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A STRUCTURAL EQUATION MODELING (SEM): CONCEPTS, ISSUES AND APPLICATIONS – “AN EVALUATION OF WORK ENVIRONMENT AND STRESS FACTORS AMONG THE EMPLOYEES OF INFORMATION TECHNOLOGY (IT) IN BANGALORE CITY”

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ABSTRACT

Job stress can be defined as the harmful physical and emotional response that occurs when the requirements of the job do not match the capabilities, resources or needs of the worker. Job stress can cause poor health and can increase rates of work-related injuries and accidents. Some potential causes of work related stress are overworking, lack of clear instructions, unrealistic deadlines, and lack of decision-making, job insecurity, isolated working conditions, surveillance, and inadequate child-care arrangements. Although sexual harassment and discrimination are often excluded from lists of traditional job stressors, they must be included in any comprehensive analysis of the causes of workplace stress. Sexual harassment is a stressor for women in the workplace; and discrimination is a stronger predictor of health outcomes, including mental ill-health, for ethnic minorities than traditional job stressors. Some of the many effects of stress include numerous physical ailments as well as mental health problems such as depression and increased rates of suicide.

INTRODUCTION

Globalization and interdependence have opened new opportunities for the growth of the world economy and development. While globalization has been a powerful and dynamic force for growth, work conditions and the labour market have changed dramatically during the last two decades. The key elements in these changes are increased automation and the rapid implementation of information technology. Workers worldwide confront as never before an array of new organizational structures and processes – downsizing, contingent employment and increased workload.

Employers have tended to take the view that work and/or the workplace are not etiological factors in mental health problems. However, whatever the causal factors, the prevalence of mental health problems in employees makes mental health a pressing issue in its own right. Although, effective mental health services are multidimensional, the workplace is an appropriate environment in which to educate individuals about, and raise their awareness of, mental health problems. For example, the workplace can promote good mental health practices and provide tools for recognition and early identification of mental health problems, and can establish links

with local mental health services for referral, treatment and rehabilitation. Ultimately, these efforts will benefit all by reducing the social and economic costs to society of mental health problems.

Occupational stress -also called work stress, job stress or stress in organizations- “is a condition wherein job-related factors interact with the worker to change, either disrupt or enhance, his or her psychological or physiological conditions such that the individual's mind and/or body are forced to deviate from normal functioning”. Occupational stress symptoms are not left in the workplace at the end of the workday, but remain with the human being to impact on to the broader psychosocial domain. The number of personal computers around the world is close to one billion, but the number of IT professionals joining this field is declining fast. Bureau of Labour Statistics estimated that about 1.6 million new IT professions would be created from 2004 to 2016.

STRUCTURAL EQUATION MODEL (SEM)

Structural Equation Modeling, or SEM, is a very general statistical modeling technique, which is widely used in the behavioral sciences. It can be viewed as a combination of factor analysis and regression or path analysis. The interest in SEM is often on *theoretical constructs*, which are represented by the latent factors.

The relationships between the theoretical constructs are represented by regression or path coefficients between the factors. The structural equation model implies a structure for the covariance between the observed variables, which provides the alternative name *covariance structure modeling*. However, the model can be extended to include means of observed variables or factors in the model, which makes covariance structure modeling a less accurate name. Many researchers will simply think of these models as ‘Lisrel-models,’ which is also less accurate.

LISREL is an abbreviation of LInear Structural Relations, and the name used by Joreskog for one of the first and most popular SEM programs. Nowadays structural equation models need not be linear, and possibilities of SEM extend well beyond the original Lisrel program. Browne (1993), for instance, discusses the possibility to fit nonlinear curves. Structural equation modeling provides a very general and convenient framework for statistical analysis that includes several traditional multivariate procedures, for example factor analysis, regression analysis, discriminant analysis, and canonical correlation, as special cases. Structural equation models are often visualized by a graphical *path diagram*. The statistical model is usually represented in a set of matrix equations. In the early seventies, when this technique was first introduced in social and behavioral research, the software usually required setups that specify the model in terms of these matrices.

Thus, researchers had to distill the matrix representation from the path diagram, and provide the software with a series of matrices for the different sets of parameters, such as factor loadings and regression coefficients. A recent development is software that allows the researchers to specify the model directly as a path diagram. This works well with simple problems, but may get tedious with more complicated models. For that reason, current SEM software still supports the command-or matrix-style model specifications too.

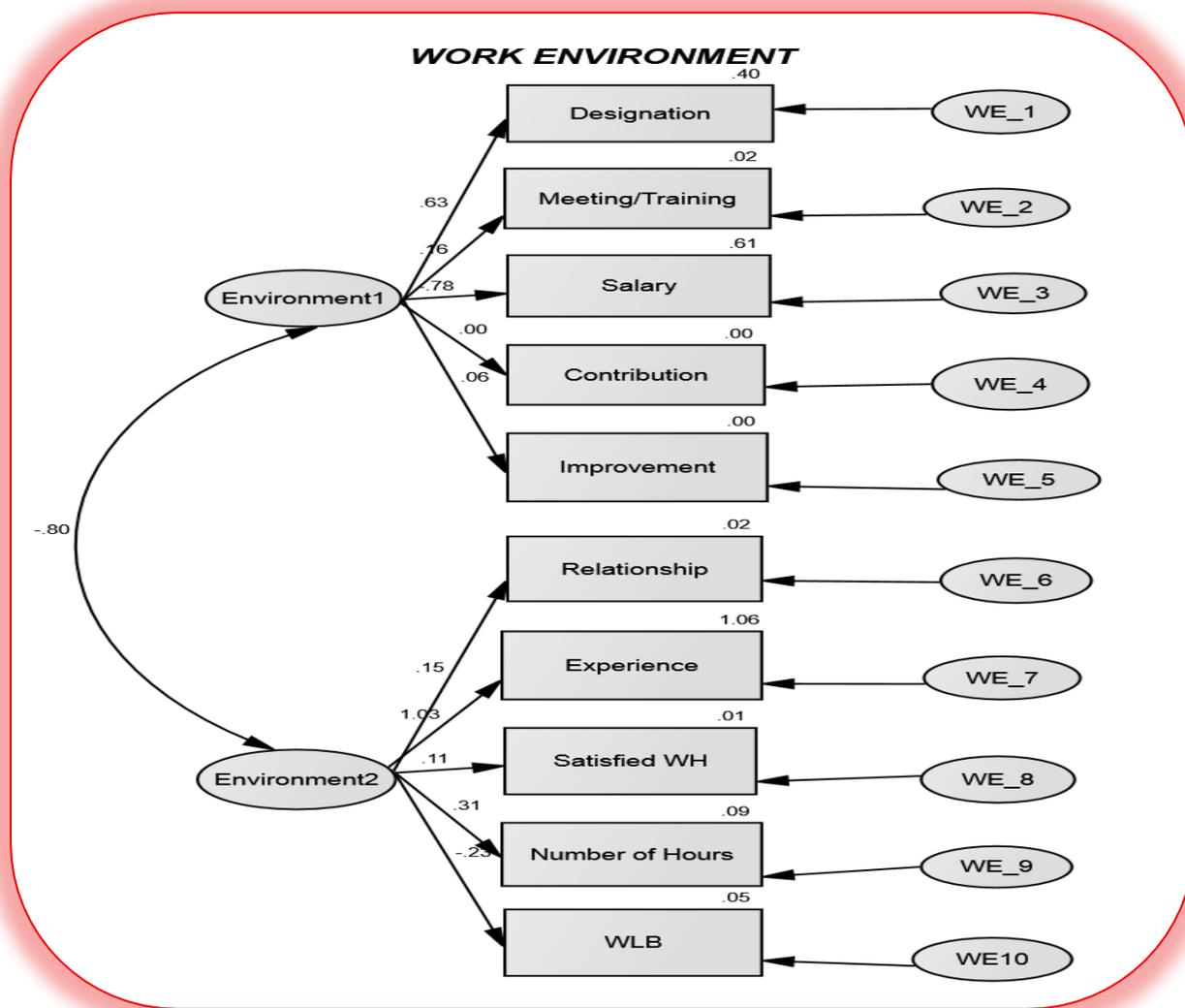
OBJECTIVES OF THE STUDY

1. To study the relationship between work environment ‘1’ and work environment ‘2’.
2. To study the level of stress in different job factor and job culture among the IT employees in Bangalore city,
3. To ascertain the impact of job stress on personal health of employees.
4. To identify the major factors responsible for causing stress in IT employees.

METHOD OF INVESTIGATION

Descriptive research design has been adopted in this study. The purpose of choosing descriptive design is to achieve new insights into the phenomenon of stress, to formulate a complete and comprehensive picture of stress affecting the well being of IT employees in Bangalore. The study focuses on stress experienced by IT Professionals. Convenient Sampling has been adopted in this study. A total of 100 IT employees were selected for the study. The study was undertaken in Bangalore which is a capital city of Karnataka, where many top notch IT companies are located and from which data has been collected.

FIGURE – 1



From the above, figure narrates that work environment relationship ‘1’ is designation, meeting/training, salary, contribution and improvement of IT employees and structural equation model used SPSS software 21. The value -0.80 is the correlation between work environment1 and work environment2. The values were predicted designation .63, meeting/training .76, salary 0.78, contribution 0.00 and improvement .06 is standardized regression weights. The values 0.40, 0.02, 0.61, 0.00 and 0.00 are the squared multiple correlation of relationship with designation, meeting/training, salary, contribution and improvement. It observes that positively correlated work environment weights in this study area.

From the above, figure 1 narrates that work environment ‘2’ with IT employees in Bangalore. In this relationship analyzed type of colleague relationship, experience, satisfied working hours, number of hours and work life balance by the IT employees in Bangalore. The value -.80 is the correlation between work environment1 and work environment2. The values were predicted colleague relationship .15, experience .103, satisfied working hours 0.11, number of working hours 0.31 and work life balance .23 are standardized regression weights. The values are 0.02, 1.06, 0.01, 0.09 and 0.05 in the squared multiple correlation of relationship with select IT employees in this study area in this study area. It reveals that positively correlated colleague relationship, experience, satisfied working hours, number of hours and work life balance in this study area.

In comparison with relationship 1 and 2 strongly prefer for work environment 1 and work environment 2 co-variance is ‘-.80’ and is not close to ‘1’ IT employees work environment in this study area. The researcher concludes that work environment is accepted and positively correlated in this study area.

TABLE – 1

Path	Estimate	S.E.	C.R.	P.value
Environment2 <--> Environment1	-.074	0.020	-3.625	***

*** (P-value <0.05)

The covariance's between tow constructs are estimated and tabulated in the table 1. The correlation between the constructs is also estimated. These measures are used for calculating the discriminant validity. The squared inter construct correlation is calculated using the inner construct correlations.

It is seen that the P-value 0.000 is less than 0.05. Since difference between observed and expected frequencies are significant. Hence, the null hypothesis (H_0) is rejected and alternative hypothesis (H_1) is accepted.

TABLE - 2
STANDARD REGRESSION WEIGHTS

			Estimate	S.E.	C.R.	P	Label
Designation	<---	Environment1	1.000				
Meeting/Training	<---	Environment1	.267	.074	3.623	***	
Salary	<---	Environment1	-1.524	.104	-14.686	***	
Contribution	<---	Environment1	-.001	.065	-.008	.994	
Improvement	<---	Environment1	.069	.045	1.507	.132	
Relationship	<---	Environment2	1.000				
Experience	<---	Environment2	10.782	2.828	3.813	***	
Satisfied WH	<---	Environment2	.437	.184	2.373	.018	
Number of hours	<---	Environment2	2.509	.679	3.696	***	
WLB	<---	Environment2	-1.702	.494	-3.445	***	

*** (P-value <0.05)

The above table 2 shows that construct reliabilities (CR) calculated with work environment1 and workenvironment2. This *standard regression weights* proves highly significant because of $P < 0.05(0.000)$. However, there is impact of IT employees work environment1 proved that highly significant 'meeting/training and salary' and work environment 2 observed that highly significant 'experience, number of hours and work life balance' in this study area.

TABLE – 3
SEM MODEL FIT SUMMARY

	Estimate	S.E.	C.R.	P	Label
Environment1	.671	.082	8.216	***	
Environment2	.013	.006	1.993	.046	
WE_1	1.003	.066	15.286	***	
WE_2	1.910	.105	18.172	***	
WE_3	1.012	.099	10.187	***	
WE_4	1.544	.085	18.276	***	
WE_5	.751	.041	18.258	***	
WE_6	.533	.029	18.286	***	
WE_7	-.089	.132	-.672	.502	
WE_8	.202	.011	18.285	***	
WE_9	.767	.042	18.069	***	
WE10	.639	.035	18.241	***	

*** (P-value <0.05)

The covariance's between tow constructs are estimated and tabulated in the table 3. The correlation between the constructs is also estimated. These measures are used for calculating the discriminant validity. The squared inter construct correlation is calculated

using the inner construct correlations. As the *P*-value is less than 0.05, there exists a strong correlation between work environment1 and workenvironment2 in this study area.

TABLE – 4

JOB FACTOR & JOB CULTURE AND CLIMATE	SA	A	N.O	D	SD	TOTAL
Work requires secular administrative tasks	30	29	16	22	3	100
Information is not directly communicated	10	38	20	29	3	100
Gender difference creates stress	14	15	32	31	8	100
Last minute approval cancellation by employer	12	36	30	20	2	100
The organizational climate is not very conclusive for performance	9	25	36	27	3	100
The performance evaluation system of organization defective	5	28	36	28	3	100
Expectations of the job and the job demands are compatible	11	36	31	19	3	100
Unethical practices of the organization creates stress	13	37	28	16	6	100
The standard of quality in the work of the job is unrealistic	7	29	37	22	5	100
Make mistake - serious consequences for the company	11	40	31	18	0	100

Source: Primary Data

The above table shows that job factor & job culture and climate of the IT employees in Bangalore. The majority of the IT employees 'strongly agree' that work requires secular administrative tasks in job factor, followed by IT employees 'agree' that information is not directly communicated and how performance is evaluated by IT companies, gender difference creates stress notified that 'no opinion', last minute approval cancellation by employer observed that 'agree', the organizational climate is not very conclusive for performance showed that 'no opinion', the performance evaluation system of organization defective preferred that 'no option', expectations of the job and the job demands are compatible explained that 'agree', unethical practices of the organization creates stress observed that 'agree', the standard of quality in the work of the job is unrealistic notified that 'no opinion' and make mistake - serious consequences for the company showed that 'agree'.

The researcher concludes that majority of the IT employee's given statement is 'agree' in the job factor & job culture and climate of the IT companies are creates more stress to employees and some of the statements does not notify by IT employees because of job security required by employees.

ANOVA – JOB FACTOR, JOB CULTURE AND CLIMATE

H_0 : There is no significant difference in the mean score of job factor of IT employees in this study area.

H_1 : There is significant difference in the mean score of job factor of IT employees in this study area.

TABLE – 4.24

Groups	Count	Sum	Average	Variance	#Rank
Job factor 1	100	239	2.39	1.47**	10
Job factor 2	100	277	2.77	1.15	7
Job factor 3	100	304	3.04	1.35**	9
Job factor 4	100	264	2.64	1.00	5
Job factor 5	100	290	2.90	1.00	6
Job factor 6	100	296	2.96	0.89	2
Job factor 7	100	267	2.67	1.01	4
Job factor 8	100	266	2.66	1.24**	8
Job factor 9	100	288	2.88	0.96	3
Job factor 10	100	256	2.56	0.83	1

Source: Primary Data [**stress factor is high]

[# Rank least variation basis]

The above table shows that job factor of summary of IT employees in Bangalore. It reveals that highest rank is 'work requires secular administrative tasks' and lowest rank is 'make mistake - serious consequences for the company'. Hence, the researcher

concludes that “A high degree of variation would mean little uniformity or consistency whereas a low degree of variation would mean great uniformity or consistency” in this study area”.

The researcher concludes that job factor is highly affected by IT employees and found least variance basis. Therefore, employees were affected the following **job factors are work requires secular administrative tasks, gender difference creates stress, unethical practices of the organization creates stress and information is not directly communicated and how performance is evaluated in this study area.**

TABLE – 5 - ANOVA RESULT

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	36.021	9	4.00	3.67	0.00**	1.89
Within Groups	1079	990	1.09			
Total	1115	999				

Source: Primary data **5% level of significance [$P < 0.05$] i.e., Rejected]

The results of ANOVA are given in different job factor of IT employees in Bangalore. The significance of variance, i.e., P-value, given under the head Sig. is 0.000. Since, the significance value 0.000 is less than 0.05 ($p < 0.05$), the variance between different experimental conditions is significant. Therefore, there is significant difference in the mean score of job factor of IT employees in this study area.

SUGGESTIONS

1. To provide opportunities of the IT company's only youngsters because of IT field is required for more skills, night shift work, no time bound work etc., therefore all the age group peoples will be selected and trained by the companies because of stress should be reduced by the employees.
2. To provide better infrastructure facilities and better hospitalize to employees and give less work, safe and health working conditions, best operating polices, opportunity for growth and security. Those facilities automatically reduce stress to the employees.
3. Social and emotional support should be made available to employees. They should be allowed to maintain close interpersonal relationships with peers, immediate boss, subordinates and family, which would help them to effectively cope with stress.
4. The present study is useful to the employees in the IT sector to achieve their goals to satisfy their career by creating awareness about the stressors and managing the strategies for minimization of stress in their life.
5. Staff shortage and work over time is significant cause of stress among employees in IT sectors. By way of new recruits, considering the present workload is the need of the hour to reduce the job stress of the existing staff. The inadequate training and developments are also pertinent cause of stress among employees in the IT sector.
6. Heavy Work Overload and Job insecurity are the major factors that create stress. Hence organization must try to reduce the workload.
7. Proper training should be provided for the employees to cope up with the latest updates in technology and methods adopted in the organization.
8. The organization must understand the problems of the employees, if any, and try to overcome them from those problems to produce good results.

LIMITATIONS OF THE STUDY

The limitations of this study are as follows.

1. The data have been collected only from 100 IT employees in Bangalore City.
2. The facts presented are based on the information provided by IT employees.
3. The report is focused only on the objectives of stress among IT employees.
4. The present study is of micro level only and studied working environment and Job factor among IT employees.

CONCLUSION:

Organizational stress is a common phenomenon in today's work places. This problem is reported to be severe in the IT industry where they have to work in a machine oriented and monotonous environment. Although much research have been done related to this issue in the other parts of the world, the understanding of the issue related to organizational stress in IT sector in Bangalore seems to be is not poor. These employees work in a range of roles spanning to over thirteen categories. The highest numbers of employees are in the field of Software Engineering, Quality Assurance, Network and System Administration and Technical Supporting. *The researcher concludes that job factor is highly affected by IT employees and found least variance basis.*

Therefore, employees were affected the following job factors are work requires secular administrative tasks, gender difference creates stress, unethical practices of the organization creates stress and information is not directly communicated and how performance is evaluated in this study area.

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