

The Knowledge Gap

How the gig economy, office design trends and the creative class are turning traditional productivity measurement on its head.

CALLISONRTKLTM
A DESIGN CONSULTANCY OF ARCADIS

By Jodi Williams



The workplace and the idea of corporate culture have fundamentally changed. More people are working within the “gig economy” and top companies are scrambling to adapt to a new generation of knowledge workers. These companies frequently ask us how office design can support and even improve productivity, and how we can measure and prove it.

CallisonRTKL’s Senior Workplace Strategist Jodi Williams weighs in on how companies can measure productivity in these dynamic times, and what they can do to stay ahead of the curve.

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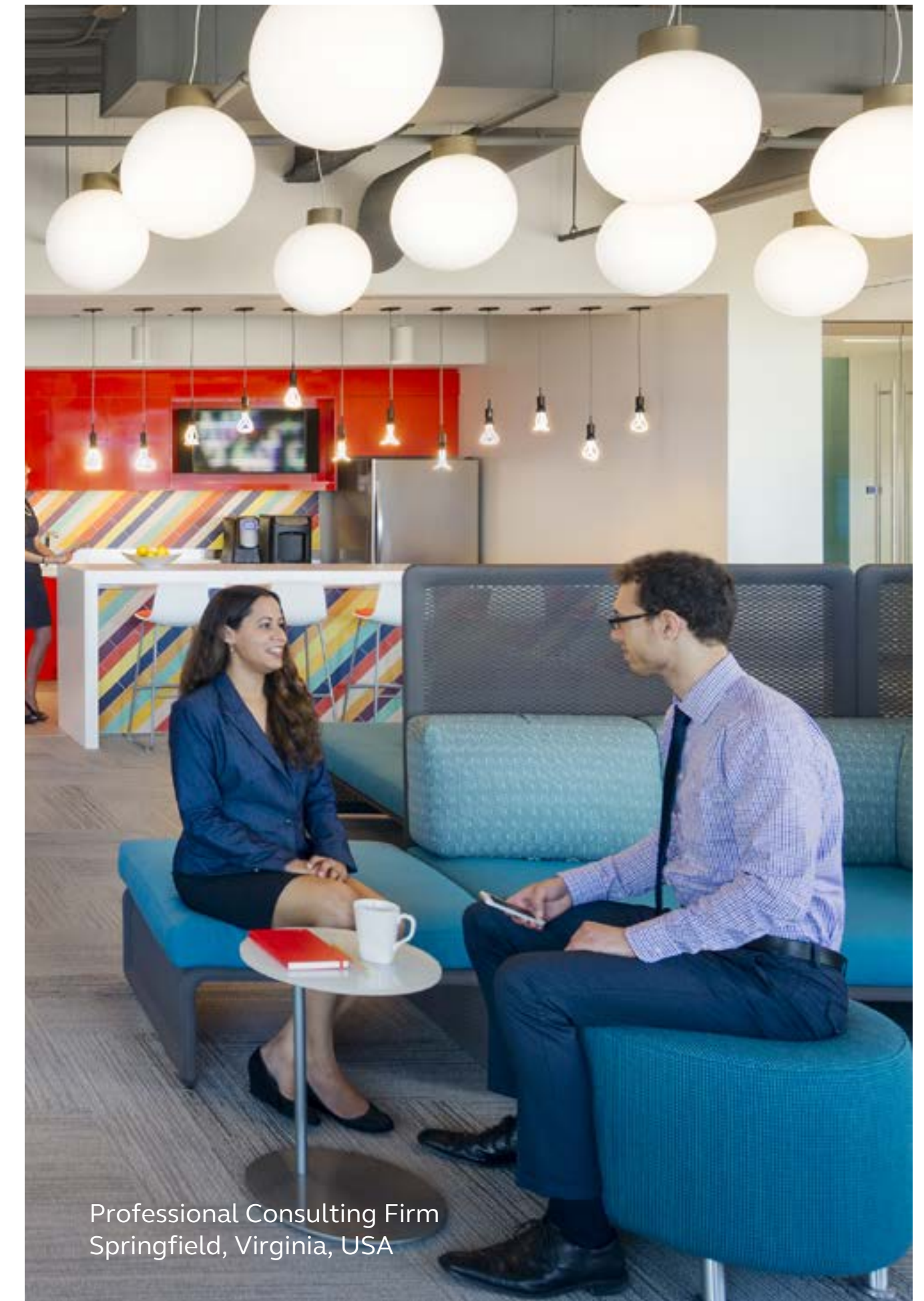
01. *The Opportunity For Productivity Measurement*

Gig Economy An “on demand” or freelance-based economy based on people working more than one job for more than one permanent employer.

Hot Desking The practice of allocating desks to workers on an as-needed basis rather than providing a permanent, personal desk for each employee.

The simplest way to define productivity is the rate at which goods are produced and work is completed. The term is also often used to describe how well a system uses its resources to achieve a goal. In other words, the amount of output generated in a given amount of time. But the question is, how can this be measured for a knowledge worker?¹ How can we go about measuring productivity when the “output” is creativity? And to complicate matters further, how can companies who have been at the forefront of office trends, have embraced the **gig economy, hot desking** and the latest workplace trends, show that their efforts are working at a staff level on a day-to-day basis?

The bottom line is one way to show whether these concepts are working, but that requires general implementation first. What about companies that need data to prove to stakeholders that these are the right steps before getting the greenlight? After all, every company wants a roadmap with a solid foundation of research to back up their visionary workplace and policy changes. In our experience, figuring out the most appropriate way to measure productivity, and then creating the workplace that supports productivity increases, enables commercial real estate organizations to truly impact the bottom line, and impact changes from simply a net-savings perspective to a value-generation one. ■



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¹Individuals who use expertise and experiences to generate knowledge – coined by *Peter Drucker* in the 1950s in his book *The Landmarks of Tomorrow*

02. Qualitative Measures

While typically the easiest to gather, qualitative productivity measures are often subjective in nature, and are frequently not accepted by a quantitative, profit-based, metric-centered business. That said, qualitative measures are often strong indicators for how well an individual, group, or business is working. Qualitative measures that can be used to measure productivity include:

Functionality

Quite simply, there can be no productivity without the ability to function in the workplace. How is the overall output of the company? Are employees able to accomplish what they need to do in order to successfully complete their jobs? There is not necessarily a measureable way to capture this information, but basic feedback from the business unit should provide leadership with an understanding of whether a group is working or not.

Quality of Output

Often, measuring productivity is about doing more, faster. However, in many cases it is more important to do individual tasks well. For example, medical professionals are looking to better health outcomes per patient, rather than seeing more patients in a shorter period of time. Is

the company's output maintaining the appropriate level of quality? Improving?

Qualitative measures are often strong indicators for how well an individual, group, or business is working

Goal Accomplishment

While some goals are quantifiable, others are not. Looking past the numerical answer and into whether or not individuals and groups are growing, changing, and challenging themselves in accordance with plan can help measure whether knowledge workers are productive or not. Are employees individually meeting their goals? Are groups? Is the company as a whole?

02. Qualitative Measures



Self-Reported

While it is hard to quantify how productive an individual is, most employees can determine whether they feel productive or not on any given day. This is typically measured either through surveys or focus groups: Do employees report themselves as feeling or being more productive?

Buzz

The positive energy in a workplace is a way to understand whether people are coming to work with a level of excitement or dread. Is there a “buzz” in the company? Do people want to come to work? Are they talking to one another? Is it a positive environment? ■

03. Quantitative Measures

Most companies are seeking a “silver bullet” that can be used to measure productivity. Quantitative measures are typically more objective in nature. For the purposes of this discussion, they are divided into two categories: output-oriented measures, and human-oriented measures. Output-oriented productivity measures seek to quantify how much a business produces. This includes:

Output Ratios

The most common measurement of output ratios is input to output: the number of hours to create a widget. This is sometimes referred to as “*labor productivity*.”² Output ratios can also be measured by looking at the cost of input to profit (cost of doing business to profit, typically measured in *EBITA or EBITDA*).³

Sales⁴ , Profitability⁵ , etc.

A favorite measure of CFOs and project managers around the world, tracking sales and profitability of various tasks is easily measureable and quantifiable. These are simpler

measures than measuring EBITA or EBITDA and also eliminate the comparison to cost of resources. It should be noted that these types of metrics can be impacted by a number of outside factors and do not necessarily capture the entire productivity picture.

Production Time by Task

Companies with timesheet-style reporting of hours worked can measure the typical time to accomplish a task. While most knowledge work is not repetitive, there are some tasks which might lend themselves well to measurement. Examples include the amount of time necessary to produce a bill or onboard a new employee. Other uses of time companies might examine include issues such as time spent waiting for broken items to be fixed (typically computers), or time spent in training.

Stock Price

While heavily impacted by market fluctuations, many of which are outside the control of a company, stock price

² The Bureau of Labor Statistics uses two programs to produce labor productivity and cost measures for the U.S. Economy: Major Sector Productivity and Industry Productivity.

³ EBITA and EBITDA are typically used by analysts and investors to understand profits and compare across companies.

⁴ Sales can be broken into a number of different metrics, such as dollars awarded, marketing time spent, cost of developing collateral (and effectiveness of collateral), response time on leads, contact to conversation ratios, and win rates.

⁵ In their paper, “*Reallocation, Firm Turnover and Efficiency: Selection on Productivity or Profitability*” published in May 2007, Lucia Foster, John Haltiwanger, and Chad Syverson argue that businesses are driven more by profitability rather than physical productivity, and that while the two are highly correlated, they are impacted differently by variables such as establishment-level prices.

03. Quantitative Measures



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can be an indicator of how well a company is doing.⁶ Comparison to itself over time and comparison to the performance of industry peers are strongest indicators.

Customer Satisfaction

Many companies seek customer satisfaction measurements through surveys and other tools. Examining satisfaction ratings over time can be used to help measure the overall productivity of a team or the company itself, and customer satisfaction is often directly related to financial performance. C-Sat scores examine topics like communications, products, websites, customer loyalty, sales processes, employee behavior, and service & support.⁷

Typing Tests

It is not glamorous, but most knowledge workers type some part of each day. Simple typing tests may be implemented to measure changes in both speed and accuracy. There are also a number of cognitive tests that can be issued, but typing is a very clear and simple method to measure and many online tools are available for free.⁸ ■

⁶As noted by Marvin Lieberman and Jina Kang in their Paper "[How to Measure Company Productivity using Value-Added](#)," stock price measures return to investors but "does not accurately reflect the full value created by the enterprise."

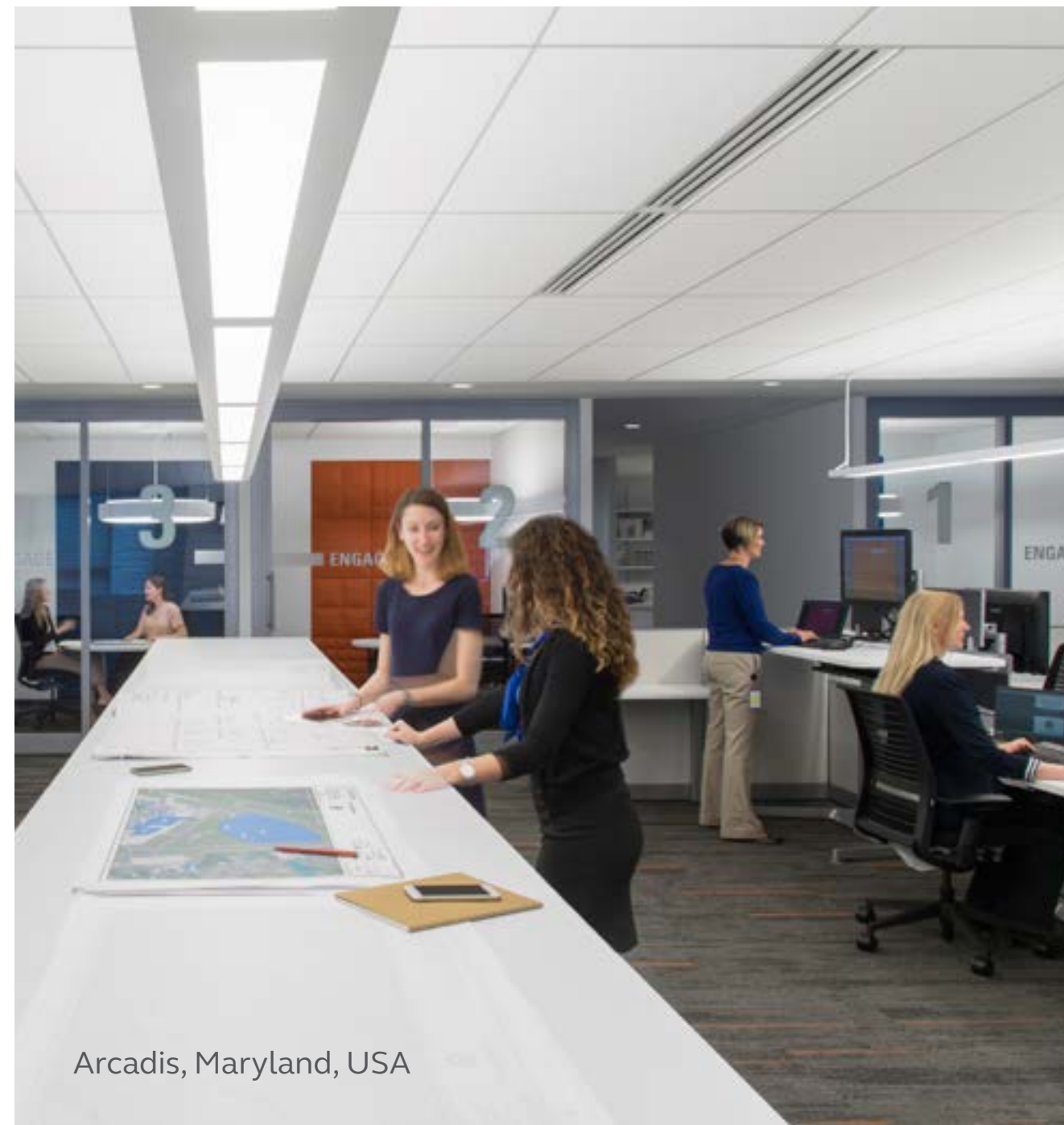
⁷ The [National Business Research Institute](#) offers whitepapers and research on customer satisfaction.

⁸ Typing speed is calculated in both gross and net words per minute; net calculates the number of uncorrected errors.

04. Human- oriented measurement

Retention is a term that often captures a number of metrics such as number of people staying at the company, turnover rates (voluntary and involuntary), tenure, vacancy rate, and special characteristics of employees who have left.

As a sub-set of quantitative measurement, productivity can also be measured by looking at human-oriented elements in the workplace. These data generally come from Human Resources, which is a good example of why it's so important for the modern corporation to work synergistically and get out of the "silo mentality."



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Sick Days

Human Resources typically collect data regarding the number of sick days taken each year. Comparison of year-over-year sick days can be used to help understand productivity of the staff.

Presenteeism

Related to sick days, presenteeism⁹ is when employees come to work without feeling well enough to function properly. This may be a result of physical illness such as a cold, allergies, or a chronic condition, or also psychological issues, including depression. Presenteeism impacts not only the speed of an employee's work, but also the quality. Presenteeism is typically measured by survey.

Recruitment and Retention

With talent shortages in many skilled positions, companies are extremely concerned with bringing in and keeping the best and the brightest. Most companies measure recruiting and employee retention to understand how well the workforce is developing. **Retention** also ties into succession planning. Understanding the way recruitment¹⁰ and retention rates are changing can help provide some quantitative measures related to a company's productivity.

⁹ Harvard Business Review's "[Presenteeism: At Work – But Out of It](#)" published in October 2004 was one of the first articles to introduce the concept and the link to an employee's productivity.

¹⁰ Recruiting metrics can include elements such as time to hire, cost of hire, number of vacancies, offer to acceptance ratios, longevity of new hires, and rehire rate.

04. Human- oriented measurement

Likert Scale Named for its inventor, psychologist Rensis Likert, the Likert scale is a psychometric scale used in surveys. Respondents specify their level of agreement or disagreement with a series of statements. Example: “I enjoy reading about productivity in the workplace.” Answer options are Strongly disagree, Disagree, Neither agree nor disagree, Agree or Strongly agree.

Performance Review Scores

While companies have varying methods for measuring performance of individual employees, many provide an annual score or grade. By examining individual employee scores over time, the company can not only identify high performers and employees in need of performance adjustment, but can also track whether or not there is a pattern of improvement.

360 Feedback

360 degree feedback enables teams to provide feedback to one another, and is designed to provide a fuller review of an employee’s overall skills and competencies. Similar to performance review scores, these measurements can be quantified and compared over time.

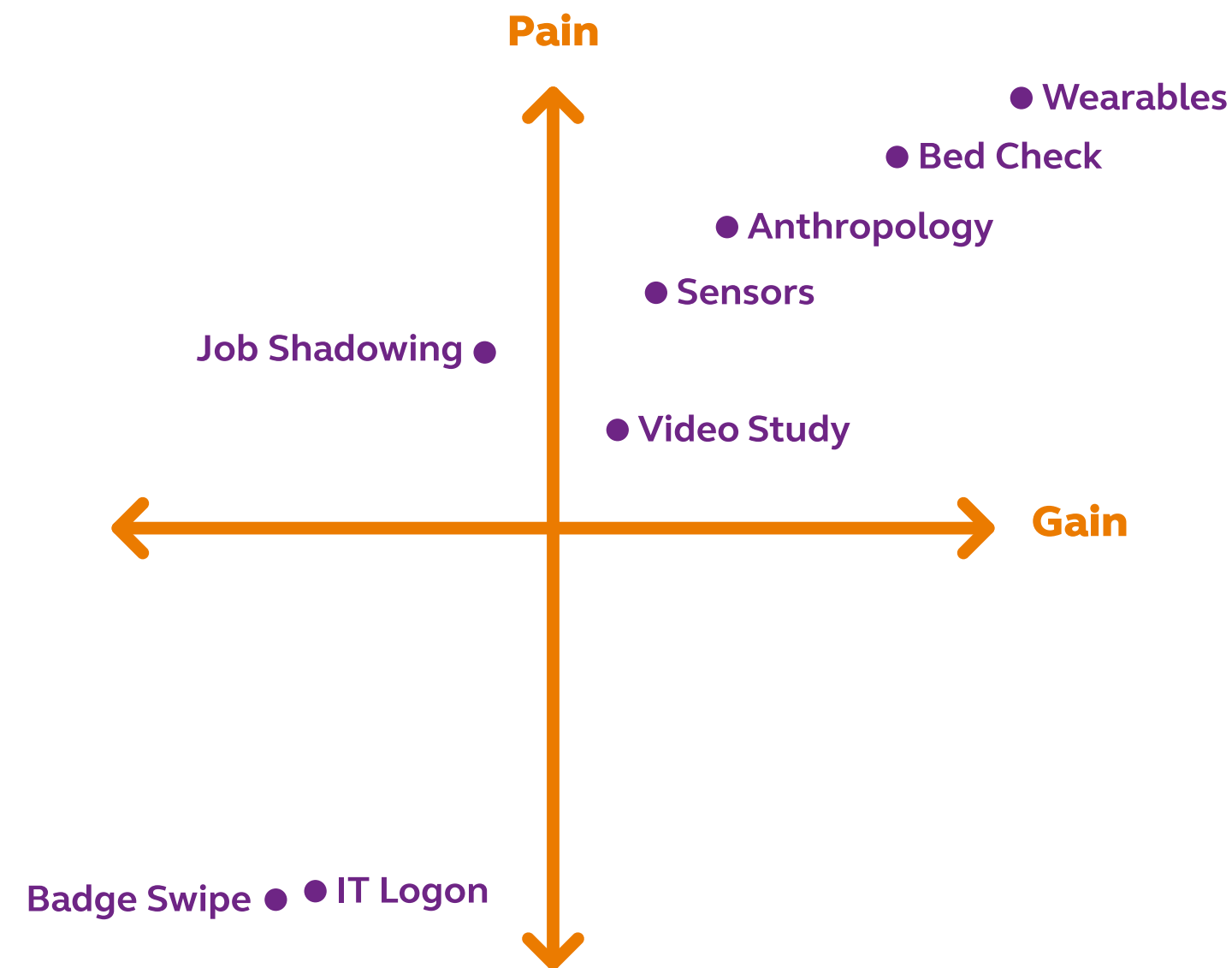
Employee Satisfaction

This is typically a self-reported (via survey), subjective, yet quantitative measure. Typically questions ask if people feel more productive, more collaborative, or more innovative. In some cases it is a simple yes/no question; in others, it is a “how much more...” scored on a five or seven point **Likert scale**. In a third instance, pre- and post- questions independently: “how productive do you feel” and scores are compared. ■



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05. Other Measurement Options



As productivity can be a challenge to measure, some of our clients implement utilization studies instead. These studies can be used to set a baseline understanding of how a workspace is used, and also to validate assumptions. First-hand observation collects both quantitative and qualitative data to help validate work and collaboration patterns, uncovering the reality of how space is being used. These studies can be used pre- and post-occupancy.

There is a wide range of costs and benefits to the different types of utilization and productivity measurement studies. The CallisonRTKL workplace strategy team *developed the matrix on this page* to demonstrate the differences and compare quality and amount of information (“gain”) to the amount of effort and costs required (“pain”). Of course this all depends on the organization, what type of data need to be collected and whether the organization really wants to measure productivity or utilization.

Pain and the gain also vary tremendously based on the individual project: time and budget constraints, staff and consultant capability and availability, and various decisions made around the study parameters. ■

06. Causation Versus Correlation

Correlation A connection or link between two variables that may or may not have a causal relationship.

Causation A relationship demonstrating a cause and effect relationship between two variables.

Latent Variable Also called a “hidden variable,” a latent variable is the actual cause between two correlated variables that do not have a causal relationship.

Perhaps the biggest challenge is not measuring the productivity, but determining the cause of change. As a reminder, it is reasonably easy to prove a correlation between two variables: when two variables vary together, they are correlated. For example, both sunburns and ice cream sales increase in the summer: there is a direct correlation.

Often correlation is confused with or conflated with causation. People jump to conclusions that because two variables are correlated, there must be a causal relationship. Often there is a latent variable in the mix. Eating ice cream and getting sunburned are correlated as their incidence increases simultaneously; however, as most of us know, one does not cause the other. The cause is a third (latent) variable: the hot sun.

Proving causation between variables is a much more challenging than simply illustrating a correlation. Causation is proved through a controlled study – for example, one in which two groups of people who are comparable in almost every way are given two different sets of experiences. For example, two groups of accountants who do the same tasks and have the same client type are placed in two different office environments; all policies, procedures and business changes are controlled across groups.



While it would be wonderful to create a truly scientific study of the impact of space on productivity, the reality is that very few companies have the time and resources to invest in such a study, and controlling the variables is next to impossible.

It is highly unlikely we will ever have true scientific proof that workplace design causes productivity. Correlations, yes. Causation, no. ■

07. Five Things You Can Do To Increase Productivity

Hoteling Similar to Hot Desking except that employees reserve a workspace before they come to work.

Co-working A style of work in a shared office environment where workers can collaborate and use resources, but are usually not employed by the same organization.

The bad news is, productivity is hard to measure, especially for knowledge workers. It becomes even more difficult when temporary employees, remote working, **co-working, hoteling** and activity-based work are thrown into the mix. The worse news is, it is nearly impossible to prove that the office design that is driving any increase in productivity. And now for the good news: there are several implementable techniques that can help improve both productivity and the way your company measures it.

1. Know Who You Are

Before trying to measure productivity by any method, understand the following factors about your organization: How data-driven are you? What metrics are already in place that you can use or expand? How much effort (both internal resource time and external consultant dollars) are you willing to spend? And, how important is it to know the absolute answer?

2. Set and Share Your Vision

Productivity is often driven by knowledge of a shared goal. It is important to know what the vision is, if employees know what it is, and if all employees know how they fit into the overall organization and its vision.

3. Fix What's Broken

What's broken? Are there things you can identify that are not working? Fix them. Some are obvious and cross industries while others are specific to your industry or your population.

4. Nature, nature, nature

Design-wise, things like biophilic design, access to outdoors, and better lighting are always a good thing and can help productivity. It's not about how big your desk or office is, but how much you can reconnect to nature.

5. Integrate and Review

As productivity within an organization is a multifaceted thing, it is important to use an integrated approach and review regularly. ■

08. Productivity News You Can Use

Measuring productivity in creative and knowledge-based industries has been intriguing experts for some time. We've narrowed down the noise with the list below to cover the top 20 productivity-related articles, videos, and blog posts from the past year.

01

Technology in the Office Failing to Keep Pace with the Digital Revolution

Author: Sara Bean

Workplace Insight, March 4, 2016

85% of office workers in the UK feel that technology provided in their offices does not allow them to maximize productivity. While self-reported, findings suggest that IT and technology upgrades could have significant cost and productivity benefits.

02

Wearable Tech is Improving Employee Productivity and Happiness

Author: John Boitnott

Entrepreneur, April 28, 2015

Who doesn't know someone completely addicted to their Fitbit, smart watch, or similar device? This article examines how wearables can impact productivity, from measuring movement in process-oriented functions to measuring fatigue. The upside is collecting infinite data points that help understand how people work. One of the clearest downsides is privacy: employees simply do not like being tracked.

08. Productivity News You Can Use

03

The Third Era of Management and Why Empathy Means More than Ever

Author: Cameron Conaway

Huffington Post, March 17, 2016

In the industrial age, the author argues, there have been three eras of management. The first era was about execution. The second was about expertise. The author argues that management has entered the era of empathy, meaning that organizations are now seeing the value of their employees in their capacity to create and maintain relationships (both within and outside the firm).

It's a nice idea, but the fact that I'm frequently asked about measuring productivity makes me think we are still firmly in the measurable eras of execution and expertise.

04

Healthy Workplaces Produce Employees Who Work Smarter – and Longer

Author: Tanya Ha

The Guardian, January 20, 2016

The study cites perceived increases in productivity following inhabitation of sustainably design workplaces and workplaces with an emphasis on improving human health and well-being.

08. Productivity News You Can Use

05

How to Take the Most Refreshing Work Break: 7 Evidence-Backed Insights **Author: Eric Jaffe**

Fast Company, October 14, 2015

This article provides key insights on breaks. Most of them are behavioral (i.e., take regular short breaks), but others can inform space design. For example, walking has been *proven to boost creativity*, so designers can incorporate indoor and outdoor walking areas or treadmills in the workplace. We also know that nature can boost attention. Green walls, green roofs, roof decks, and even small indoor planters can help. 10 to 20 minute naps were also proven to be refreshing. More wellness rooms and comfortable seating are a start, but corporate culture needs to support this change for it to be effective.

06

A Methodology for Measuring Engineering Knowledge Worker Productivity **Author: Erick Jones, Christopher Chung**

*Engineering Management Journal,
April 18, 2015*

This article focuses on a phenomenon known as “cognitive turnover” – commonly referred to as “burnout” in which people mentally depart their jobs before they actually move on.

08. Productivity News You Can Use

07

Why Corporate Real Estate and Facilities Sucks at Measuring Productivity

Author: Michael Jordan

October 2, 2015

The entire CRE world is trying to crack the code for measuring productivity and correlating it with office design. One of my favorite points: if workers can't tell us what their output is, how can CRE be expected to measure it? Another great point: in observations, it is often easy to identify productivity inhibitors – for example, a table without access to power. Fix the inhibitors.

08

How to Manage the Knowledge Workers on Your Team

Author: Shellie Karabell

Forbes, October 28, 2015

Great example of how measuring knowledge worker productivity can actually drive down quality by putting in place metrics that focus more on speed and cost than content and innovation. Recommends focus on engagement of the individual and encouragement to become part of the team.

08. Productivity News You Can Use

09

Why Worker Productivity is Contagious.
**Author: Matthew Lindquist, Jan Saurermann
and Yves Zenu.**

December 10, 2015

Researchers find that peer networks can impact productivity, attributing this to conformist behavior, or peer pressure if you will. Additionally, workers with training can positively impact the behavior of untrained workers.

10

Public Health England.
Measuring Employee Productivity

Topic Overview, August, 2015

In this research paper commissioned by Public Health England, the authors investigate how to measure productivity – and if it is worthwhile. Measuring productivity does not effectively capture the nature of many jobs; instead, organizations should focus on multiple factors, particularly the quality of output. The issue of “presenteeism” features heavily: many hours worked are not actually productive. The authors suggest measuring levels of presenteeism and tying these to productivity assessment.

08. Productivity News You Can Use

11

To Get More Creative, Become Less Productive

Author: Art Markman

Harvard Business Review, November 30, 2015

Somewhat counterintuitive to companies who are trying to make a dollar, but the author argues that creativity (and innovation) need time and space to grow, and flexibility to research and think outside the normal “box” for their work. The author suggests that not only do companies need to provide time for creative thinking, but also reward employees for engaging in creativity, even if the ideas fail.

12

Why are We So Obsessed with Productivity?

Author: Art Markman

Fast Company, October 14, 2015

Is productivity like pornography: *I know it when I see it?* Rather than focusing on productivity, the author suggests that companies focus on analyzing the tasks and factors that are associated with success and focusing on incubating these.

08. Productivity News You Can Use

13

How Visual Systems Make it Easier to Track Knowledge Work

Author: Daniel Markovitz

Harvard Business Review, September 24, 2015

Fascinating article that uses the analogy of mirrors in a gym improving workouts to greater transparency/visibility into worker output. While most companies use weekly status meetings to provide visibility, others are finding that simple visual “swim lane” diagrams help ensure that nothing falls through the cracks. High-tech solutions include apps like Trello and LeanKit, and even low-tech/high-tech solutions like Google Docs. The pros include transparency, visibility, and it reduces the need for meetings/emails. Cons are that underperformers may feel publicly shamed.

14

Data-Crunching is Coming to Help Your Boss Manage Your Time

Author: David Streitfeld

The New York Times, August 17, 2015

There are a range of tools to monitor efforts – some already in place, some are new tools created especially for tracking time and performance, and providing feedback. The overall theme is that more tracking and more feedback provides more timely response, limited distractions, and increased honesty.

Pros: transparency, fairness.

Cons: big brother, abuse, lack of context.

08. Productivity News You Can Use

15

Effectively Measuring Knowledge Worker Productivity

Author: Sonali Tare

CoreNet Research Corner Blog, November 3, 2015

This blog post provides a brief overview of a research paper (available to members at [CoreNet's website](#)). The task: to find indisputable metrics and identify cause and effect relationships. The authors found such variance and complexity in knowledge work and its outputs that there is no method or set of performance indicators that work universally. The bright side is that the authors found six “proxy measures” that relate to performance: social cohesion, perceived supervisory support, information sharing, vision/goal clarity, external communication, and trust.

16

The Missing Piece in America's Economic Growth

U.S. News, August 6, 2015

Labor productivity is measured by taking total output of an industry divided by the hours worked by its employees; in the U.S. overall productivity has been stagnant since 2009. Analysts suggest that employers investing in technologies, equipment, and facilities could make a noticeable impact.

08. Productivity News You Can Use

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Top 8 Methods for Accurately Measuring Employee Productivity.

Universal Class

This article suggests sharing productivity measurements and goals with employees to encourage engagement and active participation in reaching the outcomes.

Pros: Employee engagement is critical to productivity.

Cons: Difficult to implement quantitative tracking without specific existing metrics and/or use of “big brother” techniques.

18

15 Habits that will Totally Transform Your Productivity

Author: Stephanie Vozza

Fast Company, October 12, 2016

A fun article that provides tips on what people can do to increase productivity – some are space related, many tie to technology (put down the iPhone, turn off the email) but a few are not. One way to improve productivity is to look to protocols: consider implementing a clean desk policy – people with clean desks are more persistent and less frustrated/weary. A simple design solution is to provide access to sunlight; it is proven to boost productivity, per a citation of a study by the California Energy Commission.

08. Productivity News You Can Use

19

Why Firms Need to Rethink the Way they Measure Productivity

Knowledge@Wharton, August 20, 2015

This article highlights the findings of Ulrich Doraszelski, a researcher at the University of Pennsylvania, studying how technological change increases productivity of all factors equally (“Hicks neutral”), or if it is biased, impacting some inputs more than others. Interesting to think about how the workplace could be a biased productivity changer: making some people more productive and others equally. Doraleski argues that a biased change is actually the impetuous for shedding labor, while Hicks neutral simply allows greater output.

Pros: interesting research and separation of impacts.

Cons: no specific metrics that an individual company could use to measure productivity.

20

Profiting from IoT: The Key is Very-Large-Scale

Author: Yano, Kazuzo, Tomoaki Akitomi, Koji Ara, Junichiro Watanabe, Satomi Tsuji, Nobuo Sato, Miki Hayakawa, Norihiko Moriwaki

Happiness Integration, 2015

The authors point out that having access to big data without a link to value is essentially worthless, and share in the thought that self-reporting productivity is a flawed methodology. Instead, they propose measuring happiness through use of wearables and the correlation of physical motions to the feeling of happiness. One key finding was that aggregate social interaction during breaks correlated with aggregate happiness. It’s an interesting theory, and suggests we should continue working on ways to encourage social interaction in the workplace.

09. About Us



Arcadis is the leading *global Design & Consultancy firm for natural and built assets*. Applying our deep market sector insights and collective design, consultancy, engineering, project and management services we work in partnership with our clients to deliver **exceptional and sustainable outcomes** throughout the lifecycle of their natural and built assets. We are 27,000 people active in over 70 countries that generate €3.4 billion in revenues. We support UN-Habitat with knowledge and expertise to improve the quality of life in rapidly growing cities around the world. **Arcadis. Improving quality of life.**



CallisonRTKL combines the legacy of two great design practices into an even stronger, more distinct voice that is characterized by the strength of our ideas, the spirit of our culture and the passion of our people to make the world a better place. People are at the center of what we do. Focusing on our relationships, with clients and teams, helps us make the big seem small, more personal, and keeps us moving in the right direction. Our process centers on creativity, cross-pollinating ideas and talents across offices to deliver quality at all levels and in all places

As part of a global community, we realize our responsibility and strive to be an active participant in the world. In all our efforts, we set out to do the right thing for our people, our clients and our communities. At CallisonRTKL, we're eager to face the challenges of our world and our time and ready to ask the questions that hold others back. Our thirst for innovation and quest for creative solutions to complex issues helps set out a path that leads to new heights and continued success.

10. Contact Us

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