

# **Does Flexibility in Ergonomics Affect Performance and Well-being**

**Keerthi KR D**

Research Scholar

Vinod Gupta School of Management  
Indian Institute of Technology  
Kharagpur, West Bengal, India

**Susmita Mukhopadhyay**

Associate Professor

Vinod Gupta School of Management  
Indian Institute of Technology  
Kharagpur, West Bengal, India

## **Abstract**

Ergonomics is an important aspect of office space that employees use the most. Studies show the effect of ergonomics on health, comfort, and productivity, while the subjective well-being aspect is underexplored. The study examines the relationship between flexibility in ergonomics, employee performance, and subjective well-being. Employees working in the IT and ITES industries in India were part of the study. We collected data from 261 employees using convenience sampling. Partial Least Squares Structural Equation Modelling method using SMART PLS was used to analyse the data. Our study reconfirms that employee performance is a positive mediator and improves well-being. Contrary to the belief that ergonomics helps rectify posture and prevents the ill effects on health, our study says flexibility in ergonomics does not enable well-being directly. This study gives a base as to flexibility in ergonomics is not a direct indicator of well-being, while perception of productivity improves well-being.

## **1. Introduction**

Attracting the workforce back to offices is the most sought-after post-COVID scenario. This calls for creating office spaces that make employees happy and comfortable. With the hybrid work scenario, time spent in offices becomes crucial. Happiness was of utmost importance to philosophers from the time history was written. However, only recently has this been paid attention to in the domain of psychology (McMahon, 2006) and management. Happiness is broadly seen as of two types, which are hedonic and eudaimonic. Hedonic happiness refers to having pleasant feelings and judgements favourably, whereas eudaimonic happiness refers to doing the morally right thing -- being true to oneself, doing what is virtuous, meaningful, and growth-producing (Ryan & Deci, 2001).

A lot of terms are used as equivalent to happiness, such as quality of life, life satisfaction, Subjective well-being (SWB), and experienced utility. Seligman, in his book Flourish (Seligman, 2012), says that “the theory of Authentic Happiness” has frequencies in itself, and as a result, the life satisfaction reported is only a measure of how good one feels at that very moment. This mood view of happiness, unfortunately, cannot take into account half of the population who are “low-positive affective”. Life satisfaction also does not consider the meaning attached to things and engagement with work and people involved, making it a weak measure of happiness. The new concept Seligman has

come up with to measure more appropriately is called well-being. While happiness is a thing, well-being is a construct that has many measurable elements, and each of these elements contributes to well-being. The Authentic Happiness theory was to explain happiness, which is a real thing as per the definition of life satisfaction; people rate their satisfaction with their lives on a 1 to 10 ladder. Wellbeing Theory is made of five elements, which are positive emotions, engagement, meaning, positive relationships, and relationship, which is also referred to as the PERMA model.

The broadest of all well-being is 'context-free' well-being, which is about general life and is not with respect to a particular setup or situation, which is measured as life satisfaction, global happiness. Medium scope of wellbeing is one focused on family, health, and others. The other type of well-being is domain-specific well-being, which is job-related well-being and job satisfaction; job strain variables are used to measure it. In our study, we are specifically interested in domain-specific well-being and are restricting ourselves to it.

## **2. Literature Review**

Office space elements and happiness is being researched to a larger extent. Windows view of green space increases well-being and is relatively better than the break time that employees spend outdoors (Gilchrist et al., 2015). The effect of nature in the workplace. Windows at the workplace helped employees to have a look at nature and the outside world, also suggesting that including more natural environments at work can help in keeping with health measures of the organisations. Attention restoration theory also says that people who spend time with nature or depictions of nature are able to concentrate better (Kaplan, 1993).

Ergonomics deals with the interaction between humans and the environment. Furniture can be designed with flexibility so that the modular pieces can be assembled according to the specific need, such as working individually or in teams, or to accommodate a meeting (Tuncel & Kayan, 2018). These can be used to make the Y generation happy and comfortable at work. Office space should be able to provide a spectrum of settings and options for employees to choose a setting according to their need (Colenberg et al., 2021).

Office space dimensions and their effect on the performance of individuals and organizations are studied to a larger extent (Khazanchi et al., 2018). However, the effect of the flexibility of physical office space design on well-being is not much explored. Employees spend thousands of hours at work in their lifetime, and it is very important to know the factors that affect their well-being at work. Also, there are studies that show that happy employees are more productive at work. Hence, it is an important aspect for organizations to understand this aspect for the benefit of employees and also the employer (Cropanzano & Wright, 2001).

Providing flexibility in office furniture reduces musculoskeletal problems and reduces absenteeism in employees (Public Health England, 2015). Designing office spaces that not only provide basic facilities to do jobs but also enhance the well-being of employees is the need of the hour. WHO defines Health, Safety, and Wellbeing at work as an intersection of physical work environment, psychosocial work environment, personal health resources, and enterprise community involvement (Rokho, 2012). Workplace design should work beyond physical health and shift towards a holistic approach for employee well-being (Haworth(2017), n.d.). Design should take into account the stress levels employees go through when there is no control over the environment. Design should enable employees to provide flexibility in adjusting the furniture, chairs, and display, and also let employees choose the type and size of workspace as per their requirements. Designing a workspace is one of the ways in which an organization can influence the behavior of employees.

Employers and managers should see workplace design as an investment, like computers, to enhance employee performance (Vischer, 2008). Performance and well-being are the outcomes when the environment fits humans (Dul et al., 2012). We posit the following

H1: Flexibility in ergonomics can positively affect subjective well-being at work.

H2: Employee Performance mediates positively relationship between flexibility in ergonomics and subjective well-being at work.

The workplace comfort or workability pyramid (Vischer, 2005; Vischer & Wifi, 2017) talks about levels of comfort that can affect an employee. The three levels of comfort, as given in the pyrami,d are Physical comfort, Functional

comfort, and Psychological comfort. The pyramid/model says that Physical comfort is the basic facility, and if physical comfort is not there, people might feel that their health is at risk, such as contamination in the air, and will not be able to perform well at work as a result. Functional comfort is where people can do their work effectively and efficiently, without stress and feel comfortable in the environment. Ergonomics is also part of modern-day office environments, involving work stations especially for desk jobs. Ergonomics can enhance physical and functional comfort to employee. Health issues arise when there is no fit between ergonomic conditions and the nature of work. Good ergonomic design prevents such health issues, absenteeism, and enhances productivity, comfort, and well-being. The Habitability framework conceptualizes environment through layers of comfort, from discomfort to physical, functional, and psychological. Comfort and control over one's environment fosters happiness (Kansara, 2023), making a comfortable office space crucial for happiness. Office spaces enhance employee happiness when they are aligned with individual needs and provide layered comfort, as per P-E theory and the Habitability framework.

We used Person-Environment fit theory as the theoretical background to this study. When supplies of the environment match the needs of employees, fit is established. This study measures the aspect of ergonomics in office space that can be accommodated by organisations, such that employees can do their tasks optimally. Various tasks demand different structures such that employees can find the fit and be able to work without hassle (Figure 1).

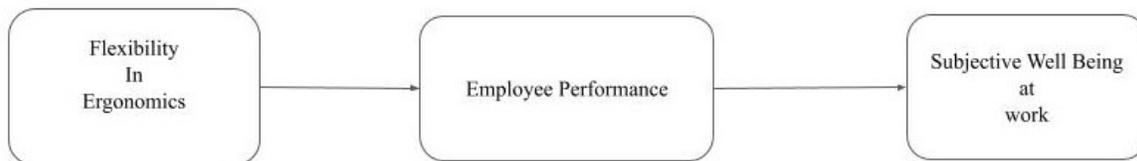


Figure 1. Hypothetical model

## 2.1 Objectives

In the above context, the objective of the paper is to understand the relationship between ergonomics in office spaces and the subjective well-being of employees. This is done by collecting data from employees, devoid of the nature of office spaces, to understand flexibility in ergonomics in the existing office spaces and their effect on the subjective well-being of employees.

## 3. Methods and Data Collection

### 3.1. Data Collection and Tools

We collected data using a convenience sampling technique. Data was collected from 282 knowledge workers, and post cleaning the data, 261 samples were obtained. A Likert scale was used to collect data working in IT and ITES employees. Items on flexibility in ergonomics were designed to see how office chair, office furniture, and office tools can be switched such that tasks can be performed optimally.

### 3.2 Participants

The average age of participants is 31 years and they worked in open space, cubicle and activity-based office setups.

### 3.3 Analysis

We used the Subjective Well-Being (SWB) concept of Seligman, which includes five aspects: Positive emotion, Engagement, Relationships, Meaning, and Accomplishment. Flexibility in ergonomics (E) and employee performance (EP) are latent variables, while Subjective well-being is higher order construct. Analysis. Partial Least Squares Structural Equation Modelling technique was used to analyse the data in the SMART PLS4 software. Reliability and Validity of items were found to be valid according to (Hair et al., 2019).

#### 4. Results

Reliability was measured using Cronbach's alpha and composite rho<sub>c</sub>. Average variance extracted was also calculated. Reliability values were around 0.7, and AVE was around 0.5. Validity of variables was measured using HTMT ratios, which are in the range of 0.2 and 0.3 (Table 1).

Table 1. Path coefficients after bootstrapping with 5000 samples

Path	Original sample (O)	Standard deviation (STDEV)	T statistics ( O/STDEV )	Result
E -> EP	0.168	0.086	1.951	Not supported
EP -> SWB	0.264	0.050	5.222	Supported

Table 2. Indirect effect path coefficients after bootstrapping with 5000 samples

Path	Original sample (O)	Standard deviation (STDEV)	T statistics ( O/STDEV )	Result
E -> SWB	0.044	0.026	1.683	Not supported

The model has explained variance (R-squared value) of Subjective Wellbeing is 6.9 percent, and that of Employee Performance is 2.8 percent (Table 2).

#### 5. Conclusion

Studies show that ergonomic design reduces musculoskeletal stress, improves health. Our study has shown that the effect of flexibility of ergonomics on employee performance is not significant, while the mediator employee performance is significant. Our findings show that flexibility in ergonomics does not translate directly to well-being. This shows that flexible ergonomic designs are useful in situations where it is perceived to enable performance, but it is not a standalone indicator of wellbeing. Our results do not agree with studies where flexible ergonomics provide happiness (Ahmad et al., 2022) and are in line with studies where sit and stand desks, which give flexibility, are effective in eliminating discomfort, while productivity is largely the same (Chambers et al., 2019). A Japanese study shows that sit and stand desks reduce sedentary behaviour while improving health and productivity (Ma et al., 2021). Flexibility in the example of sit and stand desks shows guaranteed positive results in reducing discomfort and sedentary lifestyle, while productivity has mixed results. Flexibility is an emerging field of work and needs a thorough investigation. Overall, good ergonomic design can reduce musculoskeletal disorders, physical tension and provide comfort. Comfort reduces frustration, fatigue, and absenteeism, which can enhance well-being. Our study is a cross-sectional study and is limited to employees in a single domain, and cannot be generalized to the population, yet. The other limitation is that the study uses a self-reported survey, which can be biased. The use of physiological parameters can provide many generalisable results. The study did not look at gender aspects, which can be done in future studies.

#### References

- Ahmad, A., Hussain, T., Hafiz, A., Rais, S., Hidayat, N., and Faizan, M., Total ergonomics model applied to thermal power plant for workers safety, health and happiness, in *Design Science and Innovation*, Springer Nature Singapore, pp. 33–50, 2022.
- Chambers, A. J., Robertson, M. M., and Baker, N. A., The effect of sit-stand desks on office worker behavioral and health outcomes: A scoping review, *Applied Ergonomics*, vol. 78, pp. 37–53, 2019.
- Colenberg, S., Jylhä, T., and Arkesteijn, M., The relationship between interior office space and employee health and

- well-being – a literature review, *Building Research and Information*, vol. 49, no. 3, pp. 352–366, 2021.
- Cropanzano, R., and Wright, T. A., When a “happy” worker is really a “productive” worker: A review and further refinement of the happy-productive worker thesis, *Consulting Psychology Journal: Practice and Research*, vol. 53, no. 3, pp. 182–199, 2001.
- Dul, J., Bruder, R., Buckle, P., Carayon, P., Falzon, P., Marras, W. S., Wilson, J. R., and van der Doelen, B., A strategy for human factors/ergonomics: Developing the discipline and profession, *Ergonomics*, vol. 55, no. 4, pp. 377–395, 2012.
- Gilchrist, K., Brown, C., and Montarzino, A., Workplace settings and wellbeing: Greenspace use and views contribute to employee wellbeing at peri-urban business sites, *Landscape and Urban Planning*, vol. 138, pp. 32–40, 2015.
- Hair, J. F., Risher, J. J., Sarstedt, M., and Ringle, C. M., When to use and how to report the results of PLS-SEM, *European Business Review*, vol. 31, no. 1, pp. 2–24, 2019.
- Haworth, Workplace design and the pursuit of happiness, Haworth Inc., 2017.
- Kansara, T., Well-being in the built environment, in *Understanding Happiness*, Springer Nature Singapore, pp. 77–107, 2023.
- Kaplan, R., The role of nature in the context of the workplace, *Landscape and Urban Planning*, vol. 26, no. 1–4, pp. 193–201, 1993.
- Khazanchi, S., Sprinkle, T. A., Masterson, S. S., and Tong, N., A spatial model of work relationships: The relationship-building and relationship-straining effects of workspace design, *Academy of Management Review*, vol. 43, no. 4, pp. 590–609, 2018.
- Ma, J., Ma, D., Li, Z., and Kim, H., Effects of a workplace sit-stand desk intervention on health and productivity, *International Journal of Environmental Research and Public Health*, vol. 18, no. 21, pp. 11604, 2021.
- McMahon, D. M., *Happiness: A History*, Grove Press, New York, USA, 2006.
- Public Health England, The impact of physical environments on employee wellbeing – topic overview, Public Health England, UK, 2015.
- Ryan, R. M., and Deci, E. L., On happiness and human potentials: A review of research on hedonic and eudaimonic well-being, *Annual Review of Psychology*, vol. 52, no. 1, pp. 141–166, 2001.
- Seligman, M. E. P., *Flourish: A Visionary New Understanding of Happiness and Well-being*, Simon and Schuster, New York, USA, 2012.
- Tuncel, D. B., and Kayan, H. Z., The design of flexible furniture for the new generation offices, *Civil Engineering and Architecture*, vol. 6, no. 2, pp. 78–87, 2018.
- Vischer, J. C., and Wifi, M., The effect of workplace design on quality of life at work, in *Handbook of Environmental Psychology and Quality of Life Research*, Springer International Publishing, pp. 387–400, 2017.
- Vischer, J. C., *Space Meets Status: Designing Performing Workspace*, Taylor & Francis/Routledge, Oxford, UK, 2005.
- Vischer, J. C., Towards an environmental psychology of workspace: How people are affected by environments for work, *Architectural Science Review*, vol. 51, no. 2, pp. 97–108, 2008.

## **Biographies**

**Keerthi KRD** is a Research Scholar in the field of Organisation Behaviour and Human Resources Management at Vinod Gupta School of Management, Indian Institute of Technology, Kharagpur, India. Her previous stints involve working in IT and research projects. Her research interests include Office spaces, Employee Well-being, Built Environment, HR Analytics, and Women Empowerment.

**Susmita Mukhopadhyay** is an Associate Professor at Vinod Gupta School of Management, Indian Institute of Technology, Kharagpur, India. Her research interests include (but not limited to) Organizational health and spiritual health, Organizational maturity and flexibility, HR Analytics, Positive Psychology, Mental health, insurance, Reproductive health, Women empowerment, Organizational and HR issues in Microfinance Leadership, Employee engagement, Talent management, Competency mapping, Performance management, Human Resource development, Employee voice, Soft issues in knowledge management