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It's More than a Desk: Working Smarter through Leveraged Office Design

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In 1981, social commentator and self-described "futurologist" Alvin Toffler predicted that in the twenty-first century corporations would be operating in an office-less environment.[1] True to Toffler's prediction, many corporate workers do spend less time in a traditional office than they did twenty-five years ago, spending more time working from home or in non-territorial office arrangements in which offices are shared and used on a temporary basis.[2] Yet, the traditional corporate office remains a mainstay in most modern businesses, even for the corporate telecommuter. Despite all the non-traditional work arrangements, most workers still make regular appearances in traditional offices or cubicles each week.

This combination of increasing work in off-site work arrangements and occasional, but continued appearances in traditional office arrangments, has significant implications for the meaning of time spent in the office. For instance, working in the office may become more important as a symbolic act for telecommuters—signaling that the telecommuter is just as committed to his/her work as is the on-site worker. As *Business Week* columnist Liz Ryan reports, in this age of telecommuting and hoteling work arrangements, business professionals will feel increasing pressure to put in "face time"—the act of merely being seen at work by supervisors and coworkers. Our own research confirms that being seen in the office is related to improved perceptions of employee performance because it signals responsibility and commitment to the firm.[3]

In addition to symbolic effects, time spent in the office can be essential for access to spontaneous and informal information sharing and mentoring. Research on the effects of informal mentoring in public accounting firms has shown that career development activities (e.g., taking a personal interest in a protégé's career, placing a protégé in important job assignments, providing special coaching on the job, and advising a protégé about promotional opportuni-

ties) as well as social support activities (e.g., helping with personal problems, socializing, and helping with professional goals) are correlated with higher job satisfaction and lower turnover rates.[4]

Unfortunately, there is also evidence that informal mentoring interactions decline when employees engage in telecommuting or other off-site work arrangements. This is because telecommuters do not experience the spontaneous, informal, and non-work related conversations that on-site workers do. These interactions are critical to developing a strong and productive mentoring relationship.[5] As one supervisor in a computer company noted:

> "How do you have enough face to face, or enough time in a professional environment with [telecommuters] to be able to see the things they need to improve on? And to be able to then spend that coaching and counseling time with them."[6]

Finally, time spent in the office can be crucial to creative work that builds on face-to-face meetings and interactions with idea-inducing artifacts. For example, research on brainstorming demonstrates that face-to-face interaction improves creative output in later stages of the innovation process, when there is substantial accumulated evidence to consider.[7] Time in the office may also be beneficial for establishing a more wide-ranging and non-overlapping network of colleagues (what researchers call "weak ties"), which have also been shown to be beneficial for creative collaborations.[8] Further, being together in the office during creative work may allow workers to interact with interesting and aesthetically pleasing artifacts (e.g., toys, photographs, models) that may inspire and induce new ideas and innovations.[9]

The bottom line, then, is that while professional workers are spending less time in the office each week, the meaning of that time may have changed in important ways. The office has become an important location for symbolic, learning, and creative interactions. A direct result of this trend is that the design and décor of offices has taken on a renewed importance for corporate managers. Beyond simple notions of size and comfort, office design has gained attention for its ability to meet the emerging needs of workers who spend fewer, but perhaps more important, hours in the office.

At the same time, today's managers in charge of office design are confronted with a dizzying array of décor and layout choices. Anything, from museum-quality armchairs to mass-market bookcases, is available to executives charged with re-designing their workspace. Further, there are an increasing number of consultants and design firms offering advice about how to design office layout and choose décor. In her latest book, *The Inspired Workspace*, design guru Marilyn Zelinsky provides guidance on designing workspaces for everything from creativity and fantasy to spirituality and nurturing. This innovation in office design has produced choices in furniture, layout, and décor that could, presumably, meet

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the varied needs of today's corporate workforce. With this notion in mind, we present below a framework of leveraged office design that illustrates how organizations can integrate the latest innovations into workspaces that can serve the multiple needs of today's corporate professionals.

The Multiple Functions of Office Design

In 1965, advice about office design was limited to calls for tidiness—as a neat office was equated with an efficient worker. One handbook admonished:

> *Avoid over-decorating your desk area*. When your desk, shelves, and wall space are covered with mementoes, photographs, trophies, humorous mottoes, and other decorative effects, you are probably not beautifying the office; rather you may be giving it a jumbled, untidy look. You may also be violating regulations against using nails in the walls, and so on. The proper atmosphere for a business office is one of neatness and efficiency, not hominess.[10]

While some managers are still concerned with tidiness and efficiency (and there is evidence that a neat office is important to *prospective* employees who are considering joining a corporation),[11] we now know that this is just the tip of the iceberg as far as the impact that office design has on work and the workplace. Mirroring the new corporate focus, academic research on office design has also exploded, with new studies and findings emerging in two important fields. First, research in the areas of environmental psychology,[12] organizational identity,[13] and organizational symbolism[14] reveals a complex relationship between office design and individual employee attitudes and behaviors. This research has provided evidence that office design influences individual identities, creativity, and mood, in addition to traditionally researched variables such as comfort, safety, and ergonomics. Second, research from the area of sociology has brought to light new ideas about how groups interacting with each other within organizations are influenced by office design. Studies show that office design can signal status and group membership, improve collaboration and problem solving between groups, and affect people's attachment to their workplaces. Together, these two streams of research show that office design serves more than just practical functions and that decisions about office layout and décor affect every part of an organization's operations.

Given the emerging complexity of ways in which office design appears to affect corporate work, researchers have begun to search for a framework that recognizes the many functions of office design. In one such framework, Anat Rafaeli and Iris Vilnai-Yavetz of the Technion in Haifa, Israel, show that the multiple roles of office design in the lives of corporate workers requires consideration of three functions: instrumental functions, symbolic functions, and aesthetic functions.[15]

Instrumental Functions of Office Design

Instrumental functions of office design include, primarily, those that improve the performance and satisfaction of office workers. Historical accounts

of office design have focused on factors that improve the efficiency and output of office workers, such as location of supplies and ease of use of tools.[16] The fields of human factors engineering and ergonomics, for example, have devoted extensive research to improving worker efficiency through the design of lighting, furniture, climate and noise control, and even ambient odor.[17] Because of this work, most of today's office dwellers are given work space that provides physical comfort, adequate lighting, and a buffer from disruptive noise, uncomfortable temperatures, and noxious smells. In fact, as a result of advances in understanding of human factors and ergonomics in office design, organizations can, in theory, design office spaces to accommodate almost any physical human need.

By contrast, more recent research has focused on the effects of office design on information transfer and transmission among knowledge workers and groups.[18] While we have come a long way at making work environments more comfortable and safe, we have only begun to understand their effects on today's knowledge-intensive work processes. As Curtis, Leon, and Miller recently remarked, "The physical space we work in is often poorly adapted to the task of capturing, organizing, and exploiting knowledge."[19] Two instrumental tasks that appear to benefit greatly from office design are decision making and group collaboration.

Aiding Decision Making

The uses of interchangeable and adaptable office spaces have become an integral part of many of today's organizations as more and more move toward non-territorial or "hoteling" work arrangements.[20] In non-territorial work environments, employees do not "own" their offices, but share them with others assigned to work in the same building or campus. Workers must reserve an office every time they need one, ensuring that an office that is not used 100% of the time by one worker is available to other workers. These arrangements maximize the occupancy rates of existing office space and thus further enhance organizational productivity.[21]

Yet, these very advances have begun to highlight some less obvious, but perhaps more important, instrumental functions of office design and décor. In particular, our research on non-territorial office design[22] reveals that such designs may severely limit a worker's access to resource materials, archives of past projects, or even working prototypes of current designs. Such limited access can, in turn, influence how office workers make decisions. Consider the following example:

> "Jerry," an engineer working at a successful high-tech company headquartered Silicon Valley, was discussing a work project with several other engineers. They were trying to decide how to move forward with their testing of a new electronic device. Their conversation was taking place in a common work area of their non-territorial workspace. None of the engineers had an assigned office. They stored most of their books, papers, or project reports at home. They all had reserved an office for the day, and brought in their laptop computers and briefcases for the

> day. They had no other personal items with them during the meeting. At one point, another engineer, "Rick," suggested that they end the meeting, think about the decision more, and get back together next week to finalize their plans. Jerry responded by saying, "Why can't we make the decision now? All the information we are going to use to make the decision is right here. It's not like you're going to go back to your office and review some past reports. You don't have any past reports there to review." At that point, all of the engineers agreed to make the decision then instead of later, and they proceeded to draw up a timeline for their product testing.

When professional workers, such as engineers, don't have easy access to physical resources (i.e., actual paper documents or physical prototypes), they may decide not to pursue the information contained in these resources at all. As a result, the actual process of decision making changes from one of careful data collection, analysis, and reflection to one of intuition. In this way, office design can be instrumental in affecting decision-making processes, and some important decisions may not be given the thoughtfulness they deserve as a consequence.

The lesson here is to think about how office design affects accessibility of resources that organizations would like employees to rely upon when making important decisions. "Evidence-based management"[23] shows that use of resources such as text-based data or on-line archives improves the decisions of managers. Begun in the field of medical research, a push for evidence-based decision making has gained momentum among corporate managers. Rather than use more-reliable text or on-line resources when making decisions, professionals overwhelmingly prefer less-reliable personal experience or advice from colleagues or consultants.[24] Personal sources require less effort to find and are often pushed on us by vendors, while text-based resources may be less persuasive than a juicy story or may lead to decisions that undermine the status quo.[25] Office design may be an important, but overlooked, addition to the list of factors that affect the use of evidence-based management, i.e., office design can make it harder or easier to access and rely on evidence-rich resources.

Of course, this means that smart office design might actually improve decision processes by providing easy access to resources. For example, in their study of the law firm Nicholas Critelli Associates, in Des Moines, Iowa, David Beckman and David Hirsch describe how the law offices of this firm have been transformed from a traditional set of private offices to a set of "production areas" that are designed to support specific functions of the firm.[26] Instead of providing lawyers with private offices in which to store legal books, reference materials, and computer terminals, the firm has constructed one large library that serves the entire firm, with stand-up desks for laptop computers. There is also a production room for document and visual aid design and a studio for developing electronic or video presentations. There is another studio specifically for case data input, and a third for creating pleadings and briefs. The point is to give lawyers easy access to whatever resources they need for each stage of their case preparation. In this scenario, workers can make decisions based on the best and most relevant information, rather than merely their colleagues' opinions.

Aiding Collaboration

Office design can support another aspect of knowledge work in organizations: collaboration between work groups. Specifically, the spaces and objects created by office design can facilitate or constrain social interaction between groups.[27] For instance, placing a whiteboard in an open office plan creates a shared space that helps groups interact to brainstorm and resolve design dilemmas.[28] Through its impact on intergroup interaction, office layout and design can improve the performance of groups in organizations. Further, because such design helps forge social bonds that extend not only over space, but also over time,[29] it can have long-lasting consequences on social relations.

Because people's perceptions of their situations can differ sharply by location,[30] the way that the boundaries of a workplace are designed influences the relations between people. These boundaries are particularly important in problem solving between groups in organizations, as these groups have different subcultures and often work in different thought worlds.[31] Studies have shown that the boundaries marking these different groups can be bridged by what sociologists call boundary objects.[32] These objects, ranging from blueprints to databases to buildings, are located between groups with divergent viewpoints and are used to pool heterogeneous information and help solve problems. For example, studies of manufacturing organizations show that objects, such as models or prototypes, can bridge the gaps in knowledge between functional groups, helping those groups communicate and solve organizational problems.[33] Our own research shows that when engineers and assemblers in a silicon chip equipment facility used prototypes in their discussions, they were not only better able to resolve current design problems, but the solutions were more likely to be incorporated into future designs.[34]

Office design and layout can contribute to intergroup communication in a similar fashion. For example, a food manufacturer was concerned that researchers and staff in two different groups were not communicating or transferring their complementary knowledge, as they were spread across several different buildings around their site and only met during formal meetings. When designing a new technology center, they mapped out the desired relationships between the groups, and their architect insured that the resulting building layout would bring people with similar knowledge and experience together in common areas. They added a "hub" with a café for informal interaction, and they arranged the laboratories around this hub to encourage its use.[35]

In a slightly more extreme example, a UK creative agency Mother Ltd. facilitates interaction and problem solving between different departments through their use of an enormous desk that seats all 104 employees. Every three weeks, these employees play a version of workplace musical chairs in which everyone takes their laptop and files and moves to a different seat for their daily work. As partner Stef Calcraft explains, "One week, you may be sitting next to a finance person and opposite a creative. The next, you'll be sitting between one of the partners and someone from production. It encourages cross-pollination of ideas. You have people working on the same problem from

different perspectives. It makes problem solving much more organic."[36] In firms such as these, well thought out office layout promotes communication and facilitates learning across groups.

Symbolic Functions of Office Design

In the last 15 years, the function of symbolism has attracted the attention of researchers in office design. In modern organizations, important symbols include identities (i.e., how individuals and groups are categorized) and cultures (i.e., the predominant norms, myths, and ceremonies that influence organizational life). Recent research from both psychologists and sociologists has shed new light on the important role of office layout and décor on perceptions of identity and culture in organizations. In particular, office décor in the form of personal mementoes may be critical for affirming the distinctiveness of individuals, while décor in the form of task-relevant objects may be critical for affirming the status of groups.

Affirming Individual Distinctiveness

Workplace identity refers to the symbolic self-categorizations used by individuals to signal their identities in a specific workplace, e.g., "I'm an efficient worker" or "I'm an engineer."[37] Such identities have been shown to be important to workers because they give meaning to work,[38] and they allow employees to maintain self-esteem at work.[39]

In terms of their relation to office design, workplace identities can be signaled and affirmed through personalization of one's office.[40] Such personalization can be a means of establishing the boundary zone of personal control. Boundary management is important to "maintain an optimum of accessibility versus inaccessibility to sustain appropriate ties to the larger social system and to maintain a unique identity."[41] Workers are even willing to forgo more practical privacy features such as closeable doors for symbolic territorial items like photos and plants.[42]

One of the most interesting findings of recent organizational research is that, contrary to conventional wisdom, office décor and personalization are more important to signaling an occupant's personal distinctiveness (i.e., how a person is qualitatively different from others) than his or her personal status (i.e., how a person is quantitatively ranked in comparison to others). That is, despite the fact that we commonly hear stories about the importance of the corner office with the fancy furnishings as a symbol of individual status, it appears that the office may be more important to its occupant as a symbol of individual distinctiveness.[43]

As a consequence, individuals who lose the ability to personalize their office space (e.g., if they are moved to a non-territorial office space) report feeling that their individual distinctiveness is more threatened than their status. The reason for this outcome is that office workers have lots of opportunities to express and affirm their status outside of their office décor (e.g., their titles, roles, and interpersonal interactions), but have very few means of expressing

their distinctiveness outside of office personalization. This is especially likely to be the case for employees whose distinctiveness centers on their non-work related activities or interests (e.g., their role as parents, their involvement in hobbies).[44]

The upshot of this is that office designs that allow for individual personalization can be more desirable than office designs that limit or constrain it. One successful example of designing office space that not only capitalizes on shared space, but allows for personalization is the Herman Miller Senior Leadership Space.[45] In this cutting-edge office furniture company, senior executives were recently moved from their private offices to a shared workspace in the company's R&D facility. This set up allows the executives to both meet with each other more easily and meet with clients and tour groups in an open environment that showcases the company's newest designs. Yet, instead of completely giving up any personalized space, the designers of the Senior Leadership Space came up with the idea of "front doors" and "backyards." As Zelinsky[46] reports:

> "Front doors give clients access to the fourteen executives that are co-located, but backyards let executives meet, relax, and concentrate in private backyards away from the tour groups. The rule is that neighbors share backyards, but customers can't be invited into that space because it is specifically there as a sanctuary for the executives to use."

Thus, the senior executives began to personalize their shared backyards with their own mementoes and artifacts, giving way to an almost "residential" feel to these spaces. As one of the office space designers remarked, "It helped everyone else to see that it was okay to create a workspace that helped show that a genuine person lived there."[47]

Affirming Group Status

While status may be less relevant to the identities of individuals than previously thought, it appears to remain important to groups in organizations. This is because the degree of inter-group status differences apparent in an organization says something about the organization's culture, especially in terms of how the organization values hierarchy versus egalitarianism. Just as anthropologists point to objects as the visible part of culture,[48] office design and décor can be thought of as the visible part of the culture of an organization.[49] In group areas, what we hang on the walls (a painting or pictures of family members), the furniture we use (modern or antique), and the objects on our shelves (children's trophies or reference books) symbolize our group's location in the social order.[50]

Thus, organizations interested in promoting a culture of equality among groups often discourage or eliminate more visible status symbols, such as executive lunchrooms or fancier offices for top managers. David Kelley of IDEO, a highly successful product development firm, attributes some of the firm's success to enthusiastic participation among designers and engineers. He scoffs at the idea that his firm would promote a hierarchy among groups through symbols: "I'll give you status—I'll give you a big red ball on a post. And that says you're a big

guy. If you've got a ball, you're a senior VP. You know, what do I care? A desk, a red ball, it's all the same."[51]

Access to objects and places in organizations is one way for groups to attain status. People see access to objects and places as reflections of the culture and social order of the organization. For example, in our study of a high-technology manufacturing firm, technicians were able to gain greater legitimacy in the organization by asserting control over the product while it was in the testing laboratories. While engineers were the dominant, high-status group in this firm, the technicians group gained status and autonomy through their access to the labs, which enabled them to not only perform their work better, but to experience more control over their work.[52]

Care should be taken with office design in recognition of its affect on perceptions of group status. For example, when building their new headquarters building in Manhattan, the New York Times Company carefully deliberated with their architect about the status implications of their building design. They wanted a work environment that was open and demonstrated an egalitarian culture. Therefore, not only did they place private offices near the core of the building, allowing the open-plan workspaces to take advantage of the windows and natural light, but they also located interconnected staircases at the corners of the buildings with the best views. As the CIO, David Thurm, points out, "placing the stairs in the location of the proverbial corner office physically expresses our dedication to breaking down barriers between departments."[53] Here, an office design that provided access to the best views for all the members of the organization helped the organization symbolize their commitment to an egalitarian work environment.

Aesthetic Functions of Office Design

Vilnai-Yavetz and Rafaeli define aesthetics as the "sensory experience of an artifact," such as a sense of coherence or a sense of confusion experienced when viewing a subway map.[54] Others have described this sensory experience as an "essentially non-verbal" or "a pre-linguistic form of cognition, i.e., 'knowing'."[55] The aesthetic functions of office design can be distinguished from their instrumental functions by looking at the responses of users or observers. For example, if one's response to a picture of Michelangelo's sculpture of David on a door is a sensory experience of pleasantness, the picture can be thought of as providing an aesthetic function in the workplace. If, by contrast, one's response to the picture is to confirm that behind the door is the men's restroom, then the picture can be thought of as providing an instrumental function. Of course both responses (and thus, both functions) may occur.

While the aesthetic experience is a relatively new concept in the management literature,[56] it is a construct that has been widely studied in the field of environmental psychology.[57] Recent advances in this research provide evidence that office design can be used to customize the sensory experience desired in a given workspace, as well as promote an overall sense of belonging or "place attachment."

Promoting a Customized Sensory Experience

Aesthetic experiences are often described in terms of states of being that involve both cognitive senses (e.g., coherence, complexity) and emotional senses (e.g., pleasing, arousing) components.[58] Workspaces can be designed to promote very specific sensory experiences. For example, surroundings that are experienced as "exciting" have been shown to involve high degrees of complexity (e.g., intricate designs, high quantity of features), atypicality, and low degrees of order.[59] By contrast, surroundings that are described as "calming" involve high degrees of order and naturalness (e.g., similarity to designs found in nature), while "pleasant" surroundings involve high degrees of order, moderate degrees of complexity, and elements of "popular style" (e.g., currently familiar and typical styles).[60]

We now have the ability to alter workspaces easily from designs that induce excitement to those that induce calming. Portable and adaptable work boundaries, such as configurable office screens,[61] allow workers to change their work environment—from one of vivid colors and open workspaces to those of muted colors and cocoon-like privacy—in a matter of minutes. Much of this can be done through a change in the configuration and color of the screens that are facing workers. Screens can be rolled up or down to increase privacy and can be turned around to display different color and pattern schemes. One side of the screen may display a high-energy color, while the other side displays a calming color. The Color Marketing Group of Alexandria, Virginia, suggests that one might want to alternate a bright yellow or orange screen, with a light blue or pink screen because, while "yellow is happy and energetic" and orange "connotes informality and playfulness," "blues lower blood pressure and pulse rates" and "pink acts as a tranquilizer."[62]

Another new insight relating sensory experience to office design is our understanding of how our static versus dynamic involvement in surroundings affects our aesthetic experience. Researchers have recently found that viewing a scene statically (while not moving) led to higher general preference ratings than did viewing the scene dynamically (while moving), and that dynamic viewing meanwhile led to higher ratings of potential learning (perceptions that they would learn more by exploring the scene in depth) than did static viewing.[63] Therefore, we may want to customize the designs that face hallways and the outsides of cubicles (that are viewed while walking) in different ways than the designs that face the interior of workspaces (that are viewed while sitting still). Again, flexible boundary screens can be a useful tool in creating highly complex designs that promote curiosity for those walking past a workspace, while creating moderately complex designs that are pleasant to those working inside.

Promoting Place Attachment

Office design also influences how work is accomplished by creating a particular atmosphere, feeling, and meaning for workers over time. As Shashi Caan, director of interior design at Parsons School of Design, puts it, "When we walk through an office our heart, mind, and body make sense of it

simultaneously."[64] Because interaction with objects is part of what creates our sense of self,[65] over time, people develop emotional bonds with the objects that make up their workplaces. Therefore, office design and décor create "something like an emotional home" for workers.[66]

In addition, because the atmosphere of the work environment is established by the meaning that people give to the objects in it,[67] changes in such objects and environments have an impact on work. Specifically, sociologists describe the development of place attachment, the "emotional bonding to a site that decreases the potential substitutability of other sites for the one in question."[68] Places become meaningful to people through the activities or actions that have happened in them—people remember these actions and events through their spatial understanding of the location.[69] In this way, office design and layout, such as the configuration of a workspace, can influence individual experiences as well as create an interactional experience that workers share.[70] By leveraging this aesthetic element of office design, managers can promote satisfaction through attachment to the workplace.

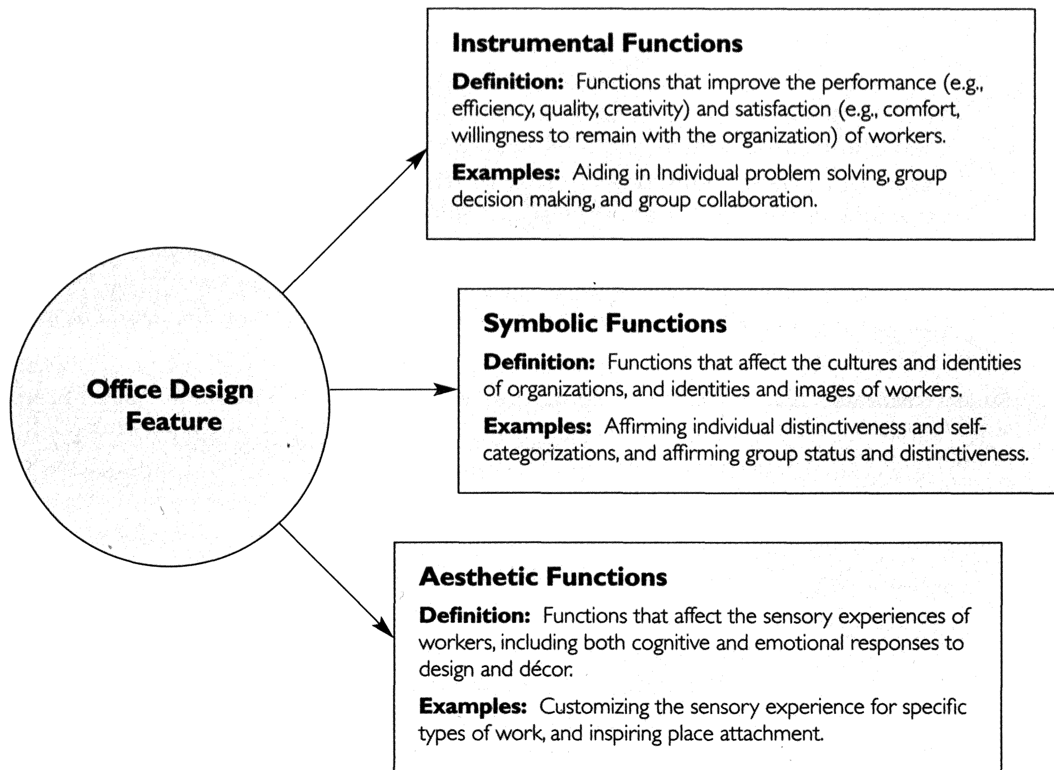
For instance, one study of place attachment showed how workers' satisfaction decreased as a consequence of an organizational move to a new location.[71] The former location of the organization, a university coffeehouse, was described as "tiny," "dirty," "cramped," and "crowded." However, those seemingly unattractive characteristics also encouraged the socialization and "hanging out" that led to much of the workers' place attachment and their enjoyment of their work. After the move, the new location was much larger but the layout was broken up into smaller areas, and the placement of the lounge, the time clocks, and the manager's office discouraged interaction. As one disgruntled worker complained, "There just wasn't any sort of traffic where there wasn't supposed to be." The atmosphere also changed, from "cozy," "unmatched," and "warm and fun" to an industrial "airplane hangar" with metal lockers and high ceilings. Workers with strong place attachment to the former space were less motivated, had some trouble relating to the new workers who were not familiar with the former space, and were unwilling to become attached to the new location.[72] Using office design to promote place attachment can make workers more satisfied with their office environment by generating emotional bonds to the workspace over time.

A Framework for Leveraged Office Design

The value in seeing office design in terms of the multiple functions of instrumentality, symbolism, and aesthetics is that managers can leverage good design beyond the obvious. Based on the research reviewed above, Figure 1 presents a framework that defines how office design features can be leveraged to meet instrumental, symbolic, and aesthetic needs of workers and their organizations.

In Figures 2 and 3 we apply this framework to two illustrative examples of leveraged office design. Figure 2 illustrates the flexible "team room" used by

FIGURE 1. A Framework of Leveraged Office Design

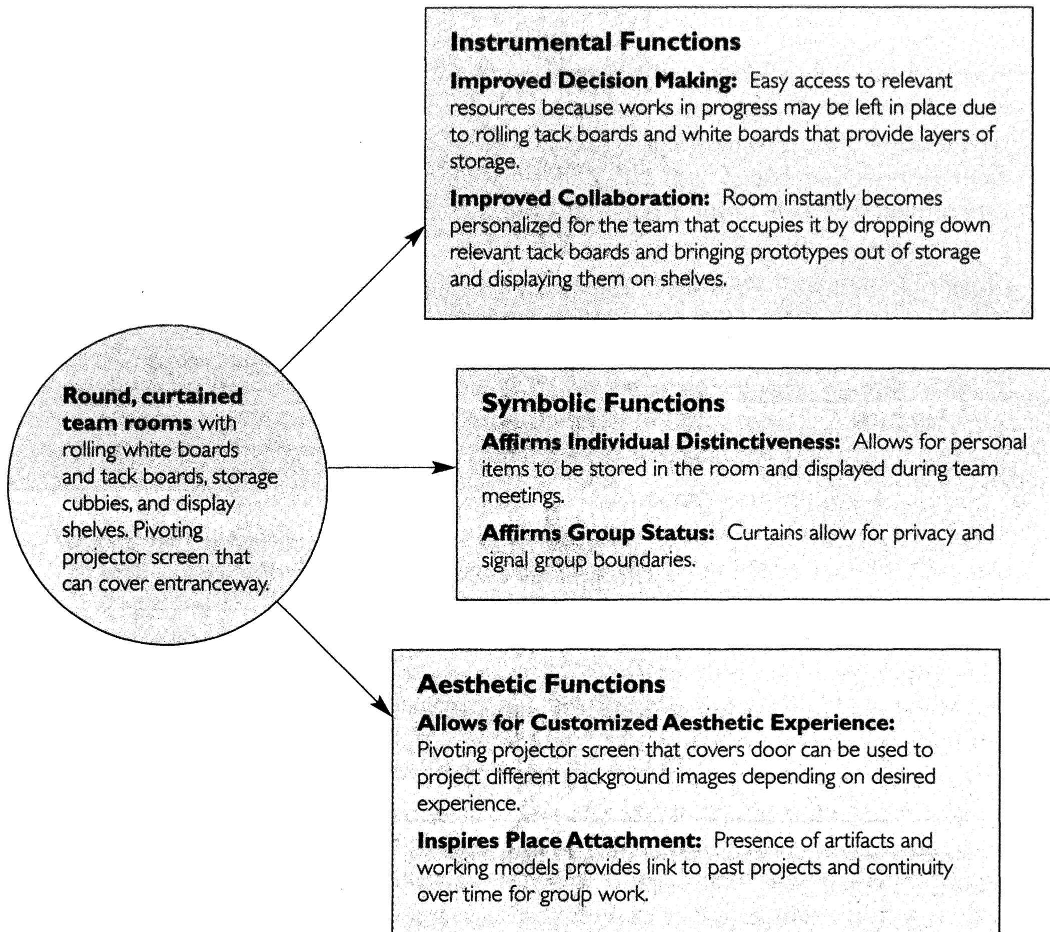


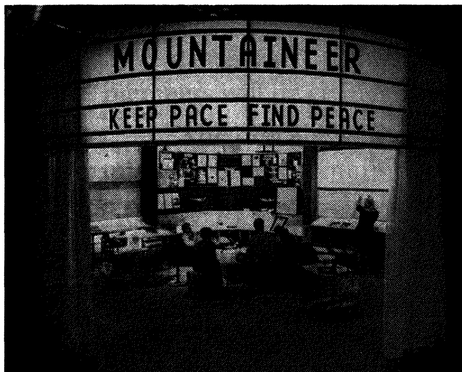
Note: This framework is based on the model of multiple functions of artifacts proposed by I. Vilnai-Yavetz, A. Rafaeli, and C. Schneider Yaacov, "Instrumentality, Aesthetics, and Symbolism of Office Design," *Environment and Behavior*, 37 (2005): 533-551.

marketing teams for the Lincoln and Mercury brands of the Ford Motor Company.[73] This team room is identified with a team "marquee" board on the outside (announcing the Lincoln or Mercury teams in occupancy). The room is circular in shape, with one quarter of the diameter dedicated to an entranceway that can be covered by curtains, and another quarter dedicated to moveable white boards and tack boards. These white boards and tack boards can be rolled up or down in "layers" on the wall. Furnishings include a large round center table, comfortable and moveable chairs, and several small moveable desks. A curved projector screen is mounted on an overhead beam that extends from the center of the circular room, allowing the screen to be swiveled into positioned anywhere along one quarter of the diameter of the room (the same part of the room that serves as an entryway, and which can be closed off with curtains). Prototypes of works-in-progress can be kept in storage cubbies and brought out and displayed on shelves fitted into the tack boards.

This design concept can be leveraged to provide all three of the functions described in our framework of leveraged design. First, the room serves several

FIGURE 2. Illustration I of Leveraged Office Design





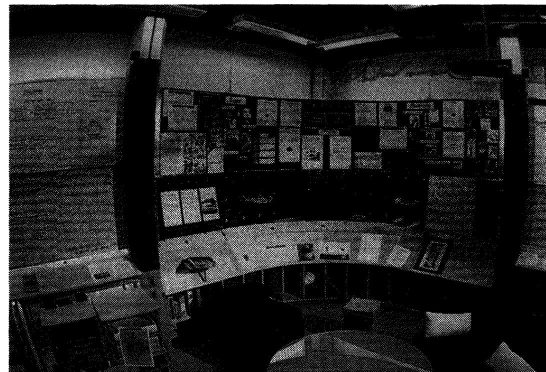


Photo Credit: Haworth/Steven Micros, Microsfoto

important instrumental functions. For example, the team room was designed specifically to allow different teams to leave works-in-progress in place on the moveable white boards and tack boards (i.e., a board in use can be slid up on rollers and another clean board can be brought down to be worked on). This configuration allows for easy access to resources that may support evidence-based decision making. Further, by rolling down these stored works-in-progress, and by placing stored prototypes onto display shelves, teams can instantly re-create their own identified workspace with its own boundary objects. As noted earlier, the ability to store, move, and share such boundary objects is important for promoting team collaboration.

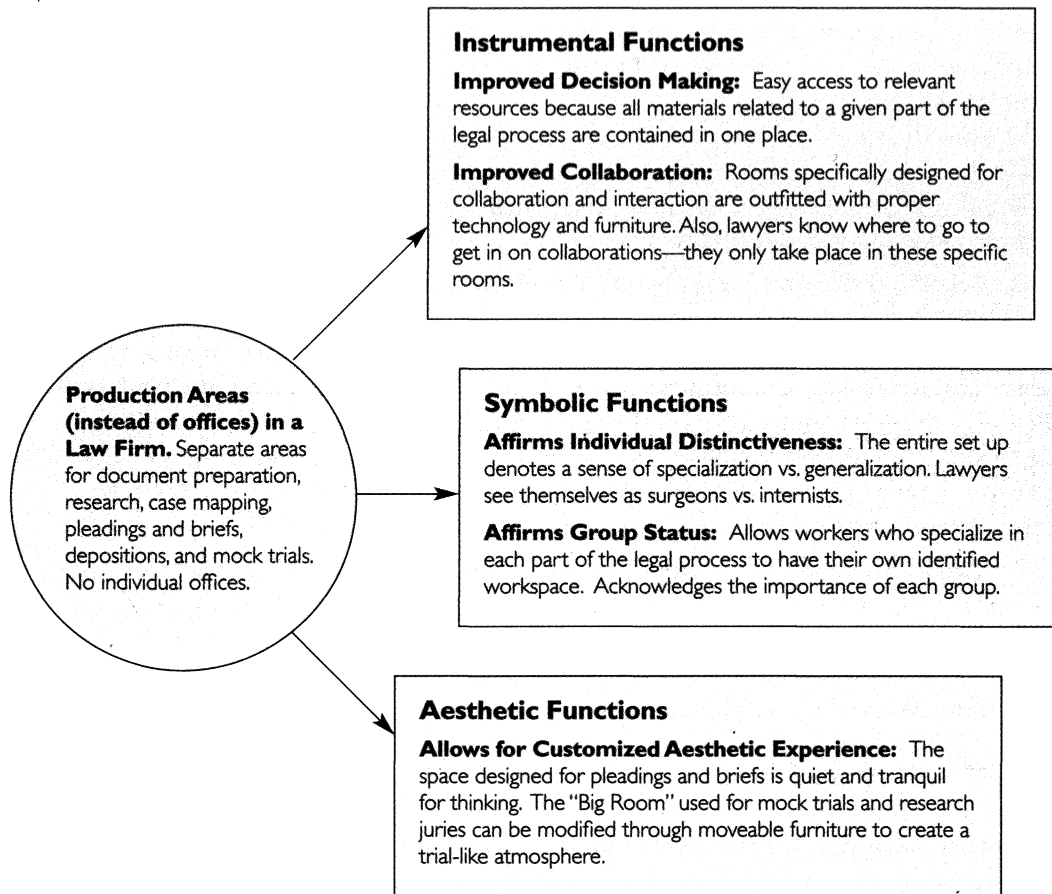
Second, the team room supports a number of symbolic functions. The ability to store works-in-progress, for instance, provides lasting evidence of individual contributions to group work (e.g., individual drawings or expressed ideas), and the display of prototypes or other artifacts on the moveable shelves allows for quick personalization of the space when a given team is in occupancy. These artifacts allow for the affirmation of individual distinctiveness. At the same time, the closeable curtains and team marquees allow the rooms to denote status to teams that occupy them.

Finally, the team room supports a variety of aesthetic functions. The moveable projector screen provides a means of changing the complexity and color of the room, allowing for customizing the aesthetic experience of team members without interfering with the work done on white boards and tables. A soothing picture of a natural landscape could be projected on the moveable screen while teams are working on detailed work at the table, while a vibrant artwork could be projected during brainstorming sessions. Because the screen swings in place to cover the entranceway of the team room, it does not interfere with other workspace on the walls or tables. In addition, the stored work-in-progress and prototypes can be used to remind team members of past experiences in the room. In this way, these artifacts help create a sense of history and promote the aesthetic experience of place attachment.

A second illustration of our framework of leveraged office design is shown in Figure 3. It summarizes how the law firm of Tre and Nick Critelli (described earlier) uses specialized "production areas" instead of individual offices in its office space.[74] These production areas help the firm to leverage the symbolic, functional, and aesthetic functions of the office design in ways that are congruent with the firm's specific needs and modes of operation.

The Critelli law firm is atypical in that it follows the British model (both Critellis are barristers, having passed the bar in England and the U.S.) of separating the trial preparation tasks from the actual trying of cases. The Critellis do the preparation work, while the lawyers they work for try the cases. As a result, the Critellis don't need traditional, individual offices for meeting with clients. Instead they need workspaces that are set up to help them perform the dozen or so tasks that go into preparing a case for trial. In this respect, the entire layout of the workspace—into "production areas" for things like document handling or writing briefs—is instrumental to the functioning of the firm. Each of the

FIGURE 3. Illustration 2 of Leveraged Office Design



individual production areas serves specific instrumental needs by providing the specific types of seating, work areas, and information technology that is needed in that area (i.e., monitors and database systems that hold the "case map" in a room designed for data input, versus write-on walls and large projectors in a room used for giving electronic presentations and taking depositions). As Tre Critelli recently remarked,

> "What we found is if you have one desk, like most law offices, you don't have all the tools you need in your general desk area. . . . By having independent studios for the different tasks, it allows me to focus on the task that I am performing. For example, if I'm doing legal research, I'm in the research room. And all of my tools are there. I can shut the door, turn off the phone, have my calls held, and I have the complete luxury to devote myself to that one task."[75]

These individual production areas also serve symbolic functions by affirming the importance and status of each task and its associated staff. Instead of

being relegated to an off-site location or back room corner, production areas are dedicated and carefully designed for tasks such as document handling and video production. Further, the entire set up serves the symbolic function of affirming individual distinctiveness of the law partners, by signaling an identity of *specialization* rather than *generalization* to the observer. As one visitor to the firm remarked,

> "You walk in here and you see this is sort of like a surgeon's operating room. I've never really had those sorts of facilities available. . . . Their [The Critellis] mindset seems very different—probably more like a surgeon who is trained to accomplish specific results, rather than an internist, who can diagnose, look at tests. It's a different set of skills."[76]

Finally, the specialized production areas in the Critelli law firm allow for a customized aesthetic experience in each of the rooms. For instance, the research library is set up like an old-fashioned English library, and it feels "cozy" according to Tre Critelli. By contrast, the firms "War Room" is crowded with technical equipment and large write-on walls that allow lawyers to sketch out strategies as they think. This space has a more open and expansive feeling to it, that lawyers say "invites you to think visually or graphically, and in that sense more creatively."[77]

The examples of the Ford "team room" and the Critelli "production areas" illustrate how innovative design elements can be leveraged to serve multiple functions within an organization. Further, they show how thoughtful design decisions may accomplish such leveraging while supporting an organization's core philosophy or ideology.

Pitfalls in Leveraging Office Design

There are, however, some common pitfalls of implementing leveraged office design. These pitfalls include neglecting interactions between office design and office task, overlooking the multiple functions of a single design feature or element, and forgetting to monitor the office design implementation for unintended effects on employees and work performance.

Neglecting the Interaction of Office Design and Office Task

People tend to have their own intuitions about how office design affects them aesthetically and functionally. As noted earlier, it is considered common knowledge that certain colors are more calming (e.g., blue or green) while others are more arousing or even stress inducing (e.g., red or orange). Calming colors are preferred to stress-inducing colors in most office work because stress inhibits productivity. Similarly, including natural plants and natural light in office environments reduces stress and improves productivity.

Yet, it turns out that these intuitions are not always correct and that, in reality, the effects of office design on aesthetic and instrumental functions are more complex. For instance, in a study that looked at both aesthetic and

instrumental functions of office design, employees *perceived* that an office environment filled with live plants was more conducive to performance on a simple letter identification task, and they also viewed the office as more comfortable and attractive.[78] Output measures, however, showed that this environment actually led to lower performance than an office devoid of plants. The researchers explain this counter-intuitive finding by relating it to the tedious and repetitious nature of the task performed in the study. In contexts that require attentiveness in a tedious and repetitious task, moderately negative moods actually improve performance.[79] In this case, the office devoid of plants may have produced this moderately negative mood because of its low attractiveness and comfort.

In another, similar study,[80] researchers anticipated that more mistakes would be made in a proofreading task when it was performed in a room painted red than in a room painted white (i.e., because red was thought to promote more stress and negative arousal than white). Further, proofreaders themselves reported that they would most like to work in the white office (rather than the red office) and considered this color the most appropriate for an office. Yet, results of the task showed that proofreaders in the red room made the least errors, while those in the white room made the most errors, despite the fact that proofreaders in the red room reported that the color of the room was more distracting than proofreaders in the white room. Again, the nature of the proofreading task may have been the key to this unanticipated finding. Rather than producing unwanted stress, the red room may have produced the required amount of stress to keep proofreaders aroused during this mundane task.

Managers must carefully consider what tasks are to be performed in a given workspace and design it to flexibly accommodate these different tasks. For example, managers can adjust the colors facing workers depending on the degree of arousal that is deemed appropriate for their tasks (e.g., soft colors for novel problem-solving, bright colors for routine de-bugging tasks). The bottom line here is that there is no one-size-fits-all office design that works for every task in an organization.

Multiple Functions for One Design or Object

Because office designs can influence outcomes through a variety of functions, careful consideration of multiple functionality is critical. Sometimes a design or object is effective for supporting one function but causes trouble from the perspective of another. For instance, Oticon, a Danish hearing-aid manufacturer, reorganized to a fully open-plan and almost paperless office with wheeled personal cabinets to accommodate its project-based work organization. Lars Kolind, the CEO, had a vision that the company should be like a birch forest and to symbolize this image, the new office design included a thousand indoor birch trees on wheels. When the projects reorganized, the trees would also be moved to demarcate the new spaces. When Oticon implemented the new office design, the symbolic function of the trees worked well. There was a difficulty, however, with the instrumental function of the birch trees. As Kolind points out, "I had hoped that birch trees would also dampen sound inside the office,

but unfortunately they didn't. So we quit the birch trees."[81] Oticon's plants were not conducive to the instrumental performance outcome, despite their symbolic and aesthetic appeal.

Another example of design functions in conflict can be seen in TBWA Chiat/Day's New York office, where one meeting space was designed to be like a stoop or a bleacher. However, these stairs were placed in a reception area, and "there's no way you can have a concentrated meeting if people are zooming past you." While the stoop could serve the aesthetic function of creating a feeling of connection and place attachment, its instrumental function of allowing for close interaction within the group that was meeting on the steps was derailed by all the extra traffic around it.[82]

Unintended Uses of Design and Décor

Not all of the effects of changes in office design and décor can be anticipated. Your new office design may be intended to foster teamwork, but what if you have an organizational culture that is not already collaborative? As Jay Brand, cognitive psychologist of organizational behavior at Haworth in Holland, Michigan, points out, "If it's a competitive office where hoarding information results in reward, then throwing everyone into an open office and assuming they are going to share is a pipe dream."[83] Thus, knowing the culture you are designing for is an important aspect of office design.

Employee work norms are an integral aspect of such cultural knowledge. The TBWA Chiat/Day alternative office implementation is a notorious example. After implementing non-territorial offices, they lost their some of their best employees and executives who grew tired of arguing over ownership of workspaces. As a consequence, they have since moved to a design that includes individual enclosable workstations and larger team spaces.[84]

Sometimes it can be difficult to predict which cultural elements will matter when designing an office. For instance, in the coffeehouse move described earlier, the changes in layout not only changed the work environment, but also the group dynamics and the culture of the organization. Formerly, the coffeehouse was staffed by a set of "alternative" students, those who were "hippies" and saw themselves as countercultural. With the move, the coffeehouse became more open in its layout, and less exclusive. The modernization made it less intimidating to potential hires, and the expansion of the space required the organization to hire many students in a short period of time. This had a huge impact on the culture of the organization. As one alternative student worker said, "They were hiring three times as many people and the people they were hiring were a lot different. The Greeks [fraternity and sorority members] were coming in. . . . I remember hearing Jimmy Buffett and all these people just kind of doing the white man's shuffle. . . . it was just this nightmare coming true for a lot of people."[85] The change in design not only changed the way the work was accomplished, but also changed the demographic of the employees and, consequently, the culture of the organization.

Some corporations try to pre-empt unintended uses of office design through piloting designs within the organization with both individuals and groups. David Lathrop of Steelcase, for instance, advocates taking time in advance of implementation to allow people a chance to figure out how the new space will align to the organization's work needs. He recommends building prototypes of the new spaces during this time, as most people can't visualize the space from two-dimensional drawings and react more realistically to having "tires to kick."[86]

Yet, even with such pilots, once workers move in, they often make their own adjustments to their workspace. This is inevitable, and also necessary, as it allows workers to build a culture around their office design and make their office a place in which they are comfortable. For example, in one high-technology firm in Silicon Valley, the graphic designers spend all of their time looking at computer screens. Their cubicles, arranged in an open plan under dropped ceilings with fluorescent fixtures, were not functionally lit, as the designers needed lower light levels to see the colors on their screens. When we visited, not a single overhead light on the third floor of the building was lit. Moreover, in one area, a group of designers had covered their joint workspace with a Moroccan-inspired maroon tent, and decorated the space with genie lamps. These décor adjustments imply that workers' aesthetic needs were also not met by the original office design. However, the organization gave employees the freedom to adapt the design to meet their needs. This indicates that managers need to be flexible about the outcomes of office design in order to accommodate the work itself.

Working Smarter

Office design is a complex process of tradeoffs, involving "satisficing" rather than optimizing all requirements.[87] Cost is one obvious factor, but the design literature has thoroughly explored others, such as the physiological impact of physical layout. For instance, temperature, lighting, and noise can be problematic for building occupants, and research demonstrates that providing user control over these factors (such as windows that open) can be critical.[88] The operation of these physical systems may conflict with one another, as well as with how they are managed in actual use, and there is growing recognition in the design literature of the interrelationships between the design, management, and use of space.[89]

Since there is no comprehensive framework for optimizing every possible office design, tradeoffs in choosing designs must consider instrumentality, symbolism, and aesthetics. However, our framework can help navigate the tensions of multiple stakeholders by pointing to important functions where tradeoffs can be made. Different functions may be primary in the use of each space. For instance, in common spaces such as the entry lobby, aesthetics may take precedence over instrumentality, as managers may want to maximize the emotional impact such a space will have on visitors and workers. Determining how design

features link with important functions can help managers negotiate with constituents and encourage support for a new space.

Great office design has never been more accessible and, at the same time, more complex. Working smarter means knowing how to make the most of your choices in office layout and décor. Our framework provides a tool for managers seeking such optimization.

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