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No. 3 in a series of articles on the Internet of Things and the occupant experience in commercial buildings.

HOW TO QUANTIFY THE BOTTOM-LINE VALUE OF OCCUPANT EXPERIENCE

The ground is shifting under the commercial building industry as it moves from a *cost* model of occupied space to a *value* model. The epicenter of that shift involves the occupant experience and its multiple impacts on the bottom line.

In the past, firms were minding the cost model when they viewed their workspaces largely as an expense necessary to conduct business. While the expense might also be viewed as part of branding or marketing, firms were not likely to quantify the value of their workspace cachet.

With the increasing recognition that workplaces are more than space, that they contribute to the bottom line and thus should be measured in order to be managed, new metrics are being applied.

“Office space used to be a commodity,” says Matt Waggoner, Managing Director, JLL (formerly Jones Lang LaSalle), Indianapolis. “Firms would spend 85% to 90% of their focus on the financial impact of a real estate decision, often seeking to lower their cost. That focus is shifting to the idea that the workplace is an asset. You can use it to leverage growth – or it can hinder growth.”

START WITH THE PEOPLE COSTS

Because employee costs tend to be far larger than any other component of total occupancy costs, Waggoner says it’s important to begin the process by evaluating annual employee costs. These typically include salaries, benefits, attrition and sick days taken. On average, those total employee costs are 10 times greater than a firm’s real estate cost, and 100 times greater than its energy cost. (For more on managing total occupancy costs, see the [3-30-300 model of total occupancy costs](#)).



To receive the greatest value from their occupancy costs, firms must focus first on their employees’ needs and output, not the building.

“The first *aha!* moment for many firms is when they recognize that they make many decisions based on a *building* and they should be based on the *people* in the building, and their preferences and needs,” Waggoner says. In fact, he believes that an HR professional should be part of the real-estate decision team for that reason – to focus on the people.

Once a firm is looking at its workspace’s impact on people, it is straightforward to calculate the true cost of real estate decisions. If a healthy indoor environment reduces employee sick days by 10%, that value can be calculated. If the indoor environment is more agreeable to employees and reduces attrition costs by 2% – which include reduced output for both the employee who exited and those remaining who must pick up the slack while conducting a job search – that value can also be calculated.

CONTINUED

BUILDING CERTIFICATIONS TURN FOCUS TOWARD OCCUPANT EXPERIENCE

As satisfying and productive occupant experiences become a primary requirement for workspaces, building certifications are adapting. Avoiding harm to occupants and the environment is not enough; workspaces should actively support wellness and well-being.

The Well Building Standard from the [The International Well Building Institute](#) is an example. It has a structure similar to LEED but is targeted narrowly on occupant health as well as “mind,” which is one of seven assessment categories. The standard promotes “the use of sensor technologies that increase awareness of physiological

and environmental factors to inform positive behavioral changes.” (For more on sensor tech, see [Smart Sensors: The Roots of Building Connectivity and Intelligence](#).)

Designed for existing buildings, the [BREEAM](#) environmental assessment method includes a “Health and Well-Being” category. The [Fitwel Certification System](#) is a new program that responds to growing market demand for spaces that support healthier lifestyles. Fitwel reports that “49% of building owners are willing to pay more for buildings demonstrated to have a positive impact on health.”

Attracting new and valuable employees is another cost affected by workspace quality. To help determine these metrics, JLL uses pre- and post-move surveys of employees when a firm changes its workspace.

PERCEPTION AND PRODUCTIVITY

But the metrics don't end with measuring whether an employee is present or well enough to be present in the workspace. For years, research has shown that the occupant's experience of the indoor environment also affects productivity and state of mind.

A Harvard study found that occupant productivity can be undermined by indoor air quality, temperature and lighting.

For example, a study by Cornell University published 15 years ago reported that indoor temperature had a huge effect on typing errors by the occupants. Over a month-long period in the offices of a Florida insurance company, researchers found that raising the indoor temperature from 68 to 77 degrees F. reduced typing errors by 44% and increased typing output by 150%. "The results of our study also suggest that raising the temperature to a more comfortable zone saves employers about \$2 per worker, per hour," said Alan Hedge, Director of Cornell's Human Factors and Ergonomics Laboratory.¹

More recently, researchers at the Center for Health and the Global Environment at Harvard's T.H. Chan School of Public Health studied the impact of indoor environment on a broader set of cognitive skills. A key factor was indoor air quality (IAQ). "In particular, CO₂, TVOCs [total volatile organic compounds], and ventilation all have independent impacts on cognitive

function, even at levels deemed to be acceptable by the relevant codes and standards," the researchers wrote.² The Environmental Protection Agency (EPA) also reports that cognitive performance is undermined by contaminants, whose concentration can be 2 to 5 times higher indoors than outdoors.³

Temperature and lighting are also factors in the indoor environment, according to the Harvard study. Building occupants working in spaces where temperatures were not in the thermal comfort zone scored 5.4% lower on cognitive functions. [Insert link here to whitepaper on temperature.] Similarly, the researchers found that better lighting conditions in a building (more daylighting and warmer colors near dusk) improved the occupants' sleep and thus their cognitive scores the next day at work. [Insert link here to whitepaper on lighting.]

OCCUPANT EXPERIENCE AS A LIFECYCLE VALUE

The financial potential of enhancing occupant experience is many times larger than the potential of improvements in operations and energy management. Astute owners will want to pursue all these factors, however, and view them in the context of their lifecycle value and not merely their initial building cost. ■

For more information on the occupant experience in IoT-enabled buildings, click on other articles in this series.

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¹"Study Links Warm Offices to Fewer Typing Errors and Higher Productivity," *Cornell Chronicle*, <http://news.cornell.edu/stories/2004/10/warm-offices-linked-fewer-typing-errors-higher-productivity>

²"The Impact of Working in a Green Certified Building on Cognitive Function and Health," *Building and Environment*, www.sciencedirect.com/science/article/pii/S0360132316304723

³www.epa.gov/indoor-air-quality-iaq/volatile-organic-compounds-impact-indoor-air-quality

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