Chapter 5

RESEARCH METHODOLOGY

5.1 Introduction

As the software engineering field has developed, much attention has focused on improving the associated technology and processes. Comparatively little thought has been given to the issue of human resource management. Some see it as central to productivity and software quality. However, little empirical research has explored the required nature of such management. A survey of the 44 software organizations reveals the nature of human resource practices, and the relatively poor importance attached to the management of human resources. Two of the organizations studied are selected as examples of preferred and poor practice, and more in-depth data was gathered from these companies. The researcher consider that this comparative analysis reveals a difference that is central to the design of human resource strategies in the software sector: One company managed software engineers as individuals within groups, while the other focused on the management of teams.

The maturity of software engineering is easily identified. The first 'wave' of maturity development was the "Waterfall" method, which was introduced in 1970 (Royce 1970). Recently it has been argued that the field is in the second 'wave' of its evolution- a maturity movement. This is where the field is attempting to formally define the process and the best ways to continually improve it (Paulk et al., 1993). There are three components of software engineering: the technology, the process and the people (Humphery 1989). The first wave of evolution used technology as the means of driving progress in the field, or to spur on improvements (Scaachi 1984). Today, the second wave is concentrating on improving the process (Jones 1991, McGowan and Bohner 1993, Paulk et al. 1993.) By simple process of elimination, the remaining component as per Humphrey (1989) is the people or the human resources, on which the software
engineering field has yet to focus its attention. The human element is becoming more important as the software industry become more global, and the mobility of skilled software developer increases.

5.2 Human Resource Management in Software Sector

Human resource practices cover issues of recruitment, training and development, team building, compensation, performance appraisals, and career development. These practices are tangible evidences of the human resource strategy used by a software organization. The human resource practices of the software organization should be made to fit the unique characteristics of the software engineering profession. This would conform with level three of the People Management Capability Maturity Model (PM-CMM), which is the standard level of the model at which human resource practices are tailored to the programming profession (Curtis et al., 1988).

It is clearly evident from a review of the literature that human resource management is of crucial importance to software organizations, in that their end products ultimately depend on how well they manage their human resource (Yourdon, 1992). Boehm (1981) concludes, from a study of sixty three software development projects, that 'Personnel attributes and human relations activities have by far the largest source of opportunity for improving software productivity'. This is supported by Thomsett (1990) who reports immediate productivity gains of 200 percent following a people management programme. Thus, it is important to identify the kind of human resource strategy software organizations employ to manage human resources. The literature has identified the complexities involved in managing the human resource within a software engineering environment. It is equally important, however, to examine how the human resource practices of software organizations support the functioning of the software team. Clearly, any evaluation of the human resource strategy of a software organization would be based primarily on the level of support given to the software team. The human
resource strategy that an organization adopts underlines its attitude and commitment to human resource management and also ultimately underlines its attitude towards the people it employs. Indeed, the human resource strategy of the software organization underlines its understanding of what is important in managing the software engineering effort.

In the previous chapter, I described the research made on HRM practices of software industry. Most of the researches were limited to the one particular topic only. Taking clue from them my research goes step further. It will not only uncover the HRM practices of software industry but also the reasons and interpretations of various aspects.

5.3 Importance of study

The emerging trend in Human Resource management is clearly toward the adoption of the human resource approach, through which organizations benefit in two significant ways: an increase in organizational effectiveness and the satisfaction of each employee's needs, rather than addressing organizational goals, human needs are compatible: one set need not to be gained at the expense of the other.

The Human Resource management has been transformed for its relative obscurity to a prominent management function in the organization. It has resulted due to the growing size of business environment and increased emphasis on managing human resources. On the other hand, unprecedented developments have taken place in the field of IT. The world has witnessed large scale changes taking place in the way the business organization do business due to increased application of software tools and techniques. The symbiotic relationship, which exists between software industry and Human Resource Management, has flourished in recent times. The impact of IT on the Human Resources function has been both pervasive & profound.
There is a growing tendency in the leading organization to use information & software systems as strategic competitive weapon to remain ahead of their competitors.

HR function greatly affect the financial success of an organization. Organization wishing to remain competitive in today's rapidly changing global market place need to address the issue of achieving productivity through their employees. The importance of the HR function is the organization's effort to achieve financial success was solidly supported by 1990 report of INC. magazine. The top one hundred rapid- growth companies as identified by INC. magazine were included in study and result found a strong relationship between HR practices & bottom line profit. A second finding was that company size measured by number of employees did not effect the result. Companies of all size work equally affected. The results generally indicated that more successful companies are engaged in More HR practices than did less successful companies.

Employers who have successfully integrated the HR function into the top level of Mgt. and strategic planning and who have a strong emphasis on employer recruitment, selection, motivation and team building can expect greater employee productivity and thus greater overall company success.

5.4 The Research Framework

It is recognized that the Software field is fragmented and pluralistic by nature in that it incorporates many disciplines (Galliers, 1991). Therefore, choosing one research method is difficult as different approaches have previously been used to investigate these disciplines (Antill, 1985). It is therefore argued that software research is best understood when conducted using pluralistic models (Banville and Landry, 1989), as either positivistic or interpretivistic method alone will not provide the richness that the software field needs to further advance (Kaplan and Duchon, 1988). However, such methodological pluralism is contingent on the
problem being studied and the kind of knowledge being sought (Hirchheim, 1985), and therefore should be directly related to the research objective and previous research in the area.

5.5 Objectives of study

The objective of this research is to empirically investigate the nature of human resource management in the Indian software industry. The study is exploratory, and the pluralistic research approach used reflects this.

The survey gathered factual and attitude data with the following objectives.

- To study various practices of Human Resource Management in software industries located in Gujarat and Maharashtra.
- To elicit role of HRM functions in software industries.
- To study various practices of HRM in software industries like,
  - Recruitment & selection of software professionals.
  - Performance Appraisal of software professionals.
  - Compensation administration for software professionals.
  - Training & Development of software professionals.
  - Gap between demand and supply of software professionals.
  - Career advancement of employees in software industry.
  - Retaining software professionals.
- To ascertain effectiveness HRM in software industry.
- To identify future challenges for HRM department of software industry.

For Exploring the influence of the areas of HRM practices on the job turnover rate of employees in software industry, following Null Hypotheses had been formulated.
Ho 1: There is no significant relationships between job turnover rate and existence of training scheme.

Ho 2: There is no association between Software engineer involvement in assessing training need and staff turnover rate.

Ho 3: Career development practices does not affect on employee turnover rate of organizations.

Ho 4: ESOP and job turnover rate are not related with each other.

Ho 5: Performance base incentives like measures and job turnover rate are not related with each other.

Ho 6: Existence of HRM dept (HRM Manager) and job turnover rate of organizations does not have significant relationship.

5.6 Benefits of study

Information technology has made the world a global village. Moreover the current millennium poses greatest ever challenging opportunities in every field. The study may be helpful to have a futuristic vision with commitment to achieve it through boldly measure. The research will be helpful in solving various human related problems of software industry. The research results will assist in more than one way in taking business policy decisions related to human resource.

Study will be beneficial to all software industry, HRM professionals working in software industry, academician and student aspiring to join this industry. Academician, students and professionals working in this field will come to know about present scenario and future challenges of this industry. It will also provide requisite data to software industries and they will know how effectively HRM can be used in software industries.
5.7 Research design

The research design chosen for the present study is an exploratory type. The major objective is to explore the HRM practices of Indian software industry in general and selected companies in particular. Since the exploratory type of research design is framed, a good number of software companies approached. In addition to it various opinions of top software HR managers have been explored, survey method, telephonic interview and personal interview techniques were used for data collection.

5.8 Sampling Procedure

It refers to the technique or procedure adopted for selecting items in the sample. In this research a non-probability sample of forty four companies were selected for survey. In choosing the companies for survey the judgment of the research convenience and respondents willingness to co-operate were major criteria.

Survey method was used to study current practices, resulting in a 'mapping' of these practices as part of the exploration of the nature of HR management. The survey questionnaire was originally sent to the 110 software development organizations located in Gujarat and Maharastra but finally 44 companies participated actively in survey. Each organization surveyed received questionnaire; for the personnel/HR manager. For the purpose of the study, a software engineer was defined as someone who designed or developed software. The survey gathered factual and attitude data on the following topics.

5.9 Methods for data collection.

Data has been collected both from secondary and primary sources.

5.9.1 Secondary data

Various published researches have been tapped for gathering secondary data. The researcher also has made extensive use of internet to obtain secondary
data. Initially it had been extremely difficult to search for secondary data on the internet, but gradually with efforts to focus on key areas, the information was forthcoming. Data from number of research papers, books, handbooks, government reports, newspapers, business magazines, National association of software and service professionals data base has also been used for the review of literature. Useful information about the factors and other related aspects of software management could also be developed with the help of this information.

Some of prominent libraries visited by researcher included IIM, Ahmedabad; Ahmedabad management association; All India management association, New Delhi; Central library, M.L. Sukhadia Univeristy; Bhaikaka library, vallabhidyanagar; Pacific Institute of Management, Udaipur; GH Patel Institute of Business Administration, Vallabh vidyanagar; National Association of Software and Service Companies, Mumbai; Gujrat informatics ltd., Gandhinagar.

5.9.2 Primary Data:

The primary data have been collected through the structured questionnaire during month of May-June 2003. At some places personal interviews, telephonic interview, online correspondence, schedule were also used.

Pilot study was done for pretesting the questionnaire and improvements were affected thereafter. Both close ended and open ended type of questions were included in the questionnaire.

Content analysis technique was also used. The content of documentary material such as books, magazines newspapers, advertisements, brochures and the contents of all other verbal materials either spoken or printed were analysed.
5.10 Response from respondents.

In the first instance the questionnaires were mailed to 110 companies. Along with questionnaire a covering letter was sent which assured respondents that the information provided by them will be kept strictly confidential and will be used only for the purpose of analysis in the present study. In order to receive the filled questionnaire the medium of internet too was used extensively in following up the responses and quiet an impressive number of responses were received via e-mail also.

At the approachable places some personal interviews and at the some places telephonic interviews were conducted.

5.11 Development of Instruments:

5.11.1 Development of Instrument for software professional response.

An instrument has been developed which attempts to measure the responses of the HR professionals regarding current HRM practices of software companies. The instrument developed in the present study reflects Indian software industry's Human Resource Management Practices and realities. The views of prominent software professionals have been incorporated while the instrument was pre tested among these professionals. After prolonged and intensive discussions with the research supervisors, colleagues and academicians, the numbers was brought down to 67 questions, the instrument was then pre tested among 9 software HR professionals. They were requested to comment on aspects of the questions, its appropriateness, ease of comprehensions, reliability wording etc.

Apart from the close ended questions, a set of open ended questions was also included in the instrument to seek the opinions of the software HR professionals in greater depths. This set also provided a basis of in-depth interviews with the respondents.
5.11.2 The Questionnaire

A structured questionnaire was framed to meet specific requirement of the present study. The design of the questions has been kept simple. Both closed and open ended questions have been included. A large number of questions are closed ended while a few questions are open ended to seek professionals' suggestions and opinion about HR issues and future challenges of software industry. For all the closed ended questions, clear cut instructions have been provided at appropriate places to avoid ambiguity.

In the beginning part of the questionnaire seeks to gather personal information about the respondents like name, designation, company, e-mail & locational address, phone no. etc.

5.12 Analysis of data

The collected data were processed and analyzed in accordance with the outline laid down for the purpose at the time of developing the research plan. All the questionnaires were examined to detect errors and omissions and to correct these where ever possible. Editing was done to ensure that the data was accurate, consistent with other facts gathered, uniformly entered as complete as possible and have been well arranged to facilitate coding and tabulation.

After editing, coding and classification of data was done, numbers or other symbols were assigned to answers so that responses can be put into a limited number of categories or classes. Classes were made by arranging data in groups on the basis of common characteristics. After this, the data was tabulated i.e. arranged in a logical manner, in columns & rows and frequency distribution was done.
Following statistical analysis methods have been used for the analysis of data. Percentages, proportions, measure & central tendency, statistical significance test named CHI-square.

5.13 Limitations of study

Limitations of study are due to following reasons.

(i) The current level of HRM issues in software companies is attempted to be explained only in selected organizations. The geographical coverage of the present study is confined to two states, Gujarat and Maharashtra only. A wider coverage might have resulted in increased reliability of the findings.

(ii) Unwillingness of respondents to provide information, some managers were unwilling to help in the study, it resulted in distortions in the research design.

(iii) Some of the responses were partially filled up. It was accounted for adjusting the sample size of a question to question basis.

(iv) The researcher is greatly handicapped by the non-availability of financial resources. The state of Maharasra and Gujarat are two large state and companies are located in far flung areas. Therefore researcher could not personally visit all the companies. As a result the response to the questionnaire could not be supplemented with in-depth interviewing.