CHAPTER 3

RESEARCH METHODOLOGY

This chapter covers the methodology employed in this study. It includes a description of the sample, sample size and the population, the scope of the study, the data collection methods, tools used and methods of statistical analysis to investigate the research hypothesis presented in chapter one.

3.1 Population and Sample

3.1.1 The Population

The population of the study consisted of Small and medium enterprises (SMEs) which manufacture automobile components in Pune, India and Bangkok, Thailand.

India

In Pune, the companies which register their company names with the Maharashtra Chamber of Commerce, Industries and Agriculture (MCCIA), were considered. The number of SMEs which were dependent on the auto industry in some way or the other was more than 6,000.

Thailand

In Thailand companies which register their company names with the Department of Industrial Works, Ministry of Industrial, Thailand, were considered. The number of registered companies manufacturing automobile components in the
entire country is 1,724. According to the Department, the number of companies which manufacture automobile components of SMEs in Bangkok is 430.

### 3.1.2 The Samples & Sample Size

The sample was selected based on the willingness of companies to participate in the study. A preliminary meeting was held with the respective Chambers of Commerce in Pune and Bangkok to establish willingness and whether companies met the criteria for the study. Based on these meetings, 20 companies were selected from Pune and Bangkok.

The sample size of 20 may seem small when compared with a true population size of approximately 6,000 in Pune, India and 430 in Bangkok, Thailand, however many of the companies which comprised the whole population were not classified as SMEs (either micro or large enterprises) and hence were not suitable for this study. The sample size of 20 from each country was deemed appropriate when this fact was taken into consideration.

### 3.2 Questionnaire Construction Method

The following method was used to create the questionnaire:

1. Study and analyze concepts, theories and research that were related to the research topic.
2. Apply results from step one (1) and conceptualize a questionnaire.
3. Consult with a relevant authority about the questionnaire.
4. Revise the questionnaire and repeat step three (3) until satisfied.

Below is a detailed description of the method described above with reference to this study:
1. Study and analyze concepts, theories and research that are related to the research topic. To accomplish this goal the following areas were thoroughly researched and studied:
   - Knowledge Management Processes
   - Small and Medium Enterprises (SME) in India and Thailand
   - SMEs in the manufacturing of automobile components industry

2. Apply results from step one (1) and conceptualize a questionnaire.
   - Researched and studied about constructing a questionnaire
   - Conceptualized and designed the parts of the questionnaire
   - In each part conceptualized and designed the questions

3. Consult with a relevant authority about the questionnaire.
   - Consulted with my research guide on content, applicability and suitability of the questionnaire. Consultation was done five (5) times

4. Revise the questionnaire and repeat step three (3) until satisfied.
   - As mentioned above, consultation with a competent authority was done five (5) times. Each time there was consultation, improvements were made to the questionnaire

The development of the questionnaire, that is studying, analyzing, applying, consulting and revising, took approximately six (6) months.

3.3 Construction of the Questionnaire

A six page questionnaire, consisting of 85 questions, was constructed and produced in English and Thai. The owner or the top executive of management of that enterprise was targeted to answer the questionnaire. There were three categories of questions to be answered:

1. Tick to choose the answer

2. Fill in the blank

3. Tick in the column of values ranging from 1-5 to indicate the degree of agreement.
The questionnaire had seven parts; each part consists of groups of questions as follows:

- **Part 1: Demographic Data of the Interviewee**
  This section consisted of four questions which asked about age, educational background and current position in the company.

- **Part 2: Characteristics of Company**
  There were six questions in this section, to identify the size of the company, types of partnership, number of employees, employees’ educational background and the value of the company’s assets.

- **Part 3: Strategy, Management Style and IT Investment of the Company**
  This section had eighteen questions and was divided into three sub-sections: the company’s strategic management plan, its management style or entrepreneurship and its IT investment. The first section, strategic management plan, consisted of questions on goal setting, goal communication, marketing plan for export, research and development (R&D) innovation of products and processes, recognition of innovation from staff, customer excellence, English and computer training for staff, customer focus, and prompt response to market changes. The entrepreneurship section refers to company’s management style. Finally, the IT investment section, asked questions about the amount of IT investment, the competency of English and computer literacy level in the company, the amount of IT infrastructure, number of IT experts, number of employees who can access Internet, the ratio of the PC to employees, the usage of specialized software, IT training hours and cost of IT training.

- **Part 4: Knowledge Management Process of the Company**
  There were fifteen questions about the knowledge management process of the company. The questions gathered information about, the company’s organizational policy towards the knowledge management process, employee’s support of the process, the effect of the knowledge management process on work speed and efficiency. The effect of process on relationships within the organization and its
effect on reducing conflict among persons in company. Whether the process supports and promotes the company's growth and assists employee’s in the organization with having a clear image of company.

- **Part 5: Customer Factors Considered by the Company**
  There were eight questions relating to customer factors, divided in to two sections: customer related activities and customer satisfaction. Questions in this section gathered information on a variety of indicators of customer related activities and satisfaction, for instance, sources and cost of advertising, questions on the convenience of buying items from the company, the delivery system, the price, understanding of customer needs, efficiency of customer handling and the response of the executive management to customer needs.

- **Part 6: Attitude of the Company towards Government Support and Policy**
  There were twenty questions to survey the attitude of the SMEs towards government support and policy. These questions covered whether the government supports research and development (R&D) of companies, communication of the policy objectives and standards, funding, efficiency of funding institutions, arranging of international trade fairs and exhibitions, IT training, IT infrastructure, and the cost and convenience of telecommunication systems. These questions also included SME taxes, international taxes, security issues, intellectual property protection, international trade and networks, and the effort of government agencies in promoting companies which manufacture automobile components, including export promotion and whether the economic and social environment supported companies which manufacture automobile components.

- **Part 7: Private and International Organization’s Support**
  There were thirteen questions in this section. These questions covered the efficiency of private agencies in support of SMEs in terms of finance, cost of IT Services, delivery services, quality, quantity and cost for material, labor, insurance service, competitiveness in domestic markets, and consumer demand.
3.4 **Data Collection**

The owners or chief executives of the enterprises were interviewed and the questionnaires were filled during the interview process. The data was collected between the months of April – July, 2008 in Bangkok, and August – October, 2008 in Pune.

3.5 **Data Analysis**

The data was analyzed in three stages which are listed below:

1. **Preliminary and Summary Analysis**

   The data was presented in a tabular format and as pie charts; additionally the mean value and median value of the data were presented as summary statistics where applicable. Continuous data was first categorized into discrete bins and then presented using tables and pie charts (Freedman, Pisani and Purves, 1997: 42 – 48).

2. **Framework Analysis**

   A framework was developed to group related parameters (attributes) from the questionnaire and explain their importance to the knowledge management process. The companies were analyzed using this framework to obtain an objective view of their knowledge management process. Continuous values were first categorized into discrete bins, so that values on varying ranges could be analyzed on the same scale (Field, 2005: 49) and coalesced together to provide objective scores for aspects of the framework. The data in its raw form consisted primarily of discrete values as well as a few continuous values. In order to combine the values to get an objective assessment for each component of the knowledge management framework, developed and used in this research, the continuous variables in each component had to be mapped to discrete scales and the discrete scales for attributes contributing to a particular component of the framework had to be standardized. Once an objective value for each component of the framework was obtained, they were then combined using equal weight for each component to produce a knowledge management process estimate (Freedman, Pisani and Purves, 1997: 42 – 48).
3. Correlation Analysis

An implicit ranking of the data was done by making the data discrete to perform the framework analysis. So in order to test the relationship between the knowledge management process estimate and the sales performance of the sample the Spearman rank correlation coefficient (rho) was the natural choice as the test statistic. The Spearman rank correlation coefficient (rho) provided two distinct advantages:

1. The test was designed for ranked data and since the data became ranked once it was made discrete, it was the obvious choice for correlation analysis (Levin, Rubin p, 2008: 793).
2. The test is a non parametric test, so it did not assume any underlying distribution of the data to be tested (unlike the Pearson correlation coefficient which assumes normally distributed data) (Levin, Rubin p, 2008: 793).

The following are the details of the Spearman rank correlation coefficient:

\[
\rho = 1 - \frac{6 \sum d_i^2}{n(n^2 - 1)}.
\]

where
- \(\rho\) – coefficient of rank correlation
- \(n\) – number of paired observations
- \(\Sigma\) – notation meaning “the sum of”
- \(d\) – difference between the ranks for each pair of observations

The level of significance of the test is probably the most important value of the test. This value indicates whether the observed value of \(\rho\) was by coincidence or if the experiment were repeated again a similar value of \(\rho\) would be obtained. In statistics terms it measures whether the observed value of \(\rho\) is significantly different from zero. This research uses the t-test to determine the level of significance. Observed values of \(\rho\) with a 2 tailed level of significance value less than or equal to 0.05 are deemed to be significant, while values with less than 0.01 2 tailed level of significance are deemed to be very significant (George, Mallery, 2006:126). In layman terms this means for 2-tailed levels of significance of 0.05 and 0.01 there is a 5% and 1% probability that the observed value of \(\rho\) occurred by chance.
respectively, so only \( \rho \) values which have a 2-tailed level of significance equal to 0.05 or less will be considered for identifying relationships.

### 3.6 Data Analysis Tools

The collected data was analyzed using the software programs Statistical Package for Social Sciences (SPSS) and Microsoft Excel 2003.