CHAPTER 4

RESEARCH METHODOLOGY
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This chapter describes the research methodology adopted in the thesis “Study of the strategic alliances between Indian and foreign pharmaceutical companies in India, with reference to the Indian pharmaceutical industry.”

4.1 Research Objectives

The research objectives are derived from the gaps in literature review. The research questions are some of the key aspects to which the answers need to be sought. Both the aspects of the research are illustrated in the table below.

1. To study the factors that influence Indian pharmaceutical companies to form strategic alliances with foreign pharmaceutical firms.

2. To study the impact of the strategic alliances between Indian and foreign pharmaceutical companies on various business aspects of the Indian pharmaceutical firm.

3. To formulate strategies for Indian pharmaceutical companies to avail maximum benefit, from the alliances undertaken with foreign pharmaceutical companies.

4.2 Scope of the Research

The research study analyses the alliances that have happened between Indian and foreign pharmaceutical companies. The period under consideration is the last 5 decades that is, from 1950-2009. It traces the evolution of the Indian pharmaceutical industry over the years and also draws a comparison with the global pharmaceutical firms. The study tracks the alliances of 10 major Indian pharmaceutical companies, along with the reason for the alliance. Empirical study is conducted to understand the impact of alliances on various aspects of the business: Product, Marketing, Technology, Manufacturing and Competitive Advantage. Personal interviews of four CEOs/MDs of Indian pharmaceutical companies, who are involved in strategic alliances with foreign pharmaceutical companies gave an framework to the various critical parameters that impact alliance formation and the areas that are impacted during an alliance.
The study does not discuss the alliances happening in other countries, especially between firms in developed countries. The study does not study each of the alliance in detail and analyze the success or failure of the alliance. It does not discuss the alliance outcomes in relation to business goal achievements, impact on turnover etc.

4.3 Research Questions

<table>
<thead>
<tr>
<th>Research Questions</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>What are the factors that influence the formation of strategic alliance between Indian and foreign pharmaceutical firms?</td>
<td>Primary data</td>
</tr>
<tr>
<td>What are the major business implications of strategic alliances between Indian and foreign pharmaceutical alliances?</td>
<td>Primary data</td>
</tr>
<tr>
<td>What are the hindrances for strategic alliances between Indian and foreign pharmaceutical companies?</td>
<td>Primary data</td>
</tr>
</tbody>
</table>

4.4 Identification of Variables

The variables selected to answer the research questions involve:

- factors that motivate the Indian pharmaceutical companies to form alliances with foreign companies
- the impact of strategic alliance between Indian and foreign pharmaceutical companies on various aspects of the business.
- Factors that influence the success of the strategic alliances between Indian and foreign pharmaceutical companies

The factors are identified from various existing literatures.
## Illustration 8: Variables and Literature References

<table>
<thead>
<tr>
<th>Factors that Motivate Indian Pharmaceutical Companies to Form Alliances with Foreign Companies</th>
<th>Literature References</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>Acquire marketing knowhow</td>
</tr>
<tr>
<td>7</td>
<td>Access to highly regulated markets</td>
</tr>
<tr>
<td>10</td>
<td>Improve market positions</td>
</tr>
<tr>
<td>13</td>
<td>Establish a brand name abroad</td>
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<tr>
<td>14</td>
<td>Access to worldwide information on latest technology and products</td>
</tr>
<tr>
<td>15</td>
<td>Managerial knowhow – access to superior managerial skills</td>
</tr>
<tr>
<td>16</td>
<td>Access to superior Quality management systems</td>
</tr>
<tr>
<td>Factors</td>
<td>Literature References</td>
</tr>
<tr>
<td>---------</td>
<td>-----------------------</td>
</tr>
<tr>
<td>6 Gain capability to invest in marketing and sales promotional activities</td>
<td>Chitoor Raveendra, Ray Sougata, Aulakh S. Preet, Sarkar M. B. (2008)</td>
</tr>
<tr>
<td>8 Achieve cost minimization</td>
<td>Linton Katherine Connor and Corrado Nicholas (2007)</td>
</tr>
<tr>
<td>11 Exploit common assets</td>
<td>Pradhan and Abraham (2003), Gehl Sampath (2005)</td>
</tr>
<tr>
<td>13 Establish a brand name abroad</td>
<td>Pradhan Jaya Prakash (2007)</td>
</tr>
<tr>
<td>15 Enabled Managerial knowhow – access to superior management systems</td>
<td>Parvatiyar Atul and Gupta P. Yash (1994)</td>
</tr>
<tr>
<td>16 Access to superior Quality systems</td>
<td>Parvatiyar Atul and Gupta P. Yash (1994)</td>
</tr>
</tbody>
</table>
4.5. Research Hypotheses

A comprehensive literature review and the scheduling study which was conducted with CEOs of Indian firms who have entered into strategic alliances with foreign firms formed the base for the Hypotheses formulation.

Hypotheses

1. RELATED TO IMPACT ON PRODUCTS

*Impact of Strategic alliances between Indian and foreign pharmaceutical companies on the launch of new patented molecules.*

**H01:** There is no significant difference in the mean value of launch of new patented molecules as an area if impact of strategic alliances between Indian and foreign pharmaceutical companies across the types of Indian pharmaceutical companies.

**H02:** There is no significant difference in the mean value of launch of patented molecules as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across the types of activity undertaken by Indian pharmaceutical companies.

**H03:** There is no significant difference in the mean value of launch of patented molecules as an area of impact of strategic alliances between foreign pharmaceutical companies, across Indian pharmaceutical companies of differing turnover.

*Impact of Strategic alliances between Indian and foreign pharmaceutical companies on the launch of generic pharmaceutical products in India.*

**H04:** There is no significant difference in the mean value of launch of generic pharmaceutical products abroad as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across all types of Indian pharmaceutical companies.

**H05:** There is no significant difference in the mean value of launch of generic pharmaceutical products abroad as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across the types of activity undertaken by Indian pharmaceutical companies.

**H06:** There is no significant difference in the mean value of launch of generic pharmaceutical products abroad as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies of varying turnover.
Impact of Strategic Alliances between Indian and foreign pharmaceutical companies on the launch of generic pharmaceutical products abroad.

H07: There is no significant difference in the mean value of launch of new generic pharmaceutical products in the domestic market as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies on the, across the types of Indian pharmaceutical companies.

H08: There is no significant difference in the mean value of launch of new generic pharmaceutical products in the domestic market as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies across the types of activity undertaken by Indian pharmaceutical companies.

H09: There is no significant difference in the mean value of launch of new generic pharmaceutical products in the domestic market as an area of impact of strategic alliances between foreign pharmaceutical companies, across Indian pharmaceutical companies with different turnovers.

Impact of Strategic alliances with foreign pharmaceutical companies on gaining a wider product portfolio

H010: There is no significant difference in the mean value of expansion of product portfolio as an area impact of strategic alliances between Indian and foreign pharmaceutical companies, across all types of Indian pharmaceutical companies.

H011: There is no significant difference in the mean value of expansion of product portfolio as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies indulging in various activities.

H012: There is no significant difference in the mean value of expansion of product portfolio as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies of varying turnover.

2: RELATED TO IMPACT ON MARKETING ASPECTS

Impact of Strategic Alliances between Indian and foreign pharmaceutical companies on gaining access to highly regulated markets abroad

H013: There is no significant difference in the mean value of gaining access to highly regulated markets abroad as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across all types of Indian pharmaceutical companies.

H014: There is no significant difference in the mean value of gaining access to highly regulated markets abroad as an area of impact of strategic alliances between Indian and
foreign pharmaceutical companies, across Indian pharmaceutical companies undertaking different activities

**H015:** There is no significant difference in the mean value of gaining access to highly regulated markets abroad as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies across Indian pharmaceutical companies of different turnover

*Impact of Strategic Alliances between Indian and foreign pharmaceutical companies on gaining capability to invest in sales and marketing.*

**H016:** There is no significant difference in the mean value of gaining investment capability into sales and marketing as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across all types of Indian pharmaceutical companies.

**H017:** There is no significant difference in the mean value of gaining investment capability into sales and marketing, as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical with varying business activities.

**H018:** There is no significant difference in the mean value of gaining investment capability into sales and marketing, as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies with varying turnover

*Impact of Strategic Alliances between Indian pharmaceutical companies on gaining access into foreign distribution networks abroad.*

**H019:** There is no significant difference in the mean value of gaining access to foreign distribution networks abroad as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across all types of Indian pharmaceutical companies.

**H020:** There is no significant difference in the mean value of gaining access to foreign distribution networks abroad as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies with differing turnover

**H021:** There is no significant difference in the mean value of gaining access to foreign distribution networks abroad as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, Indian pharmaceutical companies undertaking different activities

3: RELATED TO IMPACT ON TECHNOLOGY

*Impact of Strategic Alliances between Indian and foreign pharmaceutical companies on gaining access to new technology.*
H022: There is no significant difference in the mean value of gaining technological competency as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across all types of Indian pharmaceutical companies.

H023: There is no significant difference in the mean value of gaining technological competency as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies indulging in various activities.

H024: There is no significant difference in the mean value of gaining technological competency as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies of varying turnover.

*Impact of Strategic Alliances between Indian and foreign pharmaceutical companies on achieving R&D capability.*

H025: There is no significant difference in the mean value of achieving R&D capability, as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across all types of Indian pharmaceutical companies.

H026: There is no significant difference in the mean value of achieving R&D capability, as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies indulging in various activities.

H027: There is no significant difference in the mean value of achieving R&D capability, as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies of varying turnover.

*Impact of Strategic alliances between Indian and foreign pharmaceutical companies on gaining access to the latest information on technological and product related upgrades.*

H028: There is no significant difference in the mean value of accessibility of Indian companies to latest technological and product related upgrades as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies on, across all types of Indian pharmaceutical companies.

H029: There is no significant difference in the mean value of accessibility of Indian companies to latest technological and product related upgrades as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies of different turnover.

H030: There is no significant difference in the mean value of accessibility of Indian companies to latest technological and product related upgrades as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies with different activities.
Impact of Strategic alliances between Indian and foreign pharmaceutical companies on gaining GMP compliant manufacturing sites.

H031: There is no significant difference in the mean value of development of GMP compliant production capacities by Indian pharmaceutical companies as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across all types of Indian pharmaceutical companies.

H032: There is no significant difference in the mean value of development of GMP compliant production capacities by Indian pharmaceutical companies as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies performing different activities.

H033: There is no significant difference in the mean value of development of GMP compliant production capacities by Indian pharmaceutical companies as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies of different turnover.

4: RELATED TO IMPACT ON MANUFACTURING

Impact of Strategic Alliances between Indian pharmaceutical companies on cost optimization.

H034: There is no significant difference in the mean value of cost optimization as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies across the types of Indian pharmaceutical companies.

H035: There is no significant difference in the mean value of cost optimization as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies across the types of activity undertaken by Indian pharmaceutical companies.

H036: There is no significant difference in the mean value of cost optimization as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies across Indian pharmaceutical companies of varying turnover.

Impact of Strategic Alliances between Indian pharmaceutical companies on exploiting common assets.

H037: There is no significant difference in the mean value of achieving operational synergy as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies across the types of Indian pharmaceutical companies.
H038: There is no significant difference in the mean value of achieving operational synergy as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies across the types of activity undertaken by Indian pharmaceutical companies.

H039: There is no significant difference in the mean value of achieving operational synergy as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies across Indian pharmaceutical companies of varying turnover.

Impact of Strategic Alliances between Indian and foreign pharmaceutical companies on gaining superior quality management skills.

H040: There is no significant difference in the mean value of quality related skills acquired by Indian pharmaceutical companies, as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across all types of Indian pharmaceutical companies.

H041: There is no significant difference in the mean value of quality related skills acquired by Indian pharmaceutical companies, as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies of different turnover.

H042: There is no significant difference in the mean value of quality related skills acquired by Indian pharmaceutical companies, as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies with different activities.

5: RELATED TO IMPACT ON COMPETITIVE ADVANTAGE

Impact of Strategic Alliance between Indian and foreign pharmaceutical companies on increased market shares.

H043: There is no significant difference in the mean values of increased market share as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across all types of Indian pharmaceutical companies.

H044: There is no significant difference in the mean values of increased market share as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies indulging in various activities.

H045: There is no significant difference in the mean value of increased market share as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies of differing turnovers.
Impact of Strategic Alliances between Indian and foreign pharmaceutical companies on increase in overall profitability.

H046: There is no significant difference in the mean value of enhanced profitability as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies of differing company types.

H047: There is no significant difference in the mean value of enhanced profitability as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies indulging in various activities.

H048: There is no significant difference in the mean value of enhanced profitability as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies of differing turnovers.

Impact of Strategic Alliances between Indian and foreign pharmaceutical companies on establishing new brands in the global market,

H049: There is no significant difference in the mean value of establishment of Indian pharmaceutical brand names in the global market as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across the types of activities undertaken by Indian pharmaceutical companies.

H050: There is no significant difference in the mean value of establishment of Indian pharmaceutical brand names in the global market as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across the types of Indian pharmaceutical companies.

H051: There is no significant difference in the mean value of establishment of Indian pharmaceutical brand names in the global market as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies of varying turnover.

Impact of Strategic Alliances between Indian and foreign pharmaceutical companies on acquiring superior managerial skills.

H052: There is no significant difference in the mean values of acquisition of management skills by Indian pharmaceutical companies as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies on the, across all types of Indian pharmaceutical companies.

H053: There is no significant difference in the mean value of acquisition of management skills by Indian pharmaceutical companies as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies of different turnover.
H054: There is no significant difference in the mean value of acquisition of management skills by Indian pharmaceutical companies as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across pharmaceutical companies indulging in various activities.

4.6 Research Design

The study of strategic alliances between Indian and foreign pharmaceutical companies is a fairly new topic with little available literature. Hence, the research design consists of clearly two stages:

- An initial exploratory stage aimed at crystallization of research questions and,
- A formal study involving statistical tools and procedures to test the hypotheses.

Objectives of the exploratory study:

The exploratory study was conducted with the following objectives in mind,

- Establish the research questions
- Establish the hypotheses

Method of exploratory study:

Here the exploratory research is qualitative in nature and was executed by:

- Secondary data analysis
- Experience survey

Secondary data analysis involved extensive literature review which includes articles and publication which were related to the study topic. Additionally, annual reports of Indian companies, newspaper articles, reports from business consultants like KPMG and McKinsey became sources of information which helped to crystallize the research questions.

Experience surveys which were designed to seek out important ideas and concepts on the strategic alliances between Indian and foreign pharmaceutical companies was undertaken. The participants in the exploratory surveys were the top executives of Indian pharmaceutical
companies who had undertaken alliances with foreign pharmaceutical companies. The sample size was limited to 4 participants only. The data collection was done through individual structured interviews.

This study helped understand aspects on the reasons for strategic alliances. Some suggested factors include: cost-related factors, access to new markets, acquisition of technology and knowhow, quality-related aspects and the need to reduce time and efforts.

The impact of strategic alliances between Indian and foreign pharmaceutical companies, according to them, was high on products, competitive aspects and marketing strategies of Indian pharmaceutical companies.

Clarity on the intent of the alliance, good communication, cultural fit and compatibility, a well-oriented alliance steering committee are some of the factors that can influence the success of strategic alliances between Indian and foreign pharmaceutical companies.

**Descriptive study:**

The primary objective of the descriptive or formal study is to test the hypotheses and answer the posed research questions. The second objective is to establish a correlation among various variables that are responsible for the alliances between Indian and foreign pharmaceutical companies.

**4.6.1 Questionnaire Development**

The primary data is collected with the help of a specific questionnaire. The questionnaire is designed to gather the reasons for alliances between Indian and foreign pharmaceutical companies and understand the outcome of the alliances. The questionnaire is divided into 4 sections.

The 1st section has 15 variables. Each variable corresponds to each factor that has influenced the formation of strategic alliances between Indian and foreign pharmaceutical companies. The variables are derived from literature references.
The 2\textsuperscript{nd} section has 18 variables. This is aimed at gathering data from the responding pharmaceutical firms on their experience with strategic alliances that they have undertaken with foreign pharmaceutical companies.

The 3\textsuperscript{rd} section, has 6 factors which are identified as the possible hindrances in the formation of strategic alliances in the Indian context.

The 4\textsuperscript{th} section aims at gathering firm specific data. The descriptive analyses of the responding firm, will contain data relating to the Type of company, type of activity of the responding company and turnover of the responding company.

\textit{Scale and Design:}

The instrument is intended to be a tool for the study of strategic alliances between Indian and foreign pharmaceutical companies with the objective of understanding the factors that have contributed to the formation of alliances between Indian and foreign pharmaceutical companies. Additionally it aims at gathering firm specific experiences with respect to the outcomes of the strategic alliances.

For this study, the existing components from literature and the components suggested by the scheduling research by the industry experts were considered. Convergent and discriminant validity of the scales were verified through two rounds of scrutiny by judges and the items from the various scales were sorted under appropriate buckets. Weak and bad items from the original construct were redefined. The resulting construct was subjected to preliminary test followed by a pilot scale field test.

The Questionnaire is designed as per Likert scale, thus the level of variables are ordinal. The data scale has order but no magnitude and is a categorical data. The Non parametric tests will be used for hypotheses testing.
4.6.2. Questionnaire Administration

The sample population for this study is derived from the list of Indian pharmaceutical companies registered in recognized databases namely IDMA. The IDMA has 300 registered members and includes companies dealing with pharmaceutical manufacturing. It also includes pharmaceutical companies who are involved in contract research, research and contract manufacturing. Many of these registered pharmaceutical companies have undertaken strategic alliances with other pharmaceutical firms. The sample would consist of firms which have undergone strategic alliances with another foreign firm. The respondents will be: Top executives of pharmaceutical companies in India.

Top executives here refers to the senior managers in Marketing, CEO, MD, Heads of R&D, Heads of Production, Executives from Strategy and Development and other functions who are privy to high level activities like alliances and acquisitions. The inputs from the top executives of pharmaceutical companies in India, gives a complete perspective of the strategic alliances between Indian and foreign pharmaceutical companies.

Sample frame:

The sample frame for the top executives in pharmaceutical companies of Indian origin extends to across India irrespective of the turnover, type and activity of the company. The database was acquired from the Indian Drug Manufacturer’s Association (IDMA), which is a registry for Indian pharmaceutical companies.

Sampling method:

The database of firms that have undertaken strategic alliance was created. This included a number of 250 Indian companies. From this overall number companies were selected randomly to administer the questionnaire. However the representation in the survey depends upon the permission granted by the company to get included in the survey.

Sample size:

To calculate the sample size, the following information is critical.
Sample size is computed as: The appropriate sample size for a population based survey is determined by three factors:

- Expected frequency value or prevalence of variables of interest, assumed to be 50% (p)
- Desired level of confidence, which at 95% is a standard value of 1.96 (t)
- Acceptable margin of error, which for a standard value of 0.05 is 5% (m)

Sample size (n) is computed as follows (CEO / Sr. Managers)

Precision: 95% confidence

Expected Frequency: 99% (p)

\[
n = \frac{t^2 \times p(1-p)}{m^2} = \frac{1.96^2 \times 0.99(1-0.99)}{0.05^2} = n = 15
\]

The questionnaire was administered to 250 companies. The total responses received was 73. Thus the overall sample size considered for this study is 73.

4.6.3. Pilot study

In this stage a pilot study of the entire questionnaire was conducted with a small sample size comprising of 06 top executives from Indian pharmaceutical companies. The samples were selected purely on convenience. The first aim of the pilot test was to ensure that the mechanics of questionnaire response and compilation were adequate. This was accomplished by having the respondents complete
the questionnaire and comment on the length, wording, instructions and complexity of the questionnaire.

The second aim is to establish the reliability of the scales. This was achieved by conducting a Cronbach’s alpha where the reliabilities for this study were set around 0.7 and 0.8 range. During this analysis, the variances of the items and the scales were inspected and the change in Cronbach’s alpha when an item would be deleted from the scale was noted. The table below illustrates the alpha values for the set of data.

**Reliability coefficients of the pilot study:**

*Variables relating to the Reasons for strategic alliance and Impact of Strategic Alliance between Indian and foreign pharmaceutical companies*

<table>
<thead>
<tr>
<th></th>
<th>Cronbach’s Alpha</th>
<th>Cronbach’s Alpha Based on Standardized Items</th>
<th>N of Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reasons for strategic alliance</td>
<td>.780</td>
<td>.784</td>
<td>10</td>
</tr>
<tr>
<td>Impact of strategic alliance</td>
<td>.737</td>
<td>.727</td>
<td>18</td>
</tr>
</tbody>
</table>

The alpha coefficient for the four items is .780, suggesting that the items have relatively high internal consistency.

The alpha coefficient for the four items is .737, suggesting that the items have relatively high internal consistency.

**Conclusions of the Pilot Study:**

The following conclusions can be drawn with respect to the results of the pilot study.

The instrument that was designed to collect data to prove the hypotheses fulfils the reliability requirements. Additionally based on the feedback of the respondents the instrument has proven to be adequate in terms of:

- Clarity of questions
- Flow
- Ease of answering
A univariate analyses of the responses indicates that the hypotheses can be tested with the questionnaire.

The coefficient of reliability – chronbach alpha is >0.7 indicating consistency of responses.

**4.6.4. Method of Analysis and Justification**

The scale of measurement for the data collected is nominal in nature, and hence non-parametric. Random sampling method was used for data collection. Hypotheses were tested using single and multiple variables. The variables chosen were:

- Type of pharmaceutical companies (API, Formulations, R&D, Clinical Research)
- Type of activities of the pharmaceutical companies (Manufacturing, R&D, Contract Research, Distribution)
- Turnover of the pharmaceutical companies (<100 cr, 100-300 Cr, 300-500 cr, >500cr annually)

The groups are independent, that is presence of the members in one group is not dependent upon membership in another. The statistical techniques that were used are:

- Non parametric tests which assesses the population distribution
- One sample tests to understand the aspects which drive strategic alliances between Indian and foreign pharmaceutical companies
- K- sample tests to evaluate the variables for the three groups from the population
  - One way Analysis of Variance (ANOVA)
- Correlation to assess the correlation between scale variables
- Regression to predict a model fit
4.7 Limitations of the Research

The study does have certain limitations which are enumerated as follows:

- **Time span**: The research considers the strategic alliance between Indian and foreign pharmaceutical companies in the last 4 decades till 2010. Although passing references are made, alliances made in 2011 and 2012 are not considered. The trends from 2011 are not extrapolated, although this can be an interesting study as alliances are still being considered and some alliances have been successful and some have fallen apart (Pfizer and Biocon).

- **Sampling limitations**: Inadequate representations under the various categories of the pharmaceutical companies.

- **Gaps in data**: In India there is no single database which records all the alliances that have happened in the Indian pharmaceutical industry in the last few decades. The compilation was done through secondary data from journals, newspapers and articles. There are possibilities that all the alliances between companies may not have been recorded.