



Factor Analysis of Organizational Stress Causes in IT Personnel in India

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ABSTRACT

The study on occupational stress in IT personnel was conducted in many stages. In the initial stages, based on the Case approach of Qualitative data collection and analysis, the various themes relevant to study on concept of Occupational stress in IT personnel has been categorized and modeled appropriately under various headings. The stress may have to do with the responsibilities associated with the work itself, or be caused by conditions that are based in the corporate culture or personality conflicts. The paper discusses one stage of the study throwing light on the stress causal scale construction and factor reduction of the organizational variables causing stress. The initial pilot survey with a sample size of 131 of this factor analysis study consists of finalizing on the major stress causal items in the questionnaire. The final *sample size* based on multi stage stratified random sampling was **481**. The reliability of the scale through Spearman Brown coefficient was 0.841. The Organizationally variables causing stress includes various sub factors under the road headings of Organizational Characteristics (OC), Work Characteristics (WC), stress generating happenings in particular encounters (SGHPE).

Keywords: Occupational Stress, Stress Causes, Organizational Characteristics (OC), Work Characteristics (WC), Stress generating happenings in particular encounters (SGHPE).

INTRODUCTION

Occupational Stress or Work Stress manifests in many occupations across the globe. But mainly human service oriented professions requiring more human interaction and attention like nursing, teaching, counseling and others have been mainly studied, as such professions have exhibited extreme levels of occupational stress. Existing studies has predominantly focused on the complex inter-relationship between mental health and work productivity only in developed countries. In developing countries like India the need for such studies is necessary in upcoming fields of Information technology where more personnel are employed in delivering services towards their internal customers (immediate superior, peers) as well as external customers. Firstly we need empirical evidence whether Occupational Stress exists in IT industry. Secondly we need to identify the possible causes of Occupational Stress.

Literature Review on stress and Organizational Variables

A cross sectional study was done by¹⁶ Prakash, Khapre, Laha and Saran (2011) among railway engine pilots to assess the level of stress and identify the significant stressors like job demands and poor ergonomic factors. A study by⁷ Ivancevich, John, Napier, Albert and Wetherbe (1983) on occupational stress among information systems personnel, the various job factors perceived as stressful by respondents was analysed.⁹ Johnson's (2005) finding of particular occupations being more stressful, in terms of negative outcomes, supports earlier work on teachers²² (Travers & Cooper, 1993) and on the ambulance service.

Quality of working life can be improved through control of occupational stress according to²³ Zhang, Lan and Chen (2011). According to² Bakker, Demerouti and Schaufeli (2003) work overload was consistently found to be a very strong predictor of burnout in call centers. The western lifestyle, characterized by convenience food, TV and PCs, is taking its toll on children as well as adults, and is producing increased numbers of overweight, passive youngsters with lifestyle diseases in a study by¹⁸ Sharma and Majumdar (2009). In a³ Dataquest (2006) survey among IT and BPO companies the reasons for stress and type of Illness found in WIPRO BPO company were mostly on long working hours, travel time, work timings, sleeping disorder, digestive system related disorder and depression.

In a cross sectional study by⁴ Dinesh, Choudhary, Lata and Vikas (2007) done on 419 subjects who work on computer for varying period of time it was found that 176 (42.0%) respondents felt the workload at their work place is high and were more likely to develop Musculo – Skeletal Disorder (MSD) related to computer use.

According to⁵ Fletcher & Dione (2008) & NASSCOM (2008), organizations have downsized and changed their internal structure forcing employees to expand their job description in terms of increased workload, longer hours, and flexibility without the rewards of career mobility and job security.

Objective of the Study

- To identify and group the key organizational factors causing stress in IT personnel using factor analysis.



METHODS/TOOLS USED

Primary Data on demographic information of IT personnel as well as occupational stress causes using the initial version of questionnaire developed was collected from the study population and the following data collection methods and tools were used.

Questionnaire Survey: Pilot data is collected based on questionnaire distribution to IT and IT support personnel. Preliminary factor analysis is done to reduce the number of factors and items in the questionnaire based on factor loading.

Sampling Methodology: Stratified Random Sampling

Universe: The Universe of the population consists of IT & IT support personnel in the IT organizations of Chennai, India.

Sampling Frame/Primary Sampling Units: The sampling frame for the study consists of approximately 150 Chennai IT companies listed in the NASSCOM registered list of core IT companies. Ideally 15 companies (10% of sampling frame) were selected at random, out of which only 11 companies agreed to support the survey.

Secondary Sampling Units: The secondary sampling units consist of actual IT personnel working in these 11 homogenous clusters namely the companies. Random number generator tools were provided to administrative staff and random number tables were for making the random sampling in respective strata of the IT personnel working in the respective companies.

Sample Size: The initial pilot survey with a sample size of 131 of this factor analysis study consists of finalizing on the major stress causal items in the questionnaire. The final *sample size* based on multi stage stratified random sampling was **481**.

Discussion of Relevant Conceptual Framework of Stress

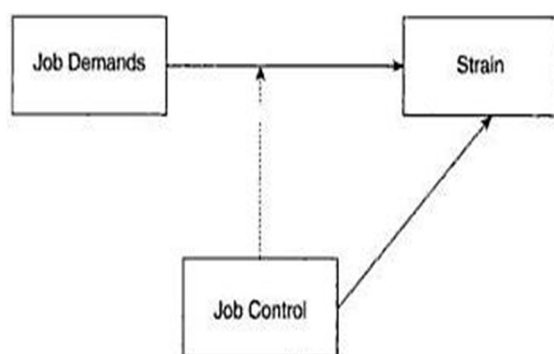


Figure 1: Job-Demand-Control-Support” (JDC-S) model

The stressors discussed in most empirical studies are based on the “Job-Demand-Control-Support” (JDC-S) model (**figure 1**) and the “Effort -Reward-Imbalance and Over commitment” (ERI-O) model¹⁹ (Siegrist 1997 and 1998). According to the JDC-S model¹⁰ (Karasek 1979, 1985 & Karasek & Theorell, 1990), high level of job demands (time pressure, work pace, deadlines),

combined with a low level of job control (influence over own work, possibilities for learning new things or decision latitude) and low levels of social support can be considered as stressful working conditions.

Though the current study adopts a transactional perspective of stress¹³ (Lazarus) as a starting point, much of the discussion blends with¹⁰ Karasek model of Job Demand Control Support (JDC-S) in later part of the study. From the various pilot interviews conducted and literature reviewed we see that the factors (independent variables) that contribute towards stress (dependent variable) include ‘macro’ and ‘micro’ level factors. While the macro level factors relate to the wider social, economic and political influences, the micro level factors are ‘Organizational variables,’ ‘Psychographically valued Variables,’ ‘Demographic variables,’ and ‘Socio-Cultural Variables.’

The Construction of Causative Factors of Occupational Stress Scale

The main consideration here was to construct a scale for identifying the Causative factors of Occupational Stress comprising of the theoretical criteria and the other dimensions derived from the literature, the organisational specificity of the profession, the proposed theoretical model and objectives of the present study, and the first hand knowledge from the field conditions. In this paper amongst the various factors of stress we limit the paper discussion to only organizational variables and its factor reduction. **On the micro level, Organizational Variables or Organizationally Valued Variables (OVV)** includes, Organizational Characteristics (OC), Work Characteristics (WC), stress generating happenings in particular encounters (SGHPE). In an equation form (Equation (1.1)) we find that,

$$[OVV = OC + WC + SGHPE] \quad (1.1)$$

a. ‘**Organizational Characteristics (OC),**’ includes, corporate governance, legality of business, job role definition and clarity, work flow, co-worker absenteeism, appropriate staffing, appropriate infrastructure facility, sexual harassment prevention policy and redressal system, staff skill training and development scheme, stress interventions available in organizations, salary and benefits, and daily conveyance/transport to and from work site. From above of the various organisational characteristics some specific numbers of items in the questionnaire were included. It includes the various items as given in **table 1**. The total number of items under OC is 47. Better Organizational Characteristics is indicated in equation (1.2).

$$[OC = BE + L\&T + OSD + OP + OC + GTDM + HRP\&P + C] \quad (1.2)$$

b. ‘**Occupational/Work Characteristics (WC),**’ includes risk factor, work load factor, work satisfaction factors, and absence of role ambiguity factors. These

reflect on conditions relating to long working hours, work over load, frequently changing shifts system, input raw material stock demand, lack of business order for processing, seasonal business, demanding client interaction, and frequent travel. From above of the various Work Characteristics (WC) some specific numbers of items in the questionnaire were included. It includes the various items as given in **table 2**. Better Work Characteristics is indicated in equation (1.3).

$$[WC = WL + WS + RA + RFJ] \quad (1.3)$$

- c. and 'stress generating happenings in particular encounters.' (SGHPE). These reflect conditions relating to over demanding and discriminating supervisor or reporting boss, harassment by reason of gender caste community or regionalism, showing favouritism, nepotism, denial of bonus, denial of salary, denial of leave, denial of promotion and denial of increments (**table 3**).

Factor Analysis of the Causative Factors of Occupational Stress Scale

Using the data consisting of the subjects scores on the 147 items, factor analysis was employed, namely, the

principal component method. The factors were extracted using the appropriate standard procedure. This was then rotated into the VARIMAX position. Analysis of the projections of items on factors showed the existence of various logical dimensions, others being too specific or unidentifiable. The empirical fitness of the items for measuring the dimensions was determined. The tables below present the results of the analysis. **The factors derived** from the application of factor analysis are discussed in detail. On the **Micro level** the various causative of factors of Occupational stress are grouped prior for understanding and explained in previous sections. From the respective grouping, various sub factors are analyzed and evolved to arrive at the final tool.

Factor analysis of Organizationally Valued Variable (OVV)

From the factor loadings and Rotated component matrix (**table 4 & 5**) it is inferred that around **7 factors** have evolved strongly and could explain the **overall variance** by **59.156 %**. Out of the various sub factor groupings initially conceptualized under organizationally valued variables (OVV), only 7 factors have evolved under the combination of different concepts.

Table 1: Concepts tested under Organisational Characteristics

CONCEPTS under OC	No of items included in questionnaire
Business Ethics – BE (higher the score higher the Business Ethics)	3
Leadership and Trust - L&T (higher the score higher the quality of Leadership and Trust)	7
Organizational Structure and Design – OSD (higher the score higher the Organizational Structure & Design)	4
Organizational performance – OP (higher the score higher the Organizational Performance)	3
Good Organizational Culture – GOC (higher the score better the Organizational Culture)	4
Group/Team Decision Making - GTDM (higher the score better the Group/Team Decision Making)	5
Human Resource Policies and Practices – HRP&P (higher the score better the Human Resource Policies and Practices)	12
Low Conflict – C (higher the score lower the Conflict in the Organizational)	9

Table 2: Concepts tested under Work Characteristics

CONCEPTS under WC	No of items included in questionnaire
Excessive Work Load –WL (Lower scores indicate excessive workload; higher scores express non-excessive work load)	13
Work Satisfaction – WS (Higher scores indicate greater work satisfaction)	12
Role Ambiguity – RA (Higher scores indicate lesser work Role ambiguity; Lower scores indicate greater role ambiguity)	8
Risk Factor in job –RFJ (Higher scores indicate lesser Risks in Job; Lower scores indicate greater risks in job)	3



Table 3: Concepts tested under Stress generating encounters

CONCEPTS under SGHPE	No of items included in questionnaire
Stress Generating Happenings in Particular Encounters – SGHPE Lesser the score Greater the SGHPE	8

Table 4: OVV Factors - Eigen Values & Variance explained

Component	Initial Eigen values			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	7.852	24.538	24.538	5.746	17.955	17.955
2	2.838	8.870	31.408	1.911	12.223	30.179
3	2.145	6.705	40.113	2.490	7.782	37.961
4	2.050	6.406	46.519	2.038	6.370	44.331
5	1.670	5.218	51.736	1.593	4.978	49.309
6	1.347	4.209	55.946	1.577	4.927	54.235
7	1.286	4.018	59.963	1.574	4.920	59.156

Extraction Method: Principal Component Analysis; Rotation Method: Varimax with Kaiser Normalization;
a. Rotation converged in 7 iterations.

Table 5: OVV Factors - Rotated Component Matrix^a

Item	Statement	1	2	3	4	5	6	7
Item 15_WS	Most of my suggestions are heeded and implemented here	0.793						
Item 90_HRP&P	There is clarity in our job roles	0.782						
Item 18_L&T	The company has good clarity in its business direction	0.757						
Item 56_HRP&P	The organization has intervention measures to handle employee's stress related burnout	0.732						
Item 104_HRP&P	The HR dept has remedial measures to address psychological job related stress	0.689						
Item 21_WS	My decisions and instructions concerning distribution of assignments among employees are properly followed	0.674						
Item 93_C	Higher authorities do care for my self-respect	0.668						
Item 80_OSD	In our company the workflow is without any hindrance	0.664						
Table 5 (continued)								
Item 62_OSD	The infra-structure facility in our company is adequate	0.654						
Item 60_WS	Others do not interfere with my responsibilities and working methods	0.563						
Item 23_GTDM	My reporting supervisor/boss is over demanding		0.711					
Item 111_GTDM	There are groups within our team that create a bias in team decisions.		0.697					
Item 122_RA	Sometime I have to do work unwillingly owing to certain group pressures		0.671					
Item 98_WL	I have to do such work as ought to be done by others		0.601					
Item 25_WL	My work is often done under very tense circumstances		0.589					
Item 129_WL	The work gets overloaded as my colleagues are often absent		0.589					
Item 73_RA	The available information relating to my job-role and its outcomes are vague and insufficient			0.796				
Table 5 (continued)								
Item 81_WS	There is always a shortage of inputs needed to complete my job in the system/business process.			0.663				
Item 75_SGHPE	I often feel that my colleagues have made my professional life cumbersome			0.641				

Item 40_WL	I am answerable for solving the problems at work to the higher level management				0.658			
Item 32_RFJ	My assignments are often quite risky and complicated				0.461			
Item 26_HRP&P	The organization has intervention programs to tackle stress among employees				-0.54			
Item 28_BE	Our business processes strictly conforms to the industry standards and ethics				-0.77			
Item 124_HRP&P	The organization takes care to relieve the physical stress of its employees.					0.695		
Table 5 (continued)								
Item 146_OC	The very nature and expertise of work assignments keep changing rapidly in the organization					-0.65		
Item 68_SGHPE	The reasons the company gives me for denying us our benefits are often lame ones						0.782	
Item 69_C	My different superior staff give contradictory instructions						0.531	
Item 35_GTDM	The decisions made in my team are riddled with politics							0.715
Item 5_C	The leaves allowed are too restricted to the extent of violating industry standards							0.508

Data Analysis & Discussion of Organizational Factor Loadings

The assessment of OVV factor loadings gives the larger picture of how the items are likely to be grouped in the final version of OVV variables. **OVV Factor 1** (Eigen Value = 5.746, % of Variance = 17.955) – The concepts under this factor indicate a combination of Human Resource Policies & Practices (HRP&P), Organizational Structure & Design (OSD) and Work Satisfaction (WS) as one of the major causal variable contributing towards Occupational Stress (OS). The Factor can also be perceived as poor organizational structure and design aligned with poor Human resource policies & practices resulting in poor Work satisfaction. The summation of all these poor effects results on Occupational Stress. Some of the highly loaded items on clarity of job roles (Item 90, Factor Loading = 0.782), good work flow without hindrance (Item 80, Factor Loading = 0.664), implementation of suggestion (Item 15, Factor Loading = 0.793) stand as testimony to the evolving of these concepts under a separate factor. In this factor the item 93 initially grouped under the concept of Conflict (C) as a causal variable of Occupational Stress (OS) has finally evolved under the concept of Human Resource Policies & Practices. If we attempt to group the entire three evolved sub factors under one concept, the appropriate cause would be poor Leadership.

OVV Factor 2 (Eigen Value = 1.911, % of Variance = 12.223) – The concepts evolved under this factor indicate a combination of Group & Team Decision making (GTDM) effects and Excessive Work Load (WL). The Factor can be perceived as some of the poor Group and Team decision making effects results in excessive Work Load. As a result of this summated effect Occupation Stress is caused. Some of the highly loaded items on biased decisions (Item 111, Factor Loading = 0.697), Feeling of being overloaded by doing others work (Item 98, Factor Loading = 0.601)

stand as testimony to the evolving of these concepts under a separate factor. In this factor item 122 which was initially conceptualized under Role Ambiguity (RA) concept has finally evolved under the concept of Group & Team Decision making (GTDM) effects.

OVV Factor 3 (Eigen Value = 2.490, % of Variance = 7.782) – The main concept evolved under this factor is Role Ambiguity. Some of the highly loaded items poor information availability on job roles & outcomes (Item 73, Factor Loading = 0.796), shortage of inputs in completing a Business process (Item 81, Factor Loading = 0.663) stand as testimony to grouping of the factor items under Role Ambiguity. Some more items which were initially conceptualized differently have been grouped under Role ambiguity in OVV Factor 1.

OVV Factor 4 (Eigen Value = 2.038, % of Variance = 6.370) – The main concept evolved under this factor is Risk Factor in Job (RFJ). Some of the highly loaded items on assignments being quite risky (Item 32, Factor Loading = 0.461) are a proof for this understanding of this factor. Some of the items initially grouped under Business ethics (BE), and items on work hazards grouped under Human Resource Policies & Practices (HRP&P) have been found to evolve under the OVV Factor 4 of RFJ.

OVV Factor 5 (Eigen Value = 1.593, % of Variance = 4.978) – The main concept evolved under this factor is Good organizational culture (GOC). Some of the highly loaded items on rapidly changing nature of work assignments (Item 146, Factor Loading = -0.647), stand as testimony to grouping of the concepts under this factor.

OVV Factor 6 (Eigen Value = 1.577, % of Variance = 4.927) – The main concept evolved under this factor is Stress Generating Happenings in Particular encounters (SGHPE). Some of the highly loaded items include lame reasons for declining benefits (Item 68, Factor Loading = 0.782) stand



as testimony for this grouping of concepts under this factor.

OVV Factor 7 (Eigen Value = 1.574, % of Variance = 4.920) – The main concept evolved under this factor is Conflict (C). This factor can be perceived as high level of conflicts induces more occupational stress (OS). One of the item 35 (Factor Loading = 0.715) on riddled politics and conflict resulting out of it, was initially grouped under Group & Team decision making (GTDM) concept. It has been finally evolved and grouped under Conflict (C) as the result of riddled politics is believed to result in Conflict and as a result Occupational Stress is induced.

A summarized view of the final version of OVV variable is given below. In equation form it is found that,

$$\text{OVV} = \text{OVV Factor 1} + \text{OVV Factor 2} + \text{OVV Factor 3} + \text{OVV Factor 4} + \text{OVV Factor 5} + \text{OVV Factor 6} + \text{OVV Factor 7} \quad (1.4)$$

$$\text{OVV} = \{ \{ \text{HRP\&P+OSD+WS} \} + \{ \text{GTDM+WL} \} + \{ \text{RA} \} + \{ \text{RFJ} \} + \{ \text{GOC} \} + \{ \text{SGHPE} \} + \{ \text{C} \} \} \quad (1.5)$$

The Final number of items evolved under this OVV variable based on factor loadings and analysis is 29.

CONCLUSION

The reliability of the scale through Spearman Brown coefficient was 0.841. Hence this scale is reliable; in spite of the methodological limitations of factor analysis. The above constructed scale (with four dimensions) has a total variance = 50.41. The value indicates that 50.41 percent of the phenomenon of causes of Occupational Stress is explained by this questionnaire. Its validity can be improved desirably in future studies with the identification of the other dimensions of Occupational Stress causes.

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