Chapter – 3

Research Design and Methodology

3.1 INTRODUCTION

Begin by noting that a clearly defined methodology helps the researcher in answering the questions: what, where, when, how much, and by what means something is to be done? As Kothari (2008), says that research methodology stands for advance planning of the methods to be adopted for collecting the relevant data and techniques to be used in their analysis, keeping in view the objectives and hypotheses of the research and availability of time, money and other requirements. Designing of methodology should be prepared with every care as any error in it may upset the reliability of results. In this chapter an attempt has been made to design and define the research methodology duly adopted to carry out this research study.

The detailed research design and methodology followed in this chapter discusses the research problem, objectives and research procedure which includes the overall research design, the sampling procedure, data collection methods, the methods of data analysis, measures undertaken and statistical techniques used for data analysis. The purpose of this chapter is to provide information regarding the research contexts, philosophical assumptions underlying the study, and research strategies used.

3.2 PROBLEM STATEMENT

It is apparent from the literature that the Indian textile industry has a significant presence in the economy as well as in the international textile trade. Its contribution to the Indian economy is manifested in terms of its contribution to the industrial production, employment generation and foreign exchange earnings. The review of literature on industrial/business clusters and Indian textile industry as a whole and Panipat textile cluster in particularly regarding growth, sustainability, problems, opportunities, threat and the benefits of industrial/business clusters evident that industrial/business cluster has been a topic of interest for long in European USA, Japan and few other countries since long. There are a very less number of studies on industries like textile, pharmaceutical, automobile, rubber, food and beverages, and agro-processing etc particularly in the context of India on the milieu of industrial/business clusters.
Although, the industry has been grossly researched on the parameters such as growth prospects, problems, opportunities, threats, competitiveness, and government policy etc., but very few studies investigated sustainable development along with impact of economic (Micro and Macro environmental) factors on the industry. Many studies on Indian textile industry and other countries are available now, but a few pertaining from specific region, only Jain and Madan (2012) studied the challenges and prospects of Textile Industries (MSMEs) from Panipat region in Haryana. Further, literature reveals that there are only few exploratory cross sectional studies on textile industry which considered large primary data with multiple dimensions.

The chapter has been divided into five sections. First section covers the major objectives and hypotheses of the present study. This section also discusses about the data and methodology used to achieve the desired objectives of the study. The major findings are citied in second, third, and fourth sections as: An analytical view present state of affairs of Panipat textile cluster using primary and secondary data on export from cluster, number of units registered, employment generated, and investment made from last several years. The third section covers the results and evidence related problems being faced by cluster (i.e. production means and their competiveness). The fourth section provides the results related to environment challenges, threats and future initiatives of Panipat textile cluster. The last section endows conclusion and recommendations for future research in the area of textile industry in general and in the backdrop of industrial/business cluster in particular.

Research gap from the existing literature, the present study find some thrust areas for future research as:

1. There may be area of research which provides evidences about the contribution of industrial/business clusters in developing countries particularly in the context of India.
2. The textile industry may be studies from the perspective of cluster.
3. The study of growth and sustainable development of textile industry may be an area of research.
4. Exploratory cross sectional studies which consider large primary data with multiple parameters (Economic and industry specific) may be an area of research.
5. Region specific research on textile industry may be another area of research.
So, the present study concaved to investigate the growth and sustainability of Panipat textile cluster considering large primary data on multiple dimensions (parameters).

3.3 OBJECTIVES OF THE STUDY

The study undertakes to provide greater insight on growth and sustainability of Panipat textile cluster considering large primary as well as secondary data on multiple parameters. This broad objective in mind, the present study intends to achieve the following specific objectives:

1. To assess the existing state of affairs of Panipat textile industry in the milieu of cluster.
2. To study the competitiveness of means of productions i.e. the problems being faced by Panipat textile cluster.
3. To examine the impact (challenges and threats) of macro and micro environmental factors on the sustainable development of cluster.
4. To investigate the important factors to attain the global competitiveness and future initiatives of Panipat textile cluster.
5. To make a comparative analysis of various segments, and exporting and non-exporting enterprises of Panipat textile cluster on multi-dimensional factors.
6. To suggest suitable policy measures required for facilitating the development of such cluster.

3.4 HYPOTHESIS

In synchronization with the above-mentioned objectives, the study intends to test the following null-hypotheses (H0):

H0.1 There is no differences in the initial investment, export, capital structure, and capacity utilization of various segments and exporting and non-exporting enterprises of Panipat textile cluster.

H0.2 There is no differences in the opinion on cooperation among firms in the cluster, and reasons for being in the business of textile of various segments and exporting and non-exporting enterprises.
H05.1 There is no differences in the opinion on problems being faced by Panipat textile cluster or competitiveness of means of production of various segments and exporting and non-exporting enterprises.

H06.1 There is no differences of the impact of macro and micro environmental factors on the various segments and exporting and non-exporting enterprises of the cluster.

H06.2 There are no differences in the environmental challenges and threats on the various segments and exporting and non-exporting enterprises of the cluster.

H06.3 There are no differences on the important factors to attain global competitiveness and future initiatives of various segments and exporting and non-exporting enterprises of the cluster.

3.5 RESEARCH DESIGN

Due to the specific requirement of the study an explorative cum descriptive research design was followed which helped in unfolding the answers to the objectives of the study. Survey was the predominant method used to collect information. A quantitative survey was chosen for the research because it is simple and effective mean of collecting a large amount of information within a short timeframe.

3.5.1 Data Sources: The present study is an empirical research based on the both primary and secondary data. The theory is basically developed from secondary sources of information and a thorough study of various academic and research works in the field has been attempted. Various sources used for the purpose are internet, books, research articles, working papers, and conferences papers which appeared in the journals and news papers, study reports etc. Self-administered questionnaire was the main source of collecting the primary data. It noteworthy, that the information has been collected from those entrepreneurs who willing to share information.

3.5.2 Sample Design: Examining whole universe in the research studies is quite difficult and only alternative left is sampling. The same is true with the present study. A systematic judgment non-probability sampling technique was used to retain representative and manageability because it commensurate with quantitative research studies. Every sincere effort is made by the investigator to avoid biasness in the selection of respondents.
The present study limits itself to the survey conducted over the subject of Panipat textile cluster. The cluster is having different segments (as presented in table 3.1) of enterprises, which are different in size and types as mentioned in the first chapter of the report.

Overall, total sample sizes of 218 were identified in the final sample for this research. 400 questionnaires were sent to the entrepreneurs of the select sample enterprises through personal contact as well as e-mail. Besides sending reminders, personal visits were made at the main offices of many enterprises located at Panipat. As a result of all our efforts, responses were obtained from 236 entrepreneurs. However, 18 questionnaires could not be included for analysis purpose as these were not filled up properly. In all, the responses from 218 entrepreneurs were taken as basis for analysis in this study. The primary survey period ranges from July 2010 to December 2012.

<table>
<thead>
<tr>
<th>Sectors</th>
<th>No. of Enterprises</th>
<th>Percent</th>
<th>Products Manufacturing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spinning/Yarn</td>
<td>69</td>
<td>31.7%</td>
<td>Manufacturing fabrics includes Woolen, Cotton, Velvet; Yarn includes Shoddy, Woolen, Velvet, Cotton; and threads manufacturers</td>
</tr>
<tr>
<td>Processing/Dyeing/Printing</td>
<td>13</td>
<td>6.0%</td>
<td>Wet processing and dry processing firms includes Dyeing, printing, packaging, job works and textile machine manufactures.</td>
</tr>
<tr>
<td>Handloom</td>
<td>64</td>
<td>29.4%</td>
<td>Manufacturing carpets, rugs, durries, throws, wall hangings, Bath mats, table mats etc.</td>
</tr>
<tr>
<td>Powerloom</td>
<td>72</td>
<td>33.0%</td>
<td>Manufacturing bed sheets, curtains, tarry towels, sofa covers, quilts, Barrack blankets, mink blankets, Cushion covers, etc.</td>
</tr>
<tr>
<td>Total</td>
<td>218</td>
<td>100.0%</td>
<td>All above</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year of Establishment</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Between 1975 to 1990</td>
<td>43</td>
<td>19.72%</td>
<td></td>
</tr>
<tr>
<td>Between 1991 to 2000</td>
<td>86</td>
<td>39.45%</td>
<td></td>
</tr>
<tr>
<td>Between 2001 to 2012</td>
<td>89</td>
<td>40.83%</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>218</td>
<td>100.00%</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Exporting Status</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Exporting</td>
<td>171</td>
<td>78.44%</td>
<td></td>
</tr>
<tr>
<td>Non-Exporting</td>
<td>47</td>
<td>21.56%</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>218</td>
<td>100.00%</td>
<td></td>
</tr>
</tbody>
</table>

3.5.3 Questionnaire Development: To develop the questionnaire a significant effort was put into so that the instrument may extract ample information from the respondents (entrepreneurs) to drawing appropriate results. Once the initial items generated an iterative discussion with research supervisor and personal interview with some of the entrepreneurs of the cluster was conducted to refine the instrument. The process was continued until no further instrumental modifications were found. The respondents were
asked to rate the extent to which each item describes the phenomenon of the variable. All ratings were made on a 5-points Likert type scale.

Overall, this self administered questionnaire comprised of seven sections: section one seeks to get the information on the existing state of affairs of Panipat textile cluster includes questions on initial investment made in plant and machinery, capacity utilization, capital structure, export, and reasons for being in the business of textile. Section two enquired competitiveness of price and non-price factor of production includes labour, raw materials, power (electricity supply), technological, transportation and pricing policy of Panipat textile cluster. Section three of questionnaire inquired opinions on macro and micro environmental factors on the cluster. Section four included the questions on future challenges, threats faced by cluster and countries posing threats. Section fifth enquired the expected near future initiatives of the entrepreneurs. Section sixth comprises questions for seeking opinions impact of the cluster on the enterprises being a part of the cluster. And finally, section seventh enquired the profile of the sample enterprises.

3.5.4 Internal Consistency Analysis: Internal consistency was used to assess the reliability of the measurement depicting the degree to which they indicate a common latent construct. It relates to the extent to which an experiment, test or measuring procedure yields the same results in repeated trails (Cramer, 1998). Cronbach’s Alpha is commonly used for the purpose. Value of alpha is ranging from zero to one, higher value indicating higher reliability. The value of each variable, as measured by each items on the scale of 1 to 5, is computed using the reliability analysis procedure shown in table 3.2.

<table>
<thead>
<tr>
<th>Variables</th>
<th>No. of Items</th>
<th>Alpha Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Global Competitiveness</td>
<td>13</td>
<td>0.913</td>
</tr>
<tr>
<td>Threats</td>
<td>5</td>
<td>0.783</td>
</tr>
<tr>
<td>Macro Environmental Factors</td>
<td>10</td>
<td>0.852</td>
</tr>
<tr>
<td>Micro Environmental Factors</td>
<td>10</td>
<td>0.821</td>
</tr>
<tr>
<td>Future Initiatives</td>
<td>13</td>
<td>0.877</td>
</tr>
<tr>
<td>Expected Future Challenges</td>
<td>9</td>
<td>0.849</td>
</tr>
</tbody>
</table>
The alpha values are ranging from 0.783 to 0.913, which indicates an internal consistency with the alpha value of more than 0.70, so no items were dropped from the each variable. These results are therefore acceptable and are a reliable measure of the construct. Overall, with this section the instrument has been proven to be an acceptable questionnaire through this test.

3.6 ANALYSIS OF DATA AND STATISTICAL TOOLS APPLIED

After collection of data from primary and secondary sources the codification and tabulation were performed. The statistical tools applied to study the specific objectives of the research are as follows:

**Compound Annual Growth Rate (CAGR):** To study the trends in number of units registered, employment provided, and investment made, and the export from the Panipat textile cluster over the years compound annual growth rate (CAGR) has been applied. The compound annual growth rate is calculated by taking the $n^{th}$ root of the total percentage growth rate, where $n$ is the number of years in the period being considered. CAGR was calculated using MS-EXCEL formula of $=XIRR$.

This can be written as follows:

$$CAGR = \left( \frac{\text{Ending Value}}{\text{Beginning Value}} \right)^{\frac{1}{\text{Number of Years}}}$$

**Chi-square Test:** The Chi Square statistic compares the tallies or counts of categorical responses between two (or more) independent groups. The test examine whether there is an association between two categorical variables. Further, according to Cochran’s (1952) rule a $2 \times 2$ contingency table no expected value should be below 5. In large table the rule is that all expected counts should be greater than 1 and no more than 20 percent of expected counts should be less than 5. In some of contingency tables this rule is not satisfied so Asymptotic and Montecarlo both test (fisher exact test) have been applied.

**Analysis of Variance (ANOVA):** It is a collection of statistical models used to analyze the differences between group means and their associated procedures (such as "variation" among and between groups). In 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 $t$-test to more than two groups. Doing multiple two-sample $t$-tests would result in an increased chance of committing a type I
error. For this reason, ANOVAs are useful in comparing (testing) three or more means (groups or variables) for statistical significance. ANOVA has been applied on the composite score on the variable to enquire about significant difference in the overall mean value of the opinions on 5 point Likert scale of the variable.

**Factor Analysis:** To reduce the original data set of variables to fewer and recognizable one, factor analysis, a data reduction technique which also point out the relationship between the variable has been used. Principle component analysis (PCA) has been used for the present study. It consists of statistical procedure, which can be applied to the set of variables to identify distinct but coherent set of cluster independent of one another. A factor therein is considered to be a linear combination of inter-related variables, thus making analysis more meaningful. The principal component analysis extracts more possible variance for each of the component than any other method of factoring. The first principal component is the linear combination of observed variables that extracts maximum variables that extracts maximum variance. These originally obtained principal components are subjected to a further statistical step known as rotation, in order to improve the interpretability and scientific utility of the solution. The varimax procedure of orthogonal rotation has been used to meet the essential conditions of the principal component analysis viz principal components are orthogonal (uncorrelated) and the first principal component account for maximum variance, while the second principal components absorbs maximum of the remaining variations as so on.

The inter-correlation matrix was factorized by using principal component method with unities in diagonal (Hotelling, 1935). Following the recommendations of Kaiser (1960), the interaction of factor was stopped when the eigenvalue (latent root) comes to be less than 1.00. Kaiser-Meyer-Olkin measure was used to verify the sampling adequacy of the data and to verify the sufficiency of individual item KMO value was ascertained using anti-image correlation matrix, the acceptable limit is 0.50 (Field, 2009). Bartlett’s test of sphericity $\chi^2$ (significant at five percent) was used to verified the variables is sufficient large for principal component analysis (PCA). To achieve an approximation to simple structure, the extracted values were rotated in accordance with criterion of Kaiser’s (1958) varimax procedure. Using the procedure outlined in Harman (1960) for the approximating the standard error of the factor loading, found that loading greater than 0.30 are significant are five percent level. The Communalities are shown before and after extraction values. Communalility is the proportion of common variance within a variable.
Principal Component Analysis (PCA) works on initial assumption that all variance is common; therefore, before extraction the Communalities are all 1. Communalities for variable above 0.50 acceptable and would need not to exclude the variable on the basis of low communalities.

**Other Statistical Tools:** Frequencies, percentages, growth rate (parentage change), and X, Y scatter graph with trend line were the other statistical tools used in the analysis. All the statistical analysis was carried out with the help of computer by making use of excel spreadsheet and SPSS (statistical Package for Social Sciences).

### 3.7 LIMITATIONS OF THE STUDY

The following are the limitations of the present research work:

1. Due to time constraint, busy schedule of the entrepreneurs and unwillingness to give the internal information of the enterprise the sample size is limited to 306 entrepreneurs. The sample size is small as compared to universe. Therefore, the sample size may not be representative of the entire population.

2. In some cases respondents are not clear about their answers. In such cases respondents are facilitated to answer.

3. The questionnaire is too lengthy and it used to make too much time to filled, so time is also constraint.

4. Some respondents are idealistic instead of being practical while answering the questionnaires.

### 3.8 ORGANIZATION OF THE STUDY

The study is organized in seven chapters as described hereunder:

**Chapter 1** presents an overview of evolution Panipat textile cluster. It gives brief outline of historical evaluation and structure of the cluster. It also outlines the support institution in Panipat region and their interlink-age with the enterprises of the cluster.

**Chapter 2** provides reviews the existing literature on the present topic. For the ease of understanding the chapter is divided into two sections that deals separately with business/industrial cluster and textile industry along with some concluding remarks and directions for future research in the end of the chapter.
Chapter 3 presents the research methodology used in the study. The various aspects herein include background of the study, objectives and hypotheses of the study, sample design, and data analysis tools of the study.

Chapter 4 presents the results about existing state of affairs of the Panipat textile industry. It also embodies the chi-square test for testing equality of opinions on the variables of various segments of the cluster.

Chapter 5 enumerates the price and non-price competitiveness of Panipat textile cluster. It also embodies the ANOVA test for testing equality of averages of different segments of the cluster for study variables.

Chapter 6 presents the analysis relating to environmental challenges, threats, and future initiatives of Panipat textile cluster. It also presents the results of the factor analysis (principal component analysis), and

Chapter 7 embodies the major findings and conclusion emerged from the present study and suggestions offered for the development of Indian Banking Industry so that banking sector can become more efficient.

3.9 REFERENCES


