

# THE IMPACT OF THE PHYSICAL WORK ENVIRONMENT ON ORGANIZATIONAL OUTCOMES: A STRUCTURED REVIEW OF THE LITERATURE

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## INTRODUCTION

The way people work has changed considerably over the past thirty-five years as a result of technological advances, globalization, demographic shifts, and the constant demand to innovate and compete (Kampschroer & Heerwagen, 2005). Work is becoming “more cognitively complex, more dependent on social skills and technological competence, and more time pressured” (Chan et al., 2007). There is a growing body of literature that suggests that workplace design can affect organizational and employee outcomes, such as better communication, collaboration, creativity, and higher employee engagement, satisfaction, well-being, performance, and employee retention. (USGSA, 2006).

The purpose of this research is to provide an extensive review of the academic literature regarding the impact of the physical work environment on organizations and their employees. This research is important because it can help leaders make better decisions about the physical work environment, the people who will use it, and the success of their organizations.

## METHODOLOGY

Several databases were searched using the keywords: ‘office design’, ‘workplace design’, ‘physical work environment’, and ‘office environment’. The databases utilized included Business Source Complete, ABI / Inform, JSTOR, and ProQuest. The results were narrowed to peer-reviewed academic journals. Articles were further filtered by reading the abstracts and selecting only those papers that linked the physical work environment with employee and organizational outcomes. Of the different types of work environments, only office-type environments were selected, excluding, for example, manufacturing work environments. The remaining articles were read and further sorted by types of academic articles: conceptual, commentary, or empirical. Table 1 shows the Journals used in this study and the number of relevant articles from each.

The study of the physical work environment, like most subjects, comes in waves of interest. Table 2 below indicates the frequency of relevant articles per year.

## Summary of Current Academic Literature

Table 3 below provides a summary of the current academic literature on this subject

## WORKPLACE DESIGN AND ORGANIZATIONAL PERFORMANCE

There is a great deal of available research on the impact of the physical work environment on positive organizational outcomes. Kotler & Rath (1984) said that good design can enhance the environment, communication, corporate identity, customer satisfaction and company profitability, and that the major elements when considering design (of the environment) are performance, quality, durability, appearance, and cost. Sailer et al. (2009) found the physical space influences the way organizations communicate, interact, and perform. Saurin et al. (2008) examined how organizations can design environments that can help them meet the challenges of uncertainty and complexity. According to Mitchell-Ketzes (2003), “an organization’s struggle to adapt to current business conditions, a high-performance workplace is no longer simply a desirable long-term goal; it may well be a key to survival” (p. 259). Work environments today need to be ‘agile’ in order to support “people, the nature of their work and the business performance they are committed to achieving” (275).

## WORKPLACE DESIGN AND INNOVATION

McKinsey & Company report that more than seventy percent of senior executives surveyed rank innovation as one of the top three drivers of their organizations (Barsh et al., 2008). Several studies have focused on the relationship between the design of the physical office environment and innovation. Haner (2005) concluded that spatial design, or the layout of the physical space, plays an important role in supporting creativity and innovation in organizations, and that management needs to purposely address the spatial layout to support convergent and divergent thinking. Both are necessary in innovative environments. Peschl & Fundneider (2012) suggest that the physical work space can be orchestrated to create ‘enabling spaces’ which support,

TABLE 1.—Academic Journals

Journal	Articles
Academy of Management Journal	6
Administrative Science Quarterly	3
AIA Conference on Highly Effective Facilities	1
Applied Ergonomics	2
Building Research & Information	2
Building and Environment	1
Buildings	1
California Management Review	9
Chartered Institution of Building Service Engineers	1
Creativity and Innovation Management	1
Design Management Review	1
Environment and Behavior	1
Environment and Planning	1
Environmental Design Research Association Facilities	9
Frontiers of Health Services Management	1
Harvard Business Review	3
Healthcare Forum Journal	1
Human Resource Management	1
IBM Systems Journal	1
International J of Learning & Development	1
International Space Syntax Symposium	1
Journal for Environmental Psychology	1
Journal for Quality and Participation	1
Journal of Applied Psychology	1
Journal of Business and Management	1
Journal of Business Strategy	1
Journal of Business, Economics & Finance	1
Journal of Corporate Real Estate	9
Journal of Environmental Psychology	8
Journal of Facilities Management	17
Journal of Futures Studies, Strategic Thinking and Policy	1
Journal of Labor Economics	1
Journal of Marketing	1
Journal of Organizational Behavior	1
Journal of Organizational Transformation and Social Change	1
Journal of Product Innovation and Management	1
Journal of Property Investment & Finance	1
Journal of Public Affairs, Administration and Management	1
Journal of Vocational Behavior	1
Managing Service Quality	1
National Productivity Review	1
Organizational Dynamics	1
Pacific Rim Real Estate Society	1
Performance Improvement Quarterly	1
Systems Research & Behavioral Science	1
Team Performance Management	2
The African Symposium	1
Work and Place	1

encourage, and facilitate the innovation process, especially radical, game-changing innovation.

Waber et al. (2014) studied organizations from a wide range of industries to understand how spatial configurations can be designed in organizations to produce specific outcomes, like innovation or performance. Socio-metric badges were used to measure interaction in the work environment and how components such as density and proximity impact the organization. Interestingly, Waber et al. concluded that face-to-face interactions were the most

TABLE 2.—Article Frequency

Year	Academic Articles	x	Year2	Academic Articles3
1979	1		2002	5
1980	1		2003	6
1981	1		2004	3
1982	1		2005	6
1983	1		2006	4
1984	2		2007	10
1985	1		2008	9
1987	1		2009	6
1992	2		2010	5
1994	1		2011	12
1995	1		2012	8
1996	2		2013	6
1998	3		2014	6
1999	1		2015	1
2000	1			

important activity in the office environment. The key, according to the authors, is for companies to first have a thorough understanding of what they want to accomplish with the space, before attempting to change it.

## WORKPLACE DESIGN AND CULTURE

O'Reilly et al. (2014) found that there is a 'clear association' between organizational culture and the level of performance of the organization. There has been much interest in the relationship between the physical work environment and organizational culture. Vischer (2007) suggested that the value of the physical work environment to a company is heavily influenced by the culture of the organization, and that value cannot be determined without considering employee comfort, needs, and organizational expectations. Price (2007) agreed and notes that success or failure of new work environments is dependent on the overall culture of the organization, and even the 'micro-cultures' that exist within each department. Becker (2007) used the term 'organizational ecology' which describes the workplace as "a system in which physical design factors both shape and are shaped by work processes, the organization's culture, workforce demographics, and information technologies" (p.47). He suggested that successful organizations have an ecological system, including the physical work environment that operates in harmony, and how the work environment is designed, used, and managed is critical to dynamic organizations.

Callahan et al. (2008) presented a case study on the design and construction of a new LEED certified medical facility in San Diego. A post occupancy evaluation revealed that in addition to successfully satisfying the project requirements, the project was also successful in supporting and shaping the organization's culture of being open, positive, optimistic, and abundant. Mallak et al. (2003), in another study in the healthcare industry, found that perceptions of the physical work environment moderate the effect of organizational culture on organization processes and outcomes.

TABLE 3.—Article Summary

Author	Year	Subject	Type of Article	Methodology
Oldham & Brass	1979	Satisfaction / Layout	Empirical	Quantitative
Sundstrom & Kamp	1980	Privacy / Satisfaction	Empirical	Quantitative
Oldham & Hackman	1981	Satisfaction	Empirical	Quantitative
Marans & Spreckelmeyer	1982	Satisfaction / Employee Performance	Empirical	Quantitative / Qualitative
Oldham & Rotchford	1983	Satisfaction / Behavior	Empirical	Quantitative
Davis	1984	Behavior	Lit Review	
Kotler & Rath	1984	Org Performance / Strategy	Conceptual	
Frazelle & Smith	1985	Layout / Employee Performance / Interaction	Conceptual	
Zalesny & Farace	1987	Satisfaction	Empirical	Quantitative
Bitner	1992	Behavior	Lit Review	
Brill	1992	Satisfaction / Employee Performance	Empirical	Quantitative / Qualitative
Scott & Bruce	1994	Innovation	Empirical	Quantitative
Leaman	1995	Satisfaction / Employee Performance	Empirical	Quantitative / Qualitative
Amabile et al.	1996	Creativity	Empirical	Quantitative / Qualitative
Horgen & Sheridan	1996	Satisfaction	Empirical	Quantitative / Qualitative
Kupritz	1998	Layout / Privacy	Empirical	Quantitative / Qualitative
Apgar	1998	Org Performance / Culture	Conceptual	
Herwagen	1998	Org Performance / Well Being	Empirical	Quantitative / Qualitative
Drucker	1999	Employee Performance	Conceptual	
Feyen et al.	2000	Ergonomics	Empirical	Qualitative
Smola & Sutton	2002	Generational	Empirical	Quantitative
Kaczmarczyk & Murtough	2002	Measuring / Innovation	Commentary	
Becker	2002	Org Performance	Empirical	Qualitative
Olson	2002	Employee Performance	Empirical	Quantitative
Roelofsen	2002	Satisfaction / Employee Performance	Empirical	Quantitative
Gibson	2003	Control / Flexible Working	Conceptual	
Ware & Grantham	2003	Future Office		
Joroff et al.	2003	Org Performance	Conceptual	
Mallak et al.	2003	Satisfaction / Culture	Empirical	Qualitative
Earle	2003	Satisfaction / Human Resources	Lit Review	
Mitchell-Ketzes	2003	Strategy / Org Performance	Empirical	Qualitative
Heerwagen et al.	2004	Collaboration	Lit Review	
Haynes & Price	2004	Innovation / Org Performance / Culture	Empirical	Quantitative
Peterson & Beard	2004	Privacy / Collaboration	Empirical	Quantitative
Rashid & Zimring	2005	Behavior	Lit Review	
Haner	2005	Innovation / Creativity	Empirical	Qualitative
O'Neill & Duvall	2005	Measuring	Empirical	Qualitative
Kampschroer & Heerwagen	2005	Org Performance	Empirical	Qualitative
Lee & Brand	2005	Satisfaction / Employee Performance	Empirical	Quantitative
Levin	2005	Strategy / Culture	Conceptual	
Kogen & Muller	2006	Employee Performance	Empirical	Qualitative
Lee	2006	Satisfaction	Empirical	Quantitative
Lindholm & Levainen	2006	Satisfaction / Innovation	Empirical	Qualitative
Vischer	2006	Well Being / Culture	Conceptual	
Haynes	2007	Behavior / Employee Performance	Lit Review	
Allen	2007	Communication / Collaboration	Empirical	Quantitative / Qualitative
Price	2007	Culture	Conceptual	
Becker	2007	Culture / Org Behavior	Conceptual	
Elsbach & Pratt	2007	Management	Lit Review	
Chan et al.	2007	Org Performance	Conceptual	
Elsbach & Bechky	2007	Org Performance	Conceptual	
Kampschroer et al.	2007	Org Performance / Strategy	Empirical	Qualitative
Levin	2007	Strategy	Empirical	Qualitative
Mobach	2007	Strategy	Empirical	Quantitative / Qualitative
Hanson et al.	2007	Well Being / Employee Performance / Ergonomics	Empirical	Quantitative
Haynes	2008	Behavior / Employee Performance	Empirical	Quantitative
Erlich & Bichard	2008	Generational	Empirical	Qualitative
Haynes	2008	Layout / Employee Performance	Lit Review	
Pitt & Bennett	2008	Layout / Satisfaction	Empirical	Qualitative
Saurin et al.	2008	Org Performance	Conceptual	
Haynes	2008	Employee Performance	Lit Review	
Morgan & Anthony	2008	Employee Performance	Empirical	Qualitative
McGuire & McLauren	2008	Well Being	Empirical	Quantitative

TABLE 3.—Continued.

Author	Year	Subject	Type of Article	Methodology
Callahan et al.	2008	Well Being / Culture	Commentary	
Inalhan	2009	Behavior / Well Being	Empirical	Qualitative
Smith-Jackson & Klein	2009	Focus / Attention	Empirical	Quantitative
Sailer et al.	2009	Layout / Org Performance	Empirical	Quantitative / Qualitative
Hameed & Amjad	2009	Employee Performance	Empirical	Quantitative
Maaleveld et al.	2009	Satisfaction / Employee Performance	Empirical	Quantitative
Gould	2009	Well Being / Employee Performance	Commentary	
Hillsman & Kupritz	2010	Knowledge Transfer	Empirical	Quantitative / Qualitative
Niemi & Lindholm	2010	Measuring	Empirical	Qualitative
Stadlhofer	2010	Org Performance	Empirical	Quantitative
O'Neill	2010	Employee Performance	Lit Review	
Hua et al.	2010	Satisfaction / Layout / Collaboration	Empirical	Quantitative / Qualitative
Dul et al.	2011	Creativity	Empirical	Quantitative
Oseland et al.	2011	Creativity / Collaboration	Empirical	Qualitative
Miles & Perrewé	2011	Ergonomics	Empirical	Quantitative / Qualitative
Greene & Myerson	2011	Knowledge Workers	Empirical	Qualitative
Zijlstra & Mobach	2011	Layout / Org Performance	Empirical	Qualitative
Jahnke et al.	2011	Layout / Employee Performance	Empirical	Quantitative
Mak	2011	Employee Performance	Empirical	Quantitative
Lansdale et al.	2011	Employee Performance / Communication	Empirical	Quantitative / Qualitative
Jahncke et al.	2011	Employee Performance / Well Being	Empirical	Quantitative
Parkin et al.	2011	Privacy / Collaboration	Empirical	Quantitative / Qualitative
Kim & de Dear	2011	Satisfaction	Empirical	Quantitative
Saurin & Ratcliffe	2011	Scenarios	Conceptual	
Heeroma et al.	2012	Culture / Strategy	Conceptual	
Peschl & Fundneider	2012	Innovation	Conceptual	
Morrow et al.	2012	Org Commitment	Empirical	Quantitative
Laihonen et al.	2012	Org Performance	Conceptual	
Spreitzer et al.	2012	Org Performance / Thriving	Conceptual	
Leblecici	2012	Employee Performance / Motivation	Empirical	Quantitative
Ajala	2012	Well Being / Employee Performance	Empirical	Quantitative
Asmui et al.	2012	Well Being / Productivity	Lit Review	
Steidle & Werth	2013	Creativity	Empirical	Quantitative / Qualitative
Chaboki et al.	2013	Layout / Performance / Interaction	Empirical	Quantitative
Jaitli & Hua	2013	Org Performance / Belonging	Empirical	Quantitative
Laurence et al.	2013	Privacy / Employee Personalization	Empirical	Quantitative
Kim & de Dear	2013	Satisfaction / Layout	Empirical	Quantitative
Cross & Gray	2013	Well Being / Collaboration	Empirical	Quantitative / Qualitative
Ferri-Reed	2014	Generational	Conceptual	
North & Hershfield	2014	Generational	Conceptual	
Waber et al.	2014	Innovation	Lit Review	
Dul & Ceylan	2014	Org Performance	Empirical	Quantitative
Pullen	2014	Satisfaction / Employee Performance	Empirical	Quantitative
De Been & Beijer	2014	Satisfaction / Support	Empirical	Quantitative
Oswald	2015	Performance / Well Being	Empirical	Quantitative

Pitt & Bennett's work (2008) sought to find a balance in which the commercial requirements of the physical space are addressed and the human needs of the space are not compromised. They proposed that the most important element of success is to have an organizational culture that supports innovation. Zalesny & Farace (1987) warned that organizations need to be careful when migrating to new work environments to ensure that the new environment does not undermine existing organizational culture and how employees perceive their role and jobs. Morrow et al. (2012) suggested that the key for organizations contemplating work environment changes is to first make employees aware of the individual and organizational benefits of the change, and secondly, to express their

appreciation and empathy for the personal discomfort that may accompany the change.

### WORKPLACE DESIGN AND EMPLOYEE WELL-BEING

Numerous studies have shown that a focus on the well-being of employees is important for both the organization and the people who work there (Harter et al., 2003). Researchers at the World Green Building Council (2014) concluded that there is 'overwhelming evidence' that the design of the office environment influences the well-being and health of the people who work there. Heerwagen

(1998) considered employee well-being from a biological perspective and noted early on that companies need to shift their focus from thinking about office facilities as real estate costs to thinking about office environments as an employee benefit that can improve health, performance, and well-being.

Inalhan (2009) conducted a study about the effect of office environment changes on employee well-being. He determined that employees experience a sense of loss and grieving when changes are made and that there is a need for management to support its employees during times of transition. Jahncke et al. (2011) conducted office environment experiments to measure the effects of noise in open office environments. Results indicated that participants were less motivated, more tired, and remembered fewer words in high noise environments as compared to low noise environments. Ajala (2012) concluded that quality lighting can reduce fatigue and eye strain as well as improve overall well-being.

Obviously, a more open environment results in less privacy for employees. Laurence et al. (2013) studied the relationship between architectural privacy, personalization of the work area, and well-being. They concluded that there was a negative relationship between the level of privacy and emotional exhaustion, and that a lack of personalization intensifies the negative effects. The takeaway for management is that as the physical office environment moves more and more toward open and multi-purpose spaces, the need for personalization, even temporary personalization, increases.

In a study of workers at call centers in the U.K., McGuire & McLauren (2008) confirmed that employee well-being mediates the relationship between employee satisfaction with the physical work environment and employee commitment. According to the authors, satisfaction with the physical work environment can be influenced by the correct fit of the work station (adjustability), greater involvement by the employee in the design of the workplace, and the employee's ability to personalize their work area.

### WORKPLACE DESIGN AND EMPLOYEE PERFORMANCE & PRODUCTIVITY

Employee performance can include the quantity, quality, and creativity of the work involved (Lee & Brand, 2005). Several studies link employee performance and productivity to the physical work environment. According to Olson (2002), support for focus work and impromptu meetings are the two most important activities in an organization that contribute to individual performance, team performance, and job satisfaction. A well-designed work environment can and should support these two activities within the same individual work areas. Gould (2009) studied how control of certain interior environmental factors influence productivity. According to his research, allowing employees to control the temperature in their work areas resulted in a 3.5% increase in productivity, utilizing high-performance

lighting resulted in a 6.7% increase in productivity, and the addition of natural light and window views resulted in 9–12% increase in productivity (p. 61).

In a review of the empirical literature, Oneill (2010) found there is a consistent relationship between environmental control and the performance and behavior of individuals and groups. Research by Maalevald et al. (2009) concluded that certain psychological dimensions of the office environment, including pleasant surroundings, sufficient privacy, and the design of the office have a strong influence on employee productivity.

### WORKPLACE DESIGN AND CREATIVITY

Creativity and the generation of new ideas within an organization can be an important source of competitive advantage (Anderson et al., 2014). The design of the physical work environment has also been linked to creativity. Haner (2005) suggested that creativity can be purposefully addressed through the design and layout of the work environment, and space is needed for both individual and group creative activities. To assess the climate for creativity in an organization, Amabile et al. (1996) developed KEYS, a tool designed to evaluate perceived 'stimulants and obstacles' to creativity in office work environments. The scale measures employee perceptions in five different areas, one of which includes the available facilities. Dul et al. (2011) identified three aspects that independently contribute to creative performance in organizations: creative personalities, corporate culture, and the physical work environment. In a later study, Dul & Ceylan (2014) showed that companies with a creativity-supporting work environment develop more new products and have more new-product financial success than firms lacking the supportive environment. Steidle & Werth (2013) studied the effect of lighting on creative performance in office environments and concluded that lower lighting levels can stimulate creative output.

### WORKPLACE DESIGN AND COMMUNICATION AND COLLABORATION

How information gets distributed is vitally important to the success of any organization. The physical work environment can have an impact on communication in an office environment. Allen (2007) identified three types of technical communication used by knowledge workers: coordination, information, and inspiration, and concluded that proximity to co-workers was the most important characteristic for the third type of communication – inspiration – to occur.

Proximity can also impact collaboration. For example, Wineman et al. (2009) found that the nearness of college faculty offices played a significant role in the likeliness of collaboration or co-authorship of a academic paper. Heerwagen et al. (2004), in a study of the literature, concluded that the physical work environment can be designed to improve collaboration. The literature also

suggested that the negative side of collaborative environments was cognitive overload. Cross & Gray (2013) agree that many popular designs to improve collaboration can cause collaboration overload and hurt individual performance. They suggest using certain design and behavioral interventions to reduce the negative aspects of collaboration. Hua et al. (2010) studied how particular spatial layouts can either support or hinder collaborative work. Their research suggested that a uniformly distributed cluster of shared spaces works best for collaborative environments, as opposed to centralized or randomly distributed spaces. Their study also indicated that individual workstations were overwhelmingly preferred by employees for collaborative as well as other types of work. Parkin et al. (2011) studied different types of office layout with respect to levels of employee satisfaction and support for collaboration and privacy. They concluded that a combi office design – a work area consisting of open and half-open spaces – was more desirable than an open-plan office.

### WORKPLACE DESIGN AND EMPLOYEE SATISFACTION

Employees with a high level of job satisfaction are more committed to their organizations and more interested in delivering high quality work (Yee, 2008). The largest amount of research regarding the physical work environment has been conducted in the area of employee satisfaction. Oldham & Brass (1979) investigated employee reactions when their workplace changed from traditional to open-plan environments. Data was collected before the change and twice after the change. Results indicated a significant decrease in both employee satisfaction and motivation after the change. Marans & Spreckelmeyer (1982) discovered that the degree of control that employees had over their immediate environment was positively related to their level of satisfaction. Interestingly, they also concluded that employee feelings about the organization were strongly influenced by their feelings about their immediate environment. Lee & Brand's (2005) research also supports the relationship between personal control over physical work area and levels of job satisfaction and perceived group cohesiveness.

Lee (2006) studied the relationship between employee expectations of the physical work environment and job satisfaction. Results indicated that an office environment that exceeds expectations does not improve satisfaction. However, when the physical work environment does not meet employee expectations, job satisfaction decreases. Kim & DeDear (2011) researched how certain environmental factors impacted employee satisfaction. The two most important factors identified were temperature and noise, and when either of these were below employee expectations, satisfaction declined. DeBeen & Beijer (2013) investigated the relationship between types of offices and employee satisfaction by gathering data from 12,000 office workers in the Netherlands. Results showed that office type was a significant predictor. People who worked in

traditional offices were most satisfied with privacy and concentration. Those who worked in combi-offices, a combination of open and half-open spaces, were most satisfied with the communication and social interaction. Employees who worked in flex offices, in which workers did not have an assigned space, were most satisfied with the design and aesthetics of the space.

### WORKPLACE DESIGN AND HUMAN RESOURCES

Andrew et al. (2014) indicated that the number one competitive advantage for companies in the future will be its top talent. Several studies have indicated that the design of the physical work environment can help attract, develop, and retain employees. This is especially important since, for the first time in history, four generations of workers are now employed in the office environment. Pullen (2014) studied how different age groups assess different types of office design. Results showed that there were significant differences between age groups and that organizations should design their office environments with the needs of the different generations in mind. This multi-generational workforce has caused a tension in how to design office environments today. Companies are changing their work environments to attract millennials (Ferri-Reed, 2014) while, at the same time, there is a higher concentration of older employees in the workplace, due to the large numbers of baby-boomers in the overall population. According to North & Hershfield (2014), there is still a need to accommodate older employees in the design of the work environment. Their research shows organizations that make changes to adapt to an aging workforce, such as changing workplace ergonomics or implementing a phased-retirement program, have seen significant improvements to productivity, retention, organizational culture, and profitability.

### THE ENVIRONMENTAL COMPONENTS OF WORKPLACE DESIGN

Office environmental factors, such as temperature, air quality, lighting, and noise, can also have a positive or a negative impact on organizations. The problem is that there is no universally accepted definition of office comfort nor how it should be measured (Haynes, 2008). Hameed & Amjad (2009) concluded that environmental factors do have a substantial impact on employee productivity, with lighting as the most important. They also note that gender differences exist in rating the most important factors. For example, noise levels impacted male productivity more than female productivity, and temperature influenced female productivity more than male productivity. Mak (2011) examined the effect of five environmental factors and concluded that all influenced office productivity and that temperature and sound had the greatest influence. Although open-plan offices increase communication and collaboration, noise levels can be higher. Smith-Jackson &

Klein (2009) studied the impact of ‘irrelevant speech’ in open-office environments and determined that it has a negative effect on employee performance, and can increase stress, and fatigue. The authors recommend that organizations regularly gather feedback regarding workers’ perceptions of the ambient environment.

### THE IMPORTANCE OF SPATIAL CONFIGURATIONS (LAYOUT)

The spatial layout or configuration of the physical work environment can have a significant impact on organizations and their employees. Sailor et al. (2009) recommended that the layout of the space influences the way in which organizations perform, communicate and interact. Allen (2007) suggested the importance of office adjacencies and proximity and provided an informative matrix for office layout. A study by Hua et al. (2010) highlighted how particular office layouts can support or inhibit collaborative work. Chaboki et al. (2013) examine how the spatial variables of visibility and accessibility influences face-to-face interaction, which according to their review of the literature, increases teamwork and organizational productivity.

### PERSONAL WORKSPACE AND ERGONOMICS

Individual workstations play a significant role in employee outcomes. According to research by Jaiti & Hua (2013), personal workspace was rated as the most important workplace feature contributing to employee satisfaction. The authors encouraged organizations to dedicate sufficient resources to improve personal workspace. Numerous studies support the role that ergonomics plays in employee performance (Asmui et al., 2012). Hanson et al. (2007), in an anthropometric research study, noted that there have been significant changes in the physical characteristics of the population and that current ergonomic standards for seating and other office furniture have not been adjusted accordingly.

### MEASURING THE EFFECTIVENESS OF THE PHYSICAL WORK ENVIRONMENT

Measuring the effectiveness and impact of the physical work environment is complex. Vischer (2006) introduced the Environmental Comfort Model to analyze employees’ relation to the workplace and help organizations assess the value of certain investments in the office environment. Haynes (2008) provided an evaluation tool for measuring office productivity based on four components: employee comfort, office layout, interaction, and distraction. Kaczmarczyk & Murtough (2002) presented three models to measure innovative work environments: Cost Per Person Model, Employee Satisfaction in the Workplace, and the Productivity Payback Model.

Maaleveld et al. (2009) developed and tested the Work Environment Diagnosis Instrument, also known as the

WODI Toolkit, a diagnostic tool to evaluate employee perceptions of the physical work environment. The assessment tool can support the decision-making process regarding the design of new facilities or the re-design or adaptation of existing ones, and help determine the best possible fit between employees, work processes, and the environment.

### ALIGNING WORKPLACE DESIGN STRATEGY WITH ORGANIZATIONAL MISSION AND GOALS

Several authors discussed the importance of aligning workplace design strategy with organizational mission and goals. Olson (2002) suggested a workplace design strategy as follows:

1. Define the business objectives and success factors
2. Describe the key employee behaviors needed to achieve the business objectives and success factors
3. Describe the qualities of the workplace that are needed to support these key employee behaviors effectively.

Kampschroer & Heerwagen (2005) recommended that the workplace design strategy should start with a discussion of the mission, goals, and core values of the organization in order to be most effective. Levin (2005) presented a model that can be used to align the workplace design strategy with five organizational categories: strategy, structure, processes, reward systems, and people, to support the organization’s ability to succeed and compete.

### CONCLUSION AND SUGGESTIONS FOR ADDITIONAL RESEARCH

There are many factors that contribute to the success of organizations today. These include a focus on creativity and innovation, leadership, and effective communication. There is also a renewed focus on the health, well-being, and development of knowledge workers who make up effective organizations today. One way that organizations can stay competitive is to pay attention to the value of the physical work environment. This review of the academic literature has shown that the design of the physical work environment can have a positive or negative effect on organizational success and the people who work there. According to the studies described above, the physical work environment can influence organizational outcomes, such as performance, collaboration, innovation, effective human-resource management, and profitability. It can also influence employee outcomes such as engagement, performance, well-being, and satisfaction.

Most researchers agree that the demand for talent in the world marketplace, in the near future, will exceed the supply of available and qualified workers. This means that organizations that prosper and remain competitive will have to use all the tools available to attract, develop, and retain this valuable resource. Evidence shows that there are several factors of the physical work environment that impact the effectiveness of people who work there. These

can include the layout of the space, architectural elements, aesthetics, and furniture. Research also shows that certain environmental factors such as lighting, air temperature and quality, and sound can also have a significant impact on workers.

The significance of this research is that it brings together, in one place, the vast amount of current academic literature on this subject and provides a great starting point for future research. This study is also beneficial for managers and leaders of organizations in that it can help them better understand the importance of the physical work environment, and make more informed decisions regarding facilities and human resources. It also introduces managers to several models that can be used to measure the effectiveness of the work environment so they can align a workplace-design strategy with organizational mission and goals. There are several areas where additional research would be beneficial. These include:

- How to best manage change in the physical work environment, in order to maximize the impact and minimize the challenges associated with change.
- How the physical work environment impacts employee engagement.
- What the relationship is between organizational culture and the office environment.
- Which methods are most effective to measure the impact of the physical work environment.

Although a significant amount of research has been completed regarding the physical work environment, this is still much to do.

## REFERENCES

- Ajala, E. M. (2012, June). The influence of workplace environment on workers' welfare, performance and productivity. In *The African Symposium* (Vol. 12, No. 1, pp. 141-149).
- Allen, T. J. (2007). Architecture and communication among product development engineers. In *Engineering Management Society, 2000. Proceedings of the 2000 IEEE* (pp. 153-158). IEEE.
- Amabile, T. M., Conti, R., Coon, H., Lazenby, J., & Herron, M. (1996). Assessing the work environment for creativity. *Academy of management journal*, 39(5), 1154-1162.
- Anderson, N., Potočnik, K., & Zhou, J. (2014). Innovation and creativity in organizations: A state-of-the-science review, prospective commentary, and guiding framework. *Journal of Management*, 40(5), 1297-1333.
- Apgar, M. (1997). The alternative workplace: changing where and how people work. *Harvard business review*, 76(3), 121-136.
- Asmui, M., Hussin, A., Paino, H. (2012). The importance of work environment facilities. *International Journal of Learning and Development*, 2(1), 289-298.
- Barsh, C. (2008). *Davidson. Leadership and Innovation*. McKinsey Quarterly, (1).
- Becker, F. (2002). Improving organisational performance by exploiting workplace flexibility. *Journal of facilities management*, 1(2), 154-162.
- Becker, F. (2007). Organizational ecology and knowledge networks. *California Management Review*, 49(2), 42.
- Bitner, M. J. (1992). Servicescapes: the impact of physical surroundings on customers and employees. *The Journal of Marketing*, 57-71.
- Brill, M. (1992). Workspace design and productivity. In *The Healthcare Forum Journal* (Vol. 35, No. 5, pp. 51-53).
- Callahan, C. W., Repeta, R. J., & Sherman, S. S. (2014). Evidence-based building design and organizational culture. *Frontiers of health services management*, 31(1), 47.
- Chaboki, H. M., Wahab, A. F. A., & Ansari, M. (2013). The Impacts of Visibility and privacy in the workplace on Organizational productivity as conducted through Informal Interactions. *IOSR Journal of Business and Management*, 7(5), 82-88.
- Chan, J. K., Beckman, S. L., & Lawrence, P. G. (2007). *Workplace Design: A New Managerial Imperative*. California Management Review, 49(2).
- Cross, R., & Gray, P. (2013). Where has the time gone? Addressing collaboration overload in a networked economy. *California management review*, 56(1), 50-66.
- Davis, T. R. (1984). The influence of the physical environment in offices. *Academy of management review*, 9(2), 271-283
- De Been, I., & Beijer, M. (2014). The influence of office type on satisfaction and perceived productivity support. *Journal of Facilities Management*, 12(2), 142-157.
- Dul, J., & Ceylan, C. (2014). The Impact of a Creativity-supporting Work Environment on a Firm's Product Innovation Performance. *Journal of Product Innovation Management*, 31(6), 1254-1267.
- Dul, J., Ceylan, C., & Jaspers, F. (2011). Knowledge workers' creativity and the role of the physical work environment. *Human resource management*, 50(6), 715-734.
- Earle, H. A. (2003). Building a workplace of choice: Using the work environment to attract and retain top talent. *Journal of Facilities Management*, 2(3), 244-257.
- Elsbach, K. D., & Bechky, B. A. (2007). It's More than a Desk: WORKING SMARTER THROUGH LEVERAGED OFFICE DESIGN. *California Management Review*, 49(2).
- Elsbach, K. D., & Pratt, M. G. (2007). 4 The Physical Environment in Organizations. *The Academy of Management Annals*, 1(1), 181-224.
- Erlich, A., & Bichard, J. (2008). The welcoming workplace: Designing for ageing knowledge workers. *Journal of Corporate Real Estate*. 10(4), 273-287
- Ferri-Reed, J. (2014). Millennializing the Workplace. *The Journal for Quality and Participation*, 37(1), 13.
- Feyen, R., Liu, Y., Chaffin, D., Jimmerson, G., & Joseph, B. (2000). Computer-aided ergonomics: a case study of incorporating ergonomics analyses into workplace design. *Applied ergonomics*, 31(3), 291-300.
- Frazelle, E., & Smith, C. (1985). Productivity improvement through office-space planning. *National Productivity Review*, 4(3), 265-274.
- Gibson, V. (2003). Flexible working needs flexible space? Towards an alternative workplace strategy. *Journal of Property Investment & Finance*, 21(1), 12-22.
- Greene, C., & Myerson, J. (2011). Space for thought: designing for knowledge workers. *Facilities*, 29(1/2), 19-30.
- Hameed, A., & Amjad, S. (2009). Impact of office design on employees' productivity: A case study of banking organizations of Abbottabad, Pakistan. *Journal of Public Affairs, Administration and Management*, 3(1), 1-13
- Haner, U. E. (2005). Spaces for creativity and innovation in two established organizations. *Creativity and innovation management*, 14(3), 288-298.

- Hanson, L., Sperling, L., Gard, G., Ipsen, S., & Vergara, C. O. (2009). Swedish anthropometrics for product and workplace design. *Applied ergonomics*, 40(4), 797–806.
- Harter, J. K., Schmidt, F. L., & Keyes, C. L. (2003). Well-being in the workplace and its relationship to business outcomes: A review of the Gallup studies. *Flourishing: Positive psychology and the life well-lived*, 2, 205–224.
- Haynes, B. P. (2008). The impact of office comfort on productivity. *Journal of Facilities Management*, 6(1), 37–51.
- Haynes, B. P. (2008). Office productivity: A self-assessed approach to office evaluation. *Proceedings of the Pacific Rim Real Estate Society*.
- Haynes, B. P. (2008). The impact of office layout on productivity. *Journal of facilities Management*, 6(3), 189–201.
- Haynes, B. P. (2007). The impact of the behavioral environment on office productivity. *Journal of Facilities Management*.
- Haynes, B., & Price, I. (2004). Quantifying the complex adaptive workplace. *Facilities*, 22(1/2), 8–18.
- Heerwagen, J. H. (1998, March). Design, productivity and well-being: what are the links. In *AIA Conference on Highly Effective Facilities*, Cincinnati, Ohio, March (pp. 12–14).
- Heerwagen, J. H., Kampschroer, K., Powell, K. M., & Loftness, V. (2004). Collaborative knowledge work environments. *Building research & information*, 32(6), 510–528.
- Heeroma, D. M., Melissen, F. W., & Stierand, M. B. (2012). The problem of addressing culture in workplace strategies. *Facilities*, 30(7/8), 269–277.
- Hillsman, T. L., & Kupritz, V. W. (2010). Another look at the relative impact of workplace design on training transfer for supervisory communication skills. *Performance Improvement Quarterly*, 23(3), 107–130.
- Horgen, T., & Sheridan, S. (1996). Post-occupancy evaluation of facilities: a participatory approach to programming and design. *Facilities*, 14(7/8), 16–25.
- Hua, Y., Loftness, V., Kraut, R., & Powell, K. M. (2010). Workplace collaborative space layout typology and occupant perception of collaboration environment. *Environment and planning B, Planning & design*, 37(3), 429.
- Inalhan, G. (2009). Attachments: The unrecognised link between employees and their workplace (in change management projects). *Journal of corporate real estate*, 11(1), 17–37.
- 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.
- Jaitli, R., & Hua, Y. (2013). Measuring sense of belonging among employees working at a corporate campus: Implication for workplace planning and management. *Journal of Corporate Real Estate*, 15(2), 117–135.
- Joroff, M. L., Porter, W. L., Feinberg, B., & Kukla, C. (2003). The agile workplace. *Journal of Corporate Real Estate*, 5(4), 293–311.
- Kaczmarczyk, S., & Murtough, J. (2002). Measuring the performance of innovative workplaces. *Journal of Facilities Management*, 1(2), 163–176.
- Kampschroer, K., Heerwagen, J., & Powell, K. (2007). Creating and Testing Workplace Strategy. *California Management Review*, 49(2).
- Kampschroer, K., & Heerwagen, J. H. (2005). The strategic workplace: development and evaluation. *Building Research & Information*, 33(4), 326–337.
- Kim, J., & de Dear, R. (2012). Nonlinear relationships between individual IEQ factors and overall workspace satisfaction. *Building and Environment*, 49, 33–40.
- Kim, J., & de Dear, R. (2013). Workspace satisfaction: The privacy-communication trade-off in open-plan offices. *Journal of Environmental Psychology*, 36, 18–26.
- Kogan, S. L., & Muller, M. J. (2006). Ethnographic study of collaborative knowledge work. *IBM Systems Journal*, 45(4), 759–771.
- Kotler, P., & Alexander Rath, G. (1984). Design: A powerful but neglected strategic tool. *Journal of business strategy*, 5(2), 16–21.
- Kupritz, V. W. (2006). The Impact of Architectural Privacy Features on Performance, Stress and Informal Learning. *Haworth Research Paper*. Retrieved from: <http://bgs.vermont.gov/sites/bgs/files/pdfs/Move/The-impact-of-architectural-privacy-features-on-performance-stress-and-informal-learning-phase-3.pdf>
- Laihonen, H., Jääskeläinen, A., Lönnqvist, A., & Ruostela, J. (2012). Measuring the productivity impacts of new ways of working. *Journal of Facilities Management*, 10(2), 102–113.
- Lansdale, M., Parkin, J., Austin, S., & Baguley, T. (2011). Designing for interaction in research environments: A case study. *Journal of Environmental Psychology*, 31(4), 407–420.
- Laurence, G. A., Fried, Y., & Slowik, L. H. (2013). “My space”: A moderated mediation model of the effect of architectural and experienced privacy and workspace personalization on emotional exhaustion at work. *Journal of environmental Psychology*, 36, 144–152.
- Leaman, A. (1992). Open-plan Offices: Kill or Cure?. *Facilities*, 10(6), 10–14.
- Leaman, A. (1995). Dissatisfaction and office productivity. *Facilities*, 13(2), 13–19.
- Leblebici, D. (2012). Impact Of Workplace Quality On Employee’s Productivity: Case Study Of A Bank In Turkey. *Journal of Business, Economics*, 1, 1.
- Lee, S. Y., & 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.
- Levin, A. C. (2007). Solving the Right Problem: A Strategic Approach to Designing Today’s Workplace. *Design Management Review*, 18(2), 44–52.
- Levin, A. C. (2010). Workplace design strategies within business organisations: Perception, power and the bottom line (Doctoral dissertation, University of Westminster).
- Lindholm, A. L., & Leväinen, K. I. (2006). A framework for identifying and measuring value added by corporate real estate. *Journal of Corporate Real Estate*, 8(1), 38–46.
- Lõun, K., Lavin, J., Riives, J., & Otto, T. (2013). High performance workplace design model. *Estonian Journal of Engineering*, 19(1), 47–61.
- Mallak, L. A., Lyth, D. M., Olson, S. D., Ulshafer, S. M., Ulshafer, S. M., & Sardone, F. J. (2003). Culture, the built environment and healthcare organizational performance. *Managing Service Quality: An International Journal*, 13(1), 27–38.
- Mak, C. M., & Lui, Y. P. (2011). The effect of sound on office productivity. *Building Services Engineering Research and Technology*, 0143624411412253.
- Maarleveld, M., Volker, L., & Van Der Voordt, T. J. (2009). Measuring employee satisfaction in new offices-the WODI toolkit. *Journal of Facilities Management*, 7(3), 181–197.
- Marans, R. W., & Spreckelmeyer, K. F. (1982). Evaluating open and conventional office design. *Environment and Behavior*, 14(3), 333–351.
- McGuire, D., & McLaren, L. (2009). The impact of physical environment on employee commitment in call centres: The

- mediating role of employee well-being. *Team Performance Management: An International Journal*, 15(1/2), 35–48.
- Miles, A. K., & Perrewé, P. L. (2011). The relationship between person–environment fit, control, and strain: The role of ergonomic work design and training. *Journal of Applied Social Psychology*, 41(4), 729–772.
- Mitchell-Ketzes, S. (2003). Optimising business performance through innovative workplace strategies. *Journal of Facilities Management*, 2(3), 258–275.
- Mobach, M. P. (2007). A critical systems perspective on the design of organizational space. *Systems Research and Behavioral Science*, 24(1), 69–90.
- Morgan, A., & Anthony, S. (2008). Creating a high-performance workplace: a review of issues and opportunities. *Journal of Corporate Real Estate*, 10(1), 27–39.
- Morrow, P. C., McElroy, J. C., & Scheibe, K. P. (2012). Influencing organizational commitment through office redesign. *Journal of vocational behavior*, 81(1), 99–111.
- Niemi, J., & Lindholm, A. L. (2010). Methods for evaluating office occupiers' needs and preferences. *Journal of Corporate Real Estate*, 12(1), 33–46.
- North, M., & Hershfield, H. (2014). Four Ways to Adapt to an Aging Workforce. *Harvard Business Review*, (April 2014). W&P.
- O'Neill, M. J. (2010). A model of environmental control and effective work. *Facilities*, 28(3/4), 118–136.
- O'Neill, M., & Duvall, C. (2005). A Six Sigma quality approach to workplace evaluation. *Journal of Facilities Management*, 3(3), 240–253.
- Oldham, G. R., & Rotchford, N. L. (1983). Relationships between office characteristics and employee reactions: A study of the physical environment. *Administrative Science Quarterly*, 542–556.
- Oldham, G. R., & Brass, D. J. (1979). Employee reactions to an open-plan office: A naturally occurring quasi-experiment. *Administrative Science Quarterly*, 267–284.
- Oldham, G. R., & Hackman, J. R. (1981). Relationships between organizational structure and employee reactions: Comparing alternative frameworks. *Administrative Science Quarterly*, 66–83.
- Olson, J. (2002). Research about office workplace activities important to US businesses-And how to support them. *Journal of Facilities Management*, 1(1), 31–47.
- O'Reilly III, C. A., Caldwell, D. F., Chatman, J. A., & Doerr, B. (2014). The promise and problems of organizational culture: CEO personality, culture, and firm performance. *Group & Organization Management*, 39(6), 595–625.
- Oseland, N., Marmot, A., Swaffer, F., & Ceneda, S. (2011). Environments for successful interaction. *Facilities*, 29(1/2), 50–62.
- Oswald, A. J., Proto, E., & Sgroi, D. (2009). Happiness and productivity. *Journal of Labor Economics*.
- Parkin, J. K., Austin, S. A., Pinder, J. A., Baguley, T. S., & Allenby, S. N. (2011). Balancing collaboration and privacy in academic workspaces. *Facilities*, 29(1/2), 31–49.
- Peschl, M. F., & Fundneider, T. (2012). Spaces enabling game-changing and sustaining innovations: Why space matters for knowledge creation and innovation. *Journal of Organisational Transformation & Social Change*, 9(1), 41–61.
- Peterson, T. O., & Beard, J. W. (2004). Workspace technology's impact on individual privacy and team interaction. *Team Performance Management: An International Journal*, 10(7/8), 163–172.
- Pitt, M., & Bennett, J. (2008). Workforce ownership of space in a space sharing environment. *Journal of Facilities Management*, 6(4), 290–302.
- Price, I. (2007). Lean assets: new language for new workplaces. *California management review*, 49(2), 102–118.
- Pullen, W. R. (2014). Age, office type, job satisfaction and performance. *Work&Place*, 3 (2), 2014.
- Rashid, M., & Zimring, C. (2005). "On psychosocial constructs in office settings: a review of the empirical literature". In *proceedings of the 36th Annual conference of the Environmental Design Research Association* (pp. 107-122).
- Roelofsen, P. (2002). The impact of office environments on employee performance: The design of the workplace as a strategy for productivity enhancement. *Journal of facilities Management*, 1(3), 247–264.
- Sailer, K., Budgen, A., Lonsdale, N., Turner, A., & Penn, A. (2009). Comparative studies of offices pre and post—how changing spatial configurations affect organizational behaviours. *Proceedings of the 7th International Space Syntax Symposium*. (pp. p. 96). Royal Institute of Technology (KTH): Stockholm, Sweden
- Saurin, R., & Ratcliffe, J. (2011). Using an adaptive scenarios approach to establish strategies for tomorrow's workplace. *foresight*, 13(4), 46–63.
- Saurin, R., Ratcliffe, J., & Puybaraud, M. (2008). Tomorrow's workplace: a futures approach using prospective through scenarios. *Journal of corporate real estate*, 10(4), 243–261.
- Scott, S. G., & Bruce, R. A. (1994). Determinants of innovative behavior: A path model of individual innovation in the workplace. *Academy of management journal*, 37(3), 580–607.
- Smith-Jackson, T. L., & Klein, K. W. (2009). Open-plan offices: Task performance and mental workload. *Journal of Environmental Psychology*, 29(2), 279–289.
- Spreitzer, G., Porath, C. L., & Gibson, C. B. (2012). Toward human sustainability: How to enable more thriving at work. *Organizational Dynamics*, 41(2), 155–162.
- Stadlhofer, Georg. (2010). Corporate Real Estate Performance. *Journal of Corporate Real Estate*, 96–116.
- Steidle, A., & Werth, L. (2013). Freedom from constraints: Darkness and dim illumination promote creativity. *Journal of Environmental Psychology*, 35, 67–80.
- Sundstrom, E., Burt, R. E., & Kamp, D. (1980). Privacy at work: Architectural correlates of job satisfaction and job performance. *Academy of Management Journal*, 23(1), 101–117.
- U. S. General Services Administration (2006). *Why Workplace Matters*. Washington DC: U.S. General Services Administration, Office of Applied Science
- Vischer, J. C. (2007). The concept of workplace performance and its value to managers. *California management review*, 49(2), 62.
- Waber, B., Magnolfi, J., & Lindsay, G. (2014). Workspaces That Move People. *Harvard Business Review*, (October 2014). W&P.
- Ware, J., & Grantham, C. (2003). The future of work: Changing patterns of workforce management and their impact on the workplace. *Journal of facilities management*, 2(2), 142–159.
- Wineman, J. D., Kabo, F. W., & Davis, G. F. (2009). Spatial and social networks in organizational innovation. *Environment and Behavior*, 41(3), 427–442.
- Yee, R. W., Yeung, A. C., & Cheng, T. E. (2008). The impact of employee satisfaction on quality and profitability in high-contact service industries. *Journal of operations management*, 26(5), 651–668.

- Young Lee, S. (2006). Expectations of employees toward the workplace and environmental satisfaction. *Facilities*, 24(9/10), 343–353.
- Zalesny, M. D., & Farace, R. V. (1987). Traditional versus open offices: A comparison of sociotechnical, social relations, and symbolic meaning perspectives. *Academy of Management Journal*, 30(2), 240–259.
- Zijlstra, E., & Mobach, M. P. (2011). The influence of facility layout on operations explored. *Journal of Facilities Management*, 9(2), 127–144.