Job Stress among Software Professionals in Pakistan: A Factor Analytic Study

Zaki Rashidi[*]
Dr. Amanat Ali Jalbani

Abstract

Job stress is a common workplace problem experienced by all professionals irrespective of their nature of work; however, this phenomenon is more common in situations that are deadline driven. Software house is one such sector, which is affected profoundly by this challenge, and professionals serving these organizations are often observed under huge stress. Software professionals' nature of job is highly time-bound, client-oriented and technology intensive. The trends in turn, coupled with many factors, contribute towards stress. These factors are extremely diverse, including change of technology, client interaction, fear of obsolescence, family support, long working hours, and work overload etc. This study explores the nature of stress amongst software developers and professionals, and endeavours to identify the key factors responsible for producing stress amongst professionals, which limit their job functionality and overall productivity. The study was carried out through survey instrument, which was developed around ten stress factors. An analysis of about 200 professionals serving different software houses in the local context was carried out. The gathered data was analyzed using descriptive and correlation analyses which revealed interesting trends related with stress and age group, gender, marital status and qualification. The insights developed through this study are useful to many stakeholders in the local context, including software professionals, project managers, and the Pakistan Software Export Board.

Keywords: *Job stress, software professionals, software developers, stress factors.*

1. Introduction

1.1 Background of the Study

Rapid growth of technology and its extensive use in business and industry has increased the competition manifold among organizations across the globe, and the worker of the 21st century is facing more challenges as compared to his/her predecessors. These compelling forces in the organizations are continuously reshaping the business strategies, restructuring the hierarchy, re-engineering business processes, and altering managerial practices, thereby,

[*] Zaki Rashdi is a faculty member at FAST, Karachi.

Dr. Amanat Ali Jalbani is Professor, Management Sciences at Shaheed Zulfikar Ali Bhutto Institute of Science and Technology (SZABIST), Karachi, jalbani@szabist.edu.pk

forcing the organizations to adapt innovative business models with their unique blend of technology.

The technological and structural changes in the organizations blurred the boundaries of traditional departments, modified the roles and responsibilities of employees and affected work-team relationships. On the one hand, those changes forced the organizations to acclimatize innovative technology for their business processes and pressurized the employees to accommodate them in their daily work routines; while on the other hand, automation of business processes created a huge demand of software development within the organization and they faced difficulties to accomplish those demands. That puts pressure on the software development team within the organization. The in-house software development team faced two basic problems: first they had time constraints, i.e. developing more software modules in a short span of time, and second, changing technology and learning upcoming technological changes to accommodate in their processes. One successful model to overcome the situation was outsourcing of software development. Hence, software development emerged as a roaring business in the last two decades and good quality software professionals were in a greater demand. Developed countries adopted the business automation quite earlier as compared to under-developed countries. This created a huge demand of software developers and professionals in those countries, hence an immense brain drain was also observed. The outcome of this brain drain resulted in the form of an acute shortage of quality software professionals in local software houses. This shortage further pressurizes the existing professionals and developers working in different software houses in Pakistan. The situation has also produced many other types of pressures in the organizations and has resulted in the form of job stress, job dissatisfaction, employee burnout and other related issues of employee motivation, behaviour, and performance.

1.2   Study Objective

This study is aimed at conducting a research survey on software professionals and developers associated to various software houses in Pakistan, in order to explore various factors causing stress among professionals assuming diverse roles in software houses.

1.3 Significance of the Study

Software development is a growing industry in Pakistan. The Pakistan Software Export Board (PSEB) is putting a lot of efforts, for the last many years, towards the betterment of software developers and professionals associated to software houses. This study will not only help PSEB but also software houses and project managers to understand their work force.

1.4 Research Methodology

The research is quantitative in nature and a tailored questionnaire, comprising of 70 questions, along with demographic factors, is designed and distributed in various software houses all over Pakistan to collect the primary data.

The population of this study comprises of all software professionals working in different software houses in Pakistan and includes programmers, developers, and project managers

and quality assurance personnel.

A sample of 500 professionals was selected by using proportional allocation and the same questionnaire was sent to the selected software houses for all types of people working there. However, due to poor response and many reminders, only 217 forms were received by the deadline of the study, out of which 12 were incomplete, hence the sample size was reduced to 205. The questionnaire is based on the seven-point Likert-scale, comprising of ten factors to measure stress. Along with this, demographic data is also collected through the same questionnaire.

1.4.1 Variables

Following are the major factors contributing in job stress of software professionals working in different software houses (Rajeswari and Anantharaman, 2003):

1. Fear of obsolescence: Due to change of technology and quick learning of new technology.
2. Individual and team interaction: Interaction of analyst, developer and project manager.
3. Client interactions: Interaction during business analysis and system analysis.
4. Work-family interface: Taking work home or working for late hours.
5. Role overload: Assuming different roles in a different or same project.
6. Work culture: Travelling abroad and facing different cultures.
7. Technical constraints: Lack of technical expertise.
8. Family support towards career: Attitude and relation of the family towards work.
9. Workload: Excessive and diverse work.
10. Technical risk propensity: Risk due to using innovative technology or process.

2. Job Stress in Workplace

The continuing streams of information technology innovations are transforming the business world (Laudon and Laudon, 2007) from traditional work processes to IT enabled integrated environment. The impact of this change has brought many challenges to software professionals and developers, working in organizations as in-house programmers and developers. The rise in software demand to business and industry, beyond the capacity of MIS professionals, who cater to the needs of organizations, has given birth to software houses (Rajeswari and Anantharaman, 2003). These software houses are fulfilling the demand of industry and providing customized software according to the need and requirements of the client organizations, by using latest available technology and skills in the market. The technology is changing so swiftly that it is becoming difficult for the professionals to keep abreast with the upcoming technology along with the daily chores of the workplace. Software industry is a human capital intensive industry (Rajeswari and Anantharaman, 2003) and largely based on knowledge workers with technology concentrated environment. Also, the software development process is a learning and communication process (Glass, 1997); hence, it requires greater interaction with the clients, deep understanding of the nature and

business processes, clear and timely communication with people involved in the development process, and insight into technological innovations. This situation puts pressure on professionals involved in the process of software development in software houses and results in occupational stress among them.

In 1990s, the restructuring of organizations and the trend of downsizing and rightsizing further engraved the situation for IT professionals with a fear of losing their jobs (Glass, 1997). Various studies in Japan were conducted to measure the stress among software programmers, and the studies concluded that programmers' stress was not only common but more problematic to the organizations (Glass, 1997).

2.1 What is Stress?

Stress is defined as 'the pattern of emotional states and physiological reactions occurring in response to demand from within or outside an organization' (Greenberg & Baron, 2003; Singh, 2003). A stressor, on the other hand, is considered to be 'a condition or situation that elicits a negative response such as anger, frustration, anxiety or tension' (Rajeswari & Anantharaman, 2003). Workplace stress is quite common and can be measured through different sources. Workload, time pressure, role ambiguity, role conflict, career progress and communication are considered as major sources of pressure in the life of an Information System professional (Ivanchevich, Napier and Wetherbe, 1983). Pressure ultimately causes the stress that leads to different types of strain and finally hampers the performance of the employees. Stress, not just affects the efficiency of the employees, but also causes ailment and other physical or emotional problems as well (Singh, 2003).

2.2   Stress in Different Occupations

There is a belief that some occupations are sources of greater stress than others. However, it would be unwise to attribute stress, and its fatal consequences like employee burnout, health issues etc. only to professionals and executive groups (McKenna, 2002). There is a view that occupational stress is more likely to be found among blue-collar and routine white-collar workers because often they work to meet the difficult deadlines or the heavy burden of work does not give them time to relieve the pressure (Fletcher, Gowler and Payne, 1979). A survey of senior managers in 112 financial organizations conducted in 1986 in London, showed that 64% identified stress as their main health concern and worst affected were accountants and building society managers. Those who worked in the city identified 'too much work' as the biggest single factor in causing stress. Other causes mentioned were long hours, competition, pressure to perform, over-promotion, conflict between work and private life, and job insecurity (McKenna, 2002). The most frequently mentioned symptom of stress was deterioration in the employee's performance. Other symptoms identified were irritability, absenteeism, problems with making decisions, difficulties with drinking and depression (McKenna, 2002). A report by the UK Health and Safety Executive (Cox and Ferguson, 1994) calls into the problem of stress at work, as well as advocating training for employees. The

report identifies excessive periods of repetitive work, lack of management support, and over demanding work schedules as contributory causes of stress. Additional factors were low pay, poor relationship with management, lack of variety, job insecurity, and conflicting demands of work and home.

Occupational stress, in particular, is the inability to cope with the pressure in a job (Ross, 2005) because of a poor fit between someone's abilities and work requirement and conditions (Holmlund-Rytkonen and Strandvik, 2005). A mental and physical condition affects an individual's productivity, effectiveness, personal health and quality of work (Comish and Swindle, 1994). Thong and Yap (2000) have summarized prior studies on workplace stress, showing that, while the topic of stress continues to interest information system researchers, there has been a lack of a cumulative tradition, in terms of the specific theoretical frameworks used to understand the problem.

3. Job Stress among Software Professionals

3.1 Software Development Process Overview

There is not a single way to define software development process like one assembly line; however, there are fundamental development principles underlying the process that provide the foundation to understanding the software house environment and its work-pressures. The series of steps that software undergoes, from concept exploration through final retirement, is termed as a 'life cycle' (Schach, 1996). The overall project planning requires a software system development life cycle to provide a framework for considering the specific tasks to be accomplished. It also needs to account for the interaction among management, development and software quality assurance and client throughout the project life cycle (Donaldson and Siegel, 2001).

3.2 Causes of Stress among Software Professionals

Software development process is quite complex, from understanding of clients' requirement to the maintenance phases, different sets of knowledge and skills are required. Hence, various personnel are involved in a cycle, like business developers, project managers, system analysts, programmers, coders, and quality assurance people; apart from other consultants who provide the insight into the domain knowledge of the area in which software is developed.

Like other occupations, software development process is also engulfed with extreme stressors. Various factors have been identified as stressors among software development personnel. However, Rajeswari and Anantharaman (2003) have identified ten most important factors that are crucial in determining the job-related stress among professionals. These factors are: fear of obsolescence, individual and team interaction, client interaction, work-

family interface, role overload, work culture, technical propensity, family support towards career, workload, and technical propensity. Fear of obsolescence is the stress caused by changing technology when software developers feel stressed to learn newer technology along with their routine job. Software development is a process carried out in various teams and requires greater interaction among team members which creates pressure on one member to timely respond to the other member, and transfer the details of work to them. Work culture in software houses also causes stress because software professionals often work for longer hours than usual; they are supposed to work even on holidays during near-completion time of their projects. Role overload is another major stress factor among software developers because if a team member leaves during the project then other members are supposed to take over the responsibility of that person. Involving a new member in the team requires the training of that person and delays the project.

According to Acton and Golden (2002), 'The satisfaction of employee and its retention in general is important; however, the retention of software personnel is vital for business successes.' This is also verified by the studies of MacDonald (2000). In fact, software development is a human-intensive industry and farsighted project managers recognize that the greatest impediments to success are often related to people rather than to information, technology, and systems (Roepke, Agarwal et al., 2000). Considering the high costs associated with replacing IT staff and their experience, it makes sense for companies to invest in mechanisms designed to keep IT staff longer (Mak and Sockel, 1999; Moore, 2000). This may involve keeping their job more relaxed and stress free. Hence, understanding the mechanism of their job and complexities is vital to optimize the performance and retention.

There is a strong reason to believe that software professionals, working either in a software house or in any organization for in-house development and maintenance, are prone to more serious risks as compared to people involved in such jobs two or three decades ago (Brod, 1984). It has been pointed out that 'high performance (requirements) with high technology can exercise a dangerous influence on the human personality ... anyone who is constantly working or playing with computers is at risk' (Kaluzniacky, 1998). The constant use of computers affects the users in terms of fatigue, eye strain, arm and shoulder pain, and backache. Khosrowpour and Culpan (1989) published a stress-related study applied to individuals working in computer-related fields. They observed: 'Information processing professionals see change in technology as a prerequisite for their existence, yet the speed of this change can have profound psychological and physiological effects.'

In their studies, Kleiner and Geil (1985), Natalie (1995), and Fujigaki (1993) argued that it is important to measure the stress among computer professionals and their articles summarize and report the presence of stress among these professionals. Hoonakker (2005) argued about different factors associated with quality of working life and turnover. He pointed out that work and family life, if spill over to each other, create different psychological demands and cause stress and depression. Googins (1987) also reported the same phenomena. Other causes and consequences of stress have been assessed by different studies like: physical

ailments by Frone et al. (1997), life satisfaction by Higgins et al. (1992), turnover at workplaces by Greenhaus et al. (1997), and job satisfaction by Netemeyer et al. (1996). In their works, Fujigaki (1993) and Furuyama (1994) have tried to measure the causes of stress among programmers and the impact of the stress in creating different types of errors in their work. Significantly, they have mentioned that stress is present in almost all phases of software development life cycle.

4.   Data Analysis and Findings

The study is conducted through a research survey in major cities of Pakistan. A questionnaire was distributed in various software houses through a contact person in every software house.

4.1   Respondents' Profile

- 71% respondents are involved in technical job and others are doing both managerial and technical jobs
- 46% respondents have undergraduate degrees in Computer Science and 22% have postgraduate degree in computers, while others have degrees in different disciplines
- 29% respondents have one or more certification besides their degrees
- 83% are male
- 29% are in the age group of 21 to 24 years and 48% are in age group of 25 to 28 years
- 75% are unmarried

4.2   Reliability and Validity

4.2.1 Reliability

The reliability of the scales is determined through Cronbach's Alpha and all the variables are found reliable, that is, the value of alpha is greater than .7 except workload.

4.2.2 Validity

The validity of the scale is determined through the people working in different software houses.

4.3 Descriptive Analysis

Each factor of stress is measured on a seven-point scale, where '1' indicates the lowest level of intensity and '7' indicates the highest level of intensity. Table 2 shows the average level of intensity of each subscale along with their standard deviation. On the basis of coefficient of

variance (CV%), the factors that are contributing more towards jobs stress are 'fear of obsolescence' (mean 3.97), 'client interaction' (mean 3.86) and 'technical constraints' (mean 3.40). While next two factors of job stress are, 'team factors' (mean 3.11) and 'role overload' (mean 3.38). Hence, major factors contributing towards the job stress are not the work or workload but changing technology, availability of technology and availability of technical staff to build the suitable team for a project.

Table 1: Descriptive Analysis of Factors

Factors	Min	Max	Mean	SD	CV%
Fear of obsolescence	1.94	5.94	3.9702	.7512	18.92%
Team factors	.00	6.77	3.1126	1.1735	37.70%
Client interaction	.00	6.71	3.8648	1.4203	36.75%
Work family interaction	.00	6.71	3.2251	1.3287	41.20%
Role overload	.00	6.13	3.3848	1.2821	37.88%
Work culture	.00	6.75	2.2780	1.7766	77.99%
Technical constraint	.00	6.80	3.4039	1.2487	36.68%
Family support	.00	7.00	2.8951	1.4531	50.19%
Workload	.00	7.00	3.7463	1.5392	41.09%
Technical risk	.00	7.00	3.3837	1.4568	43.05%

Work culture and family support has the least priority in contributing to jobs stress, because work culture is measured through data where professionals are visiting foreign countries and having stress due to new environment and culture, where most of the workers have not reported any foreign experience. Similarly, family support is not found as stressor because 75% respondents are unmarried and 76% are under the age of 28 years.

4.4   Correlation Analysis

The correlation matrix reveals that the highest correlation is found in 'workload' and 'work family interaction' i.e. .624, and 'client interaction' and 'work overload' are also highly correlated. Hence, this suggests that staff interacting with clients have multiple roles in the organizations and this mounts stress among the professionals at senior positions. On the other hand, there is weak correlation between fear of obsolescence with work culture and

workload. Similarly, there is an obvious weak correlation of client interaction with family support. One factor 'role overload' has very high correlation with almost all other factors. Hence, this seems to be a greater source of stress or at least the cause of creating stress through other sources as well.

Table 2: Correlation Matrix of Factors

	1	2	3	4	5	6	7	8	9	10
1	1.000	.474	.401	.354	.315	.268	.349	.213	.185	.349
2	.474	1.000	.501	.472	.569	.409	.346	.358	.309	.348
3	.401	.501	1.000	.547	.616	.307	.489	.197	.450	.434
4	.354	.472	.547	1.000	.586	.433	.358	.420	.624	.344
5	.315	.569	.616	.586	1.000	.438	.559	.308	.535	.572
6	.268	.409	.307	.433	.438	1.000	.425	.356	.291	.365
7	.349	.346	.489	.358	.559	.425	1.000	.319	.359	.488
8	.213	.358	.197	.420	.308	.356	.319	1.000	.335	.315
9	.185	.309	.450	.624	.535	.291	.359	.335	1.000	.442
10	.349	.348	.434	.344	.572	.365	.488	.315	.442	1.000

4.5 Analysis of Variance

Analysis of variance is applied on subscales to check whether all subscales have the same impact of stress or not. The analysis suggests that each factor does not contribute equally in the overall stress. Individual analysis of the factors also reveals that 'fear of obsolescence' and 'team interaction' are the most important contributors towards job stress in software houses.
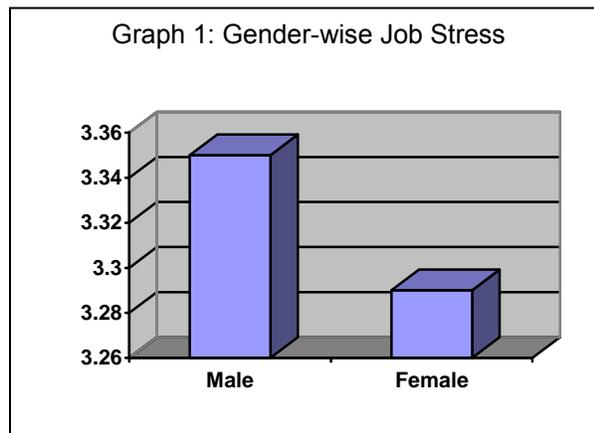
Table 3: Analysis of Variance (ANOVA)

Source of Variation	SS	df	MS	F	F crit
Between groups	458.0577	9	50.8953	27.2369	1.8845
Within groups	3811.979	2040	1.8686		
Total	4270.036	2049			

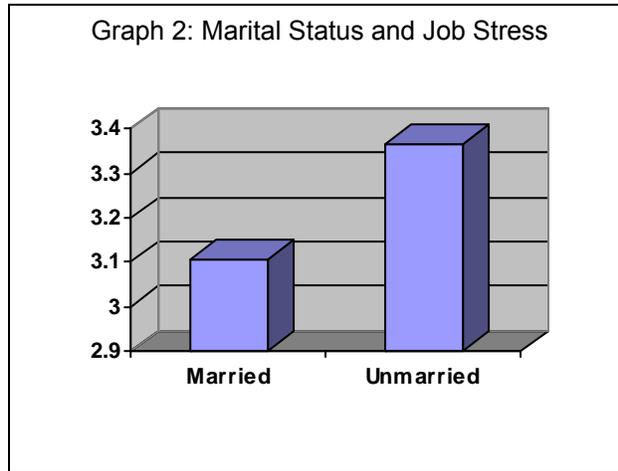### 4.6 Demographic Analysis of Factors

4.6.1 Analysis by Gender

When analyzing the data by gender, it is found that fear of obsolescence is the dominant factor both in males and females. Similarly, client interaction is equally distressful for both the gender, as the next higher stress-creating factor. The factors creating lowest stress are work culture and family support among both males and females. This is obvious because work culture is associated with the adjustment of the environment of foreign culture when the professional is travelling abroad. Also family support will become irrelevant because majority of the participants belong to the age group of 21 to 28 and are unmarried.

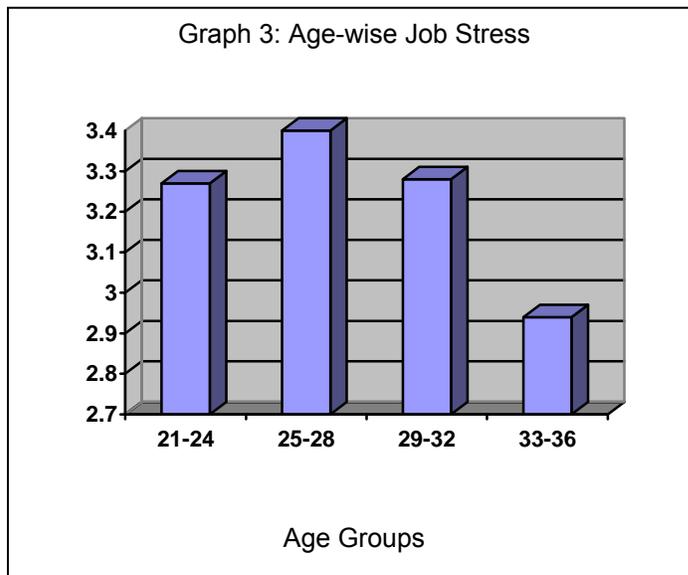Graph 1: Gender-wise Job Stress

4.6.2 Analysis by Marital Status

A higher degree of stress is found in unmarried people as compared to married people on the average. Also fear of obsolescence and workload are two strong stressors among unmarried people, whereas fear of obsolescence and client interaction are greater sources of stress among married people as compared to other factors. One of the reason of this phenomena is quite possible: married people may belong to higher age group and are working on both technical and managerial positions, hence, client interaction is a major factor contributing to their stress; while unmarried people are working for stretched hours, hence, feeling stressed due to workload. The lowest factors contributing in stress in both the cases are found to be family support and work culture.

Graph 2: Marital Status and Job Stress

(Bar chart: Married ≈ 3.1, Unmarried ≈ 3.35; y-axis from 2.9 to 3.4)

4.6.3 Analysis by Age

The data is collected from age groups ranging from below 20 years to above 40 years; however, no respondent reported the age above 40, while only one respondent could be included in the age groups of below 20 years and 37–40 years and both are showing very high stress; while the age groups from 21 to 36 years are showing normal stress. On the average, the age group 25–28 years are reporting the highest stress, and the obvious reason of this could be role overload and changing technology, because under this age group mainly relates to technical jobs.

Graph 3: Age-wise Job Stress

(Bar chart: 21-24 ≈ 3.26, 25-28 ≈ 3.39, 29-32 ≈ 3.27, 33-36 ≈ 2.93; y-axis from 2.7 to 3.4)

Age Groups

4.6.4 Analysis by Qualification

The analysis according to various degrees and qualification shows that almost all types of qualifications: BS, MS, BCS, MCS, MBA, B.Sc, or M.Sc are experiencing equal stress. Hence, qualification does not create any significant impact on the job stress.

4.6.5 Analysis by Job

Majority of the professionals working in software houses belong to the technical category. However, most of the people who are working as technical support are also experiencing the managerial support i.e. they reported to work both as technical and managerial positions. On the average, those people who are working both as technical and managerial support in the software houses are experiencing more stress, and showed the higher causes of stress as fear of obsolescence, client interaction, and workload.

4.7   Key Findings

1. Analysis of variance suggests that all factors taken into account are not equally contributing towards job stress among software professionals working in different software houses in Pakistan.
2. On the average, 'fear of obsolescence' is the most contributing factor in job stress, and is found as a prominent factor of stress in all demographic strata.
3. 'Client interaction' and 'workload' are next major factors, after fear of obsolescence.
4. According to correlation analysis of the factors, highest correlation is found of 'workload' with 'client interaction' and 'work family support'; and moderate correlation is found with almost every other factor.
5. The most significant finding is obtained through demographic analysis, and it reveals that, males are more under stress as compared to their counterparts, unmarried are more distressful as compared to married, and the age group of 21 to 28 years experiences higher stress with respect to their senior colleagues. Hence, the specific group of 'unmarried males in the age group of 21 to 28 years is found highly under stress as compared to other demographic segments.
6. Those professionals who are playing dual role of handling technology and managerial position are facing more stress.
7. Qualification or degree of the participants is not showing any impact in causing stress.

5. Conclusion and Recommendations

The professionals working in software houses of Pakistan are experiencing a moderate kind of stress in their job. This stress is equal for male and female members and there is no significant difference among them, but males are experiencing slightly higher stress as compared to females. One of the reason of this can be that males are supposed to work for longer hours as compared to females, and usually they take work along to their homes after working hours and at weekends, while females avoid to work longer hours especially late night sittings. It is also reported that males are supposed to work on Sundays as well, when the project deadlines are approaching nearer. Another reason of stress among the males is that they are more work overloaded as compared to their female counterparts.

The age group of 21 to 28 years has the highest stress as compared to their senior colleagues. The reason revealed through discussion with different professionals is that they are working for long hours, are fresh and energetic, and interested to work for longer hours in groups and friendship circles, usually formed when a project starts because they do not have much responsibility at their homes. This age group is also involved in pursuing further education, hence the added pressure of studies along with their jobs'.

The prominent segment, which reported the highest stress, is unmarried males in the age group of 25 to 28 years, and the probable reasons found through the discussion are: they are supposed to learn newer technology along with their daily job chores which puts a lot of pressure. They are more engaged in client interaction, and satisfying the client is considered the most difficult part in software projects. Also, most of the time, clients themselves are not clear about their requirements, hence, they do not freeze their requirements, which causes disruption and delays in the project and puts pressure on all other members working on the project. Therefore, it is concluded that the software professionals working in different software houses of Pakistan are experiencing moderate stress in their job.

The ten variables considered in this study contributing towards the job stress of software professionals do have equal weight and contribute differently, for example, family support and work culture have not much impact on our study, and hence these factors can be omitted or merged with other factors. Similarly, technical constraint and technical risk can be combined as one single factor. This will reduce some variables from the study and more prominent variables can emerge or the impact of other variables can be measured more precisely.

The performance of part of the stress can also be added to distinguish the stress and distress; this will also provide the impact of each variable on overall performance of the employee. It is also recommended that the scale should be reduced to one to five instead of one to seven, because the seven-point scale created difficulty in understanding the difference between two successive points, for example, having the stress of 'less than moderate' and 'low stress' more or less created the same meaning as discussed with software

professionals. So having a clear understating and quantification of the precise words can create more meaningful results.

References

1. Acton, T. and Golden, W. (2002) 'Training: The way to retain valuable IT employees', *Proceedings of Information Science* (Cork), June 19-21, pp 1-12.

2. Brod, C. (1984) *Technostress: The Human Cost of Revolution.* New York: Addison-Wesley.

3. Comish, R., Swindle, B. (1994) 'Managing stress in the workplace', *National Public Accountant*, Vol. 39, No. 9, pp. 24-28.

4. Cox, T., Ferguson, E. (1994) 'Measurement of the subjective work environment', *Work and Stress*, Vol. 8, No. 2, pp. 98-109.

5. Donaldson, S. E. and Siegel, S. G. (2001) *Successful Software Development.* 2nd ed. New Jersey: Prentice Hall PTR.

6. Fletcher, B., Gowler, D. and Payne, R. (1979) 'Exploding the myth of executive stress', *Personnel Management*, Vol. 11, No. 5, pp. 30-35.

7. Frone, M. R., Yardley, J. K., & Markel, K. S. (1997) 'Developing and testing an integrative model of the work-family interface'. *Journal of Vocational Behavior*, Vol. 50, pp. 145-167.

8. Fujigaki, Y. (1993) 'Stress analysis: A new perspective on people ware', *American Programmer*, July, pp. 33-38.

9. Furuyama, T., Arai, Y., and Lio, K. (1994) 'Fault generation model and mental stress effect analysis', *Journal of Systems and Software*, Vol. 26, No.1, pp. 31-42.

10. Glass R. L. (1997) 'The Ups and Downs of Programmer Stress', *Communications of ACM*, Vol. 40, No. 4.

11. Googins, B., & Burden, D. (1987) 'Vulnerability of working parents: balancing work and home roles', *Social Work*, pp. 295-300.

12. Greenberg, J and Baron R. A. (2003) *Behavior in Organizations: Understanding and Managing the Human Side of Work.* New Delhi: Prentice-Hall Pvt. Ltd.

13. Greenhaus, J. H., et al. (1997) 'Work and family influences on departure from public accounting', *Journal of Vocational Behavior*, Vol. 50, pp. 249-270.

14. Higgins, C. A., & Duxbury, L. E. (1992) 'Work-family conflict: A comparison of dual-career and traditional career men', *Journal of Organizational Behavior*, Vol. 13, pp. 389-411.

15. Holmlund-Rytkonen, M., Strandvik, T. (2005) 'Stress in business relationships', *Journal of Business and Industrial Marketing*, Vol. 20, No.1, pp. 12 – 22

16. Hoonakker, P. L. T., Carayon, P., Schoepke, J. (2005) 'Work family conflict in the IT work force', in Crayon, Klienier, Robertson and Hoonakkar (eds.) *Human Factors in Organizational Design and Management* – VIII. Santa Monica, CA: IEA Press, pp. 81 – 86.

17. Ivancevish, J. M., Napier, H. A., and Wetherbe, J. C. (1983) 'Occupational stress, attitudes, and health problems in the information systems professional', *Communications of ACM*, Vol. 26, No. 10.

18. Kaluzniacky E. (1998) 'An assessment of stress factors among information systems professionals in Manitoba,' Proceedings of ACM-SIGCPR Conference, Boston, Massachusetts, http://portal.acm.org/citation.cfm?id=279179.279217

19. Khosrowpour, M., and Culpan, O (1989) 'The impact of management support and education: Easing the causality between change and stress in computing environments', *Journal of Educational Systems*, Vol. 18, No. 1.

20. Kleiner, B., and Geil, S. (1985) 'Managing stress effectively', *Journal of Systems Management*, September.

21. Laudon, K. C. and Laudon, J. P. (2007) *Management Information Systems, Managing the Digital Firm*. 9th ed. New Delhi: Prentice-Hall Pvt. Ltd.

22. MacDonald, C. J., Gabriel, M. A. (2000) 'Factors influencing adult learning in technology based firms,' *The Journal of Management Development*, Vol. 19, No. (3), pp. 220-240.

23. Mak, B. and Sockel, H. (1999) 'A confirmatory factor analysis of IS employee motivation and retention', *Information and Management*, 38: 265-276.

24. McKenna, E. (2002) *Business Psychology and Organizational Behavior: A Student Handbook*. 3rd ed. Sussex: Psychology Press.

25. Moore, J. E. (2000) 'One road to turnover: An examination of work exhaustion in technology professionals,' *MIS Quarterly*, Vol. 24, No.1. pp. 141-148.

26. Natalie, E. (1995) 'IS managers under stress', *Open Computing*, Vol.12, No.1, January, pp. 44-49.

27. Netemeyer, R. G., Boles, J. S., and McMurrian, R. (1996) 'Development and validation of work-family conflict and family-work conflict scales,' *Journal of Applied Psychology*, Vol. 81, No. 4, pp. 400-410.

28. Rajeswari, K. S. and Anantharaman, R. N. (2003) 'Development of an instrument to measure stress among software professionals: Factor analytic study', in Proceedings of ACM-SIGCPR Conference, 2003, Philadelphia, Pennsylvania, pp. 34-43,

http://portal.acm.org

29. Roepke, R., Agarwal, R. et al. (2000) 'Aligning the IT human resource with business vision: The leadership initiative at 3M,' *MIS Quarterly*, Vol. 24, No. 2, pp. 327-353.

30. Ross G. F. (2005) 'Tourism industry employee work stress—a present and future crisis', *Industrial and Commercial Training* (Special Issue: Crises), pp. 135-149.

31. Schach, S. R. (1996) *Classical and Object-oriented Software Engineering*. 3rd ed. Boston: WCB/McGraw-Hill Companies Inc.

32. Singh N (2003) *Organizational Behavior: Concepts, Theory, and Practices*. New Delhi: Deep and Deep Publications Pvt. Ltd.

33. Thong, J. Y. L. and Yap, C. S. (2000) 'Information systems and occupational stress: A theoretical framework,' *Omega*, Vol. 28, No. 6, pp. 681-195.