

A study on Relevance of Ergonomics in Indian Financial Service Organisations

*Sanil S.K. * Dr. Vinithkumar Nair

ABSTRACT

The health status of employees has a direct bearing on employee behavior. Research shows that improving employee health and well being will enable employers to build up a more productive workforce. Ergonomics is the application of human sciences to the optimization of people's working environment. As Literature review reveals, its application was limited mainly to the production sector till the recent past. But now, service industry also views its importance seriously and Ergonomics is turning out to be a key element for their HR strategies. Yet, it is not an intrinsic part of organisational culture in many a cases. This study is to provide a larger framework on the relevance of Ergonomics in Indian financial sector keeping in view the modern technological and infrastructural changes. Also, the study aims to find out the correlation between the work place conditions and the employee performance. Data for this study was collected from Employees and HR managers in financial companies in Banking and nonbanking sector so as to determine whether there is any perceived system based on sound ergonomic principles in such organizations. Various Statistical tools have been utilized to analyse the data for arriving at the conclusions.

Introduction

If the worker's body is forced to fit for a job, there will be stress outcomes. It will adversely affect the employee performance. Conversely, Ergonomics is the discipline that deals with making the job fit the worker. The International Labour Organisation defines Ergonomics as 'the application of the human biological sciences in conjunction with the engineering sciences to the worker and his working environment, so as to obtain maximum satisfaction for the worker which at the same time enhances productivity'. Traditionally, the employers in the manufacturing

sector have been addressing the issues related to improvement in the health and well being of the employees. There are enough Statutes in this sector to protect and further the employee health and welfare. But, now a days in the service sector also, there is an increasing trend in adopting scientific methods to ensure the physical and mental fitness of the employees. In a study of NHS employees in the UK, Loretto *et al* (2005) demonstrated that there is a wide range of personal, environmental as well as workplace factors which influence the well-being of employees. The setting of congenial working environment and enforcing welfare policies and

* Research Scholar, Bharathiar University, Coimbatore, E-mail : sanilsk@rediffmail.com

** Associate Professor, TKM Institute of Management, Kollam, Kerala

practices in the workplaces are some requisites for making the employees deliver the best. The stress and strain among the employees in the financial sector have reached an all time high due to the industrial reasons like business challenges, unhealthy competition for market share etc. In the current era of globalisation, greater attention is required to address the imbalance between workplace standards in the developed and developing worlds (Prem Chopra 2009). The modern Indian financial sector scenario immensely warrants such an attention taking into account the radical changes in the technological front.

Review of Literature

Research study discloses that working environment that is characterized by extreme heat, dim lighting, and congested working area can be associated to stress at the workplace (Sutton and Rafaeli, 1987). This environment includes humidity system, lighting, work area design, acoustic system and like other aspects. Thus, in the process of designing a job place, several factors especially ergonomic factors must be taken into consideration (Yeow and Nath Sen, 2003; Mohamad Khan *et al.*, 2005). BNet Business Dictionary (2008) has defined the Office design as “the arrangement of workspace so that work can be performed in the most efficient way”. The office design affects the employees’ way of doing works and is an important factor in job satisfaction. Many authors are of the view that the physical layout of the workspace along with efficient management processes is playing a major role in boosting employees’ productivity and improving organizational performance (Uzee, 1999; Leaman and Bordass, 1993; Williams *et al.* 1985). An independent research firm has conducted a research on US workplace environment (Gensler, 2006) in which 89 percent

of the respondents rated the design as very important and almost 90 percent of senior officials opined that effective workplace design is important for the increase in employees’ productivity. The study by American Society of Interior Designers (ASID, 1999) has revealed that the physical workplace design is one of the top three factors which affect employee performance and job satisfaction. The study results showed that 50 percent of people who were seeking jobs would prefer a job in a company where the physical environment is good. Brill *et al.* (1984) ranked important factors based on the significance which affect productivity. They are Furniture, Noise, Flexibility, Comfort, Communication, Lighting, Temperature and the Air Quality. Springer Inc (1986) stated that an insurance company in a study revealed that the best ergonomic furniture improved performance of its employees by 10 to 15 percent.

The failure to implement the ergonomic principles at the workplaces can lead to emotional depression, physical exhaustive and declining productivity and products’ quality (Shikdar and Sawaqed, 2003). The burn out of employees in workplaces as in the Canadian experiences show that training and support from top play key roles in combating burn out. The configuration of the workplace itself can help de-stress the employees (Colleen Isherwood and Natalie Cajic, 1998). According to all major job stress models, such as the Job Demands-Control model (Karasek & Theorell, 1990) and the Job Demands-Resources model (Bakker & Demerouti, 2007), psychological demands may lead to both chronic job strain such as burnout and to a deterioration of positive outcomes such as health and job satisfaction. Therefore, it is apparent that ergonomics attains greater importance in the workplace structuring of financial sector organizations where the productivity of employees is highly demanded.

Objectives of the Study

- To identify the ergonomic interventions in the workplaces of Financial Institutions
- To find out the relationship between the employee performance and the workplace conditions of employees in such Companies
- To list out all the important ergonomic concepts applicable to the Financial Institutions.

Research Methodology

Universe and Sampling Frame:

The Universe for sampling study is the employees from the public and private financial sector companies including Banks and NBFCs. The sampling frame for the present study comprises three PSU Banks, two traditional Scheduled Commercial Banks, three new generation Private Sector Banks and two public sector NBFCs. The employees from a wide range of occupations and capacities in these institutions were selected for study.

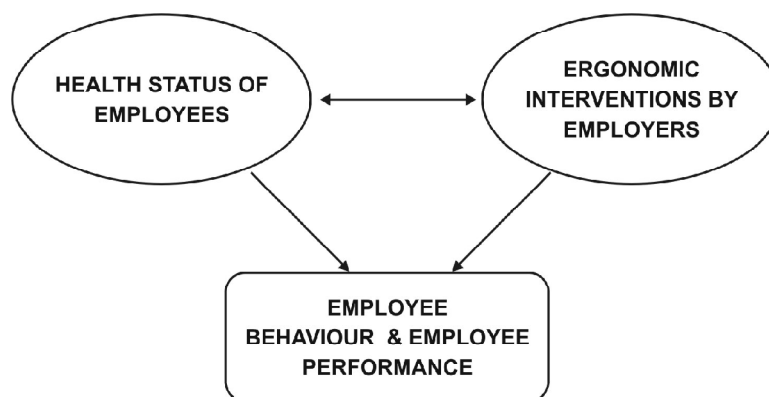
Data Collection:

The primary data was collected from 59 employees randomly selected from the population and employing a questionnaire containing 24 items. In fact, a fifty item questionnaire was initially prepared by incorporating the questions related to the ergonomic factors which were used by other researchers. Suitable changes were made and some new items were added considering the unique objectives of this study. After the pilot study results and also the preliminary factor analysis, the items were reduced to 24 so as to avoid ambiguity and to put in internal consistency and validity. Some of the items were tailored from researches done by Zafir and Durrishah (2009), House and Rizzo (1972), Brief and Aldag (1976), Lemasters and Atterbury (1996), Tate *et al.* (1997), Hedge and Erickson (1997), Miles (2000), Hildebrandt *et al.* (2001), Nag and Nag (2004), and Tarcan *et al.* (2004). A five point Likert Scale was constructed to obtain the responses.

Conceptual Framework:

The conceptual framework has been developed for the study and is shown in figure no.1 below.

Figure no.1



The performance and behavioral pattern of the employees are influenced by various health related aspects. Similarly, there exists a two way relationship between the health conditions and the working environment in which there can be ergonomic interventions by the employers. Thus, the climatic and environmental factors together with the health related issues in the work places form the independent variables whereas the outcomes in terms of performance and employee behaviour are the dependent variables.

Empirical Study Results

As a first step, the reliability and internal consistency of the variables were examined. The overall Cronbach's Alpha of all the 24 items under study is found to be 0.822 as shown in table no.1 which means that the data set has relatively good internal consistency.

Table no.1

Reliability Statistics

Cronbach's Alpha	No. of Items
0.822	24

The reliability analysis for the independent and the dependent variables are given below in table no.2. It is seen that Cronbach's Alpha coefficient is relatively good for all the five independent variables.

Table no.2

Reliability on Variables

Sl. No.	Variable Name	No. of Items	Cronbach's Alpha
1	Body postures	3	0.599
2	Seating	2	0.682
3	Workplace Climate	4	0.668
4	Health	4	0.598
5	Working Hours	2	0.502
6	Somatic Complaints	7	0.844
7	Job Satisfaction	2	0.602

Similarly, the Alpha coefficient is comparatively high for the two dependent variables and hence it is concluded that the data which is subjected to analysis is reliable for the study.

Factor Analysis

The factor analysis is conducted with all the 15 items of the independent variables.

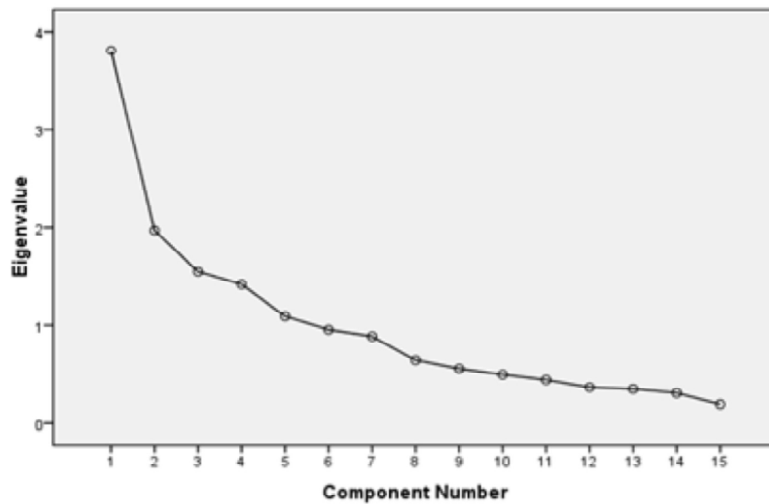
Table no.3

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.669
Bartlett's Test of Sphericity	Approx. Chi-Square	248.600
	df	105
	Sig.	.000

The table no.3 shows that we may reject the null hypothesis (viz. H₀: Factor analysis is not valid) due to the reason that the significance (0.000) is less than the assumed value (0.05). Thus, it is concluded that the correlation matrix is not an identity matrix. In other words, the factor analysis is valid for the data under study. It is also found that the KMO coefficient is 0.669 which is well above 0.5 and so it is implied that the reduction of data through the factor analysis is very much effective.

Figure no.2

Scree Plot



The Scree Plot is depicted in figure no.2 above which shows that there are five factors above the Eigen value 1. Also, it is found that the extracted five factors together explain 65.479 per cent of the total variance.

Table No. 4

Principal Component Analysis

	Component				
	1	2	3	4	5
Repetitive movements		.813			
Body postures			.603		
Frequent limbs usage		.688			
Workplace congestion	.606				
Physical exhaustion		.583			
Leave availment					.653
Irregular sleep					.732
Easy wok chair				.798	
Adjustable chair				.893	
Hot workspace	.644				
Poor ventilation	.612				
Noise problem in office	.764				
Lighting	.631				
Working hours			.782		
Rest period in working			.567		

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.a. Rotation converged in 8 iterations.

Based on the total explained variance, the five factors have been extracted by using the Rotated Component Matrix as shown in table no.4 above.

Factors identified with Scores

It is concluded that the five factors as shown in the table no.5 below have obtained the maximum scores. As such, these factors are grouped under the various heads, namely; workplace conditions, body movements, working hours and body postures, seating and health aspects.

Table no.5

Sl.No.	Factor 1 - WORKPLACE CONDITIONS	Scores
1	Workplace congestion	0.606
2	Hot workspace	0.644
3	Poor ventilation	0.612
4	Noise problem	0.764
5	Lighting	0.631
	Factor 2 - BODY MOVEMENTS	
6	Repetitive movements	0.813
7	Frequent limbs usage	0.688
8	Physical exhaustion	0.583
	Factor 3 - WORKING HOURS AND BODY POSTURES	
9	Body posture	0.603
10	Working hours	0.782
11	Rest period in working	0.567
	Factor 4 - SEATING	
12	Easy wok chair	0.798
13	Adjustable chair	0.893
	Factor 5 – HEALTH	
14	Leave availment	0.653
15	Irregular sleep	0.732

Factor 1 – WORKING CONDITIONS

The climatic conditions and the ambiance of offices have greater significance in the employee performance. Accordingly, it is seen that humidity, acoustics, lighting and office design can be grouped under this category based on the scores obtained as shown in the table no.5.

Factor 2 – BODY MOVEMENTS

The physical exhaustive activities of employees as in the case of movements of limbs and other body parts during the work have an impact on their effective discharge of duties.

Factor 3 – WORKING HOURS AND BODY POSTURES

The convenient working hours and sufficient rest periods will boost up the efficiency of employees. This time period of work and the body postures have clearly some relationship since continuing in some postures without rest while on job may cause many troubles for employees. Thus, these factors have become appeared in the same category.

Factor 4 – SEATING

The easiness and comfort of the seat and seating have a direct relationship with the satisfaction of employees.

Factor 5 – HEALTH

The availing of leave and sleep problems are classified together as it is understandable that such ill health of employees affects performance particularly in Financial Institutions.

Mean and Standard Deviation for key Ergonomic Factors

Table no.6

Descriptive Statistics

	N	Mean		Std. Deviation
	Statistic	Statistic	Std. Error	Statistic
Seating	59	2.97	.164	1.259
Humidity	59	2.90	.174	1.335
Body movements	59	2.85	.153	1.172
Accoustics	59	2.71	.151	1.160
Body postures	59	2.39	.130	1.000
Work hours	59	2.12	.103	.790
Health	59	1.97	.126	.964
Valid N (listwise)	59			

From the above descriptive statistics as shown in table no.6, it is found that seating, humidity, body movements and acoustics have assumed the highest Mean values with a relatively better Standard Deviation. This is a very clear indication for the fact that the employers in the financial sector are paying ample attention to improve ambiance and comforts in the workstations for their employees. In this context, it is noteworthy that body postures, work hours and health related aspects are having moderate or lower values only and that is an indication for the fact that in financial companies, there are lesser ergonomic interventions in such areas.

Correlation Matrix

The Bivariate Correlation Matrix of two important independent variables (Burn out and Job satisfaction) with the three relevant ergonomic variables of body movement, work hours and seating are shown in the table no.7 below.

Table no.7

		Burn out	Job satisfaction	Body movements	Work hours	Seating
Burn out	Pearson Correlation	1	.467**	.078	.367**	.097
	Sig. (2-tailed)		.000	.556	.004	.465
	N	59	59	59	59	59
Job satisfaction	Pearson Correlation	.467**	1	.143	.306*	.042
	Sig. (2-tailed)	.000		.278	.018	.752
	N	59	59	59	59	59
Body movements	Pearson Correlation	.078	.143	1	.244	-.074
	Sig. (2-tailed)	.556	.278		.063	.579
	N	59	59	59	59	59
Work hours	Pearson Correlation	.367**	.306*	.244	1	.039
	Sig. (2-tailed)	.004	.018	.063		.770
	N	59	59	59	59	59
Seating	Pearson Correlation	.097	.042	-.074	.039	1
	Sig. (2-tailed)	.465	.752	.579	.770	
	N	59	59	59	59	59

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

It is observed that the burn out of employees is significantly correlated with working hours at 1% significance level with a fairly good Karl Pearson coefficient of 0.367. Also, it is seen that job satisfaction has significant correlation at 5% level with work hours and the correlation coefficient is found to be a considerable value of 0.306.

Again, in table no.8, the correlation coefficients are given by Partial Correlation statistical analysis after taking into account the independent variable, work hours and the two most important outcome variables viz. burn out and job satisfaction, bearing in mind the objectives of this study.

Table no.8

Partial Correlations					
Control Variables			Burn out	Job satisfaction	Work hours
Seating & Body movements	Burn out	Correlation	1.000	.460	.357
		Significance (2-tailed)	.	.000	.006
		df	0	55	55
	Job satisfaction	Correlation	.460	1.000	.280
		Significance (2-tailed)	.000	.	.035
		df	55	0	55
	Work hours	Correlation	.357	.280	1.000
		Significance (2-tailed)	.006	.035	.
		df	55	55	0

The partial correlation between employee burn out and working hours is found to be 0.357. The p-value for this partial correlation is 0.006 which is well below 0.01 and hence it is significant. It is to be noted that the Correlation coefficient as in table no.7 (ie. 0.367) has dropped, but only to a very little extent when the effects of seating and body movements were eliminated. So, it is very well concluded that there exists a real relationship between the working hours set in the office and the employee burn out. Almost similar relationship is visible in the cases of job satisfaction and work hours. Here the correlation is significant because p-value of 0.035 is less than 0.05. When comparing the correlation coefficient in the table no.7 for job satisfaction at 5% level of significance, there occurred a dip in value from 0.306 to 0.280 after the effects of seating and body movements were eliminated. Despite a small decline, the values are sufficient for us to deduce that a valid relationship exists between the work hours and the job satisfaction of employees also.

Discussions and Conclusions

Broadly, the study provides many inputs to the managements of the financial institutions while structuring their workplaces and setting the standards for working conditions. But, at this juncture, it is worth mentioning that the sample size is not diverse enough to furnish a true picture of the financial sector of the country. Moreover, the data was collected by simple structured questionnaire method and no other modalities have been adopted to obtain superior responses. Nevertheless, the statistical analysis explicitly revealed the direct relationship of the office atmosphere with the employee performance. The study has brought into light some of the areas where there are traces of management interventions as also the need for more effective use of ergonomic concepts in Indian financial institutions. Now, even in the cases where there are effective ergonomic interventions some critical area remains unattended especially in the physical working conditions and related features. All these offer immense scope for the researchers to go into the details of such areas and suggest new means for improvements.

This study provides enough reasons for the management of financial sector companies to change some of their outlook, policies and practices in designing work places and in setting office standards. Of late, the management of such institutions bestows ample weightage for office design and ambiance. But such steps are oriented mainly to the customer related aspects. The ergonomically effective planning is only of secondary importance which is not desirable. The ergonomic chairs and suitable ventilation in the air conditioned atmosphere which is fitting the office lay out are only a few among the many urgently called for adaptations. The stretched working hours remains to be another major cause

for concern in such companies. The study results emphasize that burn out and job dissatisfaction are two of the offshoot of extended work hours and its streamlining can do some magical effects in the output of employees. Thus, it is high time that the employees in the ever challenging financial service sector of the country be offered the pleasant working conditions with a right blend of ergonomic principles and practices.

References

- Ahasan, R., 2002. Human Adaptation to Shift Work in Improving Health, Safety and Productivity – Some Recommendations. *Work Study*, 51(1): 9-16.
- Amir D.Aczel, 1999. Complete Business Statistics: Irwin/McGraw-Hill
- Bnet Business dictionary 2008
- Carayon P, Smith MJ. Work organization and ergonomics. *Appl Ergon*. 2000;31: 649–62.
- Cheng, Y., Y.L. Guo and W.Y. Yeh, 2001. A National Survey of Psychosocial Job Stressors and their Implications for Health among Working People in Taiwan. *International Archives of Occupational Environmental Health*, 74: 495-504.
- Clements-Croome, D., Kaluarachchi, Y. (2000) An Assessment of the Influence of the In-door Environment
- Colleen Isherwood and Natalie Cajic, 1998: Burnout-proofing your employees
- De Nederlandsche Bank ~2000!, EUROMON: the Nederlandsche Bank's Multi-Country Model for Policy Analysis in Europe, Monetaire Monografieën, 19.
- Dorgan, C.E. (1994) productivity *Link to the Indoor Environment Estimated Relative to ASHRAE 62-1989*

- Harrinton.D., Bean.N., Pintello.D., & Mathews.D. (2001), Job Satisfaction and Burnout: Predictors of Intentions to Leave a Job[16] Brill, M. Margulis S, Konar E, BOSTI (1984) *Using Office Design to Increase Productivity*. Vol. 1, 1984: Vol.[13] Noblet, A., J. Rodwell and J. McWilliams, 2001. The Job Strain Model is Enough for Managers. *Journal of Managerial Psychology*, 16(8): 635-649.
- Hedge, A. and W.A. Erickson, 1997. A Study of Indoor Environment and Sick Building Syndrome Complaints in Air Conditioned Offices: Benchmarks for Facility Performance. *International Journal of Facilities Management*, 1(4): 185-192.
- Hildebrandt, V.H., P.M. Bongers and F.J. van Dijk, 2001. Dutch Musculoskeletal Questionnaire: Description and Basic Qualities. *Ergonomics*, 44: 1038-1055.
- Iacovides, A., K.N. Fountoulakis, Kaprinis, St. and G. Kaprinis, 2003. The Relationship Between Job Stress, Burnout and Clinical Depression. *Journal of Affective Disorders*, 75:209-221.
- International Journal of Mental Health Systems 2009, 3:4
- Lindström K. Well-being and computermediated work of various occupational groups in banking and insurance. *Int J Hum Comput Interact*. 1991;3(4):339–61.
- McShane, S.L., M.A. dan Von Glinow, 2005. *Organizational Behavior*. 3rd ed. United States of America: McGraw-Hill Companies, Inc.
- Prem Chopra, 2009; Mental health and the workplace: issues for developing countries 3:4 doi:10.1186/1752-4458-3-4
- Rose.M. (2005) "Job Satisfaction in Britain: Coping with Complexity" *British Journal of Industrial Relations* 43(3), pp 455-67
- Savery, L.K. and J.A. Luks, 2000. Long Hours at Work: Are They Dangerous and do People Consent to them? *Leadership & Organization Development Journal*, 21(6): 307-310.
- Shikdar, A.A. and N.M. Sawaqed, 2003. Worker Productivity, and Occupational Health and Safety Issues in Selected Industries. *Computers and Industrial Engineering*, 45(4): 563-572.
- Sutton and Rafaeli et al., 1987; Emotion in work settings - 2 - ,
- Swanson NG, Sauter SL. A multivariate evaluation of an office ergonomic intervention using longitudinal data. *TIES*.2005;7(1):3–17.
- Tarcan, E., E.S. Varol and M. Ates, 2004. A Qualitative Study of Facilities and their Environmental Performance. *Management of Environmental Quality: An International Journal*, 15(2): 154-173
- Williams, S. and L. Cooper, 2002. *Managing Workplace Stress*. Great Britain: John Wiley & Sons, Ltd.
- Yeow, P.H.P. and R. Nath Sen, 2003. Quality, Productivity, Occupational Health and Safety and Cost Effectiveness of Ergonomic Improvements in the Test Workstations of an Electronic Factory. *International Journal of Industrial Ergonomics*, 32(3): 147-163.
- Zafir Mohamed Makhbul and Durrishah Idrus, 2009. Work Stress Issues in Malaysia. *Malaysia Labour Review*, 3(2):13-26

Websites (Accessed on 1st Oct.2012)

- <http://www.jbef.org/archive/pdf/volume1/4-Demet%20Leblebici.pdf>
- <http://www.biomedcentral.com/content/pdf/1752-4458-3-4.pdf>
- <http://www.scientificjournals.org/journals2009/articles/1460.pdf>