CHAPTER - 4

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METHODOLOGY

4.1 INTRODUCTION

In order to achieve the objectives of the study and to analyse the variables involved in the model, appropriate methodology was developed and discussed in this chapter. The present study is exploratory - diagnostic, exploratory - descriptive and predictor - perspective. The collection of data and analysis strategy were planned accordingly. The various aspects of the methodology adopted in the present study are discussed below.

4.2 SAMPLING PROCEDURE

4.2.1 Sample size

Sampling of organizations was done in two stages. In the first stage, a sample of 35 organisations in south and central Indian engineering industry were taken. The organizations in this sample were classified into highly successful and less successful groups based on the analysis of their financial data.

In order to identify the various factors prevailing in the successful organizations and the specific factors responsible for the success, a detailed analysis of organizational factors was carried out. For this purpose, a sample of 12 engineering organizations in Coimbatore were selected.

To list the public limited engineering organizations in south and central India, Bombay stock exchange directory and Kothari Industrial directory were used. All the organizations with their corporate office in south and central India namely in the states of Maharashtra, Madhya pradesh, Karnataka, Kerala and Tamil nadu were taken up.
Sample included only the organizations in these states as they were all almost exposed to similar environment, which is in contrast with north Indian engineering organizations. Social, Cultural and Climatic aspects differ between north, and south and central India. The sample of such listed organizations is given in Appendix - I.

To identify the factors which determine the success of an engineering organization, the detail study was limited only to the organizations of Coimbatore region. So, from the prepared list of thirty five organizations, the organizations whose corporate office or factory is at Coimbatore were listed. It came up to twelve organizations. All the twelve organizations were taken up for detailed analysis. General detail of the organizations taken up are given in Table 4.1. In order to maintain the anonymity of the specific organizations studied, minute details and names of the organizations are not given.

By and large the following points were considered in sample selection.

1. All the organizations are engaged in manufacturing engineering products.
2. All are public limited organizations.
3. All organizations are situated in one geographical region (in and around the city of Coimbatore). The meso - system or the external social cultural factors were more or less similar.
4. All these organizations were established before 1975.
5. As all organizations were of the same industry and also in the same category (public limited) government rules governing them are also similar.
4.2.2 Sampling in organizations

From each one of the twelve organizations in the sample, a minimum of five professionals / managers were approached for data collection. It was ensured that all the five managers / professionals in each organization were from different areas of operations. This aspect was given importance to have a balanced view of the organization.

4.2.3 Description of the subjects

The respondents sampled from organizations were comparable across organizations on the basis of the following criteria

1. Middle level managers were approached for data collection. They were either departmental or section heads of those organizations.
2. All the managers had at least a minimum of five years experience in the existing post.
3. All the managers were in different areas of operation in the organizations namely Finance, Marketing, Research and Development, Quality control and Production.

4.3 INSTRUMENT

Predominantly questionnaire instrument was used in the present study for data collection. Questionnaire was developed based on the typologies used by previous researchers. In order to validate the questions for each variable under consideration, it was sent to eminent personalities in the field of business and education and their opinions were obtained. Taking their suggestions into account, the questionnaire was modified. Details of various aspects of the questionnaire is given below.
4.3.1 Style variable

Many typologies are available for categorizing style into different categories. McGregor Theory X and Theory Y, Likert's authoritative benevolent style, consultative and participative styles [24], organic and mechanistic styles of Burns and Stalker [62] and Khandwalla's eight different styles [71] are the important typologies available for analyzing style. Khandwalla, after going through the work of previous researchers, has suggested four important ingredients of every managerial style namely Risk taking, Technocracy and long range planning, Structuring of activities, and Participation. Based on these four attributes, he has categorized style into eight different types as given in Table 4.2. Khandwalla [71] typology was used in this study to analyze the variable 'style'.

4.3.2 Structure

Huge's [91] instrument for measuring organic and mechanistic structure was used in this study. This instrument, which includes two items for each one of the five variables namely Formalization, Stratification, Complexity, and Centralization was rewritten to confirm to engineering industry. Table - 4.3 illustrates how Huge's four variables relate to organic and mechanistic structure.

4.3.3 Strategy

The typology of Miles and Snow [85] developed for identification of product-market strategy of sixteen firms publishing college textbooks was modified in the present study to suit the engineering industry. The strategies identified by Miles and Snow [85] are (i) Defender (type - 1), (ii) Prospector (type- 2), (iii) Analyzer (types - 3) and (iv) Reactor (type -
4). These typologies have empirical support also from Miles and Snow [85] and Snow and Herbiniax [7].

4.3.4 Skill

Ten distinctive competencies identified and used by Snow and Herbiniax [7] was used in this study. These functions are (i) General management (ii) Financial Management (iii) Marketing Research (iv) Marketing (v) Product Research (vi) Engineering (vii) Production facilities (viii) Distribution (ix) Legal and (x) Personnel. These measures had content validity in the fact that these ten functions appear regularly in literature and are commonly used by managers.

4.3.5 System

Adaptiveness of the system to the environment was the objective with which the questions in this section were framed. Existing procedures, modification of procedures to changing environment, information network existing in the organization were some of the aspects touched in this section to bring out the system adaptiveness.

4.3.6 Staff

Commitment of employees towards the organization was measured using the instrument developed by Mowday et al [76]. The conceptualization of organization commitment by Mowday is based on the following three components

1. Acceptance of organization goals and values
2. Willingness to exert effort on behalf of the organization
3. A desire to maintain organizational membership
Organizational commitment so conceptualized fits the objective of the present study.

4.3.7 Shared values

Relevant questions were developed to bring out the culture of the organizations as defined by Robbins [92]. It brings out (i) Individual autonomy (ii) Autonomy - Responsibility match (iii) Warmth and support provided by the managers to their subordinates (iv) Members desire to identify with the organization (v) Performance reward based on employee performance criteria (vi) The degree of Conflict tolerance present in the relationship between members of the organization and (vii) Extent of Risk tolerance present in the organization.

4.4 FRAME OF REFERENCE

To collect relevant data through the questionnaire booklet (Appendix - II) for the purpose of the present study, a change of roles by the respondents is needed. A respondent was supposed to change his frame of reference while answering to different parts of the questionnaire depending upon the type of data attempted in that part(s). For example while answering to the factors such as Style, Structure, Skill etc the respondent was supposed to remember the whole organizational perspective as a frame of reference and his role was that of an informer, who describes different aspects of the general happenings in the organization. On the other hand, for questions on organizational commitment and organizational culture, the respondent was supposed to provide a self description about his motives, needs and beliefs.

In other words, the appropriate response to the questionnaire booklet presented to the respondents demanded the switching of roles from one to other. Considering these factors,
each section of the questionnaire is provided with appropriate explanations about what is expected from them.

4.5 DATA COLLECTION PROCEDURE

The primary data was collected through questionnaire. The respondents were explained in detail about the research work in progress before the questionnaire was handed to them. They were given sufficient time to fill up the details of the questionnaire. All the financial data relating to the organizations performance were collected from published sources like Bombay stock exchange directory and Coimbatore stock exchange library.

4.6 ANALYSIS OF DATA

In order to test the hypotheses derived from the model under study, several statistical methods and tests were used. The methods and tests were selected on the basis of the requirement of the problem on hand, the analysis plane and the theoretical compatibility in terms of their implicit assumptions. Predominantly, a multivariate analysis model provided the basis for the analysis. The present section attempts to provide a brief description of the statistical methods and tests used.

4.6.1 Multiple Regression Method

Any criterion of success like profitability, satisfaction, etc has multiple determinants. In the research model conceptualized, there are more than one variable which indicates the success of organizations. Hence, it is desirable to establish the relationship between multiple determinants and multiple criteria of success. In order to establish and identify the most important criterion among the several criteria of success, multiple regression technique was
used. Also, indicators of success of each organization were influenced by more than one factor. This also requires a multiple regression technique to deal with.

Step wise multiple regression method was found more appropriate, as the model eliminated least influencing variable on the dependent variable. It identifies the best independent variable for that dependent variable and the percentage of influence of the independent variable on the dependent variable.

In the present study, independent variables were included in the model based on their highest partial correlation and their significant t-value. Test of significance for multiple R was carried out in each step by calculating the F statistics.

4.6.2 t-Test

In order to find out whether there is significant difference between the variables in the highly successful and less successful organizations, a set of t-test was carried out. It compares the mean score of both the samples and the standard deviations. The t-test assumes variables across population as same. Using the data from the sample, standard deviation and standard errors were computed and the 't' as a ratio of mean difference and standard error was computed for each case. The statistical significance was tested to find out whether there is significant difference exist between both the samples.

4.6.3 Discriminant analysis

In order to study the association of independent and dependent variables of the sample organisations, discriminant analysis was used. This is the most widely used technique among
the various techniques available such as (i) Automatic interaction detection (ii) Probit and
logit (iii) Canonical correlation and (iv) Path analysis [93].

In multiple regression analysis technique a linear composite that maximises the
coefficient of R square was found. But in two group discriminant analysis, a linear composite
of the original variables that maximises the ratio of among-to-within groups variability was
found. So, by using this technique, the factors under each variable set which was responsible
for variation between the highly successful and less successful groups was found out.

4.7 CONCLUDING REMARKS

The methodology was developed to meet the following four main objectives: (i) To
categorise organizations into highly successful and less successful groups (ii) To compare
the prevailing situations in high and less successful groups and to find if there is any
significant difference (iii) To find out the factors that significantly contribute to the
difference in the performance of the two groups of organizations through stepwise multiple
regression and through two group discriminant analysis (iv) The factors which discriminate
between both the groups.

Using the data obtained from the sample, the methods discussed in this chapter are put to
use in the following chapters.
### Table 4.1 General Details of the organisations included in the sample

<table>
<thead>
<tr>
<th>Organisation Code</th>
<th>Size of the organisation Paid up - Capital 1996 (in Crores of Rupees)</th>
<th>Year of Establishment</th>
<th>Sector (based on main area of operation)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>5.07</td>
<td>1974</td>
<td>Textile machinery</td>
</tr>
<tr>
<td>B</td>
<td>3.13</td>
<td>1956</td>
<td>Automobile components &amp; spares</td>
</tr>
<tr>
<td>C</td>
<td>4.66</td>
<td>1988</td>
<td>Machine tools</td>
</tr>
<tr>
<td>D</td>
<td>1.60</td>
<td>1977</td>
<td>Compressors &amp; Drilling Machines</td>
</tr>
<tr>
<td>E</td>
<td>5.51</td>
<td>1972</td>
<td>Automobile spare parts</td>
</tr>
<tr>
<td>F</td>
<td>3.80</td>
<td>1969</td>
<td>Industrial gears</td>
</tr>
<tr>
<td>G</td>
<td>3.83</td>
<td>1961</td>
<td>Bearings</td>
</tr>
<tr>
<td>H</td>
<td>2.82</td>
<td>1963</td>
<td>Castings</td>
</tr>
<tr>
<td>I</td>
<td>6.10</td>
<td>1962</td>
<td>Textile machinery</td>
</tr>
<tr>
<td>J</td>
<td>3.00</td>
<td>1946</td>
<td>Machine tools</td>
</tr>
<tr>
<td>K</td>
<td>3.00</td>
<td>1960</td>
<td>Machine tools</td>
</tr>
<tr>
<td>L</td>
<td>0.76</td>
<td>1973</td>
<td>Castings</td>
</tr>
</tbody>
</table>

### Table 4.2 Characteristics of top management style

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Managerial Styles</th>
<th>Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Risk taking</td>
<td>Structuring of activities</td>
</tr>
<tr>
<td>1.</td>
<td>Entrepreneurial style</td>
<td>H</td>
</tr>
<tr>
<td>2.</td>
<td>Professional entrepreneurial style</td>
<td>M-H</td>
</tr>
<tr>
<td>3.</td>
<td>Bureaucratic style</td>
<td>L-M</td>
</tr>
<tr>
<td>4.</td>
<td>Conservative traditional style</td>
<td>L</td>
</tr>
<tr>
<td>5.</td>
<td>Professional management style</td>
<td>M-H</td>
</tr>
<tr>
<td>6.</td>
<td>Professional bureaucratic style</td>
<td>L</td>
</tr>
<tr>
<td>7.</td>
<td>Colleaguial style</td>
<td>L-M</td>
</tr>
<tr>
<td>8.</td>
<td>Middle-of-the road style</td>
<td>M</td>
</tr>
</tbody>
</table>

H - High  
L - Low  
M - Medium

**Table 4.3** Huge's (1965) organisational factors related to organic and mechanistic structure

<table>
<thead>
<tr>
<th>Factors</th>
<th>Structural Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Organic</td>
</tr>
<tr>
<td><strong>Formalization</strong></td>
<td></td>
</tr>
<tr>
<td>1. Codified job</td>
<td>Low</td>
</tr>
<tr>
<td>2. Variation with in job</td>
<td>Low</td>
</tr>
<tr>
<td><strong>Stratification</strong></td>
<td></td>
</tr>
<tr>
<td>1. Status among job</td>
<td>Low</td>
</tr>
<tr>
<td>2. Mobility barrier between Low &amp; High Jobs</td>
<td>Low</td>
</tr>
<tr>
<td><strong>Complexity</strong></td>
<td></td>
</tr>
<tr>
<td>1. Number of Specialist</td>
<td>High</td>
</tr>
<tr>
<td>2. Required level of training</td>
<td>High</td>
</tr>
<tr>
<td><strong>Centralization</strong></td>
<td></td>
</tr>
<tr>
<td>1. Number of decision making jobs</td>
<td>High</td>
</tr>
<tr>
<td>2. Number of areas where decisions are made by decision makers</td>
<td>High</td>
</tr>
</tbody>
</table>