.C. Ganguli (1994) on Job Satisfaction were administered to the sample studied. The items in these scales were assessed using Likert’s five-point rating scale ranging from “strongly disagree” (1 point) to “strongly agree” (5 point) for positive items and the reverse for negative items in the
scales administered to the respondents. These two instruments are presented in Annexure I and II.

The Job Satisfaction scale by Dr. Rita Shresthya and H.C. Ganguli (1994) was answered in the first person. The *Job Satisfaction Scale* included seven dimensions namely work itself, pay and other financial benefits, promotional and training opportunities, job security, supervision, colleagues/co-workers and company practices. 26 items covered these seven dimensions of job satisfaction. The seven dimensions measuring job satisfaction are presented in Table 2. Of the 26 items in the scale three of them were negative statements namely items 12, 15 and 21, while all the others were positive statements.

The job satisfaction score of an employee was the sum of the scores of the alternatives the respondent checked for in the 26 items. The score range is 130 (26x5=130) to 26 (26x1=26), indicating very high levels of job satisfaction to very low levels of satisfaction in the job.

**Table 2**

**Dimensions of Job Satisfaction Scale**

<table>
<thead>
<tr>
<th>Dimensions of Job Satisfaction</th>
<th>Item Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Work Itself</td>
<td>1, 2, 16</td>
</tr>
<tr>
<td>2. Pay and other financial benefits</td>
<td>3, 13, 17, 25</td>
</tr>
<tr>
<td>3. Promotional and training opportunities</td>
<td>4, 18, 19</td>
</tr>
<tr>
<td>4. Job security</td>
<td>5, 12*, 20, 21*</td>
</tr>
<tr>
<td>5. Supervision</td>
<td>6, 7, 9, 14</td>
</tr>
<tr>
<td>6. Colleagues / Co-worker</td>
<td>8, 11</td>
</tr>
<tr>
<td>7. Company Practices</td>
<td>10, 15*, 22, 23, 24, 26</td>
</tr>
</tbody>
</table>

*Reverse Scored Items*
The reliability of the scale using the test-retest method was: $r=0.90$. Odd-even reliability after using Spearman-Brown's correlation was: $r=0.81$. Validity of the scale was checked through the internal consistency method, that is, item analysis showing low correlations between items and high correlations between item score and total test score.

The Labour Welfare Inventory constructed and standardized by S. K. Srivastava (2002) was in the Hindi language, which was translated in English. The Labour Welfare Inventory consisted of 8 dimensions namely education/training, recreation, medical, subsidized loans, canteen, housing, safety and others (related to the general well being of workers - uniforms, drinking water, toilets, leave facilities, workman’s compensation, retirement benefits, rest rooms and bonus). 47 items covered the 8 dimensions. This is presented in Table 3.

All the 47 items were positive statements. The scores of the Inventory could be a maximum of 235 (47x5=235) and minimum of 47 (47x1=47) indicating provision of good labour welfare facilities and poor labour welfare facilities respectively.

<table>
<thead>
<tr>
<th>Table 3</th>
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<tr>
<td><strong>Dimensions of Labour Welfare Inventory</strong></td>
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</table>

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>Item No</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Education/Training</td>
<td>1 to 6</td>
</tr>
<tr>
<td>2) Recreation</td>
<td>7 to 12</td>
</tr>
<tr>
<td>3) Medical</td>
<td>13 to 17</td>
</tr>
<tr>
<td>4) Subsidized Loan</td>
<td>18 to 21</td>
</tr>
<tr>
<td>5) Canteen</td>
<td>22 to 25</td>
</tr>
<tr>
<td>6) Housing</td>
<td>26 to 30</td>
</tr>
<tr>
<td>7) Safety</td>
<td>31 to 36</td>
</tr>
<tr>
<td>8) Others</td>
<td>37 to 47</td>
</tr>
</tbody>
</table>
The reliability coefficient of the Inventory using the test-retest method was: \( r = 0.76 \) and the index of reliability was 0.84 indicating that the Labour Welfare Inventory is highly reliable and valid. The split-half reliability coefficient was 0.83 and the index of reliability was 0.89, which makes the Inventory reliable and valid.

4.6 METHOD OF DATA COLLECTION

Data was collected from both primary and secondary sources for the purpose of the research. Primary data was collected through field survey using interview schedules and questionnaire method. Secondary data was collected from books, journals, monographs, unpublished thesis, government reports and the Internet.

For the purpose of data collection the researcher contacted the human resource/personnel manager of the selected Indian and multinational pharmaceutical companies in the four industrial estates in Goa. The objectives of the study and the instruments of Labour Welfare and Job Satisfaction were explained to them. The researcher on taking permission from the human resource/personnel managers of the respective pharmaceutical companies and with their assistance identified the managers and workers in the various departments (purchase, manufacturing, personnel, stores, administrative and so on). The researcher met all the respondents - managers and workers - individually and the Labour Welfare Inventory and Job Satisfaction Scale were administered to them. The purpose of the study was explained to them and they were asked to fill up the scales. They were assured of confidentiality of their responses. The two instruments were then collected from the respondents for the purpose of analysis.

A total of 500 scales were administered to the respondents and 350 were received. Of these the number of fully completed scales was 201, while in the others some items were
left incomplete. Thus only the completed scales (N=201) were selected for the analysis of data, in the research. The 201 usable responses represented 40.2 percent response rate.

4.7 STATISTICAL TECHNIQUES USED FOR DATA ANALYSIS

The statistical analysis was carried out on the data collected in order to test the hypotheses framed. Both descriptive and inferential statistical methods were used to analyze the data.

Descriptive statistics such as mean, standard deviation, percentages and Pearson’s Coefficient of Correlation was used. The inferential statistics included students’ t-test and multiple linear regression analysis. These statistical techniques were used to test the hypotheses of the study.

Mean was used to obtain the average score of a range of scores, and thus used as a basis for comparison.

Standard Deviation was used to assess the degree of dispersion of the values around its mean, and also for assessing the error to which the mean of a sample was subject to, when estimating the mean of the population from which the sample was taken.

Pearson’s Coefficient of Correlation is the statistical analysis, which measures and analyses the degree or extent to which two variables fluctuate with reference to each other. In this study, there are two variables, labour welfare and job satisfaction. Pearson’s Coefficient of Correlation is used to indicate whether there is any significant relationship
(positive/negative) between the labour welfare facilities provided, and job satisfaction experienced by employees in pharmaceutical companies in Goa.

Students’ t-test is applied to determine whether the means of two samples actually differ and whether this difference is significant or not. In the case of this study, it is being used to check whether there is a significant difference between employees (managers and workers) in Indian and Multinational pharmaceutical companies in Goa in the labour welfare facilities provided, and also in the job satisfaction experienced.

Multiple Regression Analysis is a multivariate analysis where we express one dependent variable as a function of many other independent variables. When we continue to add more explanatory influences, regressing the dependent variable upon many variables (more that two independent variables) this is multiple regression. In the present study the dependent variable is job satisfaction and the dimensions of labour welfare are the independent variables. The regression coefficients express the extent to which a one-unit increase in the independent variables (dimensions of labour welfare) will influence the dependent variable (job satisfaction). The coefficient of multiple determination $R^2$ describes the proportion of the variation in the dependent variable (job satisfaction) explained by the variation in the independent variables (dimensions of labour welfare). This statistical technique therefore indicates how well the model performs—how well the explanatory variables explain the dependent variable. $R^2$ determines whether the model is a good fit model.
4.8 TESTING OF RESEARCH HYPOTHESES

The null hypotheses framed for the study, were tested using the above-mentioned statistical techniques.

**Ho1:** There is no significant difference in the labour welfare facilities provided in Indian pharmaceutical companies and multinational pharmaceutical companies in Goa.

Using mean, standard deviation and the students’ t-test this hypothesis is tested. These statistical methods assist in comparing the labour welfare facilities provided in Indian pharmaceutical companies and multinational pharmaceutical companies in Goa, and whether there exists a statistically significant difference between the two.

**Ho2:** There is no significant difference in the level of job satisfaction experienced in Indian pharmaceutical companies and multinational pharmaceutical companies in Goa.

To test the hypothesis once again the mean, standard deviation and the students’ t-test are used. These help in finding whether there exists a difference in the level of job satisfaction experienced by employees in Indian pharmaceutical companies and multinational pharmaceutical companies in Goa, and whether this difference is statistically significant.

Percentages are also found which indicate whether the employees studied experience ‘high’, ‘moderate’ or ‘low’ levels of job satisfaction in Indian pharmaceutical companies and multinational pharmaceutical companies in Goa.
Ho3: There is no significant relationship between labour welfare facilities provided and the level of job satisfaction in pharmaceutical companies in Goa.

To test this hypothesis, Pearson’s coefficient of correlation is used to determine whether there is any significant correlation between labour welfare facilities provided and job satisfaction experienced by employees in the Indian pharmaceutical companies and multinational pharmaceutical companies in Goa.

Ho4: The dimensions in the labour welfare inventory do not influence the job satisfaction of employees in Indian pharmaceutical companies and multinational pharmaceutical companies in Goa.

The hypothesis is tested by using the inter-correlation matrix followed by the multiple regression analysis. This would determine the dimensions in the Labour Welfare Inventory that influence the level of job satisfaction of employees in pharmaceutical companies (Indian and multinational) in Goa.

Ho5: The statutory labour welfare facilities are not a predictor of job satisfaction than non-statutory labour welfare facilities in pharmaceutical companies in Goa.

For testing this hypothesis as well, the multiple regression analysis is used. The regression coefficients would reveal if the statutory labour welfare facilities would be a greater predictor of job satisfaction than non-statutory welfare facilities in the pharmaceutical companies in Goa.
Ho6: Gender does not significantly influence the job satisfaction of employees in pharmaceutical companies in Goa.

Using mean, standard deviation and the students’ t-test this hypothesis is tested. These enable the researcher to investigate whether gender has a significant role to play in determining the level of job satisfaction experienced by employees working in the Indian and multinational pharmaceutical companies in Goa.

Ho7: There is no significant relationship between age and the job satisfaction of employees in pharmaceutical companies in Goa.

To test the hypothesis, Pearson’s coefficient of correlation is used to determine whether there is any significant correlation (positive/negative) between the age of employees in the pharmaceutical companies in Goa and their level of job satisfaction.

Ho8: There is no significant relationship between experience and the job satisfaction of employees in pharmaceutical companies in Goa.

This hypothesis is tested using the Pearson’s coefficient of correlation. It reveals whether there is any significant correlation (positive/negative) between the experience of employees in the pharmaceutical companies and their level of job satisfaction.

Testing of these eight null hypotheses by using the respective statistical techniques, would result in certain conclusions and assist in making necessary recommendations to pharmaceutical companies in Goa - Indian pharmaceutical companies and multinational pharmaceutical companies – that would go a long way in improving the welfare of employees and enhancing their levels of job satisfaction.