CHAPTER I
INTRODUCTION AND DESIGN OF THE STUDY

1.1 INTRODUCTION

The Information Technology Sector has made the world a global village, shrinking national boundaries and integrating cultures. The Indian IT sector is growing rapidly and it has already made its presence felt in all parts of the world. This sector has a major role in strengthening the economic and technical foundations of India. The Indian IT industry has built up valuable brand equity for itself in the global markets. The IT industry in India comprises software industry and information technology enabled services (ITES), and business process outsourcing (BPO) industry. India is considered as a pioneer in software development and a favourite destination for the IT-enabled services.

The origin of the IT industry in India can be traced back to 1974, when the mainframe manufacturer, Burroughs, asked its Indian sales agent, the Tata Consultancy Services (TCS), to export programmers for installing system software for a U.S. client. The IT industry originated, under unfavorable conditions. Local markets were absent and government policy towards private enterprise was hostile. The industry was begun by Bombay-based conglomerates which entered the business by supplying programmers to global IT firms located overseas. During that time Indian economy was state-controlled and the state remained hostile to the software industry through the 1970s. Import tariffs were high (135% on hardware and 100% on software) and software was not considered an “industry”, so that exporters were ineligible for bank finance. The Government policy towards the IT sector changed when Rajiv Gandhi became the Prime Minister in 1984. His New Computer Policy (NCP-1984) consisted of a package of
reduced import tariffs on hardware and software and declared software exports as a "delicensed industry", henceforth eligible for bank finance and freed from licence-permit. These policies laid the foundation for the development of a world-class IT industry in India. Today, the Indian IT companies such as the Tata Consultancy Services (TCS), the Wipro, the Infosys, the HCL and the like are renowned in the global market for their IT prowess.

The Indian information technology industry accounts for 5.19 per cent of the country's GDP and export earnings and providing employment to a significant number of its tertiary sector workforce as of 2009. More than 2.5 million people are employed in this sector either directly or indirectly, making it one of the biggest job creators in India and a mainstay of the national economy. In 2010-11, annual revenues from the IT-BPO sector is estimated to have grown over US $76 billion and compared to China with $35.76 billion and Philippines with $8.85 billion. India's outsourcing industry is expected to increase to US $225 billion by 2020.

History has demonstrated that with each new technological innovation there have been profound changes in the quality of life of human beings. Followers of the pioneering economist Joseph Schumpeter's fifty year model asserts that the first wave of change in modern history (1780s–1840s) brought steam power that initiated the industrial revolution; next came the railroads (1840s – 1890s) followed by electric power (1890s – 1930s), and then cheap oil and the automobile (1930s – 1980s). Now the fifth wave is being driven by the information technology.

The present study is concerned with how the information technology and the consequent change in job culture affect the life of the IT professionals. This is particularly relevant because jobs in the information technology is the most coveted one in modern India and the most brilliant section of the youth are going for it. While each
job has its own stress, the IT jobs are somewhat different from the traditional and typical concept of secured employment. The IT jobs are mostly contractual with less job security but with high pay, and entail strong competitiveness, along with a globalized life style. There are a few evidences that the IT jobs are offering an elevated standard of life, but taking tolls on the mental health and relationship aspects of the professionals. Hence, in the present study an attempt is made to analyse the stress among the IT professionals.

Hans Selye first introduced the concept of stress in life sciences in 1936. There are different views of different persons on the basis of their personal experiences. Some consider that it is a frustration or emotional tension; some suggest that it is a physical or mental pressure. These views restrict and act as a hindrance, in the performance of an individual. It is a pressure that people feel in life due to their reaction to situation. Hans Selye defines stress as an “adaptive response to the external situation that results in physical, psychological or behavioural deviation for organizational participants”. It is a condition arising from the interaction of people and characterized by change within people that forced them to deviate from their normal functioning. There are two sides of stress, positive and negative. A force that deviates from the normal functioning is distress, a negative side. A positive side is called a buttress, which refers to healthy, positive, constructive outcome of stressful event. It is an experience that motivates people to achieve goals and attain success in every field of their life. With the growth of industries, pressure is mounting in the urban areas. It leads to quantitative growth in population and various problems in day-to-day life. These are some of the reasons for increase in stress. Stress is a condition of strain that has a direct bearing on emotions, thought process and physical conditions of the person.
During the past 10 years the IT sector had undergone rapid and striking changes due to globalization and liberalization and business outsourcing. The IT sector in India receives more orders from foreign countries. Hence the IT sector has paid higher remuneration for the employees. But recently due to economic meltdown in the world, the job opportunities in the IT sector are declining. At the same time the IT sector has cut down the wages of their employees. They are all working for long hours. Hence, stress is an unavoidable part in the IT sector. Thus, the researcher has made an attempt to study the stress among the employees in the IT sector.

In India, next to Karnataka, Tamilnadu attracts multitude of multi-billion rupee from foreign software companies. They are employing a large number of persons. Hence, it is decided to study the stress of the employees in the IT sector in Tamilnadu. In Tamilnadu, Chennai occupies the major position in the IT sector. So, Chennai has been selected as the area for the research.

1.2 STATEMENT OF THE PROBLEM

Occupational stress represents a major problem for both the individuals and the organizations. Previous research by Westman and Dov (1997) has shown that stress has a negative impact on the health and safety of individuals. Costs associated with occupational stress in terms of work days lost, absenteeism, and health costs have significant implications for the organization. Job stress has been examined in a wide variety of professional groups such as teachers, nurses, accountants, managers, and pilots. To date, little attention has been devoted to examining the occupational stress among the information technology (IT) personnel. The limited research which exists on this topic generally focused on the IT personnel in the United States (Ivancevich et al., 1983). The paucity of research on stress among the IT personnel is surprising in light of
both anecdotal evidence from popular business magazines as well as empirical evidence from research examining the changing roles of the IT professionals. Results of such research suggest that the role of the IT personnel has become more complex and demanding, resulting in additional responsibilities for them. Rapid changes in technology have also resulted in significant changes in expectations of users and managers (Leong 1994). Thus, it is expected that such changes can pose additional challenges as well as generate considerable stress among the IT professionals. India being an ideal country has to investigate stress among this group of professionals due to its heavy reliance on IT to develop the country into a communication, business and economic centre. The government is placing heavy emphasis on the use of IT to develop an advanced national information infrastructure.

Indian IT professionals represent a dynamic workforce in a new and high growth industry of the future. The Indian software industry has a remarkable success story. It has grown more than 30 per cent annually for 20 years. The Industry’s 2009 exports, is nearly $65 billion. India exports software services to more than 60 countries, with two-thirds to the United States and this is expected to grow over the years. Given the growing number of the IT professionals in the workforce and the increasingly important role they undertake research focusing on what stresses the IT professionals is warranted. In fact, with the increasing use of the IT by both the developing and the industrialized countries, the IT professionals constitute an important component of the workforce that can aid companies and government in leveraging IT to improve efficiency and compete effectively in the global markets. Thus, it is important for managers and organizations to understand the different types of stressors experienced by the IT professionals in order to assist them in better managing stress experienced at the workplace.
One of the major problems which plagued the IT industry in India is the high employee turnover rate of about 16.5 per cent in 2004 - 2005\(^5\) among the IT professionals. While this rate has increased to 25 per cent to 30 per cent in the year 2007 – 2008\(^6\) and it is still high compared to other industries in India. Employee turnover presents a wide range of problems for organizations. Frequent displacement of skilled IT professionals may lead to escalating costs for organizations as new employees need to be recruited and trained, and may lead to low morale amongst those who remained in the organization (Loh et al.,\(^7\) 1995). As more and more organizations continue to rely on IT for their effectiveness and competitive advantage, the demand for skilled IT professionals will continue to increase. Against this context of manpower shortage and high-turnover rates, this study seeks to examine the occupational stress among the IT professionals in Chennai. Specifically, this study examines the various factors which may generate stress for the IT professionals. The relationship between the various sources of the stress and the IT professional’s demographic and other variables are also examined.

Research studies on resilience highlighted that the association between life stress and coping resources to feelings of ill being and well being are the function of internal strength of the individuals (Heckman and Clay\(^8\) 2005). In recent times, there is a focus on harnessing the internal strengths and capacity of individuals to face any demands of the work environment. Some of the key internal factors such as hardiness, self-esteem, self-efficacy, optimism, and the like are found to have positive impact on protecting psychological health by withstanding occupational stress. Ciarrochi et al.,\(^9\) (2000) highlighted that internal resources may protect people from stress and lead to better adaptation. Bar-On,\(^10\) (2003) found that there was a moderate yet significant relationship between internal strength factors (emotional competencies and hardy
personality) and psychological health. The aspects of internal competencies that were found to have a significant influence on psychological health care (a) the ability to manage emotion and cope with stress, (b) the drive to accomplish personal goals in order to actualize one’s inner potential and lead to a more meaningful life and (c) the ability to verify feelings and thinking. Hence, the researcher relates the hardiness, self-esteem and occupational stress factors.

Unreasonable job demands with tight deadlines, fear of making mistakes, undue blame on machine failure, lack of participation in decision affecting their work, difficulty in getting adjusted to team work, and the like are some of the common stressors among the IT professionals (Bhattacharya and Basu 2007). Though fancy pay structure along with globalized life style, chances of serving national and multinational corporate clients, keeping abreast of advanced information technology and the like attract remarkable number of job aspirants into IT field, the job incumbents are subjected to have occupational stress adversely affecting their physical and mental health.

Stress is a cause, rather than the effect, of several physical, mental, and emotional problems. When such a situation prevails in the IT sector, software professionals have to face all these situations and in addition they often have to take care of their kith and kin, elders, and other responsibilities in the family. Maintaining the balance between work and life becomes a tough task. Based on these factors, the current study is also designed to find out the level of stress and depression experienced by the IT professionals in Chennai.

In the diversified economic foundation, software service has gained a major ground in the Tamilnadu economy. The late 1990s, witnessed the birth of the Business Process Outsourcing (BPO) and software development and within few years
there was a prominent squirt of outgrowth in the number and magnitude of the software industries in the state. This in turn created a great impact on the state’s economy. Chennai, which is the capital city of Tamilnadu, is now one of the important software centers of India. Cheap and quality IT labour is one of the main facts that has attracted multitude of multi-billion-rupee. Foreign software companies have to establish their business in the city as well as in other software centers of India like Bangalore, Hyderabad, Kolkata, and Delhi making the country a booming software exporter worldwide. Major software companies in Chennai are Cognizant Technology Solutions, HCL, Infosys, IBM, Symantec, Verizon, TCS and Wipro. At present Chennai is the second largest exporter of IT and the IT enabled services in India next to the Silicon Valley. The city is a hub of a number of technological parks and promises employment for nearly three lakh people. Hence, the study is confined to the stress among the professionals of the IT sector in Chennai.

1.3 OBJECTIVES OF THE STUDY

The following are the main objectives of the present study:

1. To examine the various factors that generates stress among the IT professionals.
2. To relate the sources of stress and the IT professionals’ demographic and other variables.
3. To find out the extent to which the hardiness, self-esteem and depression are related to the various factors of the occupational stress and
4. To offer suitable suggestions to reduce the stress among the IT professionals based upon the present study.
1.4 REVIEW OF LITERATURE

This section is devoted to the examination of some of the relevant literature on the stress among the IT professionals. Such examination not only highlights the historically significant studies, but also suggests the trend in theoretical progress as well as in methodology and techniques used in this study.

1.4.1 STUDIES RELATED TO INDIA

Sethi and Barrier\(^{12}\) (1997), in their study, “An Examination of the Correlates of Burnout in Information Systems Professionals”, examined the correlates of burnout in information systems (IS) professionals. While there has been little previous research in the area of burnout among IS professionals, anecdotal evidence shows that burnout causes a negative impact on the performance of IS employees. These negative impacts can take the form of cynicism, dissatisfaction, and turnover. The study empirically examines the correlations between burnout with several work attributes that are considered to be either antecedents or consequences of burnout. Two role stressors are examined in this study - role ambiguity and role conflict. These variables are theorized to be antecedents of burnout. In addition, two dimensions of organizational commitment - affective and continuance commitment - are examined as possible consequences of burnout. The emotional exhaustion subscale of the Maslach Burnout Inventory is used to measure burnout in 312 IS professionals. Both role stressors were found to correlate positively with burnout. In addition, affective commitment was found to be negatively correlated and continuance commitment positively correlated with burnout.

Vijay Raghavan et al.,\(^{13}\) (2001), in their study, “An Investigation of a Transactional Model of Stress in Information Technology Workers: Preliminary
Findings”, identified that the stress factors for Information Technology (IT) workers with a view to suggesting organizational strategies that may be employed to recruit and retain the IT workers. Stress factors were studied at the organizational level rather than at the cognitive or individual level. Anecdotal evidence suggested that work load, changes in technology, poor project management, and anxiety about corporate direction were stress factors that were commonly experienced by the IT workers. Potential stress relieving strategies that organizations may employ include work-life balancing strategies such as flexible hours and telecommuting, job sharing and support for professional development activities. Different types of IT workers: application programmers or database programmers, systems analysts and project leaders and their demographic characteristics were included as moderating variables in the proposed model.

Mohsin Aziz\textsuperscript{14} (2004) in his study, “Role Stress among Women in the Indian Information Technology Sector”, stated that organizational stress originates from organizational demands. Stress is built up in the concept of role which is conceived as the position a person occupies in a system. This paper investigates the intensity of organizational role stress among women information technology professionals in the Indian private sector. Organizational role stress scale is used on a sample of 264 to explore the level of role stress. Resource inadequacy has emerged as the most potent role stressor, followed by role overload and personal inadequacy. The research finds differences in the level of stress between married and unmarried employees on several role stressors. However, level of education does not emerge as a significant differentiator of stressors.

Rajeswari and Anantharaman\textsuperscript{15} (2005), in their study, “Role of Human-Computer Interaction Factors as Moderators of Occupational Stress and Work Exhaustion”, found that software professionals perform boundary-spanning activities,
and thus need strong interpersonal, technical, and organizational knowledge to be professionally competent. They have to perform in a demanding work environment characterized by strict deadlines, differing time zones, interdependency in teams, increased interaction with clients, and extended work hours. These characteristics lead to occupational stress and work exhaustion. Yet, the impact of stress is felt in different ways by different people, even if they perform the same functions. These differences in the perception of stress can be caused by varying confidence in their technical capabilities. People possess varying technical capabilities, based on their acquisition of technical skills, comfort level in using the technology, and intrinsic motivation. These attributes represent the human-computer interaction (HCI) personality of software professionals. This article examines whether these HCI factors moderate the relationship between the occupational stress and the work exhaustion. Data were collected from software professionals located in Chennai and Bangalore in India. The data revealed that the HCI factors had a main effect but no significant moderating effects on work exhaustion. The control over the technology variable emerged as the key variable among the HCI factors that affected software professionals’ ability to cope with stress and work exhaustion.

Sunetra Bhattacharya and Jayanthi Basu (2007) in their research, “Distress, Wellness and Organizational Role Stress among IT Professionals: Role of Life Events and Coping Resources”, studied the distress, wellness and organizational role stress of professionals in the area of the information technology (IT) and the effect of sex and age on the above variables as well as the predictability of the variables from stressful life events and coping resources taken together were also examined. Results of the study revealed that women experienced greater wellness and older personnel experienced more distress. Distress could not be predicted from the life events and
coping resources taken together. Wellness and Organizational Role Stress could be predicted from these two variables.

Chaturvedi et al.,\textsuperscript{17} (2007), in their study, “Detection of Stress, Anxiety and Depression in IT/ITES professionals in the Silicon Valley of India: A Preliminary Study”, aimed to identify the level and extent of anxiety, depression and distress problems in the information technology and information technology enabled services (IT/ITES) sectors. One hundred IT/ITES professionals were identified randomly from consenting companies selected without any bias, and administered the scaled version of General Health Questionnaire-28 items scale (GHQ-28). Thirty six percent of subjects scored above the cut-off score of four and could be considered probable psychiatric cases. Common problems noted were feeling constantly under strain (28%), unable to enjoy daily activities (22%), edgy and bad tempered (19%), not satisfied with tasks (18%), and not feeling in good health (16%). Depressive features were less commonly reported. Significantly more individuals were distressed in certain companies ($p < 0.05$) and significantly more married persons reported distress ($p < 0.05$). Despite the limitations of small sample size and methodology, the rate of psychiatric morbidity (36%) is higher than that reported for the general population in India, and suggests a need for health promotion activities in the IT sector.

Trayambak Tiwari et al.,\textsuperscript{18} (2008), in their study, “Information Technology – Induced Stress and Human Performance: A Critical Review”, examined the relationship of information-induced stress in terms of mental workload and automation malfunction detection performance in a highly computer-aided task scenario. Modern information technology puts hard pressures on individuals’ resources by demanding constant refreshing of skills. A large number of researches have been done in different areas revealing the stressful aspects of technology however, the actual
discussion about the role of modern technology as a source of stress is limited. This review is an endeavour to highlight the pros and cons of the use of sophisticated automated technology. The mental workload has been considered as a consequence of highly computerized system use which has been discussed in the light of various automated complex task scenarios. Moreover, the purpose of this review is also to attract human factors and ergonomics researchers to recognize this problem as to design a system that to be stress-free as possible for the users.

Prabhavathi\(^{19}\) (2009), in her study “Information Professionals’ Job Stress Related Problems and Coping Strategies”, studied the advances in information technology during the last decade. Information professionals play an important role in providing information services to the users. The complexity of information, communication and technology is a source of stress to all information professionals. The nature of stress and its effect can be understood by identifying the stressors. This stress may lead to strain or long-term negative effects. A great part of such stress in life is caused by job. Job-related stress has gained importance because of its implications for professional dissatisfaction, lowered service, lowered physical and mental health of the individuals.

Kathirvel\(^{20}\) (2009), in his study, “A Study on Stress among Employees Working in BPOs with Special Reference to Coimbatore”, found that the BPO industry is dependent on the knowledge of the workers, they may be considered as the ‘raw material’ of the industry. Hence, any dilution in the quality of the workforce will result in many operational hitches in the industry. While there are several problems that affect the workforce in the BPO industry, stress has emerged as the most significant problem, causing the employees to underperform and thereby leading to productivity loss. This
A study takes a close look at the stress-related issues faced by the employees working in the various BPO companies and analyses the factors responsible for the same.

Karad\textsuperscript{21} (2010) in his article, “Job Stress in Information Technology Sector - The Cause and Effect Analysis”, stated that in today's changing work environment stress level is increasing and is encompassing everyone. Prolonged stress not effectively managed causing various physical, physiological and psychosomatic diseases that are affecting the health and productivity of an individual and also functioning of an organization. The present research paper is devoted to cause and effect analysis of the job stress in the IT sector. The sample included 80 IT sector employees from Pune based IT companies. Primary data were collected with the help of a questionnaire consisting 29 questions relating to various sources and consequences of job stress. Results indicated that most of the IT sector employees are undergoing some or other kind of job stress due to extra organizational group and individual problems. Some of them are found to be trouble inviters; achievement oriented and having over expectations from their work. Most of the IT employees are facing more than one symptoms of the stress at a time, and their multiple effects on their health and on their family and on their organization. To avoid stressful conditions, change it or learn to cope with it, knowledge about stress, physiological fitness, time management, assertiveness, readjusting life goals, relaxation is necessary. It is suggested that the management should come forward and promote various activities for reducing stress level of their employees.

Rajib Lochan Dhar and Mahua Dhar\textsuperscript{22} (2010), in their article entitled, “Job Stress, Coping Process and Intentions to Leave: A Study of Information Technology Professionals Working in India” examined the levels of job stress amongst the information technology professionals, and the ways that they had found to deal with
it. It also throws some light on the intentions of the professionals regarding leaving their organizations in a sample of 26 professionals working in three different companies. The sample included professionals working full time, with varying demographic details. Qualitative methods were used to collect the data from 26 in-depth interviews. Findings show that the IT professionals are facing a huge amount of work stress mainly caused by heavy work load, inadequate staff along with role ambiguity affecting their family life. It was found that the IT professionals had own ways to cope with their stress. However, it was also seen that intentions to leave their organizations were not purely due to stress problems.

1.4.2 STUDIES RELATED TO FOREIGN COUNTRIES

Madeline Weiss (1983), in her study, “Effects of Work Stress and Social Support on Information Systems Managers” investigates the sources of organizational stress among information systems (IS) managers, the resulting symptoms of strain, and whether social support can reduce symptoms of strain. A field study comprising a survey questionnaire was distributed to the respondents who were IS managers, ranging in the organizational hierarchy from vice-president or director to project manager, in both governmental and private sector organizations of varying sizes. The study reveals that job stresses among the IS managers are positively related to psychological and physiological strains. While all of the stressors included in the investigation are significantly related to strain symptoms, certain stressors emerge as having the greatest impact. Likewise, certain strains that result from these stressors are more prevalent than others. Concerning social support, the study reveals that the level of social support among IS managers is lower than among other managers. When social support exists, strain among these managers is significantly lower. The implications of
the study’s findings are considerable both for the health prognosis of the IS managers and for their job performance.

Man-Wan Lo\textsuperscript{24} (1987), in his study “Occupational Stress in the Information Systems Profession”, found the proliferation and growing use of computers and information systems in organizations have changed the way, people live – in offices, factories, schools, libraries, banks, homes and other facets of daily life. It has also generated an increasing demand for information systems professionals to manage and implement the technology. To avoid potential health hazards, it is essential that people understand the possible consequences of spending long hours with this new technology.

Vivien Lim and Thompson Teo\textsuperscript{25} (1996) in their study, “Gender Differences in Occupational Stress and Coping Strategies among IT Personnel”, examines gender differences in occupational stress and coping strategies among the information technology (IT) personnel in Singapore. Data were collected via a combination of mail surveys and semi-structured interviews analyzed the results of the survey using analysis of covariance. Female IT personnel reported significantly higher scores on sources of stress originating from ‘factors intrinsic to the job’, ‘managerial role’, ‘career and achievement’, ‘organizational structure and climate’, and ‘relationships with others’. Contrary to initial prediction, no significant gender difference was found for stress originating from ‘home-work interface’. With respect to coping strategies, female IT personnel tend to seek social support and talk to others when they experience stress, while men tend to suppress their emotions and deal with problems in a logical and unemotional manner and discuss implications of findings.

Clinton et al.,\textsuperscript{26} (1999), in their study, “Causes and Consequences of Stress in the IT Profession”, found that working long hours, rushing to meet unrealistic deadlines, struggling to keep up with ever-advancing technology and ever-changing user
demands - these are just some of the conditions that make career in IT stressful. Fortunately for the IT professionals, work-related stress can be effectively managed and thereby mitigated. Identifying the sources of stress on the job is a major step in its management and reduction.

Szu-Yuan Sun et al., 27 (1999), in their research paper, “A Study of the Job Stress and its Effect of the Information Systems Professional in Taiwan”, investigated the information systems professional's job stress and its outcomes in Taiwan's companies. The analysis is based on an organizational stress model. The results of this study indicate that (1) statistically significant difference exists between most of the job stressor and some items of the outcomes, (2) some moderating variables, such as type A personality and SDLC stage, are statistically significant in affecting the job stressor and the outcomes, and (3) statistically significant positive correlation exists between job satisfaction and psychological effects of the job stress.

Eugene Kaluzniacky 28 (2000), in his study, “Work Stress among Information Systems Professionals in Manitoba”, reported job stress among information systems professionals in Winnipeg, Manitoba, Canada and other Manitoba centres, and to determine which hypothesized factors are reported by a majority of employees as being major contributors to their stress. Analyses are currently being carried out to investigate a significant relationship between reported degrees of experienced stress, perceived stress factors and personal characteristics of the employee, the computing environment (technical and managerial) and the employing organization.

James Thong and Chee-Sing Yap 29 (2000), in their study, “Information Systems and Occupational Stress: A Theoretical Framework”, found that the information systems (IS) profession is a stressful profession. However, there is little theoretical or empirical research on the effects of occupational stress on information systems
professionals. The IS professionals are unaware of the consequences of occupational stress. The purpose of this paper is to propose a theoretical framework of occupational stress for the IS professionals. Based on a review of the information systems, psychology, and general management literature, 12 occupational stress models are identified. These stress models are analyzed along the two dimensions of focus and theoretical foundation. The analysis shows that most of the occupational stress models consider stress to be the consequence of the interaction between an environmental stimulus and the idiosyncratic response of the individual. Further analysis of these models suggests that nine key points are critical in developing a theoretical framework of occupational stress for information systems professionals. A mapping of how the existing stress models incorporate the nine key points is also presented. The findings of this paper can provide a theoretical basis for further research on the occupational stress of information systems professionals. Finally, an agenda for further research into this issue is presented.

Ivy Chan and Patrick Chau (2001) in their research paper, “A Proposed Conceptual Model for Studying Job Stress in IT Professionals” proposed a conceptual model for studying the job stress issue among the IT professionals through integrating prior relevant studies published in management, psychology and information systems literature. The study identifies both factors that have direct impacts on the burnout and the negative consequences of stress and factors that moderate the relationships in between. The study offers suggestions for organizations to manage the stress issue in their IT professionals more effectively.

Kode Ruyter et al. (2001), in their study, “Role Stress in Call Centers: Its Effects on Employee Performance and Satisfaction”, found that call centers have become an important customer access channel as well as an important source of
customer-related information. Frequently, call center employees experience role stress as a result of the conflicting demands of the company, supervisors and customers. In this article, antecedents and consequences of role stress in a call center setting are examined. Specifically, they investigated which forms of empowerment and leadership styles decrease role stress and how this subsequently effects job satisfaction, organizational commitment, performance, and turnover intentions. It was found that particularly the autonomy dimension of empowerment has a role-stress-reducing effect. Interesting substantive direct positive effects of empowerment competence and leadership considerations on job satisfaction were found. Job satisfaction was found to be conducive to job performance. Furthermore, it was found that job satisfaction reduces turnover intentions, directly and indirectly via organizational commitment.

Mike Gallivan (2003), in his study “Examining Gender Differences in IT Professionals’ Perceptions of Job Stress in Response to Technological Change”, examined the antecedents and consequences of the IT professionals' perceptions of job stress within the context of assimilating a technological innovation in the workplace. He developed hypotheses about how the experiences of men and women IT professionals will differ in certain ways as they adopt and adapt to using a technological innovation. Using a mixed-method study of two firms that were adopting a technological innovation, he examined employees’ reactions along gender lines. He found that perceived compatibility of the changes being assimilated was inversely related to employees' perceptions of stress for both men and women. While women experienced higher levels of stress and being overworked (as predicted), there were also some unanticipated findings. Women IT professionals appeared to be more sensitive to the total number of elements in the work environment that were changing (total amount of change) as a precursor to stress. In the one firm where managers provided more autonomy but less
supervision in adapting to the new technology, women reported considerably higher levels of stress. Based on both of the expected and unexpected findings, an insight is provided for the IT practitioners to anticipate and manage workplace stress, and he offered future directions for researchers.

Suzanne Pawlowski et al., (2004), in their study “Mapping Perceptions of Burnout in the Information Technology Profession: A Study Using Social Representations Theory”, found out the job-related burnout in information technology professionals poses a serious issue for organizations and individuals. While the substantial body of research on job stress and burnout can provide valuable insights into the prevention of burnout in the IT as well as interventions, it is argued that drawing upon this work should be done with caution. As a first step towards assessing the applicability of existing burnout research to the IT, the purpose of the study described in this paper is to understand how the IT professionals make sense of and assign meaning to burnout in the profession. The study uses an approach based on social representations theory, which was first formulated by French social psychologist Serge Moscovici. Social representations are defined as the shared images and concepts through which the world is organized. Transcripts from in-depth interviews of 20 IT professionals were content – analyzed and 22 key topics (concepts) identified. Quantitative methods (including analysis of similarity and analyses to determine the relational structure of the concepts) were used to create a social representations map of these professionals’ understandings of burnout. The map provides preliminary evidence of elements that are central / peripheral to those understandings, pointing to implications for the applicability of existing theory on burnout as well as priorities for future research.

Vikram Sethi et al., (2004), in their study, “What Causes Stress in Information System Professionals?” found that job stress can lead to burnout and
turnover, costing the IT organizations countless dollars in replacement costs, and making methods for measuring and minimizing stress for business benefit.

Qiang Tu et al.,\textsuperscript{35} (2005), in their study, “Computer-Related Techno - Stress in China”, stated that techno - stress has been defined as any negative effect on human attitudes, thoughts, behaviour, and psychology that directly or indirectly results from technology. With the recent widespread application of the IT and the internet throughout China, techno-stress has become a serious issue for both the users and the IT professionals due to its potential effect on users' mental health and on-the-job productivity. Chinese employees are surrounded, often overwhelmed, by modern technology. The top 100 largest Chinese enterprises, accounting for 25 per cent of China's GDP, are investing heavily ($10 - $15 billion annually) in new IT applications, including the Enterprise Resource Planning (ERP) systems.

Maudgalya Tushyati et al.,\textsuperscript{36} (2006), in their study, “Workplace Stress Factors and ‘Burnout’ among Information Technology Professionals: A Systematic Review” found that burnout is a widely acknowledged stress outcome. As the prevalence of burnout has been observed in several other professions, it is very plausible that it could be prevalent in the Information Technology (IT) field. The objective of the study is to show a relationship between working environment of an IT professional and burnout. To the best of the authors' knowledge, this is the first systematic review of studies dealing with burnout among the IT professionals. Prior publications addressing burnout and the IT professionals were retrieved by an online search of multiple databases. Abstracts were examined to determine which articles met specific criteria for evaluation. Two reviewers critically appraised three articles and determined three key exposure variables; role ambiguity, role conflict and job tasks. The results of the study are there is a relationship between the three variables and burnout among the IT
professionals. However, the three articles collectively were evaluated as marginal (0.67 out of 2.0). Thus, the managers of the IT employees must be aware of these exposure variables and take action to protect the individuals. These efforts will enhance individual well-being and save the company money over the long-term.

Pei-Chen Liu and Huey-Wen Chou\textsuperscript{37} (2006), in their study, “The Effects of Personal Characteristics, Stress Coping Styles, Job Self-Efficacy on IT Professionals’ Burnout”, stated that there is no denying that the Information Technology (IT) plays a vital and critical role in business operation nowadays. Hence, good IT professionals are important. Unfortunately, a few problems, which may have impacts on the IT development and the IT performance of organizations, exist in IT professional labour market. These problems include insufficient number of qualified professionals, too many inexperienced workers and high turnover rate. Literature indicated that one of the possible reasons leading to high IT professional turnover rate is IT professionals’ burnout. It is widely acknowledged that the IT career is very knowledge-intensive and IT professionals are forced to acquire new knowledge quickly. Moreover, they need to have good interpersonal skills to communicate with users. Those requirements which make the IT professionals have to work longer hours cause heavy stress. As a result, the IT professionals may become burnout. This study aims to find what factors can have impacts on the IT professionals’ burnout and to offer some managerial suggestions. The results of multiple hierarchy regression analyses showed that 218 IT professionals provided evidence that those who have more positive coping style with stress and those who have higher job self-efficacy will not become burnout easily. In addition, people who have higher degree of extroversion will have less diminished personal accomplishment.
Peter Love and Zahir Irani\textsuperscript{38} (2007), in their study, “Coping and Psychological Adjustment among Information Technology Personnel”, found the practitioners who work with information technology (IT) are reported to be experiencing rising levels of work-related stress. The origins of the stress coming from increasing demands from system users, advances in technology, and the growing use of information and communication technologies to improve the efficiency and effectiveness of intra and inter-organizational business activities. In the field of information systems, stress-related research has been limited and the way in which IT personnel cope with stress has not been explored. Thus, this paper investigates whether coping and affect (both negative and positive) influence adjustment (anxiety, depression and stress) among IT personnel.

Calisir et al.,\textsuperscript{39} (2009), in their study, “Factors Affecting Intention to Quit among IT Professionals”, found that turnover among the information technology (IT) professionals still remains a challenge for many companies. The IT professionals suffer from high stress levels. This, in turn, may lead to burnout and result in quitting their jobs. Knowing the factors that affect the quitting decision of the IT professionals is important for companies to decrease the turnover rate of qualified employees. To this end, this study investigated the impact of stressors, job stress, organizational commitment, locus of control and job satisfaction on intention to quit among the IT professionals in Turkey. A total of 204 questionnaires were collected from IT professionals. The results show that job satisfaction is explained by stressors and locus of control, whereas the effect of job stress on job satisfaction is found to be insignificant. Additionally, both organizational commitment and job satisfaction predict intention to quit. The paper concludes with discussion and recommendations for future research.

From the review of literature, it is found that there are many surveys and studies on sources of stress in general. But there is no separate study on hardiness,
self-esteem and depression. Hence, in this study, in addition to the analysis of sources of stress, an attempt is also made to measure the hardiness, self-esteem and depression of the IT professionals.

1.5 SCOPE OF THE STUDY

The study is confined to the stress among the IT professionals in Chennai only. Further this study throws light on the relationship with the demographic and other variables and occupational stress factors of the IT professionals. The study also focuses on the measurement of hardiness, self-esteem and depression and its relationship with occupational stress factors.

1.6 HYPOTHESES

The following are the null hypotheses framed:

1. There is no significant difference between the occupational stress factors and the age of the IT professionals.

2. There is no significant difference between the occupational stress factors and the gender of the IT professionals.

3. There is no significant difference between the occupational stress factors and the marital status of the IT professionals.

4. There is no significant difference between the occupational stress factors and the educational qualification of the IT professionals.

5. There is no significant difference between the occupational stress factors and the monthly income of the IT professionals.

6. There is no significant difference between the occupational stress factors and the type of family of the IT professionals.
7. There is no significant difference between the occupational stress factors and the family size of the IT professionals.

8. There is no significant difference between the occupational stress factors and the number of dependents of the IT professionals.

9. There is no significant difference between the occupational stress factors and the years of work experience of the IT professionals.

10. There is no significant difference between the occupational stress factors and the type of accommodation in which the IT professionals are residing.

11. There is no significant difference between the occupational stress factors and the mode of transport used by the IT professionals.

12. There is no significant difference between the occupational stress factors and the basis of shift of the IT professionals.

13. There is no significant relationship between the occupational stress factor 'work demands' and the hardiness personality dimensions.

14. There is no significant relationship between the occupational stress factor 'relationship with others' and the hardiness personality dimensions.

15. There is no significant relationship between the occupational stress factor 'career concerns' and the hardiness personality dimensions.

16. There is no significant relationship between the occupational stress factor 'systems maintenance' and the hardiness personality dimensions.

17. There is no significant relationship between the occupational stress factor 'role ambiguity' and the hardiness personality dimensions.

18. There is no significant relationship between the occupational stress factor 'administrative tasks' and the hardiness personality dimensions.
19. There is no significant relationship between the occupational stress factor ‘job dissatisfaction’ and the hardiness personality dimensions.

20. There is no significant relationship between the occupational stress factor ‘job induced tension’ and the hardiness personality dimensions.

21. There is no significant relationship between the occupational stress factor ‘intention to quit’ and the hardiness personality dimensions.

22. There is no significant relationship between the occupational stress factors and the self – esteem of the IT professionals.

23. There is no significant relationship between the depression of the IT professionals and their demographic and other variables.

1.7 DEFINITION OF CONCEPTS

1.7.1 INFORMATION TECHNOLOGY (IT)

In the present study, information technology means managing the information in a compact form by the use of software as well as hardware. It refers to making use of different operating system and employs various kinds of tools to develop new software or designing a platform which can be used by other end users.

1.7.2 IT PROFESSIONALS

IT professionals are those who are involved in development of software programmes and software engineering, technical support, database development and administration, enterprise systems, web development and administration, network design and administration, technical writing, and digital media. It includes software personnel in the designation of project manager, project leader, team leader, senior developer, developer, senior tester, tester, support, system analyst and quality reviewer.
1.7.3 STRESS

Stress is the body's reaction to a change that requires a physical, mental or emotional adjustment or response. Stress can come from any situation or thought that makes an individual feel frustrated, angry, nervous, or anxious. Stress is caused by an existing stress-causing factor or "stressor."

1.7.4 HARDINESS PERSONALITY

The hardness personality is one that can experience situations, others would consider stressful, yet still remain calm and function at a high level. The hardy personality refers to individuals who are especially resistant to illness in spite of increased stress.

1.7.5 HARDINESS PERSONALITY DIMENSIONS

Hardiness Personality Dimensions includes commitment, challenge and control.

1.7.6 COMMITMENT

Hardy personalities with commitment are committed to their tasks, their jobs, and the people around them. They find the world interesting. They involve themselves wholeheartedly in the activities they undertake. They give their best because they know no other way. They tend to be cheerful, upbeat people with a zest for life.

1.7.7 CHALLENGE

Hardy personalities with challenge consider challenge a normal, even exciting and stimulating part of life. They know that challenge frequently brings opportunity, a chance to learn, develop, and grow.

1.7.8 CONTROL

Hardy personalities with control believe they can impact the world around them, that their efforts and attitude can make a difference in outcomes. They ask empowering, solution-oriented questions and dig beneath the surface to find creative alternatives.
1.7.9  **SELF-ESTEEM**

Self-Esteem encompasses beliefs and emotions such as triumph, despair, pride and shame.

1.7.10  **DEPRESSION**

Depression is a state of low mood and aversion to activity that can affect a person's thoughts, behaviour, feelings and physical well-being. Depressed people may feel sad, anxious, empty, hopeless, helpless, worthless, guilty, irritable, or restless.

1.8  **METHODOLOGY**

This section describes the methodology which includes the collection of data, the construction of questionnaire and the pre test, the fieldwork and the framework of analysis.

1.8.1  **COLLECTION OF DATA**

The study is based on both primary and secondary data. The primary data were collected from the IT professionals directly with the help of a structured questionnaire (vide appendix). The secondary data were collected from books, journals and websites.

1.8.2  **CONSTRUCTION OF QUESTIONNAIRE**

The questionnaire used for the study consists of two parts. The first part relates to the demographic and other variables of the IT professionals and the second part comprises occupational stress scales.

To find out the occupational stress factors, the researcher has developed her own scale. In developing the scale for the IT professionals in this study, personal interviews were conducted with 50 IT professionals in the initial phase of the study to help the researcher to identify some of the common stressors they experienced in their
work. Issues and concerns raised by the IT professionals interviewed were noted. These interviews formed the basis for the construction of the JSITPS (Job Stress for the IT Professional Scale). In addition to the interviews, the researcher also conducted an extensive review of the literature on occupational stress. Various scales used to measure the occupational stress among members of other professions such as teaching, nursing and managing were reviewed. Based on the interviews and literature review, 75 items were developed to assess the sources of stress in the present study.

To measure the hardiness, the scale developed by Maddi and Kobassa\textsuperscript{40} (1984) was used. To assess the self-esteem, Rosenberg Self-Esteem Scale\textsuperscript{41} (1965) is used. The Geriatric Depression Scale (GDS) developed by Yesavage et al.,\textsuperscript{42} (1983) is used to assess the depression experienced by the IT professionals.

1.8.3 SAMPLING DESIGN

Of the IT companies situated in Chennai ten top most companies which are serving both domestic and foreign countries are selected for the study. As per the NASSCOM records of 2009 – 2010, it is found that 42,800 employees are working in all the 10 companies. It was decided to select 1 per cent of the employees as sample in each of the companies. Thus, 428 employees were selected at random by adopting lottery method. The sampling plan of the study is presented in Table 1.1
TABLE 1.1
SAMPLING PLAN

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Name of the Company</th>
<th>Total Number of Employees</th>
<th>Sample size (1%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>IBM</td>
<td>10,000</td>
<td>100</td>
</tr>
<tr>
<td>2</td>
<td>HCL</td>
<td>5,500</td>
<td>55</td>
</tr>
<tr>
<td>3</td>
<td>Visteon</td>
<td>1,000</td>
<td>10</td>
</tr>
<tr>
<td>4</td>
<td>Hexaware</td>
<td>1,000</td>
<td>10</td>
</tr>
<tr>
<td>5</td>
<td>Infosys</td>
<td>2,800</td>
<td>28</td>
</tr>
<tr>
<td>6</td>
<td>TCS</td>
<td>5,000</td>
<td>50</td>
</tr>
<tr>
<td>7</td>
<td>CTS</td>
<td>4,500</td>
<td>45</td>
</tr>
<tr>
<td>8</td>
<td>Pixelsoft</td>
<td>400</td>
<td>4</td>
</tr>
<tr>
<td>9</td>
<td>Softeon</td>
<td>600</td>
<td>6</td>
</tr>
<tr>
<td>10</td>
<td>Wipro</td>
<td>12,000</td>
<td>120</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>42800</strong></td>
<td><strong>428</strong></td>
</tr>
</tbody>
</table>


The questionnaire was initially pretested with 10 IT professionals to elicit feedback regarding the clarity of instructions and questions in the instrument. Comments and suggestions obtained from the pre-test served as a basis for fine-tuning the items and the final presentation of the questionnaire.

Four hundred and twenty eight questionnaire packages containing the covering letter, survey instrument and returnable envelope were given to the Human Resource Manager of the company concerned to be distributed to the IT professionals. The Human Resource Managers sent an electronic mail to the respondents, indicating the purpose of the study and encouraged them to participate. One week after the initial distribution of the questionnaires, a reminder was sent to the respondents through the electronic mail by the Human Resource Managers. Of the four hundred and twenty eight packages distributed, 381 were returned. Three questionnaires were not usable due to the
incomplete responses. A total of 378 surveys were included in the final analysis, thus constituting a usable response rate of about 88 per cent.

1.8.4 FIELD WORK

The field work for the study was conducted from February 2011 to April 2011. A structured questionnaire was administered to the IT professionals through the Human Resource Manager of the company concerned. The purpose, importance of the study and the manner in which they have to answer different items were explained to them. Sufficient time was given to the respondents to provide their answers.

1.8.5 FRAMEWORK OF ANALYSIS

With a view to analyzing the data, various tools such as Likert Scaling Technique, Chi-Square Test, Analysis of Variance, and the like have been used. A master table was prepared for entering the responses of each respondent and small cross tables were made from the master table for analysis.

LIKERT SCALING

In order to obtain the score of occupational stress factors of the IT professionals, Likert Scaling Technique was used. The numerical weights given to the alternative responses are given in Table 1.2

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>No Opinion</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Negative</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

CHI-SQUARE TEST

Chi-Square test was applied to test the significance of the various demographic and other variables in relation to the depression experienced by the IT
professionals. \( \chi^2 \) is useful to establish and measure the existence of the association between any two attributes. This \( \chi^2 \) takes only positive value and is given by the formula:

\[
\chi^2 = \sum_{(i,j)} \frac{(O_{ij} - E_{ij})^2}{E_{ij}}
\]

Where \( O_{ij} \) = Observed value in the \( ij^{th} \) cell

\( E_{ij} \) = Expected value in the \( ij^{th} \) cell

\( r \) = Number of rows in the contingency table

\( c \) = Number of columns in the contingency table

On the assumption of independence attributes,

\[
E_{ij} = \frac{(A_i)(B_j)}{N}
\]

Where \( A_i \) = Total of \( i^{th} \) row

\( B_j \) = Total of \( j^{th} \) column

\( N \) = Total number of observations

If \( \chi^2_{(calc)} < \chi^2_{(5\%)} \) for \((r-1) (c-1)\) degrees of freedom then it is accepted that the two attributes A and B are independent or there is insignificant association between them at 5 per cent level. But if \( \chi^2_{(calc)} > \chi^2_{(5\%)} \) then it is accepted that there is significant association between them at 5 per cent level. This tool is used to study the significance of association between the depression and the demographic and other variables of the IT professionals such as age, gender, marital status, educational qualification, monthly income, type of family, family size, number of dependents, years of work experience, type of accommodation, mode of transport and basis of shift.

**ANALYSIS OF VARIANCE**

Analysis of Variance (ANOVA) is a mathematical technique for partitioning the total variation of a set of data in such a manner that it identifies the
component sources of variation. This technique enables the researcher to test the hypothesis concerning the equality of more than two population means. The objective of the analysis of variance is to locate the important independent variables in a study and to determine how they interact and affect the response. The ANOVA test is used to test whether there is any significant difference between the occupational stress factors and the demographic and other variables of the IT professionals.

**Scheffe’s Test**

Whenever ‘f’ ratio is found to be significant for the mean scores, Scheffe’s test is followed as a post-hoc test to determine which of the paired mean’s differences are the most significant.

**CO-efficient of Variation and ‘t’ Ratio**

The researcher had measured the occupational stress factors through some variables associated with them. In order to measure the consistency of each variable on the particular factor, the researcher found out the co-efficient of variation for each variable using its mean value and standard deviation value. The arithmetic mean was found out by adding the individual scores for all the respondents for each variable and the sum was divided by the total number of respondents. The standard deviation was only the square root of ratio between the sum of squares of deviation and the number of observation.

\[
Co\text{–efficient of variation} = \frac{\sigma}{\bar{X}} \times 100
\]

Where \( \sigma \) = Standard deviation

\( \bar{X} \) = Arithmetic mean

Further the mean values, standard deviations, co-efficient of variation are used to assess the occupational stress of each and every factor. To assess the occupational stress of each factor based on the demographic and other variables of the
IT professionals, ‘t’ test is applied. They are also used to assess the hardiness personality and self-esteem of the IT professionals.

**PEARSON’S PRODUCT MOMENT CORRELATION**

Pearson’s Product Moment Correlation is applied to find out whether there is a correlation between the various occupational stress factors, hardiness personality dimensions, self esteem and depression of the IT professionals.

### 1.9 CHAPTER SCHEME

The present study “Stress among IT Professionals in Chennai, Tamilnadu” is organized into six chapters.

The first chapter deals with the introduction and design of the study. The design includes introduction, statement of the problem, scope of the study, objectives of the study, review of literature, hypotheses to be tested, methodology, construction of questionnaire, sampling design, field work and data collection, framework of analysis and chapterisation.

The second chapter throws light on the theoretical framework of stress.

The third chapter assesses the occupational stress factors of the IT professionals.

The fourth chapter compares the occupational stress factors with the demographic and other variables of the IT professionals.

The fifth chapter relates the hardiness personality dimensions, self esteem and depression with the occupational stress factors of the IT professionals.

The sixth chapter is one of summation and it presents the findings and offers suggestions.
FOOTNOTES


10. R. Bar-On, “How Important is it to Educate People to be Emotionally and Socially Intelligent, and can it be done?”, *Perspectives in Education*, Volume 21, 2003, pp.3-13.


