

# ARE OPEN-PLAN OFFICE DESIGNS STILL POPULAR AFTER CORONAVIRUS PANDEMIC?

Sanaz Ahmadpoor Samani, PhD  |  
Sayed Mohamad Shams Zadeh Alavi

Recently the modern focus of management, human resource, and health research were on office design and reducing or minimizing workplace problems and overall cost for office design. Thus, the concepts of open-plan office design have been defined as providing at least a basic solution to many of these notable and current challenges in current working systems and organizations. In fact, open workspaces are often suggested since they offer more flexibility for dynamic organizational changes and fast technological growth in the modern working style. Today because of the spread of Coronavirus disease 2019 (COVID-19) there is a need to focus even on new open-plan office designs to prevent and minimize health risks. The fact is the world needs to be ready for new viruses and or perhaps to unknown diseases in the future. The role of the workplace and the physical environment that affects employees' perceptions about the work environment has always been challenging. In fact, managers and space designers need to pay careful attention to designing the work environment with a supportive workspace is a beneficial activity to promote individuals' perceptions about the work environment, satisfaction, and outcome. In this condition, employees feel valued by the organization and management. Consequently, the role of environmental features in affecting employees' perceptions about the workplace, environmental satisfaction, and overall outcome is remarkable and must be understood by managers and space designers.

## INTRODUCTION

The notion of office location refers to the place in which office workers perform their activities while the notion of office design refers to the arrangement, design, and type of boundaries within an office room. On the other hand, the concept of office use refers to the way in which workspaces are allocated to office workers. For example, in some cases, one single workstation may be given to one single office worker (fixed workplace) and in another situation one workstation may be allocated to a number of office workers (desk-sharing) (Brennan, Chugh, & Kline, 2002; Seddigh, 2015).

Workplace designers and their clients have accepted open-plan office design for decades. A stack of research data suggests they are either mistaken or putting costs first.

There is no standard definition of what constitutes an open office, but generally, space is considered separate or different from cubicle office rooms and characterized by having a short barrier or no barrier at all between employees. As office jobs increased after the 2008 recession, open-plan workspaces grew even more popular as a way to save on operational costs. So, open-plan workspaces offer better use of space and reduce the cost of real estate, as well as offer more social interaction and communication as advantages. Despite the mentioned advantages, a distracting, intrusive, environment and now a potential health risk are counting as open-plan workspaces' disadvantages. As Coronavirus disease 2019 (COVID-19) becomes more pervasive, recommended and mandated social distancing becomes more pronounced, office workers prefer to revert

*As Coronavirus disease 2019 (COVID-19) becomes more pervasive, recommended and mandated social distancing becomes more pronounced, office workers prefer to revert back to traditional offices, private rooms.*

back to traditional offices, private rooms. Today, many organizations have been configured in the conventional or traditional type of office or they may work in a remote office at home.

In fact, the design and arrangement of the office may be influenced by the new COVID-19, which may affect an organization and individual perception about work and workplace and overall work-related behavior. For instance, as indicated in prior studies, desk-sharing may inspire communication among workers while teleworking (working from home, remote work and flexible workspace in which employees do not travel to the office building or workplace) may enhance autonomy over scheduling of work. Similarly, an open workspace may reduce physical and psychological privacy while teleworking may reduce social support from co-workers.

The list of complaints against crowded open-plan office design is increasing, and as state officials consider how to safely reopen offices closed by the coronavirus, some people are wondering whether the design is on its way out the door. Therefore, on the negative side, open workstations can produce distractions which prevent workers from concentrating on their tasks and can cause other problems too.

Today, the world is facing a series of challenges that, whether new or not, are of a magnitude never faced before. The solutions that worked yesterday, do not work anymore today. The world needs new solutions, new answers, and overall innovation is needed. So, the aim of this study is to review office design and the individual perception about the workplace. One of the new questions that need to be asked is what the workplace design needs to be? What is the organization's goal when it comes to people? How are organizations aiming to increase collaboration? How are organizations aiming to protect uninterrupted focused work or facilitate social interactions?

*The list of complaints against crowded open-plan office design is increasing, and as state officials consider how to safely reopen offices closed by the coronavirus, some people are wondering whether the design is on its way out the door.*

Is open-plan office design still popular and workable? Is open-plan office increase individual desire for inter-team or intra-departments, online or face-to-face interaction?

## Literature Review

Open-plan offices are one of the most popular forms of office design in today's industry. There some reasons behind the establishment of this type of office design in the first steps and increasing creativity, communication and reducing the cost of real estate are important ones (Landry, 2012; Samani & Alavi, 2020; Samani, Rasid, & Sofian, 2014; Wilkins & Holtham, 2012). As mentioned earlier open-plan office design refers to the use of open and large spaces and minimizes the use of private and enclosed rooms (Brennan et al., 2002; Mike O'Neill, 2008; Roelofsen, 2008). In some cases, open-plan design is characterized by moveable walls or partitions that divide individuals' workspaces into smaller workstations. In other cases the term refers to landscaping of housing estates, business parks, etc., in which there are no specific boundaries to divide the place to small workstations such as moveable partitions and walls, most of the offices that participated in this study were landscape (Brennan et al., 2002).

In open-plan offices a group of individuals with different needs and perceptions work in the same condition, so some ambient conditions are fixed to a certain level without much opportunity to modify them. Open-plan offices are a form of arrangement that supposes to enhance communication among co-workers and people placed near to each other. It also supposes to improve employees' creativity by giving employees the opportunity to share their knowledge and ideas (Samani, 2020 #1235)(Brennan et al., 2002; Samani & Alavi, 2020). Results came from prior studies suggested that open-plan

*Open-plan office designs offer high density which increases the visual and auditory distractions that tend to counterbalance the advantages of open plans and seem unacceptable with today's coronavirus pandemic.*

office designs offer high density which increase the visual and auditory distractions that tend to counterbalance the advantages of open plans and seem unacceptable with today's coronavirus pandemic (De Young, 2013; Duval, Veitch, & Charles, 2002; Smith-Jackson & Klein, 2009).

Before the coronavirus outbreak, open-plan offices were popular for managers and space designers; meanwhile employees were trying to adapt themselves with this sort of office design. However, after the coronavirus (COVID-19) employees are nervous about returning to open-plan offices, only because of crowding and uncontrollable working conditions. As mentioned by some office workers their desks or table were less than six feet away from other people the entire time working on the computers. Therefore, most companies are only just beginning to think about how they might modify their open-plan business workspaces. Some experts saying the open-plan workspaces could be rebuilt with better consideration for personal space and stricter cleaning schedules as well. Others, however, say that the pandemic or coronavirus is the final chance for the open workspaces.

Open-plan offices have existed for many years and have progressively become the main arrangement of office space for a wide range of work activities. Initially, open-plan offices were designed in 1950s, and in the early 1970s, they achieved their highest level of popularity when many organizations changed their traditional design to these types of arrangements. Open-plan office design has been the object of many studies since 1970s. Some studies have focused on the psychological consequence of open-plan office design and its ambient conditions, and other studies have investigated the effect of open design on users' well-being and health, satisfaction with the work environment and job (Brennan et al., 2002; Hwang & Kim, 2013; Kaarlela-Tuomaala, Helenius, Keskinen, & Hongisto, 2009; Mike O'Neill, 2008). For instance, some studies

have measured the influence of environmental noise on an individual's satisfaction and performance (Jahncke, Hygge, Halin, Green, & Dimberg, 2011; Roelofsen, 2008; Sundstrom, Town, Rice, Osborn, & Brill, 1994). Other studies also have examined the direct relationships between physical variables in the work environment and occupants' behavior, comfort, and satisfaction in both open-plan office design and traditional one (Dul & Neumann, 2009; Hwang, Lee, & Kim, 2012; Leather, Beale, & Sullivan, 2003; Lockton, Harrison, & Stanton, 2010).

Moreover, prior studies worried about open offices long before the coronavirus pandemic. Studies linked open-plan offices with reduced well-being and higher use of sick days. Compared to closed office rooms, open workspaces are not clean since microbes spread more easily, or because this sort of office design may reduce individual productivity and increases stress as well (Leather et al., 2003; Oommen, Knowles, & Zhao, 2008; Rashid, Wineman, & Zimring, 2009). In fact, today the more useful question to consider in open-plan offices is to what extent workers are supported by the workplace to have better physical and psychological health or to what extent workers' ability to work is influenced by the work environment.

## THEORY AND HYPOTHESES

### Environmental Comfort Theory

Among all the theories in environmental psychology, the Environmental Comfort Theory is the most common theoretical model supporting the majority of studies concerning environmental effects on peoples' performances. In accordance with the nature of this theory, it supports the majority of relationships in this study. Working in a comfortable and supportive work environment enhances and promotes peoples' outcome (Kim & de Dear, 2013; Vischer, 2007a). When the employee feels that the workplace can fulfill not all, but the majority of their needs and requirements they feel safe and important and they work better. Controlling and personalizing social distance and environmental features in a workplace especially in today's workplace (with coronavirus pandemic) is a basic and the most important factor in the workplace. For instance, appropriate lighting, a comfortable ambient temperature, and social distancing which are adjustable, and the individual's ability to modify these appear to be important and affect people's work-related behavior. Satisfaction with the work environment which can be affected by the ability to control the ambient conditions and reduce environmental distraction and stress can positively affect individual health, well-being, and outcome (Lee & Brand, 2005; Lee & Brand, 2010). Having a comfortable and/or a type of personal space or the availability

of a meeting room also seems essential for promoting communication among individuals, which is needed for enhancing creative outcomes, reducing environmental stress, and feeling comfortable.

The Environmental Comfort Theory argues that a workspace may support (comfortable condition) or it may fail to support (uncomfortable condition and a cause of stress) the tasks and activities that are being performed there (Lewis & Zibarras, 2013; Vischer, 2007a). Recently, the concept of comfort, which is a base and foundation for determining environmental standards, has gone beyond the simple measurement of people's needs and requirements to be simply healthy and safe in the buildings they occupy. In fact, people within a building require environmental support for the tasks and activities they are there to accomplish, and this condition of environmental support is what is meant by comfort (Vischer, 2007a, 2007b).

## The Relationship between Workplace Support and Individual Perception about Workplace

Health, safety (mental, psychological, and physical), emotions, and well-being help the individual to face difficult and challenging situations. In the other form satisfaction, happiness, and positive emotions can be treated as psychological well-being, which also refers to emotional or subjective well-being (Biggio & Cortese, 2013; Fisher, 2010; Myerson, 2014). Work and work environment have a significant effect on individual well-being which is extensively documented in the psychological literature (e.g., Smith-Jackson & Klein, 2009; Vischer, 2008; Biggio & Cortese, 2013). Individuals' attitudes and feelings are developed from the relationship between their general mood and well-being (Ünal, 2014). In fact, well-being plays a fundamental role in producing successful societies.

Well-being has a central role in the work environment as well to help employees' satisfaction and success at work. Well-being shows people's feelings about themselves in relation to the environments they are involving with and the overall world. In fact, well-being is only one feature of mental health; other factors include personal feelings about his/her ability, desire, and degree of personal control. There are some environmental factors which associated with well-being at workplaces including: the opportunity for personal control; the environment; the opportunity for using one's skills; the opportunity for interpersonal contact; diversity; money availability; physical security; supportive management; and job position in society (Clements-Croome, 2006). These elements which lead to well-being also lead to satisfaction at the workplace. In fact, a greater level of well-being or

more satisfaction at the workplace is linked to better job performance, more job satisfaction, lower absenteeism, and may lower employee turnover (Clements-Croome, 2006; Martin, 2005; Van der Voordt, 2004).

Therefore, the condition and environment that employees experience in office buildings affect employees' well-being, satisfaction, and efficiency. In this regard, the work environment should be designed in a way that motivates people who work within it toward better behavior and outcomes. The work environment can be understood as a motivation domain with particular stimulus characteristics that enables and permits some behavioral patterns to take place while limiting others (Carnevale, 1992). Therefore, there is a need to understand the relationship between the workplace and the individuals involved in it.

The fact is that within the workspace the ability of residents to control environmental features can reduce the negative effect of the uncontrollable environmental features, improve individuals' moods, and boost their level of environmental positive behavior as well as environmental satisfaction and overall outcome. As mentioned by prior studies, personal control over the work environment can have a positive effect on workers' health, satisfaction, group cooperation and effectiveness, and other perceptions associated with health and stress at both individual and group levels (Awang & Denan, 2016; Baldry & Barnes, 2012; Guo & Meggers, 2015; Huang, Robertson, & Chang, 2004; Leather et al., 2003; Lee & Brand, 2005, 2010; McCoy & Evans, 2005; MJ O'Neill & Evans, 2000; Oldham, 1988; Oldham, Kulik, & Stepina, 1991; Passero & Zannin, 2012; Samani & Alavi, 2020). In this condition, employees feel they have a supportive work environment.

As suggested by "Environmental Comfort Theory," employees require environmental support for performing their activities within a workplace. Comfort refers to this stage of environmental support. In fact, as indicated by Vischer (2007a), in the Environmental Comfort Theory, "comfort links the psychological aspects of workers' environmental satisfaction with concrete outcome measures such as improved task performance and with organizational productivity" (p.23). A comfortable work environment and the availability of personal control have a positive effect on employees' satisfaction with the work environment (Lee & Brand, 2005; Lomonaco & Miller, 1997) which can eventually enhance their positive work-related behavior and outcome (Bangwal, Tiwari, & Chamola, 2017; Igbeneghu & Popoola, 2011; Lee & Brand, 2005; Lee & Brand, 2010). Moreover, as suggested by the theory, the concept of functional comfort connects the psychological features of employees' environmental likes and dislikes with their outcome measures; such as improved work performance and team efficiency

(Vischer, 2007a). As stated by Csikszentmihalyi (2004), the best way for setting an ideal workspace for creativity and flow is to balance users' environmental demands with their skills and abilities to act on the environment.

Therefore, in a situation where individuals can personalize and control their ambient conditions in their workspace, they feel more satisfied which may positively affect their creative outcome, as well. Thus, based on the above-mentioned section, the following hypotheses were proposed:

- H1: Workplace's support is positively linked to individual perception about work environment.
- H2: Workplace's support is positively linked to individual satisfaction with the work environment.

Previous studies in environmental behavior indicated that satisfaction with the work environment is a key sign of employee well-being and performance at work (Mike O'Neill, 2008; Schakib-Ekbatan, Wagner, & Lussac, 2010; Tanabe, Haneda, & Nishihara, 2015; Van der Voordt, 2004; Veitch, Charles, Farley, & Newsham, 2007; Veitch, Charles, Newsham, Marquardt, & Geerts, 2003). Some factors are related to individual well-being and satisfaction (both job and environment) in the work environment. Factors that are mostly related to satisfaction with the work environment include the work environment itself, the availability of personal control over ambient conditions, and the opportunity for interpersonal connections, physical safety, and supportive management (Clements-Croome, 2006; Veitch et al., 2007). These elements are associated with individual well-being, health, happiness, and satisfaction at the workplace. Working in a comfortable workplace develops people's satisfaction and overall outcome (Bangwal et al., 2017; Kim & de Dear, 2013; Mike O'Neill, 2008; Roelofsen, 2008; Veitch et al., 2007). Controlling and personalizing ambient conditions in the workplace especially in today's workplace with coronavirus pandemic will directly affect employees' perception about their workplace and satisfaction with work environment and overall outcome. Therefore, the following hypothesis was proposed:

- H3: Satisfaction with work environment is positively associated with individual outcome.

Based on all the arguments above, a conceptual framework is suggested as shown in Figure 1.

## CONCLUSION

Along with the hypotheses presented above, the framework highlights three factors that have a significant effect on employees' perception regarding their workplace (workplace support and satisfaction). In fact, working in a



FIGURE 1. THE EFFECT OF INDIVIDUAL PERCEPTION OF WORK ENVIRONMENT ON EMPLOYEE SATISFACTION AND OUTCOME

comfortable and supportive work environment enhances and promotes people satisfaction, well-being, and overall outcome (Kim & de Dear, 2013; Mike O'Neill, 2008; Roelofsen, 2008; Veitch et al., 2007), this fact is also supported by Environmental Comfort Theory.

When the employee feels that the work environment can fulfill the majority of their needs and requirements, they feel safe and important and they work better. Controlling and personalizing environmental features and ambient conditions in a workplace enhances the comfortable mood and employees feel more satisfied. For instance, receiving adequate support from the workplace which can be expressed in the form of environmental control in open-plan workplaces or at least a symptom of control in the social distancing as a basic human right. So, organizations have a fundamental duty to realize that especially in today's epidemic of coronavirus and they need to provide the best care with the available resources regardless of the chances of survival.

Satisfaction with the work environment which can be affected by the ability to control the ambient conditions can positively affect the individual outcome (Igbeneghu & Popoola, 2011; Lee, 2010; Lee & Brand, 2010; Samani, Rasid, & Sofian, 2017). Having a comfortable and/or a type of personal space or the availability of private (half or totally enclosed) office room also seems essential for promoting social distance among individuals, which is needed for enhancing positive work-related behavior as well as positive perception about the workplace and environmental satisfaction, reducing environmental stress and feeling comfortable.

Some factors in the environment are related to individual well-being and satisfaction (both job and

environment) in the work environment. Factors that are mostly related to satisfaction with the work environment are including the work environment itself, the availability for personal control over the ambient condition, the opportunity for interpersonal connections, physical safety, and supportive management (Clements-Croome, 2006; Veitch et al., 2007). These elements are associated with individual well-being, happiness, and satisfaction at the workplace. In fact, a greater level of well-being or more satisfaction at workplace is linked to better job performance, more job satisfaction, lower absenteeism, and may lower employee turnover (Clements-Croome, 2006; Martin, 2005; Van der Voordt, 2004). Based on the ISO/DIS 28802 report as mentioned in Cao et al. (2012), occupants' comfort and well-being within an environment could be influenced by the assessment of social distance, thermal, acoustic and visual, lighting, air quality, and other environmental factors. Moreover, environmental satisfaction has an important role in employees' work-related behavior, well-being, and performance.

Previous studies have indicated the psychosocial effect of the work environment on employees' health and well-being (Briner, 2000; Edwards, Cable, Williamson, Lambert, & Shipp, 2006; George & Brief, 1992). Furthermore, prior studies support the finding of this study and suggested that environmental satisfaction is considered as a key indicator of employees' well-being and performance at work (Van der Voordt, 2004; Veitch et al., 2007; Veitch et al., 2003; Yee, Yeung, & Cheng, 2008). Previous studies suggested that personal control over the workstation is directly related to group efficiency, teamwork, and collaboration (Hua, 2007; Hua, Loftness, Heerwagen, & Powell, 2011; Lee & Brand, 2005; Lee & Brand, 2010). It also contributes to environmental satisfaction, comfort, and other perceptions that are linked to an individual's health and stress (Dul & Ceylan, 2010; Huang et al., 2004; Lee & Brand, 2005, 2010). In fact, the degree to which an individual believes that it is possible to directly affect the environment has a significant effect on perceptions of that environment and reactions to it (Knight & Haslam, 2010; Lee & Brand, 2005; Luck, 2003). So based on the finding of this review, managers and interior designers need to consider that open-plan office designs need to be established through actual changes in the process of perceived personal control and social space especially because of the spread of COVID-19. Architects can and should incorporate knowledge about territoriality to allow building users as much control as they are capable of responsibly exercising and as the organizational context allows; territory holders then benefit from a greater sense of self-determination, identity, health, and safety. 🌟

## References

- Awang, A.H., & Denan, Z. (2016). Designer's office in Malaysia: Comparative analysis on space planning and design issues. *International Journal of Social Science and Humanity*, 6(6), 427.
- Baldry, C., & Barnes, A. (2012). The open-plan academy: Space, control and the undermining of professional identity. *Work, Employment and Society*, 26(2), 228–245.
- Bangwal, D., Tiwari, P., & Chamola, P. (2017). Workplace design features, job satisfaction, and organization commitment. *Journal of Workplace Rights*, 7(3), 1–12.
- Biggio, G., & Cortese, C.G. (2013). Well-being in the workplace through interaction between individual characteristics and organizational context. *International Journal of Qualitative Studies on Health and Well-being*, 8(1), 1–13.
- Brennan, A., Chugh, J.S., & Kline, T. (2002). Traditional versus open office design: A longitudinal field study. *Environment and Behavior*, 34(3), 279–299.
- Briner, R. (2000). Relationships between work environments, psychological environments and psychological well-being. *Occupational Medicine*, 50(5), 299–303.
- Cao, B., Ouyang, Q., Zhu, Y., Huang, L., Hu, H., & Deng, G. (2012). Development of a multivariate regression model for overall satisfaction in public buildings based on field studies in Beijing and Shanghai. *Building and environment*, 47(1), 394–399.
- Carnevale, D.G. (1992). Physical settings of work: A theory of the effects of environmental form. *Public Productivity & Management Review*, 15(4), 423–436.
- Clements-Croome, D. (2006). *Creating the Productive workplace* (2nd ed.). Oxford, UK: Taylor & Francis Group Ltd.
- Csikszentmihalyi, M. (2004). *Good business: Leadership, flow, and the making of meaning* (Vol. 2). London: Penguin Book.
- De Young, R.K. (2013). Environmental psychology overview. In A. H. Huffman & S. Klein (Eds.), *Green organizations: Driving change with IO psychology* (pp. 17–33). New York: Routledge.
- Dul, J., & Ceylan, C. (2010). Work environments for employee creativity. *Ergonomics*, 54(1), 12–20.
- Dul, J., & Neumann, W.P. (2009). Ergonomics contributions to company strategies. *Applied Ergonomics*, 40(4), 745–752.
- Duval, C.L., Veitch, J.A., & Charles, K.E. (2002). *Open-plan office density and environmental satisfaction*. Ottawa: Institute for Research in Construction.
- Edwards, J.R., Cable, D.M., Williamson, I.O., Lambert, L.S., & Shipp, A.J. (2006). The phenomenology of fit: Linking the

- person and environment to the subjective experience of person-environment fit. *Journal of Applied Psychology*, 91(4), 802.
- Fisher, C.D. (2010). Happiness at work. *International Journal of Management Reviews*, 12(4), 384–412.
- George, J.M., & Brief, A.P. (1992). Feeling good-doing good: A conceptual analysis of the mood at work-organizational spontaneity relationship. *Psychological Bulletin*, 112(2), 310.
- Guo, H., & Meggers, F. (2015). Impact of control availability on perceived comfort. *Energy Procedia*, 78, 1671–1677.
- Hua, Y. (2007). *Designing open-plan workplaces for collaboration: An exploration of the impact of workplace spatial settings on space perception and collaboration effectiveness* (Doctoral dissertation). Carnegie Mellon University, Pittsburgh, PA.
- Hua, Y., Loftness, V., Heerwagen, J.H., & Powell, K.M. (2011). Relationship between workplace spatial settings and occupant-perceived support for collaboration. *Environment and Behavior*, 43(6), 807–826.
- Huang, Y.H., Robertson, M.M., & Chang, K.I. (2004). The role of environmental control on environmental satisfaction, communication, and psychological stress effects of office ergonomics training. *Environment and Behavior*, 36(5), 617–637.
- Hwang, T., & Kim, J.T. (2013). Assessment of indoor environmental quality in open-plan offices. *Indoor and Built Environment*, 22(1), 139–156.
- Hwang, T., Lee, D.G., & Kim, J.T. (2012). Optimal illuminance of seven major lighting colours in LED: Focus on occupant comfort and communication in an indoor environment. *Indoor and Built Environment*, 21(1), 122–128.
- Igbeneghu, B.I., & Popoola, S.O. (2011). *Influence of locus of control and job satisfaction on organizational commitment: A study of medical records personnel in university teaching hospitals in Nigeria*. Retrieved from <http://digitalcommons.unl.edu/libphilprac/575/>
- Jahncke, H., Hygge, S., Halin, N., Green, A.M., & Dimberg, K. (2011). Open-plan office noise: Cognitive performance and restoration. *Journal of Environmental Psychology*, 31(4), 373–382.
- Kaarlela-Tuomaala, A., Helenius, R., Keskinen, E., & Hongisto, V. (2009). Effects of acoustic environment on work in private office rooms and open-plan offices—longitudinal study during relocation. *Ergonomics*, 52(11), 1423–1444.
- Kim, J., & de Dear, R. (2013). Workspace satisfaction: The privacy-communication trade-off in open-plan offices. *Journal of Environmental Psychology*, 36, 18–26.
- Knight, C., & Haslam, S.A. (2010). Your place or mine? Organizational identification and comfort as mediators of relationships between the managerial control of workspace and employees' satisfaction and well-being. *British Journal of Management*, 21(3), 717–735.
- Landry, D.R. (2012). *Encouraging Creativity in the Workplace Through the Physical Environment: Focusing of the Office Workstation* (Master of Science). University of Nebraska–Lincoln.
- Leather, P., Beale, D., & Sullivan, L. (2003). Noise, psychosocial stress and their interaction in the workplace. *Journal of Environmental Psychology*, 23(2), 213–222.
- Lee, Y.S. (2010). Office layout affecting privacy, interaction, and acoustic quality in LEED-certified buildings. *Building and Environment*, 45(7), 1594–1600.
- Lee, Y.S., & Brand, J.L. (2005). Effects of control over office workspace on perceptions of the work environment and work outcomes. *Journal of Environmental Psychology*, 25(3), 323–333.
- Lee, Y.S., & Brand, J.L. (2010). Can personal control over the physical environment ease distractions in office workplaces? *Ergonomics*, 53(3), 324–335.
- Lewis, R., & Zibarras, L. (Eds.). (2013). *Work and Occupational Psychology: Integrating Theory and Practice*. London: SAGE Publication Ltd.
- Lockton, D., Harrison, D., & Stanton, N.A. (2010). The design with intent method: A design tool for influencing user behaviour. *Applied Ergonomics*, 41(3), 382–392.
- Lomonaco, C., & Miller, D. (1997). Environmental satisfaction, personal control and the positive correlation to increased productivity: Johnson Controls, Inc. o. Document Number.
- Luck, G. (2003). *The relationship of an innovative thinking style, locus of control and perceived control on job satisfaction and workspace preferences among knowledge workers* (Doctor of Philosophy). California School of Professional Psychology, Los Angeles, CA.
- Martin, A.J. (2005). The role of positive psychology in enhancing satisfaction, motivation, and productivity in the workplace. *Journal of Organizational Behavior Management*, 24(1-2), 113–133.
- McCoy, J.M., & Evans, G.W. (2005). Physical work environment. In J. Barling, E. K. Kelloway, & M. R. Frone (Eds.), *Handbook of work stress*. Thousand Oaks, CA: SAGE Publications.
- Myerson, J. (2014). Workplace and wellbeing. In D. McDaid & C. L. Cooper (Eds.), *Wellbeing: A complete reference guide*, (Vol. 2). Hoboken, NJ: John Wiley & Sons, Inc.

- O'Neill, M. (2008). *Open plan and enclosed private offices*. Retrieved from [www.knoll.com/media/878/738/OpenClosed\\_Offices\\_wp.pdf](http://www.knoll.com/media/878/738/OpenClosed_Offices_wp.pdf)
- O'Neill, M., & Evans, G. (2000). *Effects of workstation adjustability and training on stress and motivational performance*. Paper presented at the Proceedings of the 2000 EDRA Conference, Los Angeles, CA.
- Oldham, G.R. (1988). Effects of changes in workspace partitions and spatial density on employee reactions: A quasi-experiment. *Journal of Applied Psychology, 73*(2), 253–258.
- Oldham, G.R., Kulik, C.T., & Stepina, L.P. (1991). Physical environments and employee reactions: Effects of stimulus-screening skills and job complexity. *Academy of Management Journal, 34*(4), 929–938.
- Oommen, V.G., Knowles, M., & Zhao, I. (2008). Should health service managers embrace open plan work environments? A review. *Asia Pacific Journal of Health Management, 3*(2), 37–43.
- Passero, C.R.M., & Zannin, P.H.T. (2012). Acoustic evaluation and adjustment of an open-plan office through architectural design and noise control. *Applied Ergonomics, 43*(6), 1066–1071.
- Rashid, M., Wineman, J., & Zimring, C. (2009). Space, behavior, and environmental perception in open-plan offices: A prospective study. *Environment and Planning B: Planning and Design, 36*(3), 432–449.
- Roelofsen, P. (2008). Performance loss in open-plan offices due to noise by speech. *Journal of Facilities Management, 6*(3), 202–211.
- Samani, S.A., & Alavi, S.M.S.Z. (2020). Does the design of the workplace affect individual creativity. *Performance Improvement, 59*(5), 6–16.
- Samani, S.A., Rasid, S.Z., & Sofian, S. (2014). A Workplace to Support Creativity. *Industrial Engineering & Management Systems, 13*(4), 414–420.
- Samani, S.A., Rasid, S.Z., & Sofian, S. (2017). The effect of open-plan workspaces on behavior and performance among Malaysian creative workers. *Global Business and Organizational Excellence, 36*(3), 42–52.
- Schakib-Ekbatan, K., Wagner, A., & Lussac, C. (2010). *Occupant satisfaction as an indicator for the socio-cultural dimension of sustainable office buildings development of an overall building index*. Paper presented at the Conference Adapting to Change: New Thinking on Comfort, London.
- Seddigh, A. (2015). *Office type, performance and well-being: A study of how personality and work tasks interact with contemporary office environments and ways of working* (Doctoral thesis). Faculty of Social Sciences, Stockholm University, Stockholm.
- Smith-Jackson, T.L., & Klein, K.W. (2009). Open-plan offices: Task performance and mental workload. *Journal of Environmental Psychology, 29*(2), 279–289.
- Sundstrom, E., Town, J.P., Rice, R.W., Osborn, D.P., & Brill, M. (1994). Office noise, satisfaction, and performance. *Environment and Behavior, 26*(2), 195–222.
- Tanabe, S.-I., Haneda, M., & Nishihara, N. (2015). Workplace productivity and individual thermal satisfaction. *Building and Environment, 91*, 42–50.
- Ünal, Z.M. (2014). Influence of leaders' humor styles on the employees' job related affective well-being. *International Journal of Academic Research in Accounting, Finance and Management Sciences, 4*(1), 201–211.
- Van der Voordt, T.J. (2004). Productivity and employee satisfaction in flexible workplaces. *Journal of Corporate Real Estate, 6*(2), 133–148.
- Veitch, J.A., Charles, K.E., Farley, K.M., & Newsham, G.R. (2007). A model of satisfaction with open-plan office conditions: COPE field findings. *Journal of Environmental Psychology, 27*(3), 177–189.
- Veitch, J.A., Charles, K.E., Newsham, G.R., Marquardt, C.J., & Geerts, J. (2003). Environmental satisfaction in open-plan environments: Workstation and physical condition effects. Institute for Research in Construction, National Research Council of Canada.
- Vischer, J.C. (2007a). The concept of environmental comfort in workplace performance. *Ambiente Construido, Porto Alegre, 7*(1), 21–34.
- Vischer, J.C. (2007b). The effects of the physical environment on job performance: towards a theoretical model of workspace stress. *Stress and Health, 23*(3), 175–184.
- Vischer, J.C. (2008). Towards an environmental psychology of workspace: How people are affected by environments for work. *Architectural Science Review, 51*(2), 97–108.
- Wilkins, A., & Holtham, C. (2012). Organizational creativity: Building a business Ba-Haus? *Creative Education, 3*(26), 737–745.
- Yee, R.W., Yeung, A.C., & Cheng, T. (2008). The impact of employee satisfaction on quality and profitability in high-contact service industries. *Journal of Operations Management, 26*(5), 651–668.

SANAZ AHAMADPOOR SAMANI, PhD, is an assistant professor in the Department of Management and Human Resource at Payame Noor University, Tehran, Alborz, Mahdasht, Iran. She earned her doctoral degree in management at Universiti Teknologi Malaysia, Johor, Malaysia, and her research interests include human resources, creativity, and innovation. She may be reached at [sanaz.ahmadpoor@gmail.com](mailto:sanaz.ahmadpoor@gmail.com)

SAYED MOHAMAD SHAMS ZADEH ALAVI, has a master's degree in public administration-human resource. He earned his master's degree at the Faculty of Management and Human Resource, Payame Noor University, Tehran, Alborz, Mahdasht, Iran. He may be reached at [Alavi.mm@gmail.com](mailto:Alavi.mm@gmail.com)