ISSUE 11 SPRING 2019

Work&Place

Leading the world in workplace thinking

TIME TO SHOOT THE WORKPLACE MESSENGERS?

WHY TOO MANY PEOPLE ARE PANDERING TO FADS AND FANCIES WITH NOTHING MEANINGFUL TO SAY

Stories of a new life after carbon

The magic of workplace disruption

The power of deep engagement

PLANON
AIM FOR THE OPTIMUM

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Work&Place

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Work&Place is a global learning and development organisation serving professionals with an interest in the intersection of work with digital, cultural, and physical space. Since 2012, it has engaged the world's most progressive workplace thinkers to explore cutting-edge ideas about the ever-changing and transdisciplinary nature of work and place.

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Editorial

Welcome to **Work&Place** issue #11. As always, it offers a diverse compilation of timely and provocative perspectives focused on the intersections between and among work, the workplace, technology, culture, and business strategy.

You might start with **Rob Harris**'s call for shooting the messengers in his (highly responsible) rant on the dearth of meaningful research about the business value of open offices and the all-too-frequent unfounded claims about how wonderful open plan is.

If you find Rob's insights compelling, you might want to turn next to **Anthony Brown**'s "Brief history of workplace disruption", which provides a marvellous review of how the workplace has evolved over the past several centuries, introducing one powerful disruption after another into the way we now work.

Then, for a glimpse at a very plausible workplace future, dig into **David Karpook**'s article about how AI and sensing tech will change the way we experience our workplaces (and the way they experience us). This is David's second article for us; his first, which appeared in issue #04 in September 2014 (available via our new website), was also focused on immersive experiences.

Follow that up with **Jan Johnson**'s call for a people-powered approach to workplace design. Jan shares her own experiences as a long-time workplace designer who believes in actively engaging the people who will use the workplace.

That kind of engagement in workplace design is critical, because as **Peter Ankerstjerne** points out, the most important source of wealth in the information economy is the experience of the people who do the work. While much attention is paid these days to Big Data, Peter makes a convincing case that data only has meaning when it is used, processed, and interpreted – and it is their own experience that influences that interpretation.

Then, for a wholly different perspective, think outside your workplace (and your entire facility) for a moment to learn about how large urban areas are beginning to design economies and physical facilities for "life after carbon."

Peter Plastrik and John Cleveland have just published an incredibly important book called *Life After Carbon: The next global transformation of cities*. We are proud to bring you both an excerpt and a thoughtful review of the book by **Nancy Johnson Sanquist**. An IFMA Fellow and former Chair of the IFMA Foundation, Nancy wrote in issue #04, in 2014, about IFMA's role in developing an urban presence for facilities management.

And there is one more article, on bringing the outside in – **Kelly Taylor**'s overview of the latest thinking about biophilia – the introduction of living things and their images into the workplace, to restore workers' connections with nature and enhance their productivity and satisfaction.

We are also debuting a new section, **Conference Reports**, in which we provide you with summaries of major events from participants. **Work&Place** is now an active media partner for many conferences around the world, and we use that role to provide you with insider looks at the major themes, presenters, and conversations that make them so important.

You need to engage with these ideas and spend some time sorting through their implications for your own work. But don't stop there. Engage with us and the authors too; use the website to extend the conversation, raise new questions, and tell us what you want to read about, and hear about, going forward. We view **Work&Place** not as a dusty library, but as a continuing and lively global conversation.

Enjoy!

Jim Ware
Managing Editor

The accessibility of data and the use of data analytics set a new direction for our society and the wealth creation – just like oil did back in the past

Peter Ankerstjerne

Data isn't the new oil - but experience is

> **"Our ability to turn data into insight has never been more important as this will allow us to design the right workplace experiences for the future"**

The term "data is the new oil" was coined in the mid-2000s; it refers to the notion that data should be considered a "natural resource" just like crude oil[1]. Like oil, data is valuable, but if unrefined it cannot really be used and therefore it must be broken down, analysed, and processed to have value.

As we do so, the access of data and the use of data analytics sets the new direction for our society and for wealth creation – just like oil did back in the days. Data, and especially digitalization, AI, and robotics have become the focal point for the latest industrial revolution (industry 4.0)[2].

There is no doubt that data is important, and it does provide the foundation on which we make decisions and develop our society. But I would argue that it is the experiences that will keep the engines running today and into the future.

It is experiences that provide the energy, passion, and engagement that will fuel the development of our businesses and then ultimately all of society.

'The experience economy' is a term that has been around since the late '90s[3], and as such it is much older than the aforementioned data-related topics.

Nevertheless, it is still relevant, and we are still learning more and more how we can manage experiences in our workplaces, through our products and services, and towards our customers and the communication that ties it all together. Actually, the experience economy has never been more relevant than it is today.

Joseph Pine and James Gilmore wrote their famous Harvard Business Review article (and book), Welcome to the Experience Economy, in 1998:

To realize the full benefit of the experience economy, businesses must deliberately design engaging experiences that command a fee. This transition from selling services to selling experiences will be no easier for established companies to undertake and weather than the last great economic shift, from the industrial to the service economy. Unless companies want to be in a commoditized business, however, they will be compelled to upgrade their offerings to the next stage of economic value[4].

Pine and Gilmore later refined their model to include the next phase in the economic value model as Transformation. To be successful, organisations must create memorable events for their customers, and that memory itself then becomes the product — the 'experience'. The authors also believed that a more-advanced 'experience business' could begin charging for the value of the 'transformation' that the experience offers.

There is no doubt that working with experiences, which can even become transformational for a business, must be the holy grail for any organisation that aims to create value in the relationship with its customers[5]. Naturally, the experiences will not only have to be relevant to customers (and probably even more so to the organisation's employees) but help to transform

The Experience Economy in FM (adapted from Pine & Gilmore, 1998)

Facing image: Microsoft / Steelcase

and redefine the business, grow revenue, and drive innovation and change.

Staging experiences in a workplace context

Something interesting is happening in the Facility Management and Corporate Real Estate (FM/CRE) sector these days, with the new focus on staging experiences and driving transformation. Every big company is trying to get its hands (and heads) around the workplace experience and to make it an integral part of its value proposition.

Even when these concepts (workplace-, service-, human-, and employee experiences) are labelled differently, the outcomes are still relatively similar. Developing an ability to stage experiences within the workplace that will bring it to life and provide a better and more holistic experience for the employees who work there, and for visiting guests, is at the centre of corporate success today. The workplace experience should of course be aligned with, or even leverage, the strategy, the brand, and especially the culture of the organization.

This development in the FM/CRE market is providing an interesting "big shift"[6], of which we have only seen an early emergence. The focus is moving from cost optimisation (how cheaply can you manage your facilities?) to a return on investment in people (how can you increase the engagement and productivity of your workforce?).

Responsibility for this shift is moving away from the Finance department over to the Human Resources department, where the focus is centred around the ability to create attractive working

Requirements for a best-in-class workplace

"Developing an ability to stage experiences within the workplace that will bring it to life and provide a better and more holistic experience for employees and for guests, is at the centre of corporate success today"

environments, ones that employees will want to come to work in – not because they have to, but because they want to – because the workplace supports their ability to work effectively, socialize, and have a better work-life balance.

Human Resource departments are re-defining the "new normal"[7] in the workplace by creating memorable employee experiences for employees.

These experiences range from designing the space employees work in to providing smart workplace technologies and crafting new emotional connections between employees and the organisation.

There is no doubt that this development spans a far greater breadth of engagement with employees and provides entirely new demands for HR professionals[8]. In addition, it calls for a more conscious and sharper brand engagement as the workplace becomes both the visual and the emotional expression of the corporate brand.

The corporate brand should be seen as an external reflection of the internal culture[9]. A well-branded, integrated workplace tells a story about who the company is, what it does, and why it matters. It provides the workforce with a reason to believe, and it enables them to feel valued as part of the business goals and mission[10].

The people within the organization represent the living experience behind the brands and determine how the brand is perceived externally. When people's experiences match their expectations loyalty increases.

Since we spend most of our time as adults at work, it does makes sense to be more people-oriented around the workplace design and provide a more compelling workplace experience. It is not only a question of transferring the responsibility to the

HR team and tweaking a few HR practices to include workplace design; rather it is one that is woven into the overall approach to the business of the employment of others where HR works closely with FM/CRE teams.

The Irish Management Institute (IMI) has come up with five key elements of work that ideally should be built into one seamless experience for employees. When this happens, a more compelling workplace experience can positively impact employee engagement and business outcomes:

1. Build More Emotional Connection
2. Improve the Intellectual Experience
3. Enhance the Physical Experience
4. Upgrade the Technological Experience
5. Promote the Culture Experience[11]

Better workplace experiences tap the engagement potential of any company's workforce, whether it is a global corporation or a small growth-oriented business.

Coworking space – putting experience first

We cannot discuss the workplace experience trend without also addressing the concept of coworking. The interesting thing about coworking spaces, is, that it is not only about the physical place, it is much more about establishing a sense of community first.

The benefits of such concepts can already be found outside of the actual office space, and coworking is increasingly seen by many workplace strategists as a disruptor to the traditional corporate real estate market.

The coworking trend started out as membership-based workspaces where diverse groups of freelancers, remote workers, and other independent professionals could work together in a shared, communal setting. However, especially over the last couple of years, this perspective has broadened as coworking now also includes many corporate spaces.

WeWork[12] have been pioneers of coworking spaces for a decade, and they are now increasingly focusing on establishing corporate environments as coworking spaces. They are in fact a proven illustration of how the shift from the experience economy to the transformation economy is working[13].

WeWork's IBM case study is a great example of this process; WeWork helped IBM fuel collaboration and innovation with key clients through establishing an IBM-dedicated coworking space in the United States.

"The combination of a well-designed work environment and a well-curated work experience is a big part of the reason people who cowork demonstrate higher levels of thriving than their counterparts in traditional workplaces."

But what is it that makes coworking spaces so seemingly effective? To find out, Gretchen Spreitzer, Peter Bacevich, and Lyndon Garrett interviewed several coworking space founders and their community managers, and then surveyed several hundred workers from dozens of coworking spaces around the U.S.

The researchers reported in Harvard Business Review[14] that, in general, people who use coworking spaces see their work as meaningful. Aside from the type of work they're doing the people surveyed reported finding meaning in the fact that they could bring their whole selves to work.

The researchers identified three main factors driving this finding:

- First, unlike a traditional office, coworking spaces consist of members who work for a range of different companies, ventures, and projects. Because there is little direct competition or internal politics, they don't feel they have to put on a work persona to fit in. Working amidst people doing different kinds of work can also make one's own work identity stronger.
- Second, meaning may also come from working in a culture where it is the norm to help each other out, and there are many opportunities to do so in a coworking environment.
- Lastly, meaning may also be derived from a more concrete source: the social mission inherent in the Coworking Manifesto[15], an online document signed by members of more than 1,700 working spaces.

There is no doubt that this research proves that the combination of a well-designed work environment and a well-curated work experience is a big part of the reason people

> **Workplace designers need to work with Service Design professionals to bring the workplace to life**

who cowork demonstrate higher levels of thriving than their counterparts in traditional workplaces.

Now the challenge is to make sure the we see coworking as part of an integrated work approach, one that also includes a corporate office, home-working, and working on the fly. Each mode has its own separate profile and purpose, and each has to be considered part of the "new normal" in terms of how and where we work.

Using Service Design to elevate the experience

How can organizations optimise the impact of their workplace experience?

You can spend a lot of money designing the most beautiful and effective reception area in the world, but if the behaviours and attitudes of the receptionists are not up to standard, neither employees nor visitors will have a positive lasting impression.

Thus, workplace designers need to work with Service Design professionals[16] to bring the workplace to life. Only by engaging the service staff will you be able to provide an integrated experience that leverages both the design and the aesthetics of a workplace with the behaviour and service quality of the people working there.

For another thoughtful article about the power and importance of understanding the employee experience, be sure to read David Karpook's "The workplace as an immersive experience" in Work&Place 4, September 2014

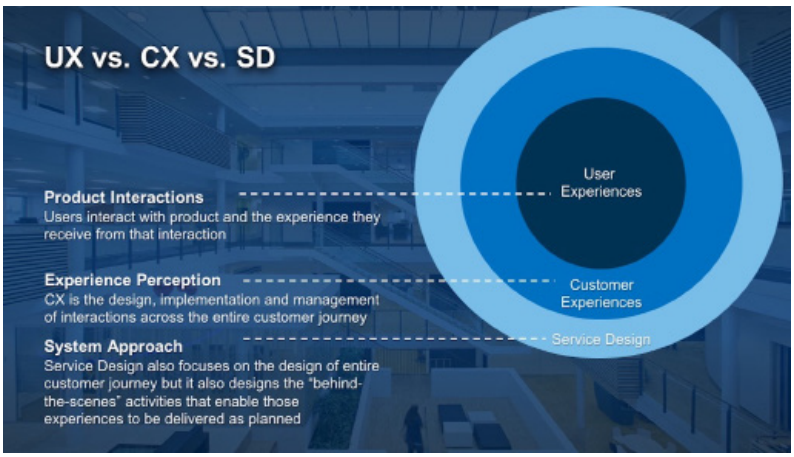
The Service Design discipline calls for capturing in a so-called "journey map" the emotions felt by the end-user at each touchpoint in the work journey. This focus is important because we know that end-users are most likely to remember how brands make them feel over the particulars of a series of service interactions. Design Thinking uses creative strategies to create compelling experiences that customers will remember—and be delighted by.

Service Design Thinking actively involves customers, employees, and stakeholders in the creative aspects of developing service to deal with consistent and seamless experience across channels around the intersection of people, environment, process, policy, procedures, practice and systems[17].

The "front stage" view encompasses all the business does that customers can see, hear, feel, and touch. The backstage view includes things a business does that are invisible to the customer but still critical to enable the experience. When it comes to touchpoints, we need to consider the two-way digital, human, physical, and sensory interactions with the organization.

The key is to design the front stage and back stage from the outside in perspective, to reduce complexity, uncover opportunities, and simplify the organisation. Often this approach generates a case for a cultural change initiative and a change-in-thinking mindset to shape experiences for solid business outcomes.

The Components of Service Design Thinking



User Experience vs. Customer Experience vs. Service Design

> **Developing an ability to stage experiences within the workplace that will bring it to life and provide a better and more holistic experience for employees and for guests, is at the centre of corporate success today**

Service Design Thinking drives results because it recognizes an important view of business success: that the end-user should be at the centre of everything we do.

In some ways, Service Design Thinking isn't simply a framework— it is a culture that nurtures agile decision-making and customer-centric ways of doing business. It is important to combine a strategic focus with a designer focus. Strategy ideally should provide the context while the design process should focus on creating breakthrough experiences going beyond digital[18].

But, let us bring the focus back to the beginning of this article and to our discussion of data versus experiences. Thanks to social and digital technologies and customer behaviour, attitudes and motivations continue to change. As the dialogue evolves, design thinking will only grow in importance in the decades ahead.

Consequently, the need to build empathy for end-users and to understand work (and customer) journeys will become even more crucial. Everyone working with services, from the Chief Technology Officer to user experience designers, must access and use customer intelligence at every step of the process[19].

This focus on engaging end-user occupiers in design is completely consistent with Jan Johnson's insights in this issue and Pinder et al's call for "Early stakeholder engagement in workplace projects," in **Work&Place** 10, August 2018

Engaging directly with the people you are designing for is a necessary step in developing deep empathy and building better products and services for your customers using relevant data-points as the foundation for decision and change **W&P**

Peter Ankerstjerne

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The onus is increasingly on employers to create environments that generate positive workplace experiences and provide workers with the tools to boost wellbeing, engagement, and performance

Jo Sutherland

EVENTS • WORKPLACE DESIGN • PRODUCTIVITY

Designing the workplace to unleash everybody's full potential

In the early eighties marketers Morris Holbrook and Elizabeth Hirschman conducted a study looking into the experiential aspects of consumption, focusing on how the customer experience impacts purchasing decisions**.**

They discovered that an experience occurs on a number of different levels and happens largely without customers being consciously aware of the interactions that are driving their responses.

A decade later, Joseph Pine and James Gilmore, writing in the Harvard Business Review, hypothesised that customers' experiences are defined not just by the product or service they are buying but also their internal responses to every interaction they have with that organisation. More recently, Italian researcher Chiara Gentile , channelling Holbrook and Hirschman, proposed that an experience encompasses the rational, the emotional, the sensory, the spiritual, and the physical.

The 'employee experience' discourse enveloping the workplace world reiterates the industry-wide belief that one's surroundings influence one's behaviour. The dictionary definition of "experience" is "an event or occurrence which leaves an impression on someone."

However, Andrew Mawson, founder of global change management firm Advanced Workplace Associates (AWA), having joined forces with Interserve to analyse over 100 scientific studies into the customer experience and its impact on behaviour in order to draw parallels and apply the learning to the workplace arena, argues that it goes much, much deeper than that.

"Workplace management is about designing and delivering multi-faceted, minute-by-minute, multi-sensory experiences that create an emotional response," says Mawson. "It is about designing workplace experiences in much the same way a retailer would, considering every second to deliver a specific 'mission'. It encompasses thinking about journeys and destinations, the fusion of space, information, services, and how these reflect organisational personality, support human effectiveness, and are attractive to target employees."

Experience matters

AWA and Interserve's most recent report – "Designing and Delivering Effective Workplace Experiences" – argues that experience is not just about the physical workplace and its ability to satisfy the functional needs of the user. It is about the way each and every interaction within that space has a bearing on that employee. In the war for talent, employers must cater to the demands of their workplace consumers or lose out to the competition.

Workplace Week London 2018 , the brainchild of AWA, took over the capital last month to shine a light on the organisations that are putting much more thought into how they create an excellent workplace experience. More than twenty organisations, including ten debutants, opened their doors to the public for the very first time, including some of the world's biggest banking, travel, technology, media, creative. and professional services firms.

"Workplace Week was created in 2011 to showcase how business leaders and their facilities, people services, and workplace teams can champion change in order to improve engagement, productivity, wellbeing, and business performance," says Mawson. "Over the years, the week has explored how organisations are using workplace change as a tool for business transformation by embracing new, modern approaches to work to help people be at their best."

Courtesy of Jellyfish and Workplace Creations

Following twenty-eight 'working workplace' tours conducted as part of Workplace Week, it seems the workplace experience encompasses four key areas: health and wellness, collaboration and connectivity, courageous cultures, and diversity and inclusion.

Tour Highlights

Seven wins

The Crown Estate's head office, located on the first and seventh floors of No 1 St. James's Market, is the first ever WELL platinum-certified building in Europe. Through 102 performance metrics, design strategies, and procedures, the WELL Building Standard (WELL) looks at all components of a building and analyses how these could affect an occupant's health and comfort. It focuses on seven areas: air, water, nourishment, light, fitness, comfort, and mind.

Crown Estate embraces WELL's heptagon. The building promotes optimal indoor air quality; the lighting scheme maximises natural light and minimises disruption to the body's circadian system; there is a safe and clean water supply; the integration of physical components supports an active lifestyle; the design of the space promotes a productive and comfortable environment and optimises cognitive and emotional wellbeing; and, thanks to its partnership with London contact caterer Vacherin, there is an exceptional nourishment programme that encourages healthy eating habits and food culture.

Building bridges

Digital marketing agency Jellyfish has recently expanded to new heights within the UK's tallest building. With UK offices in Reigate and Brighton, the Jellyfish crew can also choose to work on the 22nd and 28th floor of The Shard (the 95-story supertall skyscraper in Central London, the tallest building in the UK).

The Jellyfish employee experience is all about coming together and feeling part of a team. The space itself has been designed as a conduit for creative collaboration. Collaboration zones pepper the space, and a sense of transparency underpins the design. This tone feeds into the organisation's culture as well. The Jellyfish CEO, Rob Pierre, will happily host a meeting in the middle of the workplace, in full view of everyone's ears and eyes – leading by example to ensure the team of creatives always feels comfortable to do the same.

In fact, Jellyfish employees can choose to virtually visit any of the firm's worldwide offices; all that separates the UK team from their colleagues in South Africa, the United States, and Europe is a touch of one of the many screens that line the space. Unlike many organisations that do their best with second-rate tele- and audio-conference systems, here the technical and virtual infrastructures are seamless. People can essentially 'drop in' when and where they choose, timezone permitting, to throw around ideas as they enjoy another city's skyline.

Daring to dream

The Transferwise London headquarters scooped up the silver medal at last year's London Design Awards, and it was named one of GlassDoor's 'Top 10 Coolest Offices' in 2017. The quirky Shoreditch workspace is located in a former tea factory. With 200 employees from thirty different nationalities working in the office, the design aims to inspire energy, creativity, and collaboration.

In addition to a roof terrace, colourful hammocks, and ping pong tables, there's a padded sleep cell and a sauna – a nod to the Estonian heritage of the company's cofounders. These

Courtesy: Transferwise

design attributes go some way towards promoting a culture of courage. People feel like they belong to a community and so are empowered to try new things. This culture perhaps explains why Transferwise is one of Europe's most successful fintech companies.

Be one and belong

Viacom International Media Network UK and Ireland is home to Channel 5, MTV, Nickelodeon, Comedy Central, BET, and fifteen other channels. There are many people at Viacom doing all sorts of jobs – scheduling, transmission, creative, sales, digital, finance, IT, consumer products, social responsibility, and more.

To celebrate the fact that the organisation is made up of all kinds of people from all sorts of backgrounds, the Viacom Talent team champion diversity and inclusion initiatives. Recently, the firm ran a campaign in line with National Inclusion Week. The theme was 'Be You. Belong'. In the spirit of the week, Viacom UK explored its diversity and togetherness by inspiring conversations, engagement with external thought leaders and events around the building.

Summing up

In a world where attracting, retaining, and getting the most from people is vital to the pursuit of gaining a competitive advantage, the experience that employees have in the workplace is a powerful strategic resource. That experience should be something thoughtfully developed and painstakingly designed to align with the business goals and needs of the organisation, claim AWA and Interserve.

Returning to Gentile's hypothesis about the components of an experience, the workplace experience must be built on a series of almost-invisible interactions that encompass the rational, the emotional, the sensory, the spiritual, and the physical. Ultimately, workplace experiences must be carefully crafted and managed with the primary aim of creating a workplace that people genuinely love **W&P**

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As workplace strategists and designers better understand their role as systems designers, deeply engaging and involving users is both powerful and critical

Jan Johnson

ENGAGEMENT • WORKPLACE CHANGE • OFFICE DESIGN

The power of deep engagement

Usually considered a curse, the phrase "May you live in interesting times" is meant to be ironic. Interesting times – like the ones we're in now – are full of change and disruption. Trying to keep up with the pace of technology and its impacts, like way faster business cycles; "passing the baton" from Boomers to Millennials to Gen Z; responding appropriately to the huge interest in wellness and engagement – those are only a few of the challenges organizations are trying to navigate.

> **"A workplace only exists to enable its users to be their most effective as they contribute to their organization's mission and strategies"**

It's not surprising that we long for simpler times when things weren't so interesting, and, in our world, "workplace" success was defined using straightforward metrics like square-foot-per-person or cost-per-seat .

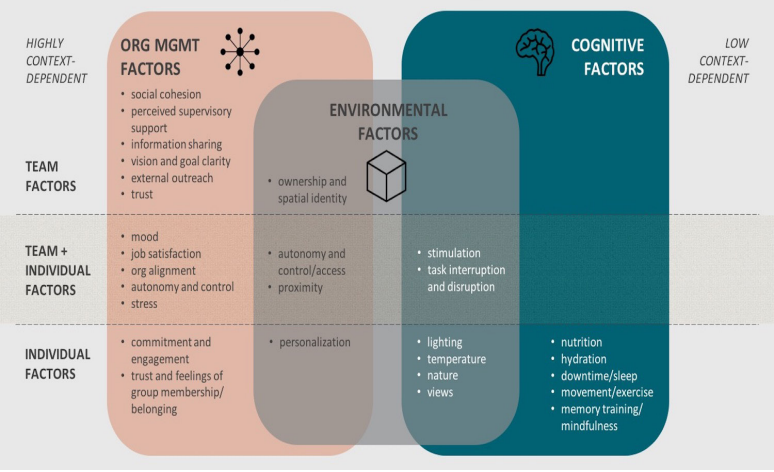
But here we are, and there's no going back.

The way we think about the workplace has changed. No longer a factory for white collar processing tasks, it is now an "ecosystem": a dynamic series of places where work – and socializing, learning, and playing – happens. Where workers' experiences matter. Quite a lot, actually.

So, too, have our measures of workplace success changed – to borrow a phrase from CoreNet's 2020 predictions[1] – "from cost control to value creation." From focusing on effectively and efficiently "managing supply" (space) to "satisfying demand" (what workers need to be effective) in all its new forms: whether that is for amenities in a vibrant neighborhood, for flexible hours, or for support for wellness.

Science has clued us in on what helps people perform at their best[2], and we're starting to build this knowledge into our workplaces in three major categories that correlate to knowledge worker productivity: organizational and management factors, like encouraging teams to develop social cohesion; environmental factors, i.e., promoting group identity or providing great indoor air quality; and cognitive factors, including healthy hydration and nutrition to optimize brain function *(See Figure One: The Science Behind Knowledge Worker Productivity[3])*

The Science Behind Knowledge Worker Productivity



We know, for example, that providing autonomy and control is related to both individual and team performance. Daniel Pink, in his book Drive[4], takes it even one step further, as he describes a compelling study from Cornell:

"…the benefits that autonomy confers on individuals extend to their organizations. [emphasis added]. For example, researchers at Cornell University studied 320 small businesses, half of which granted workers autonomy, the other half relying on top-down direction. The businesses that offered autonomy grew at four times the rate of the control-oriented firms and had one-third the turnover[5]."

Science also tells us that granting teams the ability to "own" their neighborhood and create a spatial identity is "good." The act of doing so builds that all-important social cohesion, and – especially if the team displays their work-in-progress or celebrates their successes – also supports information sharing to others in related teams and reinforces their focus and priorities.

"People get overwhelmed with too many choices, so establishing parameters and setting boundaries is a good thing"

Over the last decade or more, our workplace-making industry has made a sizeable shift towards "activity-based" planning – workspace planning using activities or work processes (vs. status) as the basis for design. This approach results in a range of settings to support the broad range of activities – individual and group – that is now understood as making up a day-in-the-life for most knowledge workers. This and other emerging workplace models emphasize quality user experiences that help them do their best work.

Yet at the same time, our industry appears to have less and less patience for thorough needs analysis or design studies: We sometimes jump straight from cursory test fits to construction documents, rather than investing the time and effort to involve a healthy cross-section of users and delve into how work is happening and what activities make up their most business-critical work processes, and then exploring how best to design the space, allocate resources and encourage supportive behaviors.

This critique of current workplace assessment practices parallels Rob Harris's concerns about the emptiness of much of the formal workplace research today. See his article "Maybe the time has finally come to shoot the messenger?" in this issue

Said another way, and perhaps stating the obvious, if we do help organizations make this shift to "activity-based" workplace planning, doesn't it – by definition – mean we/they need to know much more about the activities that make up work (and socializing, learning, and playing)?

I would argue that this kind of investment provides an equally valuable second benefit – as we bring along those workers, get their best ideas, and demonstrate how what they do is linked to space, resources and behaviors, we are creating both informed consumers and stewards of our workplaces.

And, importantly, we also enable them to self-perform some portion of the upgrades to their space themselves. Their continued engagement in making the workplace work for them only makes it more relevant and adept at meeting their needs and preferences.

This approach also makes financial sense: If we accept the 3-30-300 rule (the average order of magnitude between a company's costs per square foot for utilities @ $3; rent @ $30; and payroll @ $300), focusing on the factors that will make the workers more effective and productive will have a significantly higher payoff than focusing only on space efficiency.

So even though moving at the speed of technology has become a wide-spread expectation, there are huge benefits to organizations to invest in robust needs analysis – analysis Into how work is happening now and what those business-critical processes and activities we have to get right are ; into how we create great user experiences; and into what we need to stop doing, start doing, and keep doing to leverage what we now know about knowledge worker productivity.

The time spent will be well worth it and has a huge added benefit: workers want to participate and be engaged; and involving them will satisfy that desire and give us far better information about what is truly needed.

And no, we're not advocating opening Pandora's box – we don't have to open the flood gates to every whim and wish-list item. People get overwhelmed with too many choices, so establishing parameters and setting boundaries is a good thing. Involvement and participation don't create chaos, nor does the involvement have to drag on for months.

Those readers who know me will very likely have heard the following story already, but for those that have not, I want to share a career-altering event that pushed me to the point of view I am advocating here.

In my first job as a consultant (vs. interior designer), I was assigned to Sun Microsystems to act as a liaison between HOK (my employer) and Sun's Real Estate and Workplace Effectiveness teams. In the early weeks of my sitting at Sun's

Mountain View campus, I was told that Sun had an intranet, enabling any employee of Sun – all 65,000 of them – to go online and order furniture for their office (Sun's primary facilities were 100% one-size-fits-all small private offices at the time).

I have to admit, my first reaction to this discovery was to gasp and express my sheer horror, and say something like "That's awful, please let me fix that." The Sun person then proceeded to double down and explain that "if that's your reaction, you clearly don't get it" and explain that:

- it's only six items – which are already part of the 'kit-of-parts' that make up a standard office layout: a binder bin, bookcase, lateral file, deck chair, guest chair, small table – not the whole world;
- there is a check-and-balance system – at the end of the month, Joe's boss sees what Joe and his colleagues have ordered. If Joe is secretly taking things home and selling them on E-Bay it may take a few weeks to catch on, but we will, and go have a little chat with Joe;
- Sun doesn't believe there are that many Joe's in the world; the company subscribes to a sociological principle called 95/5, which says 95% of the population will do the right thing, while only 5% will game things. Sun did the math – if 5% abuses this privilege, that costs Sun $x; and if they hire the three 'furniture police' they knew I was going to suggest, that would cost 2x. Letting a small percentage of their employee population cheat was cheaper and did not send the message that "You're children and we don't trust you."
- these are low-cost items in the larger scheme of things. If a worker who feels loved and supported spends five more minutes a day in productive discretionary effort, that lateral file pays for itself in about a week.

This mindset rocked my world. I realized I was guilty of being predisposed to distrust. And that I thought my job was to set and defend the rules. Instead I now realized my job as a workplace strategist was to "design the system" (the parameters, the checks and balances, etc.) that enabled people to get what they needed with as little friction as possible.

Fast-forward fifteen years to Facebook's having bought Sun's old Menlo Park Campus and moved thousands of 'hackers' into a number of the campus buildings; and adding vending machines to each floor near the work areas: machines not filled with food or drink, but with computer peripherals.

Any employee can swipe their ID card and "vend" keyboards, laptop batteries and power cords, screen wipes, and other components. Much like Sun's allowing employees to order furniture themselves, Facebook is by-passing the lengthy, often discouraging justification/approval-required process of requesting an item, and instead is trusting its employees to know what they need and not abuse the easy access to such items.

All this variety, choice, and control creates new challenges for designers, planners, and facility managers, not to mention brokers and portfolio managers: how do we define "demand," how do we make sure we have the right "mix" of options (in the right proportions, so space is optimally utilized).

> **"How do we involve and engage the people whose workplace we're designing to have them be co-creators and on-going stewards of their space and its dynamics"**

James Pinder and his colleagues describe a successful workplace design project that addressed this very question in "Early stakeholder engagement in workplace projects" in Work&Place #10, August 2018.

How do we shift our mentality from event-based planning to on-going monitoring and adaptation? And perhaps most importantly, how do we involve and engage the people whose workplace we're designing to have them be co-creators and on-going stewards of their space and its dynamics ?

I believe our industry must emphasize four critical capabilities:

- Understand the new geography of work – given that workers are more mobile and have greater discretion for where they work than ever before; given the unprecendtedly increased importance of virtual communication and virtual "place;" and given the increase in the geographic dispersion of organizations and project teams, we need to better understand how people work in this new geography. What personal styles of working are they now developing or have already developed? How can these styles can be supported through spatial, organizational and technological means?
- Understand the "work" itself – the business of the business at the level of the critical activities in which employees engage. A deeper understanding of work processes – and their requirements for both physical and virtual infrastructure - would allow us to base our workplaces on the activities that make up work: their flow, the resources needed to accomplish them, and

even opportunities to reduce inefficiencies or "waste" in "lean" terms.

- Understand human dynamics and social systems – become students of all that we're now learning about how we assign meaning, make decisions, optimally perform, and use social norms to effectively co-exist.
- Create a new kind of platform for support – one that involves, empowers, and provisions workers as well as workplaces and continues to monitor work activities as well as changes in technology or business strategy to quickly and easily adapt to change.

While the second capability may seem to be the most challenging, I know the third and fourth are more far-reaching and industry changing.

That new kind of platform also requires us to loosen up and evolve from rule setters and gatekeepers to designers of workplace eco-systems that we – and our organization's workers - deliberately adapt over time.

It requires us to shift from an event-based model – where the planning and certainly the design process is complete on move-in and should only be re-visited during a major re-organisation or when a lease expires – to one that expects services to extend well beyond move-in – and way beyond moves, adds and changes.

We echo several of the already-come-true predictions in CoreNet's Corporate Real Estate 2020 series report on Workplace:

- From Facility Management to Work Experience Enabler. CRE's role in major corporations will become highly strategic in support of the business's requirements. Metrics will shift to the support of the business: innovation, knowledge worker, and so on. CRE executives will be "Experience Managers," offering employees an à la carte workplace experience with a menu of services, locations and support.
- From Owned to On-Demand Assets. For many organizations, the need for owned real estate as we know it today will decline, replaced by a model where a combination of assets both within and outside the portfolio are leveraged to meet specific needs. Corporations will increasingly turn to third parties to provide on-demand models of office space and technology to serve the mobile worker and knowledge work as a whole.
- From Workplace Mobility to Presence. Workplace will expand beyond a focus on "mobility" to include the concept of "presence," both physical and virtual. Our focus on the expanding range of places where our employees are "present" and actively accomplishing the various requirements of their work is critical[6].

We have the opportunity to unleash the energy and know-how of our workers. We have the opportunity to move beyond optimally planning and managing space to optimally enabling the business of the business over time. To do so, we have to be willing to leave old models behind and learn how to translate business metrics and work practices into on-demand provisioning strategies . And to continuously improve our processes to do so.

Investing time and effort into robust needs analysis will return huge benefits to the organization and make their workers and their workplaces work even harder for them **W&P**

Jan Johnson

Jan Johnson is vice president of design and workplace resources at Allsteel; she has spent her career strengthening the correlations between business strategies and the planning, design, and management of workplaces. She leads a key element of her company's research, mining science for insights into the effectiveness of work environments. She has contributed to the emerging field of workplace strategy in the United States and abroad through important works in the field's body of knowledge, and by shaping and teaching the field's professional competencies.

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Facing image: BW Workplace Experts

Two important conferences were held recently in San Francisco and Sacramento, California, one on the future of workplaces and one on the future of cities, reports Jim Ware

James Ware PhD

CITIES • WORKPLACE DESIGN • FACILITIES MANAGEMENT

The future of offices and the urban environment

I had the privilege and the pleasure of attending and participating in the Future Offices Summer 2018: conference (FOS18) hosted by IQPC in San Francisco in late August (a delightful time of year in San Francisco, though never as warm as outsiders expect it to be; that's the tail end of our fog season).

The two-day conference brought together several hundred senior facilities and HR professionals who shared a common interest in the future of the office, in workplace design, and in how technology is and will be changing not only the way we work but the way we use space.

The event chairperson was Tracy Hawkins, Global Head of Real Estate & Workplace (REW) for Twitter , which is of course headquartered in San Francisco. Tracy shared a fascinating "inside" story about her personal history and role at Twitter as a change agent, focusing in particular on using workplace design to reflect and reinforce the culture and brand of an organization.

> **"The conference brought together hundreds of senior facilities and HR professionals with a common interest in the future of the office, in workplace design and changing technology"**

At first blush that approach may not seem particularly innovative or unique. However, I was quite taken with Tracy's approach of imagining the "journey" for both employees and visitors as they enter a Twitter building, proceed through the lobby, settle into a work area, and then move around to different spaces like conference rooms, the cafeteria, private "phone booth" spaces, and so on. In fact, that focus on the employee journey, or experience, permeated many of the presentations and much of the informal discussions on the expo floor, at lunch, and over evening libations.

But Tracy went well beyond the concept of a journey to share a very personal story about a Twitter employee who suffered and eventually passed away from a virulent form of cancer. Her name was Lucy Mosley, and while she was struggling with her disease the London Twitter employees all learned to knit so they could create a blanket for her, so she would know how much they loved her and that they were rooting for her.

Lucy felt so much warmth and support from her fellow employees when she received the blanket that she tweeted "keeping cozy with my @TwitterUK blanket #LoveWhereYouWork #Family"[1].

When Lucy passed away, the Twitter UK employees asked Tracy and the REW team to find a way to commemorate her in a positive and uplifting way in the new office they were about to move to. Tracy, who had never met Lucy, decided the best way to get to know her would be to go through her Twitter feed to understand what sort of a person she was, and the tweet ending #LoveWhereYouWork just jumped right out.

The REW team got to work creating a #LoveWhereYouWork neon sign that was proudly displayed in the heart of the office space known as the Commons – where the employees would meet to eat, have company meetings, and host important events. Those in the know knew it was a tribute to Lucy, but they could also own it as a team since it summed up Twitter's culture so well.

Facing image: Microsoft One, Dublin by Gensler

> **No one liked cubicles until they saw open plan**

Since then the hashtag has taken on a life of its own even though Lucy is gone, and now it reflects the heart of Twitter's culture of caring for Twitter employees. Today Twitter offices all over the world, 33 of them in total, proudly display their own individual neon signs, each one designed in a unique style but all with the same message: #LoveWhereYouWork.

I find it encouraging that workplace strategy and design professionals are increasingly paying attention to employees and their experiences at work. If that sounds like an obvious, palm-slapping-face "doh" moment, remember that most of the major professional associations in this space still use words in their names like "facilities," "workplace," "real estate," and "design" as a way to describe their professional focus.

We all pay lip service to the importance of people, and every conference I've attended in recent years has included at least one presenter who reminds everyone that most organizations' salary budgets are ten to thirty times the size of their workplace budgets. I do see more and more emphasis on the impact of workplace and office design on productivity, engagement, and employee retention, but I am still waiting to attend a conference that brings HR and workplace professionals together in one event where they can listen to and learn from each other.

That said, the FOS18 gathering came closer to my ideal vision than any I've attended in the last several years. Several other presentations highlighted the challenges of managing large-scale organizational change and of the power of biophilic design (incorporating plants, water, sunlight, and other natural elements into workplaces). And this conference included many more opportunities than most for conversations among attendees, rather than relying on one "sage on the stage" lecture after another.

I also enjoyed the sessions by senior workplace executives like Paul Battaglia of Clark Nexson, Al Kinisky of SAP, Art Aguilar of Bloomberg, and Jody Brown of Silicon Valley Bank, each of whom shared their lessons learned from many years in the trenches. We heard plenty of success stories, but we also picked up many of the behind-the-scenes dirty little secrets about what it took to produce those successes.

Even more compelling was the opportunity for attendees to make actual visits to several Bay Area corporate headquarters. The entire afternoon of the first day was devoted to on-site visits to the offices of firms like Twitter, Github, Pinterest, and AirBnB.

And, by the way, I want to commend Tracy Hawkins for being a presence throughout the conference. She attended every plenary session and hosted lunch tables each day. So often the leaders of a conference make brief appearances at the beginning and end of the event but are nowhere to be seen otherwise. Tracy was an active participant in all the plenary sessions, often asking questions herself during the Q&A, and often adding her experiences at Twitter to the conversation.

I am one of those people who takes copious notes during conferences, mostly to force myself to listen to the speakers. And now, a few weeks later, as I review those notes, I find several memorable lines that will forever mark the event as an important one in my own learning.

For example, here are two lines from my notes that I find myself quoting almost daily to colleagues and friends, even though I can't remember who first said them:

"No one liked cubicles until they saw open plan."

and:

"Calling a smartphone a 'phone' is like calling a Lexus a cupholder ."

That second one may not have much to do with future offices, but it serves as a reminder that we tend to impose our historical experiences on our current technologies. Sure, a smartphone can make phone calls, but think of all the other things it can also do – and does for you on a daily basis. And if you are like me, you do all those other things with your "phone" far more often than you use it to actually talk to another person.

Remember that the next time you hear someone talking about the "office of the future." Chances are it will be a whole lot more than an office, or not look like one at all – and it may not be in an "office building" either.

The Meeting of the Minds 2018 Summit, California

Several years ago, a group of us who were active in the IFMA Real Estate and Advisory Leadership Community realized that what happens outside and near a corporate facility is just as important as what happens inside the workplace.

That is, where a building is located has a huge impact on the experiences of everyone who travels to and from it, to say nothing of the quality of the workforce that employers can recruit and hire to work there. And the connections an employer builds with local urban planners and city leaders also matters – a

> **If you care at all about the city you live and work in, you owe it to yourself to sign up for the MOTM newsletter and blog**

lot. Because we wanted to learn more about urban planning and development we organized an "FM in the City" session that was held at several IFMA conferences. While it was well-attended and produced great insights, the interest wasn't high enough to keep the sessions going for longer than a couple of years.

Independently, I had the good fortune several years ago of meeting Gordon Feller, who had cut his teeth on sustainable urban planning as the CEO of the Urban Age Institute, a World Bank spin-off. Out of the Urban Age Institute grew "Meeting of the Minds,"[2] a consortium of companies and urban leaders who all care about the future of urban areas (with a particular focus on producing sustainable and affordable transportation options for both local residents and corporate commuters). Gordon also served for many years as the Director of Urban Innovation at Cisco Systems.

Gordon's passion and commitment to sustainable urban areas has helped "Meeting of the Minds" (MOTM) grow into an international movement that promotes leading-edge examples of urban planning.

Among the most prominent examples from the Summit that excited me were ubiquitous sensors that monitor roads, bridges, traffic, lighting, and air quality; smart lighting systems and signage that ensures safety and convenience, urban farming that reduces both food waste and the greenhouse ga sses generated by transporting fresh produce from distant rural areas; green areas that both conserve water and absorb carbon dioxide; and LED-based signs that inform shoppers and walkers of upcoming events, provide real-time weather reports, and offer not only "You are Here" maps but also report on current special events, provide traffic and parking information, and even offer ways to connect with your nearby friends.

The 2018 "Meeting of the Minds" summit was held in late November in Sacramento, California, the state capitol. We were greeted at the opening of the conference by Sacramento Mayor Darrell Steinberg, who demonstrated with his energy and his stories exactly how central a leader's vision of a city's potential is to creating a new future.

Just like any corporate leader, a Mayor's sense of what is possible produces an incredible virtuous circle of self-fulfilling prophecies. Mayor Steinberg's belief in Sacramento was palpable as he described his commitment to public/private partnerships in education, affordable housing, and renewable energy, and his experiences in recruiting both large businesses and entrepreneurs to invest in Sacramento.

I particularly liked these two comments from the Mayor's presentation: "Homelessness must not become hopelessness" and "We must focus on innovation because innovation translates into growth – for the city, for our citizens, and for our economy."

Following that terrific opening to the conference we were treated to a series of engaging panel conversations (rather than formal presentations), a format that made the topics both more compelling and easier to absorb. The panellists, too numerous the mention individually, included a Stanford professor, the youngest U.S. mayor of a city with a population of more than 100,000, several under-thirty CEOs of wildly successful start-ups, and an advocate for urban farming who still lives in the community where she grew up.

We also had an opportunity to visit several local businesses and make on-site observations on what they are doing to make Major Darrell Steinberg's vision come alive.

Over the two days we heard from almost 100 experts and advocates who shared their passions and their accomplishments in creating liveable, sustainable urban communities all over the United States. I am particularly impressed that the "Meeting of the Minds" team was able to pack the two-day agenda so full yet still leave plenty of time for the attendees to meet each other, share their personal experiences, and engage with the presenters both formally and informally. That's a remarkable achievement.

"Meeting of the Minds" is exactly what it claims to be. If you care at all about the city you live and/or work in, you owe it to yourself to sign up for the MOTM newsletter and blog[3], and to plan on attending a future conference **W&P**

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An emerging new urban paradigm has profound implications for players who care about and depend on the design of a city's built infrastructure

Peter Plastrik and John Cleveland

CITIES • SUSTAINABILITY • INNOVATION

Life after carbon: the coming global transformation of cities

A new urban model is emerging worldwide – transforming the way cities design and use physical space, generate economic wealth, consume and dispose of resources, exploit and sustain the natural ecosystems they need, and prepare for the future. This emerging new urban paradigm has profound implications for players who care about and depend on the design of a city's built infrastructure – including architects, engineers, builders, real estate developers, and office building tenants.

The model is upending the pillars on which our modern cities were built. It is most evident in several dozen cities, half of them in the United States, that are widely regarded as leaders in making extraordinary efforts to prevent global warming and protect themselves from climate turbulence.

These pioneering cities—we call them "urban climate innovation laboratories"—are trying, in just a few decades, to eliminate fossil fuels from their immense, complex systems of energy supply, transportation, buildings, and waste management. Just as systematically and rapidly, they are preparing their built infrastructures, ecosystems, economies, and residents to handle the grave impacts of extreme storms, rainfall, heat, drought, and rising seas—conditions already experienced by many cities and projected to get much, much worse.

The city as innovation lab

A city innovation lab isn't a facility with highly controlled conditions, high-tech equipment, and scientists in white coats. The laboratory is the entire city, the complex, real urban world with its messy swarms of businesses, governments, and organizations; urban systems; ideas, interests, and politics; built infrastructure, natural ecosystems, economic sectors; and, of course, all manner of people and groupings.

These city labs exist on every populated continent, but have concentrated mostly in the U.S., Canada, China, western and northern Europe, Australia, and Japan. Most are well-known global cities, including Austin, Berlin, Boston, Copenhagen, London, Minneapolis, New York City, Oslo, Paris, Portland, Rotterdam, San Francisco, Seattle, Shanghai, Singapore, Stockholm, Sydney, Toronto, Vancouver, and Washington, D.C. Some are smaller, high-spirited cities: Boulder, Colorado, and Melbourne, Australia. Several—Cape Town, Mexico City, and Rio de Janeiro—are stepping energetically onto the world climate stage.

These cities are innovating aggressively and radically—by developing and implementing experimental projects, tackling entire urban systems, and reweaving the physical and cultural fabric of the entire city. Their numerous innovations contain a set of profound ideas that are changing the city's wealth, metabolism, ecology, and identity.

These ideas contain the seeds of a new urban paradigm that is reshaping what people think a city can and should become. They introduce new ways for cities to compete successfully in a global 21st-century economy that is shifting to renewable energy. They herald new ways for cities to more efficiently use the vast quantities of energy and materials they need. They announce new ways for cities to value and obtain the benefits their wetlands, forestlands, open space, and other ecosystems provide. They signal new ways for cities to develop the social and physical adaptability needed to anticipate and prepare for uncertain future conditions.

Many of these ideas have been hovering off-stage, even for decades, looking for traction in cities. They were incubated within conceptual frameworks for sustainable development, environmental services, eco-efficiency, urban metabolism, and New Urbanism, or the urban agendas of UN-Habitat and the Club of Rome's Earth Charter, or thought-leader formulations such as the "economy of cities" revealed by Jane Jacobs, the Cradle to Cradle™ principles of designer William McDonough, the "biophilic urbanism" of professor Timothy Beatley, or the Third Industrial Revolution economic vision of Jeremy Rifkin.

Now they are being moved onto the world's urban stage by leading cities responding to the imperatives of climate change. They are spreading to other cities, carried through robust global networks that share information, support innovation adoption, and collaborate on further experimentation. At the same time,

the mounting "climate smart" requirements of consumers, corporations, investors, professions, and state and national levels of government are forming enabling conditions that accelerate and globalize the trajectory of this urban evolution.

Since cities were invented some 6,000 years ago, they have often evolved fundamentally in response to war and conquest, trade and technologies, and earthquakes and other natural disasters , as well as demographic shifts, social reforms, and political revolutions. This time climate change is driving a full-scale evolution.

The new urban model is still in an early stage of emergence. Its elements have not yet been fully defined and assembled into a coherent practice by cities. It has not yet locked in as the comprehensive new way of doing business in cities, and it faces considerable obstacles. The fossil-fuel sector continues strenuous political resistance to sweeping changes and many national and state-level governments have failed to pursue sensible policies. Cities have limited control over many factors needed to implement radical innovations.

Innovation by cities is an age-old phenomenon. The experiments of ancient cities produced profound and enduring innovations: markets, democracy, libraries, bureaucracy, universities, and writing. Cities "have been engines of innovation since Plato and Socrates bickered in an Athenian marketplace," notes urban economist Edward Glaeser. "The streets of Florence gave us the Renaissance, and the streets of Birmingham gave us the Industrial Revolution."[1]

But cities are more than a platform for innovation; they, themselves, are an innovation. Born out of experimentation thousands of years ago, they are a great and sustained invention that reveals, realizes, and refines the collaborative potential of our species.

Why Cities matter more than ever

The City is more important than ever. When the modern city began to develop around 1800, there were few large cities – only about 3 percent of the world's one billion people lived in cities. Just a few cities – London, Beijing, Tokyo (known then as Edo), Baghdad, and Istanbul among them – had ever contained as many as one million residents.[2] In North America, only Philadelphia held more than 40,000 people. When Britain invaded New York City in 1776, its force of 32,000 soldiers outnumbered the city's inhabitants.

Now, though, 3.9 billion people live in cities, more than half the world's population; and millions more arrive every month by birth or migration from rural areas and small towns, in search of economic advancement or personal development. In the United States, about 300 cities each have 100,000 or more residents. Worldwide, more than 500 cities contain at least one million people and there are thirty-one "megacities" with more than ten million people each.[3]

"Whatever a city's age, history, or location, affluence and stage of development, economic niche or governance model, it has developed and manages massive, complex systems"

A single megacity, the Greater Tokyo Area, is home to more people than lived in all cities in the world just four lifetimes ago. From now on, the majority of our future generations' children will be born and raised in cities.[4]

By 2050, the United Nations projects, population growth could add two billion people to cities. Two of every three human beings will dwell in cities.[5]

As we became an urban-dwelling species, we made cities in the same basic modern image. Whatever a city's age, history, or location, affluence and stage of development, economic niche or governance model, it has developed and manages massive, complex systems for buildings, transportation, energy supply, waste, water, and more. And these systems use essentially the same technologies and processes and are professionally managed in much the same way everywhere.

It was no accident that the development and spread of modern cities coincided with the development and spread of the Industrial Revolution and the fossil-fuel economy. Starting in Britain, cities became the places where investors in new coal-burning factories could most profitably organize and obtain the necessary mass labor and consumer markets they needed, as Andreas Malm explains in his award-winning book, *Fossil Capital*[6]. As cities grew into centers of population and economic activity, they also became the locales from which as much as seventy percent of all greenhouse gases (GHGs) are emitted.

Radical Transformation, Not Tweaks

Now, city laboratories around the world are pursuing radical goals for climate change. While climate scientists suggest that it is critical to reduce greenhouse gas emissions (GHG) by at least 80% to avoid a two degrees Celsius temperature increase, many

> **It is only by transforming the performance of citywide systems that a city can become carbon-free and strongly climate-resilient**

of the most ambitious cities are pursuing a goal of total carbon neutrality by 2050.

To do this, they seek to eliminate the use of fossil fuels in the production of electricity, heating and cooling of buildings, and powering of vehicles – replacing it with renewable energy sources. They seek to end the dominance of automobiles and trucks over city streets – replacing it with flows of pedestrians, bicyclists, buses, trams, and light rail that invigorate city life.

They seek to ensure that every new and existing building, from single-family houses to office and apartment towers and industrial facilities, uses only a small fraction of the energy and water that is currently consumed, or produces surplus energy for sale. They want to eliminate the vast amount of solid waste that cities bury in landfills, dump into waterways, or ship to other places – replacing waste management with a "circular economy" that reduces consumption of materials while reusing and recycling nearly everything.

So what innovations might you see in these future cities?

- Cities where the majority of commutes are by walking or biking (Copenhagen); where Bus Rapid Transit is an efficient and cost-effective way to rapidly ramp up public transit (Mexico City); where new office buildings are 40%, 50% or 60% more efficient (Amsterdam, Sydney, Boston); where cars are restricted from large sections of the city (Stockholm); where electric vehicles are already becoming a dominant form of transportation (Oslo), and large investments are being made in electric vehicle (EV) charging infrastructure (Shanghai).
- Cities where 90% or more of waste is diverted from landfills and mandatory organics recycling is producing compost that feeds regional agriculture while sequestering carbon in the soil (San Francisco); where large investments in car-free transportation infrastructure, like new bridges built exclusively for pedestrians, bicyclists, and public transit (Portland).
- Cities where green infrastructure is being systematically re-woven into the urban fabric to reduce temperature extremes (Melbourne and Singapore). and cities that are investing in natural barriers to protect from sea level rise and storm surge (New York).
- Cities where fossil fuel heating is systematically being phased out and replaced with renewable sources (Vancouver); where distributed energy is replacing centralized electricity systems with city support (Boulder); where local residents and businesses are being supported to purchase renewable energy directly instead of relying on their utility (Washington DC); and where entire districts of low-carbon living – housing, workplaces, retail stores, and transport – are being designed and built.

Making this scale of change happen means re-engineering large complex urban systems. As a result, a focus on changing urban systems is a defining feature of innovation lab cities. It is only by transforming the performance of citywide systems that a city can become carbon-free and strongly climate-resilient.

Cities striving for high-impact climate action tend to target what we call delivery and spatial systems. Delivery systems supply a city with energy, transportation, shelter, waste disposal, water, health care, and other essential services – a handful of which produce the bulk of a city's GHG emissions. Spatial systems organize a city physically, the use of land, into individual building sites and blocks of buildings; neighborhoods, shopping, industrial, and other districts, and campuses (usually for universities, hospitals, and corporations); parks, forests, rivers, and other natural features; and networks of streets, roads, sewers, electricity distribution, communications channels, and other physical infrastructure.

These systems have massive through-puts; they involve large sums of money; and they have rigorous performance requirements. As a result, as ambitious as climate innovators may be, they have to be careful when intervening in their city's core systems. They cannot disrupt the performance of these indispensable urban systems too much; breakdowns are not an option.

The systems must meet multiple performance requirements, such as for service availability and reliability, not just climate-related standards. Changing the systems is likely to have impacts on the city's social and economic systems, generating financial gains for some people and new costs for others, which may generate political conflicts.

Emerging transformational ideas

A little more than a century ago, few cities in the world had electricity, cars, or skyscrapers.

When the first central power station went online in New York City in 1882, thanks to inventor Thomas Edison, it lit up 400 light bulbs in nearby buildings, and Edison had no way of measuring the energy supplied or billing his customers. Today, New Yorkers spend $15 billion a year on electricity—to do a lot more than just keep the lights on.

When five European-made cars arrived in Beijing in 1907 for the start of the first "Peking-to-Paris" race, they were the only cars in the city. Local officials didn't want them to be driven in the streets; they were supposed to be pulled by mules. Today, Beijing contains five million cars, which contribute so much exhaust emissions to the city's hazardous air pollution that they are sometimes banned from the roads.

> **Cities are assuming an even greater importance in today's knowledge-driven innovation economy, in which place-based ecosystems are critical to economic growth**

In the early 1900s, few buildings stood more than ten floors high. But the use of reinforced steel frames and other construction techniques produced the skyscrapers that now form signature skylines in most major cities worldwide. Today, Shanghai's stunning 21st-century skyline contains more freestanding buildings above 1,200 feet than any city other than Chicago, where some of the first skyscrapers rose more than a century ago[7].

Modern cities were built on a mix of ideas that began to take hold in the 19th century. These ideas worshipped the use of markets and capital to create massive wealth and meet social needs. They celebrated the role of ever-increasing material consumption in producing personal and societal benefits. They revered the control of the planet's natural systems through science and engineering. And they admired acts of will that sought to shape the future.

Over time, the ideas that formed the modern city turned into a global juggernaut. As we became an urban-dwelling species, we made cities worldwide in the same basic modern image with the same modern systems. The similarity of modern cities is pervasive, observes Wade Graham, a Los Angeles-based writer on urbanism:

These days, local variation is hard to spot. In the modern era (since about 1850 in Western Europe and America and now everywhere), cities look more alike than they do different, from Singapore to Ulan Bator to Boston to Moscow to Buenos Aires. Aside from those parts of them built before the modern era—the odd churches, squares, and low-rise historic districts—there is a remarkable, global urban monotony: here are tower blocks, there freeways, there shopping malls, over there pseudo-historic suburbs, here a formally ordered civic center, beyond that, mile after mile of car-dependent sprawl.[8]

While in some cases the modern city design was imposed through colonial force, for the most part the modern cities arose because the new ideas we've described became a widespread way of thinking that urban leaders – elected and appointed government officials, entrepreneurs and business owners, architects, engineers, and other professionals, consumers, and civic activists – found extremely appealing and used to make decisions. These decisions changed city space and, in turn, reshaped cities' economic, social, and environmental fundamentals.

Today cities that are aggressively following a climate-innovation pathway are abandoning the very ideas that made them modern and got them this far. They are turning to a set of new ideas – four transformational ideas that are embedded within the hundreds of climate innovations emerging in lab cities and spreading from city to city. These are not just ideas that cities should be using; they are in play in the cities responding most ambitiously to the imperatives of climate change. These ideas are gaining traction in markets, professions, and with consumers and national and state levels of government, an essential development for supporting and accelerating change by cities.

We frame these transformative ideas as new roles and capacities of cities for the climate-change era.

1. Cities can employ their advantages to turn the emerging renewable energy economy into urban wealth and jobs

Modern economic ideas have treated cities mostly as an afterthought: companies, markets, and nations were the drivers of economic growth, and cities were supposed to facilitate companies' efforts by holding down local costs and providing the infrastructure needed for commerce.

More recent thinking, however, recognizes that the city is a primary driver of economic innovation and growth. Cities "are assuming an even greater importance in today's knowledge-driven innovation economy, in which place-based ecosystems are critical to economic growth," explains urban studies professor Richard Florida. "Cities are the key economic and social organizing units of the Creative Age."[9]

The primary reason that cities pursue carbon-free energy systems is to address the problem of excessive GHG emissions, but the many innovations they use – offshore wind turbines, on-site solar installations, and more – provide more than clean energy at competitive prices. They also provide local and regional economies with transformational economic opportunities. Cities are developing local clusters of "clean economy" businesses that sell products and services worldwide. They are localizing the production, storage, distribution, and management of renewable energy production, in a shift that creates jobs.

As technology changes the structure of work, the economic development paradigm is getting stood on its head. Instead of talent migrating to where the employers decide to locate, companies are migrating to where the talent wants to live. In this context, city innovation labs are becoming increasingly appealing to young, talented entrepreneurs and employees attracted to carbon-free urban life styles , which in turn attracts employers looking for this talent. This virtuous cycle of wealth creation gives climate innovation cities an enormous leg up in the global economy.

2. Cities can efficiently use energy, materials, resources and space to generate a new kind of urban abundance.

In the modern-city era, economic ideas about abundance drove vast increases in material consumption and shaped

> **We imagine our cities reducing the things we don't want, increasing the things we do, and letting our children lead us into this future**

worldwide expectations about rising standards of living and social progress. Pursuit of this type of abundance brought on improved living conditions for many; but in the process, it sacrificed environmental and human health and other non-economic values, promoted short-term growth at the expense of long-term sustainability, and yielded pervasive economic disparities that hobble social wellbeing and individual development.

Now cities pursue greater efficiency in their core systems, especially energy for buildings and transport, and seek to eliminate all waste, which reduces GHG emissions and increases climate resilience. In the process, they are redefining abundance to embody long-term sustainability of resources, a comprehensive set of non-economic values, and a wider base of participants sharing in the bounty. "It's a world of sharing and abundance," declares world-renowned architect and product designer William McDonough. "We imagine our cities reducing the things we don't want, increasing the things we do want, and letting our children lead us into this future."

3. Cities can restore and tap the power of natural systems to enhance and protect urban life.

The huge expansion of built urban space in the 18th and 19th centuries embodied the idea that a city's physical, economic, and social needs were to be met by dominating natural systems near and far – sweeping away, reengineering, or overriding them. "Man's dominion," boosted in philosophies that promoted human agency, was facilitated by emerging engineering and scientific prowess. As a result, observes biologist Edward O. Wilson, an early conceptualizer of biodiversity, "Humanity has destroyed a large part of the natural world and withdrawn from the remainder. We have also expelled it needlessly from our daily lives."

Cities that once turned their backs on nature are now turning back to nature to provide environmental, social, health, and economic benefits, as well as reduced GHG emissions and greater resilience to climate impacts. Their "re-naturing" innovations – use of living infrastructure, stewardship of ecosystems and biodiversity, and provision of "biophilic" immersion in nature – invert the modern idea-hierarchy by restoring nature, instead of the city, as the dominant context for urban development.[10]

4. Cities can cultivate the capacity of inhabitants and systems to adapt successfully to future new requirements.

As modern societies developed, they embraced the idea that people could create the future they desired by planning for it, instead of waiting to see what nature's cycles, divinity, or fate imposed upon them. Planning practices emerged as a way of actively constructing the future – to discern the possibilities, assess potential benefits and risks, and decide what to achieve. In cities, planning took on the role of articulating the public interest in determining a collective future.

However, given the global unfolding of climate change and destabilizing social and economic forces, the future seems less knowable and controllable, more uncertain and riskier. "The ideal of progress and a blind faith in social control no longer guide our collective futures," observes professor of environmental planning David Connell. The uncertainties of climate change, notes professor of urban planning Yosef Jabareen, "challenge the concepts, procedures, and scope of conventional approaches to planning."

Urban planning has begun to emphasize preparing for and adapting to unpredictable change and minimizing risks. Cities are investing in the capacity of residents and civic leaders to understand, deliberate about, and collectively determine responses to complex, changing problems. They are designing the physical infrastructure and service capacities of urban systems so they can be readily adapted as climactic conditions change and technological advances emerge.

A new urban future?

The potential urban transformation we describe has decades to go before it can become the new normal. Climate change is not the only driver of urban disruption and innovation, but it has several momentous characteristics. Its threat is planetary; every city must pay attention, and the sooner the better.

Its causes and effects are comprehensive and systemic; nearly every core urban system's performance and viability is at stake. It impacts the private, public, professional, and nonprofit sectors, as well as the individual, family, neighborhood, city, metropolitan region, state, nation, and international levels.

The ideas that serve this revolutionary purpose can be woven together into a new model for the development of cities, as innovation lab cities are doing at district, system, and citywide scales. Economic innovation based on renewable energy is compatible with zero waste and circularity; these are compatible with realizing nature's full benefits; and all are compatible with developing a city's capacities to adapt in the future .

Because of climate change cities around the world will be different at the end of the 21st century. Whether they will be prosperous, healthy, and safe, better places for everyone to live in, remains to be seen. There's no guarantee that a climate-driven transformation will occur fully in all cities or many cities or even just a few cities.

But a possible future city, a radically different city than the modern one we know, is coming into view. It is emerging in cities all around us, in the cities that have decided to turn the climate disaster into an opportunity, cities that are making the urban future now **W&P**

If you have any doubt that cities and urban planning represent an important context for facilities professionals and other infrastructure executives, take a look at Erik Jaspers' article in Work&Place #02, "The emerging role of the city as a workplace for everyone"

Melbourne, Pixabay

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An important new workplace conference held in Tampere, Finland, last year emphasised the multi- and transdisciplinary thinking at the heart of the modern workplace

Nigel Oseland

WORKPLACE • FUTURE OFFICE • CROSS-FUNCTIONAL

The transdisciplinary focus of modern workplace thinking

I was fortunate to present the closing keynote address at the first Transdisciplinary Workplace Research conference (#TWR18) held recently in Tampere, Finland.

Around fifty researchers, mostly academics with a few practitioners, gathered to discuss their latest workplace research on topics such as wellbeing, productivity, change management, agile working, co-working, and similar themes.

I can honestly say that TWR18 was the first academic conference I've been to where every paper was relevant and interesting.

> **"My particular favourite emerging transdisciplinary field is that of biomimicry – studying nature's best ideas and imitating them in designs and processes to solve human problems"**

It was great to see the academic perspective of my favourite topics and, unlike many conference presentations, the papers were grounded in solid research with evidence-based and people-centred findings and recommendations.

The organisers of TWR18 have created a great community of like-minded people and I felt very much that I belonged to that community.

So, what exactly is transdisciplinary research (or a transdisciplinary project), and how does it differ from multidisciplinary and interdisciplinary research? From what I gathered there are three key elements to transdisciplinary research:

- It is a collaboration between the disciplines with the sharing and application of tools, skills, approaches and philosophies of the different disciplines;
- The research and/or project is organised and coordinated under a real-world theme or problem (e.g. workplace wellbeing) that benefits from being addressed by multiple disciplines; and
- The research/project includes input from stakeholders outside of the academic disciplines, for example sponsors, practitioners, planners and policy makers; this input helps prevent groupthink.

TWR18 ticked all the above boxes, but I would have liked to have seen more practitioners present. I also made the point that the researchers must publish in the trade journals as well as the peer-reviewed academic ones that I suspect most practitioners do not even see, never mind read.

As a psychologist, I feel that it is only over the last few years that we have been considered to have a relevant part to play in workplace design. When I worked in architecture in the early 2000s, I was often asked why an architectural practice needed to employ a psychologist[1]. As an environmental psychologist, I have mostly felt interdisciplinary but falling between and outside of the disciplines rather than at the intersection.

With the wellness and wellbeing agenda in full flow, there is more need than ever for a transdisciplinary approach to

Courtesy of https://visittampere.fi

workplace, including architects, engineers, psychologists, biochemists, biologists, and other professions such as health practitioners.

My favourite emerging transdisciplinary field is that of biomimicry – studying nature's best ideas and imitating them in designs and processes to solve human problems. Engineers, biologists and biochemists are working together. For example, the structure of sharkskin has been applied to performance yachts to improve streamlining, and one university is looking at how spiders' silk can be replicated in engineering, as it is super strong and produced with minimal energy and waste.

I've been wondering how to apply biomimicry learnings to the workplace, which I consider a biological system. See, for example, my blog "Beware the workplace parasites" .

I finished my keynote presentation by applauding the conference organisers (Rianne Appel-Meulenbroek and Suvi Nenonen) and suggesting they not only invite more practitioners but also the views of specialists from less-obvious disciplines like philosophers and mathematicians to name but two. But most importantly I urged them to continue to build a diverse TWR community **W&P**

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Dr. Nigel Oseland is a workplace strategist, change manager, environmental psychologist, researcher, international speaker and published author with eleven years research and nineteen years consulting experience. Nigel is also an active researcher, speaker, lecturer and author. He specialises in strategic briefing and change management to help create workplaces that improve collaboration, enhance creativity, facilitate concentration, meet psychological needs, and respond to changing organisational structures. His current topics of interest include psychological needs, psychophysics, productivity, personality factors, remote working, collaboration, creativity, wellbeing, biophilic design, and post-occupancy evaluation. Nigel founded the Workplace Change Organisation and is the programme advisor for the biannual Workplace Trends conferences.

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A new book is timely following a dire warning that the climate is worsening faster than previously thought, which could lead to major effects by 2040

Nancy Sanquist

CITIES • SUSTAINABILITY • INNOVATION

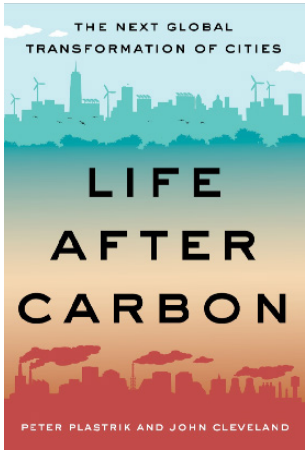
Stories of place in the Fourth Industrial Revolution

It comes as no surprise that Google conducts experiments all over the world in its researchtand development offices, but to hear that it is experimenting with an abandoned twelve-acre neighborhood in Toronto – now that is unexpected.

This urban planning venture, "Sidewalk Toronto," is being designed by Sidewalk Labs, a peer company with Google under the Alphabet umbrella. In a response to a proposal issued by Waterfront Toronto to redevelop what was known as the Quayside property, Sidewalk Labs won the rights to be an innovation and funding partner with the Urban Development Corporation, and then committed $50 million to the project.

They agreed to create an eco-friendly, smart neighborhood that could be a showcase for Sidewalk Labs' innovative technologies and new urban concepts.

An interesting motivation behind Sidewalk Toronto was also the concept of involving academia and the public in the creation of this mixed-use urban experiment. An "Urban Innovation Institute" was planned to be a quasi-academic institution, which would be a place for collaboration and testing of ideas for urban regeneration. In addition, there were concepts for public participation in discussions, temporary pop-up experiments, and design jams along with embedded sensors, which would control building environments, traffic lights, and everything needed to support ambient sensing in the neighborhood. And, more importantly, the development would be a carbon-negative energy revitalization project.



A new revolution transforming everything as we know it

We are at the beginning of new era called the "Fourth Industrial Revolution," as introduced in 2015 by the leader of the World Economic Forum, Klaus Schwab. Driven by twelve new innovative technologies, this revolution will mean a fundamental change in the global economy, society, and, certainly, how we plan for, design, construct, operate, and manage places.

Smart cities are very much part of the blending of these new technologies with urban design and management, and they signify a new type of work in the Fourth Industrial Revolution. This new type of work requires the kind of collaboration between public entities and private enterprises like what is happening in Toronto – a collaboration that "helps defray costs, solve pressing problems, and increase benefits for government, citizens and industries."[1]

The story of Sidewalk Toronto represents a new form of experimentation going on in urban environments around the world; it is thoroughly explored in Life After Carbon, the new book by John Cleveland and Peter Plastrik .

This book gives us hope by identifying twenty-four cities in the world (nine in the US, seven in Europe, two in Australia and Canada, and one city each in Asia, South Africa, and South and Central America) that are called Urban Climate Innovation Labs (UCIL) and are tackling climate change head-on. Now Google, one of the largest technology companies in the world, has become an urban planner and developer in this new transformation of cities in the Fourth Industrial Revolution.

The concept: The Urban Climate Innovation Lab defined

It is the urban climate change experimentation that attracted authors John Cleveland and Peter Plastrik to Toronto and its UCIL as a core theme for the book. The authors describe the UCILs as:

"…cities that have come to understand themselves, their place in the world, in a new way and act boldly on their changed awareness. They take to heart the challenge of climate change.

They publicly commit to do more about it than many national governments have pledged.

They immerse themselves in figuring out what they can do. And they start doing it, despite the many technical, political, economic and social difficulties involved."[2]

The authors describe how these forward-thinking cities are redefining every aspect of the "city." This redefinition includes buildings, streets, and neighborhoods (like Sidewalk Labs), as well as the entire infrastructure of a city that is comprised of the supply and demand of water, energy, transportation, natural elements, and waste disposal.

The authors are also trying to change the way the public thinks and behaves in cities and how the outside world identifies with a city's brand. And urban residents cannot do it without a top-down belief in what they are doing, which requires each city's mayor's leadership.

It is no surprise that Dan Doctoroff is CEO of Sidewalk Labs. He served under the change-leader Michael Bloomberg, when Bloomberg was mayor of New York City, as deputy mayor for economic development, which included a large environmental and economic plan, PlaNYC and the first truly digitized neighborhood in the world, Hudson Yards.

It is not only mayors who have a big role to play in the design of these innovative responses to climate change, but a huge cast of characters including:

- the leaders of local governments, civic institutions, business and academic institutions;
- the professional classes of people like city planners, architects, engineers, real estate developers, government and corporate managers, financiers, environmental and social-change advocates, community organizers, philanthropists, and university researchers and scholars; and
- a supportive public who support the efforts of the UCILs.

All of these "characters" value the sense of place their cities give them to work, play, live, and consume resources. They realize they need to take action sooner rather than later in the fight to be as resilient as possible in the unpredictable moves of a climate that is changing their environments right before their eyes. Many residents have already experienced the effects of climate change in their cities, like Hurricane Sandy in New York, Cape Town's lack of water, and Boston's changing winter climate that is affecting the roads, infrastructure, and downtown transportation systems.

"The decisions we all make about place (in this case, cities, neighborhoods, and buildings) are even more important today in our digitized world on a very fragile planet"

The scale of UCILs: cities, districts and buildings

Almost 20 years ago, Martha O'Mara's book, *Strategy and Place*[3], revealed that the centrality, physicality and competitive advantage of place (land, buildings and technology) were linked to the strategy of an organization. For those readers who know of O'Mara's ideas, this book is a great sequel to her work, emphasizing that the decisions we all make about place (in this case, cities, neighborhoods, and buildings) are even more important today in our digitized world on a very fragile planet. The following are some of the book's enlightening stories about place in 2018:

Story 1. Carbon-free Advantage of New York City

When the vast scale of a major city is treated as a UCIL, it is a major project where there are more buildings than people.

In New York City there are 8.5 million residents and 600,000 commuters pouring into the city each work week. All of these buildings together produce 70% of New York City's GHG emissions – mostly coming from fossil fuels and natural gas. In 2014, Mayor de Blasio committed to a program entitled "One City Built to Last," which centered around a bold commitment to reduce those emissions – in the short term by 30% (2025) and in the long term by 80% (2050).

What is key to workplace professionals is that the program will be a requirement for buildings in cities like NYC to create or renovate buildings into high-performance places in terms of both design and management. It will also require a behavior modification where both workers and residents must consume fewer resources and less energy, and modify their water usage, besides deploying new technologies in their buildings. And Facility Managers will require upskilling in these new technologies to achieve the aim to reduce energy usage by 40-60%.

The developer who created the world's greenest and smartest office building in Amsterdam, The Edge, has his eyes set on the New York City market. Coen van Oostrom, the CEO of OVG Real Estate, has said, "…when it comes to sustainability or technology, [the US is] behind what is happening in Europe at the moment. And, that gives us a fighting chance."[4]

> **"Building professionals, real estate markets and potential driving forces of urban change are themselves in an early state of a long-term innovation and transition"**

Story 2. Renaturing Melbourne

If you live in Melbourne, Australia, and you have a problem with the way the city is pruning a city tree in front of your house, you can send an email to #1024658, the ID number of that particular tree, to complain about its treatment. In this city, all of the 77,000 publicly-owned trees have an ID number; they are visualized on Melbourne's digital urban forest map and monitored by the city government's own ten-person team of foresters, ecologists, and arbor culturists.

This is one example of how a city responded to a twelve-year drought by removing trees and reducing irrigation of public greenery. However, years later, a city urban sustainability manager reversed that response by working with nature, not against it. An urban forest was created; it was designed to cool the streets, reduce the flow of storm water, and provide nutrients, as well as reducing air pollution and GHG emissions.

Story 3. Efficient abundance of a district of Austin

In Austin, Texas, the Mueller district is 700 acres of mixed development involving 13,000 workers and an equal number of residents. This area is located in an abandoned airport three miles from the city.

There is a three-story R&D building that monitors the performance of the rooftop solar panels, electric vehicles, and residential microgrids in this neighborhood lab.

Many of the stories in the book, like this one, are about neighborhoods that are often located in blighted areas and have been redesigned using the UCIL approaches to reduce the consumption of energy, water, and other resources to save money and materials, reduce waste, and embrace recycling , as well as other initiatives to rezone and rethink the compactness and mixed-use design of urban neighborhoods.

Story 4. Adaptive Future of Smartest Greenest Buildings

This summer, when I was traveling to my company's headquarters by train from Schiphol Airport to Nijmegen in the Netherlands, I spotted an asymmetrical-shaped building out the window and recognized what has been called the smartest and greenest building in the world, The Edge.

Now, after reading Life After Carbon, I realize it is an Urban Climate Innovation Lab. The developer and architectural firm that designed it experimented with the most innovative technologies to create a system of systems for a smart, efficient, and sustainable building on steroids, including;

- the orientation of the building is based on the sun's movement throughout the day;
- 65,000 solar panels, which allows the structure to produce more energy than it requires;
- Collectors on the roof for rainwater reducing waste of resources; and

- Low-emission LED lighting with sensors to reduce energy costs by 100,000 euros.

The developer of The Edge also used similar concepts and technology to redesign the Unilever American headquarters in the United States, in Englewood Cliffs, New Jersey – an initiative that proves you can create the same benefits in an existing, remodeled building in terms of environmental sustainability (LEED Platinum) and wellbeing for the employees (WELL certifications) to increase productivity and health.

The conclusion: alignment with SDGs

As a former urban planning student, historic preservationist, and ex-Chair of a small Southern California planning commission, I believe Cleveland and Plastrik's book is a powerful guide for people interested in innovations in cities around the world that also meet the goals of sustainable development . By this recommendation I am referring to the UN Sustainable Development Goals (SDGs), which are rapidly being embraced by cities all over the world, as well as universities (Higher Education Sustainable Initiative (HESI)), and many of the major institutions, industries, non-profits, and corporations.[5]

There are seventeen stated goals that make up the UN's SDGs – and the activities and innovations that the UCILs are doing (which are chronicled in this book) are aligned with more than half of these goals, including:

- Goal #3: Good health and well-being
- Goal #6: Access to water and sanitation for all
- Goal #7: Affordable and clean energy
- Goal #9: Industry, innovation and infrastructure
- Goal #11: Sustainable cities and communities
- Goal #12: Responsible consumption and production
- Goal #13: Climate action
- Goal #17: Partnership for the goals

Life After Carbon should be required reading for anyone who cares about the city where they live and/or spend most of their adult years working in , like the readers of Work&Place. Cleveland and Plastrik define their audience well: "For now, though, building professionals, real estate markets and potential driving forces of urban change are themselves in an early state of a long-term innovation transition."[6]

And for all of us, as facility, real estate, and workplace professionals, we have to make sure that transition happens, for the sake of ourselves and future generations – so there is, indeed, life after carbon **W&P**

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In today's dynamic digital economy, employees must upgrade their skills on a continuous basis. Two new kinds of workplaces – maker spaces and fablabs – create innovative learning environments

Anthony Brown

When workplace disruption is indistinguishable from magic

In a 1973 essay called "Hazards of Prophecy: The Failure of Imagination**",** the science fiction writer Arthur C Clarke sets out Three Laws regarding our relationship with technology. Only the third of these is well remembered these days:

Any sufficiently advanced technology is indistinguishable from magic.[1]

He was one of the first writers to coin the sort of law that has now become commonplace on the subject of the way our world can be disrupted by technological developments. Those laws now include a corollary to Clarke's:

Any technology distinguishable from magic is insufficiently advanced (Gehm's Law)

and an adage now almost as well known:

We tend to overestimate the effect of a technology in the short run and underestimate the effect in the long run (Amara's Law)

What these examples share in common is an implicit understanding that the world is apt to change in completely unexpected ways as a result of disruptive technological developments. They also share the assumption that we are very bad at predicting what the future holds and that we tend to confuse disruption with innovation.

When we make these errors, we can fall into the trap of thinking that the future will be primarily or even entirely an evolution of the present. In reality, genuinely disruptive developments take us in new directions and have unpredictable consequences.

Fortunately, if we understand this unpredictability and the true nature of disruption we can make ourselves ready for it. Nowhere is this understanding more important than in our working lives and the built environment. While technology can change very quickly, our skills, company cultures, and surroundings are not quite so volatile. So we must make them malleable.

That has been the core challenge for workplace designers and managers for at least the past three decades, and their ability to meet it grows more important by the day. This article sets out the nature of this challenge and explores how we are meeting it.

What disruption really means

Many people like to talk about disruption, but few of them seem to know what it really means or are perhaps deliberately misusing the term. It is most often confused with innovation and improvement. Better, cheaper, smaller, faster products are not disruptive. Nor are most new ones.

In his classic book *The Innovator's Dilemma*[2], Clay Christensen draws a distinction between a low-end disruption, which might involve the development of a pre-existing solution, and a genuine disruption that creates a new market and so is very difficult for incumbents to serve. The title of the book derives from the dilemma this insight creates for suppliers and service providers.

Incumbents typically ignore or downplay the disruption because they cannot see it for what it is, or it does not serve their commercial interests, or they cannot (or will not) follow its lead. The long-term consequences can be fatal.

This combination of speciation and extinction events is the core characteristic of disruption. And it is not just suppliers and service providers who can fall into this trap of failing to distinguish between an innovation and a disruption. We are all prone to do it, especially when we come to believe that we are where we are because it is where we are meant to be.

The dangers in this mindset for both organisations and individuals was once summarised in a fable by the author Douglas Adams:

Imagine a puddle waking up one morning and thinking, 'This is an interesting world I find myself in — an interesting hole I find myself in — fits me rather neatly, doesn't it? In fact it fits me

“Disruption is not the warming of the water in which we sit, but the rays that evaporate it. History is littered with examples of what happens when we ignore this truth. Whole civilisations have fallen for not recognising it or responding too slowly”

staggeringly well, may have been made to have me in it!' This is such a powerful idea that as the sun rises in the sky and the air heats up and as, gradually, the puddle gets smaller and smaller, it's still frantically hanging on to the notion that everything's going to be alright, because this world was meant to have him in it, was built to have him in it; so the moment he disappears catches him rather by surprise. I think this may be something we need to be on the watch out for.[3]

Disruption is not the warming of the water in which we sit, but the rays that evaporate it. History is littered with examples of what happens when we ignore this truth. Whole civilisations have fallen for not recognising it or responding too slowly.

Firms are now particularly prone to the consequences of disruption. The disruptive force of technology is killing off older companies earlier and at a much faster rate than decades ago, squeezing employees, investors, and other stakeholders, according to a recent report from Credit Suisse. It found that the average age of a company listed on the S&P 500 has fallen from almost sixty years old in the 1950s to less than twenty years currently.

The creation of a new consensus

It is not just the firms subject to disruption that can fall foul of its creative destruction. Pioneers can sometimes be identified by the arrows in their backs.

One of the most famous examples of this danger is the story of Hungarian physician Ignaz Semmelweis. While working at a Viennese Obstetric Clinic in the mid 1840s, he noticed that mothers were far less likely to succumb to potentially fatal infections when the medical staff treating them washed their hands.

He found that hand washing reduced mortality rates from around 10 percent to as little as 1 percent. Although his findings predated the germ theory of disease, which left him without a causal explanation, in 1847 he published a book in which he proposed that the link was so evident that in the future staff should always wash their hands in chlorinated lime before treating patients.

In spite of the evidence, the medical profession reacted with dismay and completely rejected the idea, not least because Semmelweis couldn't explain the link between hygiene and infection. His critics remained wedded to the idea that there were many reasons why people could become infected and that cleanliness could not be the primary or sole cause, even in those cases where staff were treating mothers immediately after performing an autopsy.

Semmelweis was removed from his post and driven out from Vienna, eventually dying at the age of just 47 from septicaemia. Vindication only came years later when Louis Pasteur published his work on the germ theory of disease, which at last explained why personal hygiene was so important for medical staff.

The story is now often cited as an example of what can happen when people are presented with unacceptable ideas, especially when those ideas challenge their core beliefs. Change comes in time, but sometimes at a cost for the disruptors as well as those being disrupted.

Implications for the workplace

When it comes to work, a deterministic fallacy was exposed by Charles Handy in his book The Age of Unreason[4], first published in 1989. In it he talks about the need to adapt to a world of discontinuous change in which businesses reshape themselves into what he called 'Shamrock Organisations' with three parts containing (1) a core of well-qualified technicians and professionals, (2) a contractual fringe of individuals and other organisations, and (3) a flexible, itinerant labour force. For

Left to right: the Church of San Nicolò; the Larkin Building; Ant Chair by Arne Jacobsen; Central Beheer, Apeldoorn

many people, Handy suggested, careers would be replaced by 'portfolio work' and they would work twice as hard for half the money.

If this insight seems incredibly prescient, then that's because it was. Handy was way ahead of the curve.

The consequences of clinging to the idea that we are not subject to the forces of disruption came in the central metaphor used in Handy's book. He tells the fable of a frog placed in a saucepan of cool water that is then slowly heated. The frog sits there in blissful ignorance, quite comfortable in its surroundings and not noticing how incrementally but radically its environment is changing, until it is too late, and the frog is boiled to death.

At the core of this story and Douglas Adam's fable of the puddle is the protagonists' assumption that they understand their environment and their place within it.

Sometimes, even if we are told something directly, we may not act on it if it does not fit with one of our core beliefs. So, if we told the frog it was at risk of being boiled to death because the water in which it was sitting was on a hob , the frog might decide to stay put because water is its natural environment and it doesn't understand what a hob is.

This easy rejection of inconvenient ideas as heretical, until there is no choice but to accept them, is often described using the idea of "The Overton Window".[5] Originally a political theory describing the range of policies that the voting public considers acceptable at any point in time, the idea is now more widely used to describe how former heresies are accommodated into mainstream thinking over a period of time and in response to changing events.

We can see this process at play in the world of work right now. Although many commentators like to talk of the evolution of work and workplaces, we should know that we are in a period of discontinuous change, in Handy's terms. Crucially, the present and the future are not merely extensions of the past.

A history of disruption in the workplace

Pre 20th Century

Office work has existed in some form ever since people started writing on tablets and papyrus. Depictions of clerical staff are common in the Bible and on the walls of pyramids. In the mid 14th Century the Church of San Nicolò commissioned the artist Tomaso da Modena to create the fresco in the chapter room of the church depicting forty monks of the order hard at it at their desks. The word 'office' itself derives from the famous Uffizi Gallery in Florence, created in 1560.

Things picked up after the Industrial Revolution, as is evident from the work of Charles Dickens, amongst others, and it is worth noting that the first swivel chairs for clerical work were developed by the likes of Thomas Jefferson, Albert Stoll, and Peter Ten Eyck .

Early 20th Century

The first widely recognised example of a modern office was the 1904 Larkin Building designed by Frank Lloyd Wright[6]. Shortly afterwards, Frederick Taylor introduced his theory of scientific management that applies industrial principles of the division of labour and time and motion to office activities.

In its wake, the firms like Steelcase and Herman Miller were founded to create products for the new forms of workplace. In 1939 Frank Lloyd Wright completed his work on the Johnson Wax building, including The Great Workroom[7], an early form of open plan, and all the furniture within. That effort is still truly breath-taking.

In the 1920s and later in Europe the development of new materials such as tubular steel, combined with the rise of the Modernist movements and its figureheads such as Mies van der Rohe, transformed the world of architecture and design.

In their wake and on the other side of the Atlantic, designers like Eero Saarinen and Charles and Ray Eames designed genuinely iconic products that endure to this day.

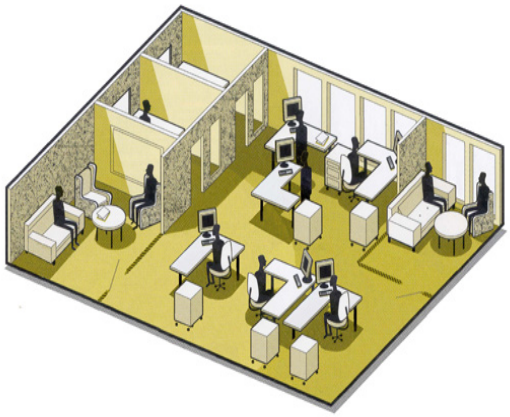
Mid 20th Century

While the Eames continued to create ground-breaking designs in a range of new materials, George Nelson introduced the first L-shaped workstation in 1947.

In Europe in the early 1950s a new conception of the open plan office was forming around the idea of Bürolandschaft[8]. In contrast to the open plan bullpens that were now common in the United States, the brothers Wolfgang and Eberhard Schnelle developed the concept based on a rejection of scientific management and a new focus on the needs of individuals and the flow of information among them.

Although still open plan, it opened up a new idiom that still distinguishes European open offices from those in the US.

In parallel in Europe in the 1950s, Arne Jacobsen began to design his own generation of enduring furniture icons for Fritz Hansen.



Left to right: combi-office; Herman Miller Aeron; WeWork coworking in New York

1960s and 70s

The defining furniture system of the 1960s was Action Office by Herman Miller. Originally launched in 1964, it was updated in 1968 but this time supported by a Manifesto written by its designer Robert Propst that was just as influential as the furniture itself. Many of the statements about the design of spaces for people are just as relevant fifty years on, even if the furniture now looks anachronistic. It was to form the blueprint for American panel systems for the next few years.

Meanwhile in Europe, Herman Hertzberger's designs for the Central Beheer building heralded the idea that even a fixed form such as a building can have in-built adaptability to cope with changing technology and working cultures[9].

1980s

Computers with their large CPUs and CRT monitors started to appear on workstations, and in response the desks became bigger and more heavily engineered. Cable management became a major issue, and in response Douglas Ball designed the Race system for Herman Miller and Steelcase introduced their context core unit.

Europe followed suit with a range of solutions including sliding tops. As much attention was paid to the structure of the desks as their surfaces. A similar revolution was also taking place with office seating as mechanisms became more complex and five-star bases were adopted as the norm in a response to the growing interest in ergonomics for computer users.

The idea of the combi-office, in which people choose between an open plan workstation and an unassigned personal office, was an early progenitor of activity-based working. People began using terms like 'hot-desking'.

1990s

The miniaturisation of technology and the Internet changed everything. At this time there was a great deal of talk about new ways of working but they remained more talked-about than implemented.

The use of laptops and mobile phones began to drive a reduction in the size of workstation footprints and desks.

In the UK, the most talked-about building was British Airways' new Waterside building[10] that had at its heart a 'Street' with cafes, shops, trees, plazas, and road signage. It was an early example of both activity-based working and the idea that workplaces can function like communities or even cities.

Chiat Day's vivid and playful New York offices from 1994, designed by Gaetano Pesce[11], became the progenitor of creative offices with quirky features. In London a firm called Michaelides and Bednash pioneered working around a single shared long table that clearly announced the arrival of the bench desk that was to become the de-facto default desk solution in the years that followed.

1994 proved to be a watershed in office furniture design with the introduction of the Aeron chair from Herman Miller[12], Vitra's Ad Hoc designed by Antonio Citterio[13], and a product from President called Kyo that was too ahead of its time[14]. All pointed to the world that was to arrive very soon after their launch.

The 21st century

In many ways the 21st century produced a crystallisation of the ideas that had formed at the end of the 20th Century. Work had become uncoupled in both space and time and as a consequence we saw a convergence not only of the places we work and their design idioms, but an almost inability to distinguish between work time and the other facets of our lives.

Perhaps unsurprisingly, wellbeing became as big a concern for firms as productivity, as did the war for talent. A greater focus on empowering people was one of the consequences.

A new way of occupying property also became evident with the growth of coworking as an alternative to traditional property models. Although in essence a development of serviced offices, the coworking phenomenon tapped into a perfect storm of change in the way people worked, globalisation, excessive rents in tech hot spots, organisations still smarting from the 2008 downturn, and technological developments that facilitated new models of space.

In design terms, the century started with a clear focus on bench desks in open plan offices, often supported by break-out spaces and meeting and team spaces, but that model has evolved into something more sophisticated and adaptable: activity-based working.

What next for the way we work?

As we have suggested, the core challenge for the people who design and manage workplaces is how to deal with a world subject to relentlessly disruptive technological and cultural forces within the context of an organisational structure and property that works on a different timescale.

> **Transformation can manifest itself in narratives that exist in a quantum superstate of both futuristic and traditional**

A recent study published by MIT[15] sets out how this can lead large organisations in particular in less than optimal ways. In particular the study argues that while corporate transformation is surprisingly thin. As a result, transformations are often guided by beliefs that, while seemingly plausible, are more anecdotal than empirical in nature."

For an extended discussion about the dearth of meaningful research on the impact of innovations in workplace design, see Rob Harris's article in this issue (#11), "Is it time to shoot the messenger?"

In the workplace this situation manifests itself in narratives that exist in a quantum superstate of both futuristic and traditional. The effectiveness and adaptability of a workplace will depend on how well it resolves the tensions that exist between the physical, digital, and cultural layers of the workplace.

The principles behind this complex situation have been known to us for a long time, at least since the 1970s when Frank Duffy first introduced the world to his ideas about the physical and temporal layers of the building – in his terminology the 'shell, services, scenery, and sets'. The balance between these layers may have shifted significantly in recent years, but the tensions among them continue to determine how well we design and manage our workplaces.

Consequently, the ability to respond to change is perhaps the most important facet of an effective design. While the nature of work has already changed in many ways, the pace of change has increased even more dramatically over recent years. We fully expect that pace to continue accelerating, especially when you consider the potential of technological developments such as automation and artificial intelligence to continue transforming our relationship with work in ways we cannot begin to imagine today W&P

Prerequisites of Disruption

Guy Kawasaki was one of the Apple employees originally responsible for marketing their original Macintosh computer in 1984 and is now a self-proclaimed tech evangelist. He has set out a manifesto for creating disruption[16].

1. Make meaning: Cash may be king but it shouldn't be the only motivation for organisations. Without the creation of meaning, firms are doomed in the modern world. "I believe that if you try to make meaning, you'll also make money."

2. Create a mantra: An organisation should be able to sum up what it does in two or three words. "The test for a mantra is that every employee can recite it."

3. Jump to the next curve Staying on an exiting curve means you will die. The trick is to stay ahead of the curve in what you now do and know when to jump onto the next one. "Don't define yourself in terms of what you already do. Think about the benefits that you provide."

4. Roll the DICEE: Use the DICEE acronym in decision making and service delivery. DICEE stands for: Deep Intelligent Complete Empowering Elegant.

5. Embrace failure Failure happens but the successful own their mistakes. Accept you'll never be perfect. "If you wait for this perfect world, the world will pass you by."

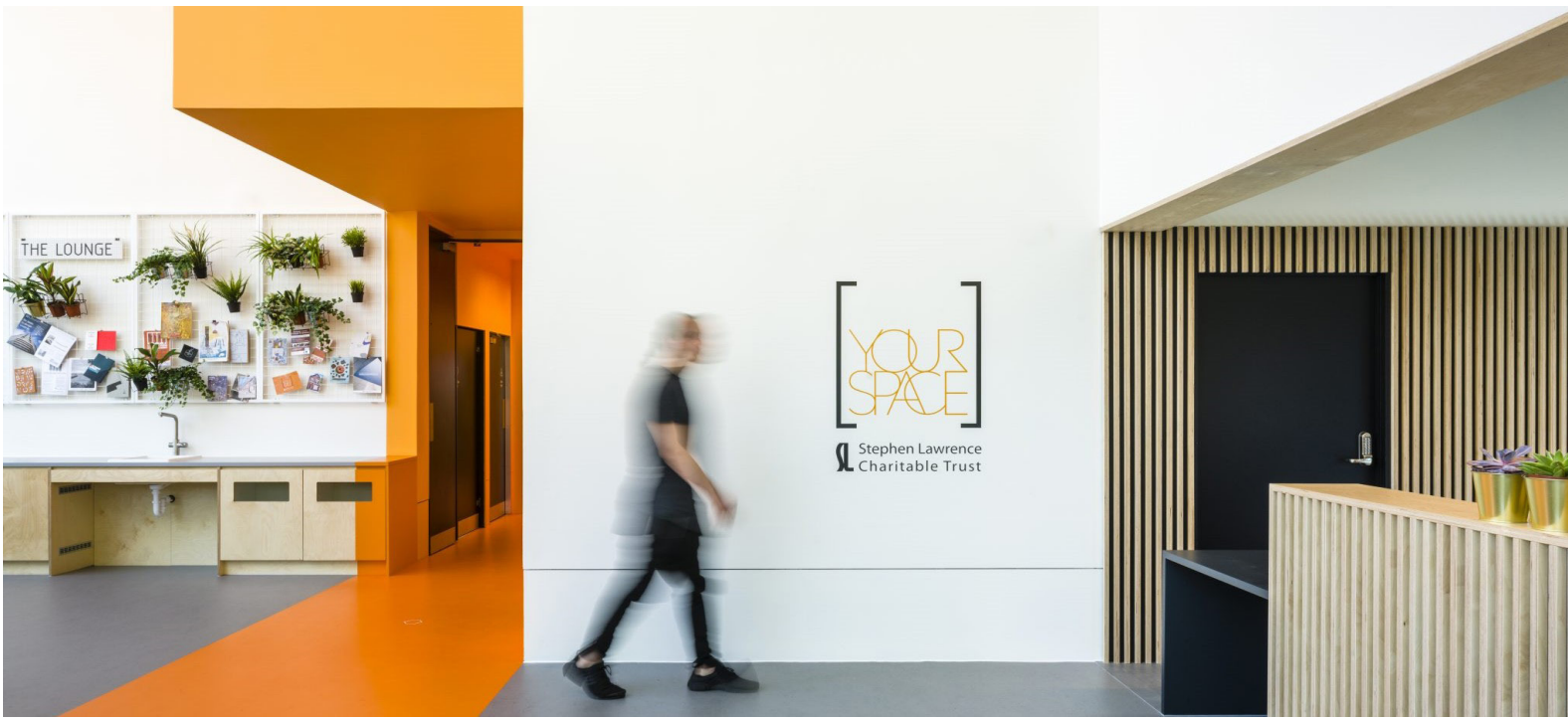
6. Let 100 flowers blossom: Don't assume you know all the uses your customers will find for products. They can teach you what you are producing.

7. Polarise opinions: Apathy is the real enemy, not disagreement. "What you need to worry about is if people don't care."

8. Churn baby, churn: Ask people what they think and take it on board. If they're just naysayers, you'll know.

9. Niche thyself: Identify how you are unique and sell that.

10. Perfect your pitch: Honing your message will ensure you can describe what is unique about you.



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A provocative critique of the content and direction of current workplace research work, suggesting much of the work is losing sight of its applied role, so we need to address the issue

Rob Harris

Maybe the time has come at last to shoot the workplace messenger

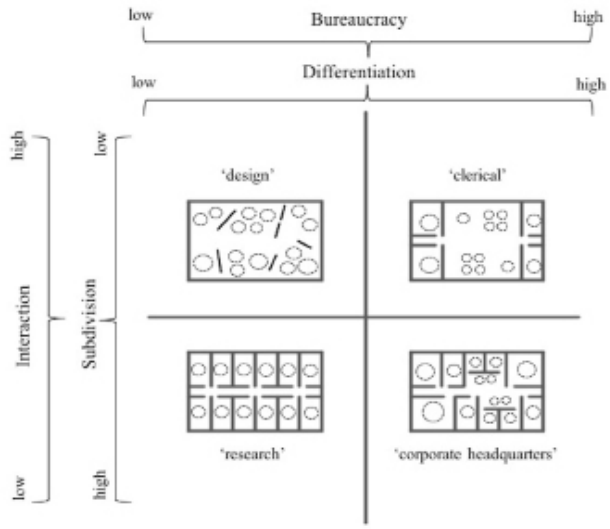
I spent some time with Frank Duffy recently, releasing a stream of memories of working with him, first as an employee at DEGW during the 1980s, and then as a client while directing developer Stanhope's research programme during the 1990s. Along with his long-term business partner, John Worthington, and thinkers including Franklin Becker, Gerald Davis, Michael Joroff and Jack Tanis, to name a few, Frank helped sketch out the grand scheme of what we now call 'workplace'. Much of the work of their successors has involved filling in the matrix of detail within the grand scheme.

But further reflection has caused me to ask whether, in filling in the finer details, we have recently somehow lost our way. Are we, the 'workplace profession', instead of standing on giants' shoulders, now just pandering to fads and fancies? Or, even more radical, might it be that 'workplace' is now done, and that we've run out of meaningful things to say?

Back to the beginning …

I ask these questions because much workplace 'research' that I have read in recent years (say, the past five) is not research in the commonly-accepted sense of the term. Rather, much of it is agenda-driven, serving the purposes of narrowly-defined interest groups. Some of it is simply opinion gathering, in the tradition of "eight out of ten cat owners said ….", with little attention given to social science rigour. Some of it is so devoid of context that it simply crumbles to dust when methodologies are exposed to scrutiny.

Duffy began to publish back in the 1970s and, for my money, one of his earliest articles counts among his most incisive and instructive. The figure represented here (by today's MS Office standards, a somewhat primitive diagram) appeared in a 1974 article, arguing that different organisational characteristics demand various kinds of office layouts[1].



Linking Office Layouts to Organisational Types (Source: Duffy, 1974)

The fact is that an organisation and an individual will have different perspectives on what is a 'good' workplace. The design imperative is to provide settings which accommodate a balance between the corporate and individual perspectives. Duffy was one of the earliest to link organisational ecology with physical form.

A decade after Duffy's article two Harvard academics, Philip Stone and Robert Luchetti, released a landmark article in which they sought to:

… challenge the customary ways of thinking about offices and show how managers can gain the advantages and avoid the disadvantages of the new technologies. Managers can integrate physical layout, design, and communications to support organizational objectives that:

> **Barely a week passes without some new research purporting to offer fresh insight into how today's workplace can be nudged in the direction of a more perfect future**

- *Emphasize informal exchange.*
- *Reassign people to different work teams and study groups.*
- *Provide many employees access to specialized equipment.*
- *Value individual initiative and mobility.*
- *Derive payoffs from serendipity.*
- *Attract talent employees. Increase productivity while reducing office costs.*[2]

The authors went on to suggest that:

Any coherent rethinking of an office plan requires that management integrate facilities, communications, and computers in accord with company objectives[3].

The article was, possibly, the first formulation of what we now call activity-based workstyles.

(For an extended discussion of the benefits and risks surrounding open plan offices, see also "Keeping an open mind about the open plan office" by Maciej Markowski in Work&Place #5 from May 2015)

These articles illustrate the role of research in helping us understand the relationship between organisation and worker. And, of course, there have been many enlightening pieces of research since these early examples: it would be quite wrong to suggest otherwise.

However, over the past few years there seems to have been a step-change in the sheer quantity of material vying for our attention and, yes, a consequent dilution in the overall quality of the work.

Barely a week passes without some new research purporting to offer fresh insight into how today's workplace can be nudged in the direction of a more perfect future. Three thematic examples will suffice to illustrate the nature of the problem: open and enclosed space planning; wellbeing in the workplace; and the march of the millennials.

Open and enclosed space planning

As long ago as 1994, in his much-underrated book How Buildings Learn, Stuart Brand discussed an American model, referred to as 'caves and commons', whereby office workers had private offices, often quite small, opening onto generously-planned open areas surrounded by other private offices[4].

The open area contained vending, couches and informal meeting tables, possibly even a library. Such an arrangement meant that a worker "could shut the door of your cave and concentrate, or you can leave your door open and keep an eye on who's coming and going in the commons".[5] The ambience is "congenial and homey" encouraging "casual encounters which … are at the heart of creativity in offices".[6]

Such a model was given further expression a few years later in New Environments for Working, which introduced the idea of cells, clubs, dens, and hives as alternative work settings[7]. Such work oozed common sense rather than design sense.

And yet, two decades on, every once in a while, the mainstream press picks up on a piece of research that hints at the failings of open plan offices. And every time there is a misrepresentation of the issue: open versus enclosed, rather than which blend of settings is most appropriate for the circumstances in question? Open and enclosed is not a binary choice; those designs are opposite poles with a spectrum of blends between .

Why is it so difficult to move on? Why do we have to repeatedly return to the 'open plan is bad for you' discussion? The most recent example is a Harvard Business Review article by Ethan Bernstein and Stephen Turban[8]. The five-and-a-half-page article, supported with eighty-five references (perhaps the largest citation-to-page-count ratio I've ever seen) is based on two field studies of corporate HQs undergoing transformation to an open plan format. The study examined the effect of open

The roots of the open plan concept may be much deeper than most of us realize. For a bit of open plan history, see Mark Eltringham's commentary "A 300 year old idea explains the enduring appeal of the open plan office," Work&Place #9, Winter 2017.

office design on face-to-face, email, and instant messaging interaction patterns, with workers using wearable devices to monitor activity.

The main counter-intuitive finding was that the volume of face-to-face interaction decreased significantly, with a concomitant increase in electronic interaction. The authors suggest that, rather than increasing collaboration, open plan design "appeared to trigger a natural human response to socially withdraw from officemates and interact instead over email and IM".

My colleague Nigel Oseland has recently pointed to the methodological problems with this piece. He hinted at the problem of subjects' behaviour being influenced by the act of monitoring and pointed out that the quality of the open plan design was unknown[9].

The point is, we have yet another piece of research that perpetuates the binary discussion of open versus enclosed. It does not take the subject further forward but re-treads old arguments in an academic cul-de-sac. Moreover, it sends a confusing message to clients and office workers, by reinforcing the conception that 'workplace' is about space efficiency rather than something that negotiates the three-dimensional world of people, place, and process.

Wellbeing in the workplace

The second theme here is the apparently parlous state of the UK office workforce. This is not a small constituency: office workers comprise around ten million people, or one-third of the entire workforce. So its overall welfare is an important issue.

I have become inured to the Government's constant wail that the UK's productivity is lagging our competitors, but I am also struck by the burgeoning volume of research pointing to workplace factors affecting productivity. A cursory scan through my workplace cuttings file, just for the past twelve months, yields a crop of misleading research headlines.

Can it really be that ten million workers, in a modern economy, can be so ailed? Three million of them too stressed to book a holiday? Even allowing for some crude double-counting, it seems that most of our office workers suffer in some way from the physical and managed workplace.

This catalogue of ills suggests not so much an economic enigma as a national crisis.

What does all this research tell us? More to the point, what does it tell us about the state of research itself?

Most work of this kind relies upon self-assessment, whereby individual workers record whether they "feel" or "believe" that their effectiveness is affected by the environment, facilities, furniture, space planning and so on.

> **"One of the key problems with the workplace profession is that there is an underlying sense that a perfect workplace is waiting to be discovered if we can correct this or that issue"**

Leaman and Bordass recognised the significant difficulty of defining a productivity measure for office occupiers, suggesting instead self-reporting on workplace factors as an acceptable surrogate[10]. Indeed, most practitioners and academics seem to take the view that in the absence of anything else, this approach will suffice.

Again, while this is not wrong, such data cannot possibly contextualise the motivations of the individual: how closely they are aligned with the organisation, their general level of work satisfaction, or their relationships with colleagues and bosses.

One of the key problems with the workplace profession is that there is an underlying sense that a perfect workplace is waiting to be discovered, and that if we can only correct this or that issue, then we will move 'forward', make progress.

> **Current approaches to workplace planning are not wrong, per se, but their limitations must be recognised**

This is, of course, fantastical. A chimera. The crux of Duffy's approach was that there will always be a trade-off between the organisation and the individual, yet most research addresses only one side of this equation. Moreover, no matter how well-planned and responsive the work environment is, if individuals are not comfortable, or aligned, with the organisation, their effectiveness will suffer.

Conversely, individuals who are highly aligned to an organisation, and deeply motivated by their work, might put up with all manner of workplace discomforts and shortcomings while at the same time being highly productive.

Wellbeing research is suffering from the same reductionist problems as space planning: the focus of interest in each study is now very narrow and yet the results are expected to help 'explain' a much broader set of issues. But, in stretching results in this way, the overall credibility of an important avenue of enquiry is fundamentally weakened.

The march of the millennials

Our third example relates to the outpouring of 'research' (I resisted the inverted commas in the previous two examples, but simply have to use them for emphasis here), is the tsunami of reports describing the workplace experience of those born since 1980 – the millennials.

Never in the field of workplace thinking has so much hogwash been written by so many about so little.

Despite reading countless articles referring to the matter (and I have an electronic filing cabinet stuffed full of them), I've not seen a single shred of credible evidence that millennials form a distinct sub-set of demand. The workplace needs of all age groups have evolved rapidly over the past twenty years, as society, technology, and the economy have evolved.

My workplace needs as a fifty-something are radically different from when I worked with Frank Duffy as a twenty-something. The fact that the 'tools' of the office are different, that modes of communication are changing, and that attitudes to social structures and mores are also changing, does not lead to a sub-culture of demand for one cohort of workers.

The most foolish images of the millennial workplace bring bean bags and billiard tables to the fore (forgetting that even half of the millennial demographic are introverts) along with the faintly threatening (or should that be 'absurd') notion that you must be happy in the workplace. And 'research' has done little to dispel such nonsense.

What do these themes (and others) have in common?

The relatively recent tendency to see the workplace as a lever of organisational effectiveness has led to an almost frantic search by designers to demonstrate how this or that aspect of the workplace experience can influence productivity, satisfaction, wellbeing, and so on. Environmental quality, facilities services, furniture, heating and lighting, and space planning are all routinely cited and measured. But, in the rush to describe these micro-influences, the context of Duffy's grand scheme is forgotten.

The real danger of extrapolating the impact of context-free influences is a form of reductionism: the tendency to divide the world into ever-smaller boxes until, finally, we find one that helps to confirm our expectations. This process of description and categorising is comforting because it gives us a level of simplicity that isn't otherwise there.

The danger comes when we use these specific boxes to generate prescriptive models that claim to provide a more general understanding. Such output can be used to help paint a picture that is incomplete and, at worst, possibly hopelessly wrong. Reductio ad absurdum.

Current approaches to workplace planning are not wrong, per se, but their limitations must be recognised. For example, empirical work usually limits the definition of effectiveness to that of the individual (rather than the organisation), and it tends to limit the definition of the workplace to the physical aspects of the fit-out.

Such approaches define the work environment as a physical entity, largely ignoring the business, social, and systemic influences on performance. In other words, there is a danger that a set of narrowly focused variables is stretched almost to

breaking point in an effort to explain issues or solve problems that actually require "cross-cutting" thinking in order to provide workable and sustainable solutions.

And herein lies the crux of (what I see as) the problem.

The world of 'workplace' today is standing in splendid isolation, adding yet another narrowly defined silo to an already silo-rich supply industry that have worked against the interests of clients (occupiers) for decades.

Instead of becoming the integrative force that Duffy and colleagues envisaged back in the 1980s and 1990s, 'workplace' is today marooned on an island of increasing irrelevance. It is a little-known fact that Frank Duffy was instrumental in bringing facilities management to the UK, not as a distinct activity, but as an integral part of the grand scheme. How many of today's 'workplace' experts understand that lesson?

So, what to do with the messenger ….

The title of this opinion piece asks whether the time has come to shoot the messenger. Perhaps less provocatively, has the time come for some mild push-back against poor research and marketing masquerading as research? The question was posed in the context of a concern that recent trends in research were suggestive that 'workplace' is somehow losing its way, or even that we've run out of meaningful things to say.

My own sense is that 'workplace', certainly as expressed through the research that is used to underpin its approach and methods, is moving backwards.

Rather than standing on the shoulders of pioneers who set a path towards integrated thinking about people, technology, and place, it is retreating into a remote technical corner of an already fractured and inefficient supply industry.

Because of its ability to bring together the three most important concerns of modern organisations – people, technology, and place – workplace has the opportunity to become a pivotal activity, not a side show.

So, yes, we need to shoot some messengers, and we need to re-establish a workplace agenda that speaks to its client community rather than its own echo chamber.

Workplace can achieve so much more if it seeks to re-establish the barrier-free nature of enquiry it once had and takes a less reductionist and more integrative approach to people, technology, and place.

Now that would be a fitting tribute to Frank Duffy's legacy of work **W&P**

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Biophilic design principles offer new ways to enhance workforce productivity and employee well-being

Kelly Taylor

WELLBEING • WORKPLACE DESIGN • PRODUCTIVITY

Biophilia might be one of the keys to wellbeing and productivity

"The passionate love of life and all that is alive," wrote German-born American psychoanalyst Erich Fromm when first describing the term biophilia in his book *The Anatomy of Human Destructiveness.*

Fromm believed that humanity instinctively strives to overcome the feeling of being separate from nature, originating in self-awareness and becoming one with it again. In 1984, American biologist Edward O. Wilson published his book Biophilia, introducing his hypothesis that humans innately seek to connect with nature and "affiliate with other forms of life." However, the further humanity progresses, the more this connection seems to be lost.

Like all other living organisms, we thrive in certain environmental conditions and suffer in others. If a zoo placed a tiger in a small windowless box to live out its days, who would hesitate to call it cruelty? Yet how many workers spend most of their days in a cramped and bare office?

In the end, human beings are the result of thousands of years of evolution – evolution that has programmed all living creatures to be at their best in certain natural environments, while responding negatively to others.

Based on habitat selection theory, researcher G.H. Orians concluded that humans' environmental preferences should correspond to the features of the ancestral savanna environment that helped Homo Sapiens flourish. These features include semi-open spaces with trees, places that can serve as refuge from rain and excessive solar gain, and a lot of visual access, especially to the horizon.

From a biological perspective, there are two issues to keep in mind when speaking of comfort maintenance. First, humans have different ambient preferences resulting from a combination of influences, such as gender, lifestyle, and genetic and cultural differences. Second, these preferences change over time for individuals due to the changes in their state of health, activities, and other factors.

For most of history, humans have adjusted their environment to fit their current needs and achieve a level of personal comfort; however, far too many architects and designers continue to design buildings and interior spaces with a "one size fits all" approach.

> "For most of history, humans have adjusted their environment to fit their current needs and to achieve a level of personal comfort"

Another factor to consider is that human ancestors needed to pay attention to changes in daylight and sensations associated with direct sun, humidity and wind; and even though the modern person's perception of sensory variability has evolved, those perceptions still have a high impact on how one responds to any given environment.

According to a study funded by the U.S. Environmental Agency, the average American now spends 87% of their time indoors . The trees of the savannahs have long been abandoned in favor of built environments. However, these chosen new habitats of skyscrapers and office buildings often lack the environmental factors important for our well-being. As Dr. Judith Heerwagen put it in her work exploring the links between

“In the past twenty years there has been a rapidly growing body of research on how human relationships with nature and natural patterns have positive effects on a person’s physical, mental, and emotional well-being”

well-being, productivity and design, “… our ties to nature are deep and enduring; when we sever these ties, we create conditions that are contrary to basic human needs.”

In the past twenty years there has been a rapidly growing body of research on how human relationships with nature and natural patterns have positive effects on a person’s physical, mental, and emotional well-being. Even a simple photograph of a natural landscape has been shown to improve stress recovery – lowering blood pressure and heart rate.

A landscape image is the most simple and direct example of a connection to nature, but many other nuanced connections to the natural world have been studied and proven to have a beneficial effect on human beings. Dynamic light, natural materials, and variable airflow are all elements that our brains and bodies associate with a natural environment and respond positively to.

With all this information available, and thousands of years of successful adaption behind the human race, the question begs to be asked: why is it that people fail to adjust their habitats now to achieve the highest levels of comfort and performance?

“Putting some plants in a room and hanging a picture of a forest doesn’t constitute biophilic design. It is a systematic and informed approach to creating a connection with nature in the built environment”

Designers and property managers should use this knowledge of positive and negative environmental factors in design and architecture to create habitats that meet basic human needs and promote positive experiences, improved health, and productivity.

Biophilic design

Fortunately, this issue is not completely ignored. From the hypothesis of biophilia comes the concept of biophilic design – a design practice that aims to reconnect people with the natural environment.

It is with the idea of evolutionary processes and how that shapes one’s well-being and ability to function at one’s highest levels in any given environment that Stephen R. Kellert and Elizabeth F. Calabrese described the main goal of biophilia as “creating good habitat for people as a biological organism in the built environment.”

However, simply putting some plants in a room and hanging a picture of a forest doesn’t constitute biophilic design. Biophilic design is a systematic and informed approach to creating a connection with nature in the modern built environment. In Kellert’s words, it “doesn’t involve simply applying any form of nature to the built environment, but rather doing so in ways that effectively satisfy the inherent human inclination to affiliate with the natural world.” To be meaningful, contact with the natural world must be re-occurring and engaging.

Architects all too often treat the natural environment as the enemy – something to be overcome in order to realize their particular vision. However, research by Dr. Heerwagen suggests that building environments that contain the essential features of preferred natural settings will be more supportive of human well-being and performance than environments lacking these features.

When a certain kind of design has a positive impact on productivity, doesn’t it make sense to implement it wherever possible, especially in a workplace?

How can biophilic design be specifically impactful in the workplace? There is an increasing number of studies assessing how biophilic design and related design movements and environmental factors affect a person’s well-being in the workplace (“well-being” here meaning high levels of positive functioning - physically, socially, and mentally).

It is widely understood that certain environmental conditions are detrimental to an individual’s well-being as well as to a workplace’s overall productivity. Anyone whose office air conditioning has broken down during a hot summer day knows how unpleasant conditions can quickly bring work to a grinding

halt. Accepting that, then we must accept that the inverse is equally true: more ideal environmental conditions will improve a person's well-being and productivity.

The impact of biophilic design

Let us take a closer look at the negative impacts on health that buildings can have. Ambient conditions such as temperature, noise, lighting, and air quality are particularly important. Excessive temperature conditions and noise levels have been linked to increased irritability and stress. Lighting that creates visual discomfort and glare is more likely to cause eye problems and headaches. Poor indoor air quality is a potential health hazard, as many buildings use finishings and materials, equipment, and cleaning products associated with noxious chemicals and airborne toxins, as well as hazardous and noxious substances in work processes.

Even a lack of window views has also been associated with higher levels of stress . In a workplace, such negative effects can lead to absenteeism, lower productivity, and even higher employee turnover.

It is simple to point out conditions that make it difficult to concentrate – lighting that creates computer glare, stiflingly warm temperatures, or high-level noises. Beyond simply eliminating the obviously negative aspects, it can be somewhat trickier for architects to design with the intention of creating an environment that deliberately impacts its inhabitants in a number of positive ways, rather than one that simply lacks those negative aspects.

As for positive factors, multiple studies have shown that visual and non-visual connection with nature, thermal and airflow variability, and the presence of water all have positive impact, including stress reduction, improved cognitive performance, and mood.

Non-rhythmic sensory stimuli, such as bird chirping and the scents of leaves and grass, positively impact on heart rate, systolic blood pressure, and sympathetic nervous system activity, as well as improve attention. Material connection with nature is linked to increased creative performance, and finally, an ability to see beyond immediate surroundings called "prospect" in biophilic design is linked to reduction of irritability, boredom, and fatigue.

Rachel Kaplan reports similar results in a field study of office workers, finding that workers who had window views of nature felt less frustrated and more patient, and reported more overall life satisfaction and better health than workers who did not have visual access to the outdoors or whose view consisted of built elements only.

According to analysis in the Human Spaces Report, which surveyed 7600 office employees in sixteen countries, workers in environments featuring natural elements report a 15% higher level of well-being . Nature-resembling colors such as green, brown and blue in work environments also had a positive impact on employee well-being and productivity. Window views of nature were linked to decreased stress levels, and office environments with natural elements such as natural light and greenery increased productivity of employees by 6% and creativity by 15%.

On top of that, a third (33%) of office workers say that the design of an office would affect their decision to work at a company . While the link between biophilic design, employee well-being, performance, and retention is becoming more and more clear, architects and designers seem to fail to understand the growing need for incorporating biophilic design in office buildings.

Look at these statistics collected by the Human Spaces Report:

- Only 42% report having live plants in the office, and an alarming 47% report having no natural light in their office.
- Almost a fifth (19%) of respondents report that there are no natural elements present in their office.
- Just under half (47%) of all respondents agree that they have felt stressed in their workplace within the last three months. This finding emphasizes the importance of identifying and enforcing practices that can improve well-being at work – practices such as biophilic design.
- 24% of respondents say that their workplace does not provide them with a sense of light and space.
- 28% of respondents report that they do not have a quiet space to work in their office.

> **"Despite limits on a workspace's ability to implement these green-scaping measures, there are nevertheless many opportunities to adopt biophilic principles in impactful ways"**

Of course, most workplaces are limited either by real estate or resources in how they can implement biophilic design. Most businesses do not have the capabilities to construct their buildings with walkways through native landscaping or with expensive interior water features.

Despite limits on a workspace's ability to implement these green-scaping measures, there are nevertheless many opportunities to adopt biophilic principles in impactful ways. One does not need to literally surround himself or herself with plant life and have a window view on the ocean to get the same positive effect. Rather, according to senior researcher Beatriz Arantes at Steelcase, "It's about tricking our brains to feel like we're in a natural environment by triggering underlying patterns that we're programmed to recognize and feel good in."

It appears that even symbolic connections with natural elements can produce nearly as impactful a response in observers as the natural elements themselves . Symbolic connections can be as direct as an image of greenery rather than a living green wall, but they can also be implemented in

> **Widespread adoption of biophilic design does not mean we are limited to filling the office with landscape paintings**

more subtle and nuanced ways, including implementing layers of color, pattern, and texture, as well as organic shapes; using natural light and creating air flow; encouraging movement to create "natural challenges"; or implementing local natural colors and materials.

Widespread adoption of biophilic design does not mean we are limited to filling the office with landscape paintings. Nor does biophilic design need to take away from brand consistency or prevent your business's distinctive brand identity from being embedded in the space. In fact, a distinct brand identity and effective biophilic design go hand-in-hand.

For example, at the Glumac's Shanghai office, biophilic elements and deliberate design for human health were prominent considerations when planning their newest workspace. One of the repeating elements found throughout the space is a cloud motif, which not only serves as a symbolic connection to the natural world but also holds cultural weight – Chinese lucky clouds being a traditional symbol of happiness and good fortune. This motif repeats though decorative glass film patterns of abstract swirls, organic shapes in the carpeting patterns, and a number of Kvadrat cloud installations – acoustic paneling structured in amorphous three-dimensional shapes.

In "The Practice of Biophilic Design" Kellert and Calabrese identify one of the three primary experiences that biophilic design creates in order to build a more beneficial environment for its inhabitants as "experiences of space and place." A major value of this approach is creating a unique attachment to a specific place – culturally, ecologically, geographically, historically, or some combination thereof.

For instance, Couer D'Alene Resort and Casino focused its renovation on integrating tribal history and ecology into the guest experience. The designers created a sense of place by capturing the essence of the territory and the local tribe's history. A prevalent pattern in their renovation was connection with natural systems, achieved through landscaping that demonstrates species and ecosystems native to the area and design that connects guests to the site as soon as they arrive.

The visual connection is achieved by creating a vegetated parking lot and a transitional covered parkway with full glass windows. For material connection, reclaimed and recycled timber was used in construction, creating an inviting environment with a warm rustic feel. The spa area features local stone by the reception desk that is also made of reclaimed oak.

The importance of a cohesive strategy versus merely – and often thoughtlessly – adding biophilic elements at random cannot be overstated. Designers guided by biophilic principles are creating an environment, not simply adding a few extra potted plants.

All organisms existing within connected environments are bound together as ecosystems. When the habitat functions in the best interests of the organism, the ecosystem performance at a level greater than the sum of its individual parts," says expert Stephen R. Kellert.

"By contrast, habitats comprised of disconnected and unrelated elements provide few benefits to their constituents and may even harm individual members." Therefore, simply inserting a single object of nature into a human built environment and ignoring the rest of the setting will have very little positive impact on people occupying the space.

The importance of creating a comfortable environment in buildings through designing a systematic connection to nature, or biophilic design, is hardly new. With the possibilities of modern technology, architecture and design, and undeniable benefits for well-being and productivity, it would only be logical to implement biophilic design in more spaces.

With the growing trend of employee well-being and office workers all over the world believing that office design impacts their decision to work at a company, it is time for architects, designers, and employers to stop seeing comfort and attractiveness of a workplace as an unnecessary "luxury."

Biophilic design is an available solution for those looking to improve employees' health and sense of well-being, while also increasing their productivity for financial gain. However, it is also important to remember that biophilic design is a systematic approach so it cannot be achieved by simply putting a plant on a desk and hanging an image of nature on the wall. It only works when all parts are connected and act as a whole – as any ecosystem does **W&P**

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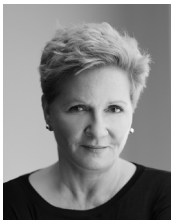

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There seems to be no end to the false narratives that have sprung up about open plan offices and the false dichotomies they create for occupiers

Dr Caroline M. Burns

Calling time on the fake news about open plan

A recently published paper describing the results of an academic study by Ethan S. Bernstein and Stephen Turban[1], both of Harvard, has become another unwarranted casualty of the debate within our industry and in the mainstream media on 'open plan' offices versus anything else. The researchers conducted two controlled studies in different organisations before and after a workplace refurbishment from dedicated cubicles to dedicated open plan (benching) neighbourhoods, and concluded that face to face interaction reduced significantly, while email and other digital communications increased.

It's not hard to guess what happened when workplace commentators got their hands on these findings.

"Here's the final nail in the coffin of open plan offices"
"Open-plan offices are making us less social"
"Open plan offices don't live up to the hype – in fact, the idea that they promote interaction is dead wrong."
"A recent Harvard University study has proven what anyone who has ever worked in an open-plan office already knows to be true: they're terrible!"
"If you've long felt open-plan offices were a collaboration killer, a new Harvard study proves you were right all along."

We all know this is the wrong debate, right? Setting aside the fact that 'open office' encompasses a hugely diverse range of workplaces, like many things in life when done excessively it can be bad, but used in moderation in the right context for the right purpose, it has a place in the workplace toolkit.

So why is it so tempting to get caught up in the 'open plan is evil' debate, rather than reviewing the facts of the research and applying these rationally to advance the understanding and (one hopes!), the quality of decisions about work environments?

Fake news vs the facts

I took the time to locate and read the original research paper titled "The impact of the 'open' workspace on human collaboration" by Bernstein & Turban. Yes, it's an academic paper so it's structured in a particular way that's a bit like reading Shakespeare after a diet of Facebook, but the effort is worth it if you're serious about separating 'fake news' from the facts.

After reading the paper, I felt compelled to put the research findings into context and to consider how the results contribute to our understanding of the influence of open environments on behaviour.

In a nutshell, the purpose of the research was to test the effect of moving from cubicles to open plan benches on face to face and digital interaction. To isolate the possibility of a 'causal' effect the study had to be very controlled, which means the effect of other potentially influencing factors had to be removed, reduced or ignored in the data. This is typical of rigorous, statistically valid academic research, and is both its strength and, sometimes, its weakness.

The methodology involved a small sample of employees who agreed to wear sociometric devices to capture the change in quantity of face to face (F2F) interactions, which were defined as occurring under specific circumstances. In parallel, the volume of digital interaction (also carefully defined) was also measured. The statistical results revealed that in both studies the volume of face-to-face interaction decreased by approximately 70%, and emails between participants increased by approximately 22-56%.

The logical conclusion was that as a result of moving to open plan email and instant messaging replaced communication that was previously done face to face.

On the surface of it, many of us in the industry might not find this result terribly surprising, as we know from many studies - stretching back to the famous Hawthorne Studies[2] - that there is a tendency for people to withdraw when boundaries and degrees of privacy are removed – in other words, people feel more exposed without their cube walls and try to 'replace' perceived loss of communication privacy by emailing instead of talking.

However, while this may explain to a degree the change in behaviour, this should not be used to suggest that cubicles offer more acoustic privacy for face to face conversations; fake news alert - high-walled cubicles are not acoustically private.

Instead it should heed us to devise better ways of mitigating negative behavioural responses to exposure, while encouraging the positive responses to openness and greater connectedness, in very open and transparent environments.

If you don't ask…

If you are like me, by now you are probably starting to ask a yourself a lot of questions about the context of the studies, which would deepen our understanding and help us come to relevant and rational conclusions about the results. Questions like:

- What other spaces to conduct individual or group activities were available to the groups studied on the same floor, and in the tenancy? For example meeting rooms, breakout areas, booths, casual discussion areas?
- Was the only physical change from cubicles to open plan desks? Were any other individual or group spaces added or changed?
- Was any technology changed?
- How large were the two spaces/floors that were refurbished and did the density change from before to after (other studies have shown that face to face communications rarely occur when people have to travel more than 50 metres[3])?
- Did the sociometric badges only capture data in the open plan area where the team was based? How do we know what conversations might have happened in other places (noting this was not an activity-based environment, people were assigned to desks)?
- The sociometric badges record a F2F conversation according to specific conditions - was there any attempt at capturing or observing casual conversations for example side-by-side or diagonally across workstations?
- Were people encouraged to modify their workstyles after moving to the new environment? Was there any cultural or behavioural coaching or new workplace etiquette developed to support the desired outcome of greater collaboration?

Questions like this are important, because without properly understanding the context, we risk applying (or discounting) the evidence in a situation where it could have contributed to a better workplace decision.

Context context context

Seeking answers to my questions, I reached out to the authors, and had an engaging and enjoyable dialogue with Professor Bernstein.

Of course, as this was a real-world situation (and perhaps also because the collaboration outcomes were less than ideal!) the researchers were required to keep most of the study information confidential - including the really useful contextual stuff I wanted to know more about. Bummer, but totally understandable.

However, the authors could confirm that there was no change in technology or overall density in the new environment, and no new collaboration or focus spaces were added, although the researchers couldn't reveal if there were any (or many) in the first place.

> **"People feel more exposed without their cube walls and try to 'replace' perceived loss of communication privacy by emailing instead of talking"**

This suggests that people were not physically closer to each other in the new open plan, so increased proximity was not a factor in people withdrawing from direct engagement.

We also conclude that F2F was not encouraged in other ways; people were no more mobile than before, as no new technologies were introduced to support individual or group activities away from dedicated desks, nor were any new spaces designed to encourage face to face discussions provided in either refurbishment.

However, we would have expected the ability to observe colleagues within close proximity (who we assume were previously hidden from sight by the cube walls) would have prompted more spontaneous conversations around the benches, particularly coaching and problem-solving type discussions that tend to happen as people are working together. The researchers said they tested the findings without the line-of-sight constraint for identifying a F2F conversation and found no significant change in the results.

This means side by side or diagonal conversations at desks didn't increase, which is a very poor business outcome because these ad-hoc localised conversations are increasingly important in fast-paced, continuous improvement, on-the-job learning environments, and more open team environments have been widely embraced as a way of encouraging this.

So, what might this mean for future workplace strategies and design? It probably means we don't know enough about the context to draw specific conclusions about contributing causes.

It could be that both refurbishments were poorly-designed open plan environments, with little spatial diversity and little regard for acoustic privacy and noise management, or it might mean that neither company considered behavioural change and supporting protocols to encourage the desired increase in communication. It could also be that people are having these conversations outside the physical research zone, when not wearing their sensors.

We just don't know.

Context is complex (and so are humans)

The findings by Bernstein and Turban provide valuable, quantitative evidence that line of sight and proximity may not increase the quantity of face to face communication within teams under all circumstances. It complements and reinforces existing research into teamwork, collaboration and innovation that reveal some of the shortcomings of open-plan offices[4]. Specifically, it could be inferred from the evidence that providing open plan environments for teams who depend on

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collective intelligence is likely to reduce F2F interaction and therefore performance, unless more private spaces for discussion are also provided.

Face to face interaction is the most valuable form of communication for building collective intelligence, which is social, political and technical, and a critical requirement for team performance and productivity[5].

The potentially negative impact of open plan team areas on the quantity of face to face interaction should not be confused with the potentially positive impact of proximity on social interaction. Social interaction helps people form relationships that facilitate information exchange and collaboration, which in turn builds trust and supports innovation, particularly in multidisciplinary teams[6]. There is evidence that few boundaries and less distance between people increases social interaction[7].

This theory of proximity has been widely applied in workplace strategies for open team work areas connected by shared breakout and connector spaces which act as 'buffer and bump' zones, the argument being that these spaces encourage social interaction and relationship building.

A real-world example of 'encouraged proximity' increasing social interaction is provided by Boston Consulting Group's move to new offices at Hudson Yards, which were deliberately designed to encourage "brilliant, diverse, passionate people to connect and cultivate ideas that shape the future." Face to face interaction data captured (also using sensors) showed that 'collisions' between people increased by almost 20% in the new workplace compared to before[8]. Most of the increase was in collisions with people in other teams or departments, which was a desired outcome.

A critical contributor to this successful workplace for BCG is that it is 100% unassigned, and the workstyle of a management consultant is naturally mobile, extremely varied and reliant on superior knowledge-accumulation across a range of disciplines. The BCG workstyles are probably a stark contrast to the workstyles of a bunch of finance, human resources and product people assigned to desks with what seems to be little spatial diversity in the Bernstein and Turban study.
This demonstrates the critical importance of workstyle and cultural context in identifying the workplace characteristics most likely to have a positive or negative influence on desired behaviours.

We only know what we know

What the evidence from both these new workplace performance results fail to tell us (and don't try to!) is whether open plan is good or bad, because we know that question doesn't make sense.Despite evidence suggesting the advantages of transparency and proximity often don't materialise, more open, less partitioned environments have become, in various guises, the dominant characteristic of workplace strategy and design for the past twenty years. While predominantly open environments might be here to stay, we should be able to use the evidence built up over the past two decades to create open office environments that perform better, not just ones that photograph better.

This new research from Harvard provides some useful insights and cautions us to consider team workstyles and what makes teams successful when making choices about the work environment. How we combine and apply the settings in our workplace toolkit can have a negative – even if unintended - influence on team effectiveness, so it is incumbent on workplace advisers and influencers to avoid 'groupthink' and apply learnings from other workplaces thoughtfully.

Rigorous, credible workplace research is good for our industry and for leaders because it helps inform decisions. Without understanding the context and how it may relate to a specific organisational decision, it is risky to apply research findings to workplace strategies in general.

Monotonously open plan environments may indeed be the enemy of workplace effectiveness and employee experience in many (or most) situations, but let's ensure we don't make critical workplace decisions based on 'fake news' W&P

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As artificial intelligence becomes embedded in buildings, spaces, and equipment, a new paradigm for the interaction of people and place is emerging

David Karpook

AI • HUMAN RESOURCES • AUTOMATION

The ambiance of ambience: How AI changes occupant experience

If a robot received a signal you had entered the building, it might bring you a fresh cup of coffee just as you reach your desk. If the front door recognized your face, it might unlock itself for you without requiring you to use a fob to gain access. If your desk knew you had left for the day, it might offer itself to a colleague who is looking for a quiet workspace.

Throughout history, the interaction of humans with technology has been pretty much one-sided. We turn our technologies on and off, operate and guide them in their tasks, and use our senses to monitor their functioning and detect anomalies.

But over the past few years, the nature of that relationship has started to change. More and more, our technologies hear us and see us, and take actions without our explicit intervention . Developments in what we call artificial intelligence have been rapid, and they can be unnerving.

Artificial intelligence today is a combination of the practical, the plausible, and the potential. Some of its most interesting manifestations can be classified as "ambient," meaning that they exist as embedded features in our environment, operating without us having to pay particular attention to them. They rely not on keyboards and screens but on our voices, our movements, and our physical features.

Andrew Ng, the former chief scientist at the Chinese company Baidu, one of the world's largest artificial intelligence firms, has said that, "AI is the new electricity."[1]

The analogy is compelling. Electricity is so ubiquitous as to be a virtual necessity. When electric power is needed, we assume that we will be able to find a source on the nearest wall; when it is not available, we feel as if civilization has left us behind .

Although it is still in its infancy, there are reasons to suspect that artificial intelligence, particularly in its ambient forms, could develop in ways that eventually make it ubiquitous and necessary in similar ways.

Current experience is telling us that the AI revolution is taking over quietly, and it is becoming an aspect of daily experience without us really being aware of how dramatic the changes are.

We talk to our cars, telling them where we want to go, and they respond by giving us step-by-step directions. More and more of us are speaking in conversational syntax with our phones and with devices in our homes to seek information, make

A smart kiosk working in tandem with occupancy sensors can highlight available workspaces for nomadic workers

appointments, operate appliances, order food, and purchase consumer goods.

This article's opening scenarios for building behavior are far from outlandish. Consider the following:

- CafeX, at two San Francisco locations, has replaced human baristas with talented, ever-improving robots[2]. They don't deliver to your desk yet, but CafeX has targeted corporate office settings in its expansion plans.2
- Cloudastructure is one of many companies offering facial recognition-based access control systems. Cloudastructure's system matches a learning application for face recognition with more traditional access technologies, such as card readers, to provide a multi-layered identification system. Over time, the system learns to recognize a person in different lighting, clothing, hairstyles, and so on.
- Facility management software vendors such as Planon (my employer) have integrated their space management functions with occupancy sensors that allow unused space to be displayed on kiosks and mobile devices so that they can be reserved and used, as well as released for rebooking when an occupant leaves.

Ambient intelligence, as an extension of artificial intelligence, is being enabled by a cluster of emerging technology developments including:

- zero UI, the replacement of a computer-screen-and-keyboard combination with machines that respond to voice, touch, movement, and biometrics such as fingerprint and retina recognition;
- natural language processing, which enables computers to listen to people asking questions or seeking information, understand their words, and reply;
- machine learning, the ability of computerized devices to build skills and improve performance of various tasks without being explicitly programmed to do so;
- mesh networks, which provide continuous connectivity as computerized device users move from space to space or setting to setting. Mesh networks can encompass seamless movement among a multitude of devices, a multitude of applications, a multitude of locations, and a multitude of individual networks; and
- edge computing, which improves responsiveness and turnaround time by moving processing from a "centralized" processing center – most likely in the cloud – to smaller processing centers close to where the information is being created or delivered.

An advance led by the consumer market

One of the greatest cultural transformations of the past decade has been the move to introduce new technologies to consumers first, and then have them brought later into business settings by those consumers who have come to depend on them. Think of smartphones and tablets as the leaders of this revolution.

Over the past few years, voice recognition has come into its own due to consumer adoption of Amazon Echo and Google Home, and increased use of voice recognition capabilities on smart phones and in vehicles.

Now we see voice recognition moving into the workplace, with adaptations such as listening devices mounted directly on or in walls. Similarly, facial recognition using 3D cameras is becoming accepted as a security feature on iPhone X devices.

The online journal Bisnow reported in January 2018 on how artificial and ambient intelligence – "smart building" amenities – are changing the residential real estate market:

While building-wide WiFi, electric chargers and rooftop decks remain popular among tenants, smart building technology is becoming the new 'it' amenity ... In a Schlage and Wakefield Research survey of 1,000 U.S. multifamily renters, 86% of millennials are willing to pay one-fifth more for a smart apartment. Gen Y renters are 61% more likely to rent a unit because of electronic access such as keyless entry, and 55% are willing to pay more in rent for a unit with a smart lock.[3]

Evidence is beginning to show that tenants are willing to pay a premium for "smart office" amenities

The IT analyst group Gartner Inc. predicts that within 5 years, more than 50 percent of facility security will be managed by voice and/or image biometrics[4].

Voice and facial recognition are just the beginning. A rapidly developing area of so-called Zero User Interface technology[5] is gesture recognition. Google and Apple were leaders in the consumerization of voice recognition, so it should be no surprise that they are heavily involved in gesture recognition – Google with its Project Soli, and Apple through its acquisition of PrimeSense. Another company, Leap Motion, has developed a desktop sensor that can read hand and finger motions as

> **“Once set up, the app will control light and temperature for workers wherever they travel in the building, utilizing the network of lights and sensors installed throughout the facility”**

input commands. And the Canadian startup Thalmic Labs has developed the Myo armband, a wearable that recognizes gestures and is being used in both the entertainment and medical fields.

Bio-informatics company Emotiv is taking things even farther, developing technology that can take actions based on brainwaves. The company's initial focus is on providing assistance to people with ALS (Lou Gehrig's disease), but it is not difficult to imagine a broader commercial use of this technology as it matures.

The emergence of the "smart environment"

What seems more and more to be emerging is the "smart environment," a long-predicted phenomenon in which a place – a home, an office, a shop, a lab, etc. – can "recognize and respond to the needs of its inhabitants in an almost invisible fashion."[6]

Carsten Ruecker, a professor at the University of Applied Sciences Ostwestfalen-Lippe who has written extensively about ambient intelligence in workplace settings, sees ambient intelligence as a hallmark of the "third wave" of computing, a "post-PC" age characterized by a single person utilizing many computing devices, many of them embedded into everyday objects that do not require traditional input/output devices such as keyboards, mice, and screens.

Innovation is rapid and often surprising in the world of Ambient Intelligence (AmI), but the concept has been around for a generation. It was defined in the late 1990s by the research arm of the electronics giant Philips N.V., which remains a leader in the development of ambient technologies. Philips Research identified three key elements of ambient intelligence: Ubiquity, transparency, and intelligence:

"Ubiquity refers to a situation in which we are surrounded by a multitude of interconnected embedded systems. Transparency indicates that the surrounding systems are invisible and moved into the background of our surroundings. Intelligence refers to the fact that the digital surrounding exhibits specific forms of intelligence, i.e., it should be able to recognize the people that live in it, adapt itself to them, learn from their behavior, and possibly even show emotion."[7]

Building on the Philips research, the European Commission's Information Society and Technology Advisory Group (ISTAG) formally proposed the Ambient Intelligence concept in this way:

Environments that are integrated with sensors and intelligent systems. The environments have the following properties:

- Awareness of the presence of individuals
- Recognition of the individual's identities
- Awareness of the contexts (e.g. weather, traffic, news)
- Recognition of activities
- Adaptation to changing needs of individuals

"AmI is able to deliver personalized services automatically in anticipation of the needs of the inhabitants and visitors."[8]

Mark Weiser, a researcher at Xerox PARC, had even earlier -- in a 1991 Scientific American article -- set out a vision that he called "ubiquitous computing": "The most profound technologies are those that disappear. They weave themselves into the fabric of everyday life until they are indistinguishable from it."[9]

Weiser and the Philips researchers articulated their vision in an age before Google Maps, before the FitBit, before the iPhone changed the way we work, play, and live. Some of us remember that in the 1990s, computers were not "location aware," the concept of a "wearable" was the stuff of science fiction, and "mobile computing" was a clumsy upstart with an uncertain future.

The desire for ambient operations in buildings found early expression in now-common devices such as thermostats, smoke detectors, and lighting controlled by motion sensors. What distinguishes current development in ambient intelligence – ambient operations supported by strong artificial intelligence -- is a move toward extreme personalization.

It is no longer enough for the interior temperature to be maintained automatically; we want it to adjust to our personal preferences. Lighting turning on and off as we move through a building is worse than passé; we want it to adjust to our color and intensity preferences.

Philips Hue lighting is an example of the latter that is showing up in many homes. It requires interaction with a networked wearable – typically a smartphone – but if all the elements are in place it will, for example, make sure that lights are turned on when the resident comes into range, thus avoiding the need to fumble around in the dark for a light switch or change lighting with a voice command.

Philips has brought this concept into the workplace in the Edge, a new building in Amsterdam where workers can

personalize both lighting and temperature at their workstations using a smartphone app. Once set up, the app will control light and temperature for workers wherever they travel in the building, utilizing the network of lights and sensors installed throughout the facility that Philips refers to as a "connected, smart ceiling."[10]

Personalized Service is a concept that is gaining traction in markets such as transportation, where vehicle manufacturers are developing ever-more sophisticated ways of anticipating the needs and desires of individual vehicle occupants; everything from seat position to interior temperature to music and navigation preferences is being tied to user profiles that live in the cloud[11].

Concerns about privacy and human agency

Because it is based on a confluence of powerful technologies that implicitly have the ability to shape our environments and even alter our behavior, ambient intelligence carries risk as well as promise. The Dutch scholar Philip Brey, writing in Ethics and Information Technology, noted that, "One of the fundamental ethical questions regarding Ambient Intelligence is whether it is more likely to enhance human autonomy and freedom, or diminish it."[12]

Brey identified three key ways in which ambient intelligence can foster greater human agency:

- by making its environments more responsive to voluntary actions, thus helping people to more easily reach particular goals;
- by supplying people with detailed and personalized information about their surroundings, giving them the ability to interact more successfully with their environment; and
- by allowing the environment to respond to human needs without explicit effort, thus freeing people from "tedious routine tasks."

As the flip side of this coin, Brey identified three key ways in which ambient intelligence could take away human control:

- by taking actions that do not correspond to the needs or intentions of users;
- by, in effect, telling us how to behave due to making incorrect inferences about a situation; and
- by not simply representing the needs of the user but also incorporating interests of a third party, such as a corporation.

Stories – some well-documented, some apocryphal – have proliferated about the intrusive potential of big data, such as analysis that leads a retailer to suggest purchases that inadvertently reveal personal secrets. Digital assistants have been accused of recommending unnecessary purchases by making unflattering comments to vulnerable consumers, such as children.

Because ambient intelligence rests heavily on the collection and analysis of data, and the ubiquity of collection devices, some of these fears are well-founded. A retail system that knows your purchasing patterns and preferences might use dynamic pricing to entice you into irresponsible purchases. An insurance program that tracks your behind-the-wheel behavior could either lower your rates or raise them based on its judgments of your driving capabilities. A robot that knows how you take your coffee may well know other more personal things about you.

The protection against abusive intrusion into our lives rests in a combination of personal vigilance and organizational responsibility. Machines – even the complex, multi-faceted machines we call buildings – can take over aspects of our life to

Could a "smart" environment become "disloyal" to its occupants?

> **As with any technological advance, humans must remain cognizant of what is being gained and what is being lost or threatened**

the extent that we allow them to do so. If the social exchanges that occur in break rooms are important to you, you probably don't want to allow a robot to bring your coffee to your desk. If personal space is a priority for you, you may need to fight a corporate policy that encourages your desk to be shared by others.

The introduction of ambient technologies in the workspace will inevitably cause tension between users who want the benefits of a personalized environment and organizations that see the benefits of controlling those users. Attempts by corporations, governments, or regulatory agencies to direct the allowable behavior of ambient devices could lead to situations where an environment is considered "disloyal" to its user(s)[13].

Opt-out capabilities, manual overrides of automated choices, and other user-specific policies may be needed to prevent, for example, the recording of private conversations in a meeting room without the speakers' consent. This issue undoubtedly will be a subject of exploration, debate, and, unfortunately, litigation for many years to come as ambient technologies become ever more pervasive in the built environment.

Conclusion

Technology is meant to ease human endeavor. Ambient intelligence suggests a significant leap forward in that it not only makes various tasks easier to accomplish, but it does so without requiring much in the way of explicit commands or controls. Lighting and temperatures that adjust to the desires of occupants; devices embedded in walls and ceilings that track occupancy and that record and transcribe meeting minutes; robots and drones that deliver supplies and necessities to workers when needs are perceived; all of these are science-fiction dreams that are rapidly becoming reality in the 21st-century built environment.

But, as with any technological advance, humans must remain cognizant of what is being gained and what is being lost or threatened . There is no substitute for a pro-active approach to technological transformation to ensure that human needs are truly put first, and that mechanics and electronics are designed and implemented in ways that serve rather than control **W&P**

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The **Work&Place** blog includes many posts from our previous site, occupiersjournal.com, and is also being updated and expanded regularly, with contributions not just from our own editorial staff but from colleagues and other experts in every region of the world.

The blog also includes a few – soon to be many – excerpts from video interviews with selected **Work&Place** authors – conversations in which they expand on or dig deeper into the core messages in their written articles.

I will also go out on a limb to tease you a bit with several new sections of the website that are still under development. We're building an Author's Corner, where you can "meet" each of our authors, find links to their work elsewhere, and engage with them in extended electronic correspondence.

We are also developing curated collections of articles and video presentations on more focused topics – for example, pulling together three or four articles by different authors addressing a common challenge, like Big Data, or open plan office design, or the history of the workplace amongst many other key topics.

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