

Physical Space and Productivity

Jay Brand and Manek Dustoor

Explore the multidimensional nature of determining the relationship between the designed environment and worker performance, suggesting that a graph depicting productivity as a function of cubicle size would simply average out most of the really important information.

Whither "Cubicle Size"?

Anyone involved in corporate human factors/ergonomics has encountered questions regarding work space and productivity. Given the reality of rising real estate costs, facilities managers feel pressured to squeeze more and more bodies into smaller and smaller spaces without compromising "productivity." So naturally, the prototypical question becomes, "Can you show me a graph of worker productivity as a function of 'cubicle size'?" Of course, many similar questions could be raised concerning the relationship between productivity and the many physical dimensions of the built, artifactual environment; however, cubicle size appears to be the current favorite. At first blush such questions seem to be reasonable requests, but the perspective they provide on the productivity issue deserves more thorough exploration. While Dilbert may pursue to its absurd logical end the ramifications of moving toward ever-smaller "cubicles," real concerns about space planning do exist, not all of which are motivated entirely by the need to punish office workers.

Thorny Complications

In such requests about "cubicle size" and productivity, what exactly is meant by "worker productivity?" Should worker performance be included? Almost certainly, but how should it be measured? Number of units produced per unit time? What constitutes a "unit" (particularly for "knowledge" workers)? Number of requests dispatched per day? Number of customers talked to per hour? What about number of customers satisfied per hour? This latter question raises the thorny issue of performance quality. Many times a "Speed-quality tradeoff" holds such that the faster one works, the lower in quality one's work product becomes. Must we also consider worker motivation in productivity? More highly motivated employees generally perform better, although an "inverted-U" relationship exists here: There typically is an optimum level of motivation for maximizing performance; fail to reach—or exceed—that level, and performance declines apace.

Should we strive to have a satisfied workforce? Certainly available evidence points to a link between job satisfaction and productivity, although the relationship again tends to be quite complicated, and determining the direction of influence is difficult at best: Does satisfaction lead to productivity, or vice versa (as some recent evidence suggests)? How does contentment relate to satisfaction? Is a contented workforce productive, or napping? Some employees undoubtedly respond best to constant challenges, while others prefer predictability and routine. Should highly efficient employees be considered productive, or should innovation and creativity—regardless of efficiency or basic organizational skills—be more valued? Add to these myriad individual differences the notion that even highly productive employees must be supported by an organizational climate that efficiently leverages their contributions; without such augmentation, individual productivity can get “lost in the shuffle.”

Just the Facts, Please!

To be fair, perhaps there are instances where high turnover might be preferred over any attempt to “satisfy” one’s workforce. Although the ethical basis of such an approach must be questioned, perhaps if the personal or physical costs of a particular job developed cumulatively, frequent turnover would be beneficial—at least for corporations. This would almost certainly be true for transient, seasonal industries or services. Some teleoperations or telemarketing applications, with minimal training costs for new workers, provide another specific example. Typically such employees are young and single, and would not be expected to incur high health benefit costs nor require job security to support a family; in fact, high turnover rates might even be said to benefit the vast majority of these workers to the extent that they view their jobs as temporary “stepping stones”.

However, many if not most companies employing “cubicle candidates” (office, or “knowledge” workers) must consider not only the short-term benefits of cutting real estate costs through minimizing “footprints,” but also the long-term consequences of any facilities planning, corporate restructuring or job redesign. Consider just one aspect of this complicated forecasting: Cumulative trauma disorders, such as carpal tunnel syndrome. With such disorders (and their associated costs) among these workers increasing exponentially each year, and chronic spinal disorders still representing the single largest chunk of the national health care budget (at some \$50-\$60 billion annually), are the long-term risks of inadequate facilities design ever worth its short-term benefits?

Future Trends

In our attempt to imagine and design for the “office of the future,” we here at Haworth would like to offer a more holistic view of productivity that incorporates both the well-being of employees and the company’s “bottom line.” We believe that such a view, while it requires embracing a more complicated definition of productivity, will reward its proponents for the extra effort it requires of them. Productivity necessarily must address the “bottom line,” but the costs of absenteeism, turnover, “churn,” tardiness, sick leave, initial training and retraining, leveraging knowledgeable employees, the process of corporate acculturation, and many other facets of “productivity” all contribute to corporate success and must be included in any realistic “costs/benefits” analysis.

So before one can claim to have minimized costs by reducing cubicle size—without adversely impacting individual worker productivity—we must inquire not only about such things as turnover and absenteeism, but also consider how

efficiently persistent in scheduling a conference call an employee tends to be, or how willing s/he would be to search through a confusing database for exactly the right marketing concept information, or a myriad of other relevant scenarios. Tentatively, one could reasonably expect that decreasing the size of “cubicles” (apologies to Dilbert; we prefer “workspaces”) might not impact behavioral productivity in the short term; however, many of the aforementioned “intangibles” that must be included in any valid representation of productivity could increase as a result, particularly long-term. Indeed, job satisfaction has been shown to be related to aspects of the work environment, and such satisfaction is inversely related to employee tardiness, absenteeism and turnover, although these relationships tend to be complex. Additionally, negative attitudes toward working conditions tend to predict positive attitudes toward unions; most executives would not include unionization among their most popular cost-cutting strategies.

Remaining Challenges

Unfortunately, relationships among job satisfaction, motivation and productivity remain unclear in the available research literature. Theoretically, job performance is the product of an employee’s motivation and abilities moderated by situational constraints. Aspects of the physical environment constitute some of those “situational constraints.” But the most successful theories of work motivation and job performance make predictions based on individual needs, values and interests. This reality flies in the face of any attempt to mandate a “one-size-fits-all” “footprint” for workspaces. An isolated variable such as “cubicle size” simply cannot represent whether workers have adequate access to the tools and resources necessary for them to be productive. Too many other factors (e. g., individual differences; leadership styles;

the broader culture) intervene in the determination of performance and productivity.

A cursory analysis of the impact on the “bottom line” simply won’t do, unless company longevity is no longer an issue (and while some have claimed as much for most of American business, we prefer a more optimistic vision). How do one’s working conditions (including “cubicle” size) influence productivity? The answers to this question appear to be quite complex, but many of them point toward more flexibility and individualization in the work environment, not only regarding physical space configurations but also incentive systems. The physical environment interacts in significant ways with psychosocial variables in its influence on work outcomes. For example, the combination of high workload (quite typical in today’s office environments) and lack of personal latitude for decision making has been related to psychological distress and even cardiovascular disease symptoms.

To address these realities, we must begin to think of creative products and processes that combine the services of many different areas of the corporation in order to optimize productivity and performance in the workplace. Traditional departmental divisions (particularly evident in large corporations) into IS (Information Systems), IM (Information Management), FM (Facilities Management), HR (Human Resources), and CC (Corporate Communications) need to forge creative, integrated solutions for the workplaces of tomorrow. The facilities provided for workers should be viewed as an important part of their incentives and remuneration, just as their workspaces should feature seamless access to the resources of IS, IM and CC (to the extent that the latter department engages in internal as well as external communication). In interacting with their workspaces, workers of tomorrow

will experience the tangible advantages of their entire organization. Their workspaces will express their own personal values in addition to the benefits of their corporate culture and environment.

Our industry needs more concrete solutions, not just more speculation, but until we have empirically based solutions, let’s not simplify our analysis by providing a unidimensional graph illustrating worker productivity as a function of cubicle size. Such a curve would simply average out most of the really important information (see accompanying side bar for suggestions on improving productivity).

Bibliography

Aamodt, M. G. (1996). *Applied industrial/organizational psychology*, 2nd ed. Pacific Grove, CA: Brooks/Cole.

Evans, G. W., Johansson, G., & Carrere, S. (1994). Psychosocial factors and the physical environment: Inter-relations in the workplace. *International Review of Industrial and Organizational Psychology*, 9, 1-29.

Ideation Group. (March, 1997). *Team workspaces*. Holland, MI: Haworth, Inc.; Technical Report.

Gehlmann, S. C. (1992). Individual differences in employee stress as related to office environment and individual personality factors. In J. C. Quick, L. R. Murphy, & J. J. Hurrell, Jr., (Eds.), *Stress & well-being at work: Assessments and interventions for occupational mental health* (pp. 225-234). Washington, DC: American Psychological Association.

Green, G. M., & Baker, F. (Eds.). (1994). *Work, health, and productivity*. New York: Oxford University Press.

Jewell, L. N., & Siegall, M. (1990). *Contemporary industrial/organizational psychology*, 2nd ed. St. Paul, MN: West Publishing.

Muchinsky, P. M. (1993). *Psychology applied to work*, 4th ed. Pacific Grove, CA: Brooks/Cole.

Salvendy, G. (Ed.) (1997). *Handbook of human factors and ergonomics*, 2nd ed. New York: John Wiley & Sons.

Shalley, C. E. (1991). Effects of productivity goals, creativity goals, and personal discretion on individual creativity. *Journal of Applied Psychology*, 76, 179-185.

Voss, J. (1997). *Knowledge in the workplace*. Holland, MI: Haworth, Inc.; White Paper.

Could Productivity be Improved in Your Workplace?

1. Do workstations allow for individuality? (There is a correlation between the number of “personal effects” in a space and employee job satisfaction; in addition, lack of personal discretion in high workload environments is related to cardiovascular disease.)
2. Do workers have enough space to arrange necessary task materials? (Constantly referring to other locations for resources interferes with productivity.)
3. Do incentive systems reflect individual workers’ values? (Motivation is highest when remuneration reflects employees’ interests.)
4. Can workers take breaks every 30 minutes? (More frequent work-rest cycles—even if total time-on-task is higher—generally increase productivity and lower injuries.)
5. Are workstations designed according to ergonomics principles? (Up to 90% of workers compensation costs due to musculoskeletal disorders could be prevented with sound ergonomic design.)