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Work&Place

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Editorial

It's only when you look back on the production of an issue of this journal (and most others) that you finally get the chance to pull together the strands of thought that make it up.

In the best cases, these will crystallise from whatever is in the air at a particular point in time and tell us something about the world in which we currently live.

In the case of this issue I would sum up its core theme as convergence. The essential idea behind this is the lack of any sort of meaningful distinction in a traditional sense between the physical, digital and cultural workplaces. These were once pretty clearly demarcated spheres of personal and organisational influence.

Their overlap and integration define the greatest puzzles we face in the workplace in the early 21st Century. Some of these are addressed in the features included in this edition of **Work&Place**. They include Despina Katsikakis looking at what the idea of flexibility now means, Francisco Vazquez on the new challenges faced by business leaders, Rob Harris's take on the multi-disciplinary nature of the workplace, Rianne Appel-Meulenbroek's call for trans-disciplinary study and Monica Parker's analysis of the current state of organisational hierarchies.

Elsewhere, Neil Usher gets back to basics with his take on the elemental workplace, Beatriz Arantes tears down the barriers to creativity, Christine Kohlert offers her own take on creative work, Mark Gilbreath considers how flexible offices might help the environment and Rob Leslie-Carter offers a considered perspective on the current status of artificial intelligence and automation. Finally, Aki Stamatis considers the right to disconnect that is now becoming a global problem with local solutions.

However, one trap we should avoid is to conclude that there is convergence on a single point, commonly referred to as 'The Office of the Future'. Rather, I think we will see a convergence of the facets of the workplace which will - perhaps paradoxically cause a proliferation of work and workplace models. We should be preparing for even more complexity, in other words.

This is an ongoing and evolving debate which is why it's so important that we all contribute. We hope that you will take up the opportunity, to ask questions, challenge the writers, or to make a related point at our LinkedIn Group, via Twitter, email or even a chat on the phone.

Finally, we'd all like to thank our sponsors Steelcase, The United Workplace and Liquidspace who make it all come to life.

We look forward to hearing from you.

Mark Eltringham
Managing Editor
@InsightOnWork

Scope

news and views

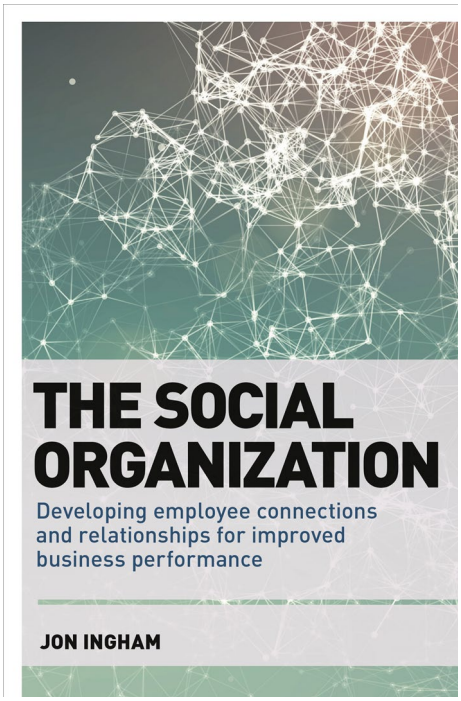
Book review

Paul Carder reviews John Ingham's new book The Social Organization

Jon Ingham's latest book focuses on "how we can make organizations and the work of their people as effective as possible". That could almost be the strapline for **Work&Place**, so it is no surprise that we were keen to get a copy and review it here.

The Social Organization is in three sections. Part One explores the context of social capital and analyses how and why HR and others responsible for talent management need to foster and develop social capabilities. Part Two provides practical guidance for developing higher quality connections and social capital by improving the alignment and effectiveness of organizational architectures, including through workplace design.

I found Part Three useful to think about how the physical workplace and service culture can impact on organizational employees at different stages. This section outlines how HR and related professionals can identify and implement appropriate changes throughout the whole employee life cycle. This includes initial recruitment and job design, social learning, performance management, employee retention, talent management, organization development and the role of social media and other technology as well as social analytics.



The Social Organization: Developing Employee Connections and Relationships for Improved Business Performance
Publisher: Kogan Page; 1st edition (3 June 2017)
Language: English
ISBN-10: 0749480114
ISBN-13: 978-0749480110

Available at Amazon and all good booksellers

Throughout the book, Jon's view of organizations as social communities comes through: i.e., groups of people, with a broad range of human experiences, wants and needs. To manage this social community he argues that we therefore need to understand and think more deeply about human disciplines such as psychology, sociology, anthropology and neuroscience. To me, this is one of the great appeals of this new book: its trans-disciplinary nature. As a result, the book should appeal and apply fairly equally to strategically-focused professionals working in many disciplines. Jon has written extensively about HR in the past, so it is interesting to read the world view through this lens. But the book also ranges across organization design, organization development, internal communication, learning and development, recruitment, reward, IT, knowledge management, corporate real estate and facilities management.

Developing Social Connectedness

The Social Organization makes a specific point about the need for organizations to move on from developing individuals, to enabling networks and relationships between employees. Simply focusing on individual performance does not necessarily result in team, division or whole organization performance. The latter needs a functioning social relationship between the people who need to work together. These points are supported by case studies from leading companies, to further illustrate how relationship-based strategies can be implemented successfully to increase organizational performance.

The book argues that HR must focus

much more on supporting groups than it does just on individuals as it tends to do today. Not just designing the whole organization, and designing for individuals – things like job design – but focusing on the design of groups. HR must ensure that the right groups are included in organization structures, with processes for teaming, and for developing communities. And that those teams are supported by the right type of digital workspace, with the physical workplace, so that groups can be as effective as they can be.

Jon argues that we also need to focus much more on organization development interventions, helping to create higher levels of trust between people working in organizations. And, to help move the focus on, from 'what's in it for me', to 'what's in it for us'. He states that if managers can move up the agenda for HR, from a focus on individuals to a focus on groups, then organizations will achieve much more.

What about 'place'?

There is a Chapter specifically on "Designing the Workplace", in which Jon Ingham proposes that "organizations consider the workplace as an important strand of their organization architectures and the workplace is therefore considered a key element in the OPM" – the Organization Prioritization Model. And he has considered the work of many workplace strategists whose names will be familiar to readers of **Work&Place** – such as Kerstin Sailer (UCL), Nigel Oseland, Philip Tidd (Gensler), Christine Congdon (Steelcase), Zhonghua Gou (Griffith Univ.) and others. But we should not be parochial or stove-piped in thinking about this book. It presents a useful way to reflect on both the social connections necessary across organizations, and the ways of harnessing these social connections across all management disciplines, working together.

The Organization Prioritization Model

This is taken from a video interview with Jon at
https://youtu.be/9xPuiEYleQ0

"An organization model, or operating model, is a tool that organization designers and developers, and others involved in changing and improving their organizations, can use to ensure that they are considering their organizations holistically and are thinking about the different elements in the organization and how those elements interact. And also, these models are useful to create a shared language inside the organization, so that when people talk with others about the organization, they are all coming from the same place.

There are a number of very well-known and very well-used organization models, including McKinsey's 7S, Jay Galbraith's Star model, the Burke Litwin model, David Nadler's congruence model, and a few others. But most of those have been around for some time, and the world of work has changed completely, meaning that a lot of these models are not fit for today's world.

There are a number of problems with these models. Firstly, they tend not to be dynamic. They either focus on change management, so looking at the different activities that an organization can undertake, in order to create different outcomes. Or, they focus on business excellence, [looking at] the outcomes and the different elements inside an organization to ensure that they fit and align with each other well. What they don't do is help understand how organizations can undertake activities in order to create the outcomes that they need. And that is one of the things that the Organization Prioritization Model (OPM) does.

Secondly, a lot of these models give far too much attention to structure. The structure is part of any organization model, but it tends not to be a very important one. It is fairly difficult to get much transformation just by changing the structure. And yet that is the thing that most models, and most organization designers, focus on. It shouldn't be. The OPM pushes back the focus on structure, until we have considered some more important things.

Thirdly, a lot of the other organization models don't focus enough on some things which are really important in today's business world. And in particular, I'd emphasise the role of social relationships. So, particularly in terms of McKinsey's 7S, today that really needs to be an 8S model. It needs to include social relationships, because relationships are so important in today's world. So the OPM, to me, is more effective than other models because of those things.

The OPM includes four core elements of an organisation, which I suggest are the infrastructure, the work processes that help the organization operate, the people, and the relationships between them. It then looks at a number of different groups that relate to those four core elements. Those are the functional groupings, the project teams, communities and networks. And the OPM helps link those two things together. So, organizations can prioritize the type of structure that they may need, depending on which of those elements are the most important to them.

To me, it's a best fit model for a new world of work' **W&P**

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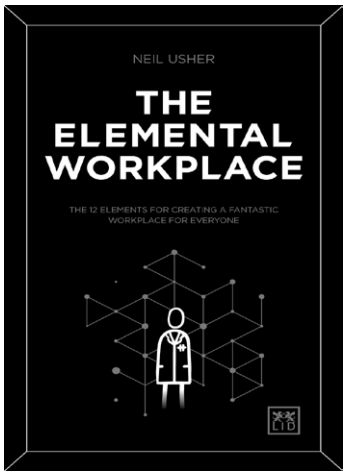
We need to stop pursuing workplace fads based on flimsy data and wishful thinking, and instead focus on what really counts in creating great spaces

Neil Usher

Discovering the elemental workplace

We love a survey. Not a week passes without another startling revelation of the poor condition of our workplace, the fragile state of our engagement, or the dearth of meaning at the heart of our daily pursuits. The data (and I use the term lightly) tells us we want to be productive, if only we could be productive. Our intent and motivation is never in question. We have become masters of realising and articulating that we have a problem, and so we ask ourselves over and over just to make absolutely sure. We bang the table, we sound enlightened when we declare "something must be done!"

Unless, of course, you work in one of the 10 Coolest Workplaces in the World in which case you are okay and do not need to worry. Unless you worry that yours is not as cool as the others in the list, envy is a terrible thing. We are drowning in hastily-gathered, invariably sponsored survey data, yet suffer a poverty of solutions. Interestingly, while the tendency is to define the problem in these terms, on the few occasions we respond it is in pictorial form: people were struggling to get anything done, so here is a shot of a nice meeting room with a motivational slogan on the wall in mock-handwritten text. Possibly even in neon, for effect. We cannot help but respond in aesthetic terms, without considering the underlying infrastructure on which the ephemeral beauty and playfulness of the design totters. There is of course much more to it.



Rather frustratingly we do not hear much from occupiers, those who most understand the present situation and the challenges of redressing it. Ironically, we heard a little more before social media opened up so many new channels of enquiry and network creation, when all that was open to us were the professional leviathans, dominated by a small number of active voices domiciled within brands we recognised. Whether it be for reasons of time or fear of being quoted or misquoted, it is a mute landscape. We are all the poorer for that, and will remain so. The same leviathans still tick over, one or two steps behind, not lost to us just yet.

A bit of structure helps. Not too much, just enough as my old friend Lloyd Davis would say. The workplace world has always struggled with it, lurching as it does from one possible universal panacea to another. We are currently locked into a Wacky Race to the printers to declare leadership in the area of biophilia, without actually stopping to ask whether it is relevant or important: it may well be, but we do need to critically engage, as the end product will be all the more robust for it. A framework is needed that can stand the test of time, that is not imprinted onto schemes that sparkle and so soon dwindle, compromised and superseded. A structure that exists outside of fad, and outside the changing shape of both the corporate and vendor landscape.

Structure in turn requires balance. It must be stable, equally considerate of each of its components. Not a hierarchy, in which we are forced to prioritise or accept the priorities of others. In turn, balance is not compromise, as is often assumed. It should stand scrutiny whichever way it is tipped and turned, from whichever direction it is viewed.

The structure should also be capable of being rejected, on the basis of sound reasoning, as there will always be situations requiring of a different approach or solution. A choice not to adhere is still a valid choice.

The Elemental Workplace is an attempt at a solution-oriented approach with structure and balance, a possible pathway from problem to outcome irrespective of culture, location, sector or workstyle. It has been evolving for several years and will continue to evolve beyond its publication in early 2018. We know we can do better than we are – it is time we started considering how, and getting on with it. We can do this, and we must do this **W&P**

Neil Usher
Neil Usher is a workplace strategist. His first book The Elemental Workplace is out soon

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The flexibility to choose where and how to work can be a double edged sword, but when done correctly opens new vistas of choice and engagement

Despina Katsikakis

A future landscape of flexibility and choice

Over the last 10 years, technology has given us the choice of where and how to access information. Being connected anywhere has enabled a shift from work as 'somewhere you go' to work as 'something you do' anytime, anyplace.

While this new engagement with work increases flexibility, it also brings increased working hours and information overload as people are lost in their devices, 24/7, with little awareness of their surrounding environment. The results in the workplace are people who are both disengaged and distracted. Gallup (2013) reports that 70 per cent of American workers, are 'not engaged', and are just going through the motions of working or are 'actively disengaged', hate going to their work and undermine their companies with their attitude.

These figures are consistent with data from the UK and even more extreme figures in the developing world.

> "...While not yet effectively implemented as the norm, the arguments in favour of more flexible working practices are powerful and here to stay..."

While not yet effectively implemented as the norm, the arguments in favour of more flexible working practices are powerful and are here to stay. In the UK, Thompson and Truch (2013) estimate the value of productive hours gained to be at least £6.9 billion and workstation savings of at least £1.1 billion, as flexible ways of working enable office buildings to be used more intensively with workspace being used on a shared, as-needed basis. Findings consistently suggest that workers also gain a better work-life balance, are more productive, can concentrate better and experience reduced stress and commuting times, when they have choice of where and when to work.

One of the usual arguments against offering people greater autonomy over where and how they work is a lack of control and consequent lack of effort from employees. New evidence by the German Institute for Economic Research (Beckmann et al., 2015) suggests what actually happens is the opposite. When employers relinquish control, people actually work more. People who enjoy autonomy on average put in an extra seven hours each week and are more committed to their employer.

In this new, increasingly paradoxical world, helping companies to design the infrastructure to support and enable engagement in the workplace is at the core of helping them to be productive. The current focus of work is on supporting knowledge workers. The core of knowledge work is non-routine problem-solving which requires an integrated approach that includes spatial, technological and managerial issues. Even though technology enables a great deal of knowledge work to be performed anywhere and anytime, the role of the office is still very relevant but it needs to be redefined.

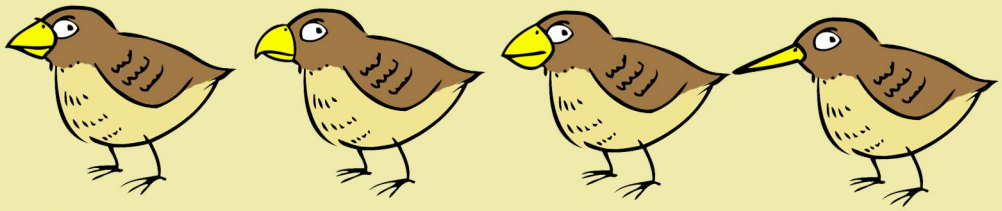
New ways of supplying, leasing and servicing the workplace are needed. Assuming an overall reduction in space requirements for office users, given intermittent patterns of occupancy and increased sharing of space over time, landlords can plan for less real estate to be better used.

This densification approach can be used as part of a wider strategy to make workspaces more valuable and command higher rents by finding new ways of adding value for tenants by providing shared spaces beyond the office that they lease to be used as alternative places to work. This allows the landlord to make more of the real estate asset. By providing flexibility to tenants and activating the shared spaces to create a vibrant community that people want to be a part of, the building itself becomes a destination. Such an offer will both attract new tenants and also retain them beyond the normal lease period as it can support their changing business requirements and offer them access to a unique ecosystem of talent.

What we design today will be our future heritage. It must be a sustainable and resilient resource that stands the test of time. 'Long life, loose fit, low energy' should be the guiding principle. A minimum life expectancy of 60 years is not unreasonable for new buildings but they should be flexible to accommodate a variety of uses over that time. The dynamic changes enabled by technology add another dimension to time, that of the day-to-day and hour-by-hour change of settings for work. People

On The Origins of Flexibility

@BeagleChuckD

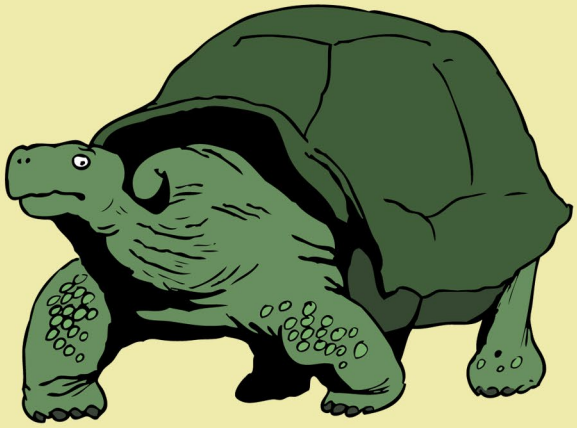


Adaptable, agile and nimble

Workers also gain a better work-life balance, are more productive, can concentrate better and experience reduced stress and commuting times, when they have choice of where and when to work.

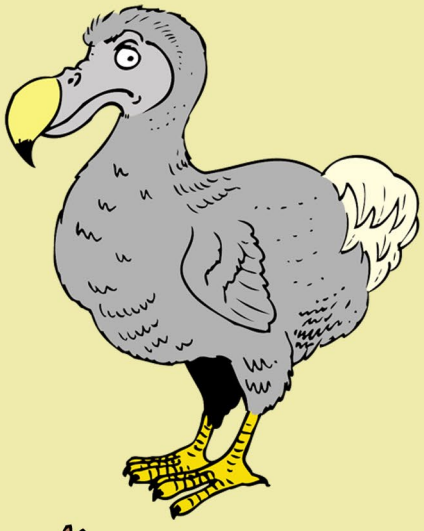
Slow on the uptake

Developers and landlords need to start thinking of their buildings as vibrant communities and create a new approach to provide optimum (and timeless) versatility and adaptability for new ways of working.



Stuck in silos

The challenge will be breaking down the corporate services silos to integrate workplace and resource planning and focus on creating people-centric experiences.



Driven by Technology

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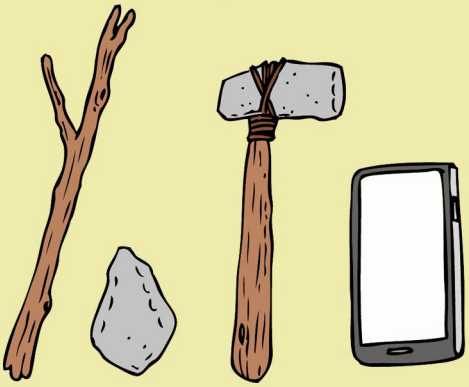
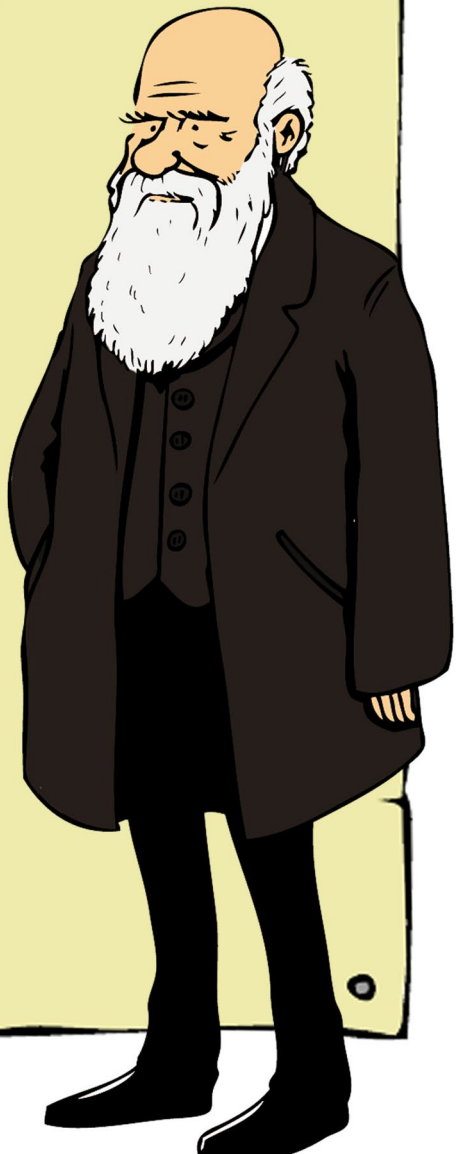




> **"…Attracting the best and brightest staff to your organisation and fostering a happy and healthy workforce can be significantly impacted by the quality of the working environment..."**

regularly report that freedom and choice matter most; they feel better when they are in a flexible space that they can change to meet their work needs, mood, or inspiration at the moment.

What if a building was designed for continuous adaptability? Space could be adapted for business shifts in 'real time', to be continually re-aligned with the core business objectives. And if space was able to be continually informed with real-time metrics? True sustainability in terms of workspace was able to be directly measured not only as environmental, but also financial, productive, cultural and market competitive?

All these scenarios have a consistent theme; they are dynamic and fluid, much like the use of space in cities. Recent models of the workplace, such as distributed working, hoteling, teleworking, agile working, etc., are dynamic in principle but primarily are intended to maximise efficiency and cannot deliver real flexibility unless they embrace a wider real estate context.

Developers and landlords need to start thinking of their buildings as vibrant communities and create a new approach to provide optimum (and timeless) versatility and adaptability for new ways of working by shifting traditional ownership and lease constraints to pay as you go, and providing the workplace as a service.

The working environment can either stimulate and sustain people's engagement and energy or dampen and drain it. For it to be a positive experience that adds value, it must meet a series of basic human needs: our need to renew our physical energy; our need to feel valued; our need to focus and be creative; our need to connect with others in a range of ways.

We perform at our best when we move, spend time outside getting daylight, and alternate between different physical, emotional, mental and spiritual states. The combination of open plan office design and email has shattered people's capacity to focus on deep work due to constant interruption, distraction and lack of freedom and choice. We have come to see multitasking as an essential skill when in fact it destroys our productivity. The lack of places to work without interruption means that we further reinforce a culture of intermittent thinking that tends toward the narrow, short-term and superficial. As we work more continuously, the natural breaks we took in the past have been replaced with constant access to mobile email, increasing our need for intentional high quality renewal.

Technology-induced stress and a lack of meaning in everyday work creep into most workplaces. Brigid Schulte (2014) states that, on average, initial enthusiasm for the job fades after six months when the majority of employees feel overwhelmed and disconnected from their management team and its vision. In her book, *How to Work, Love and Play When No One Has the Time*, she looks at the stress caused by a culture that glorifies constant busy-ness and encourages organisations to implement policies that promote a 'digital detox' and true vacations in order to liberate people from the 'ideal worker' paradigm.

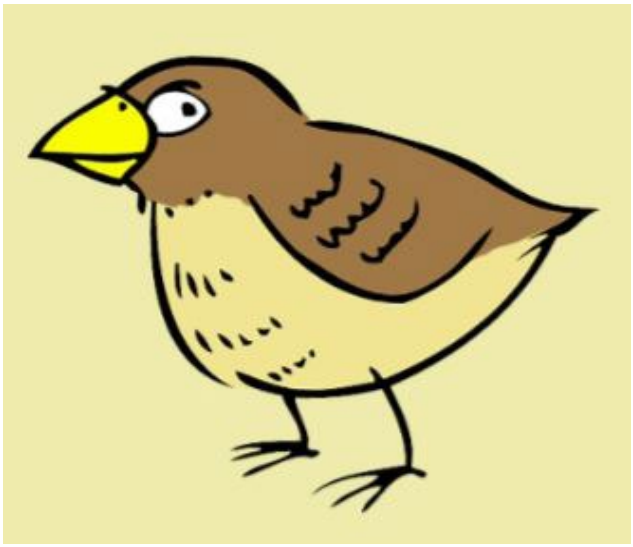
To cope with the intensity of work today we need more access to quiet spaces to concentrate, think and recharge, as well as access to flexible spaces for meeting, collaborating and socialising. We should change positions and spaces and stand up more often and ask ourselves if it's really necessary to do all of our tasks sitting in a chair.

The World Green Building Council (2014) reports overwhelming evidence that a range of office design factors – from air quality and lighting, to views of nature and interior layout – can significantly impact the well-being and productivity of staff.

Attracting the best and brightest staff to your organisation and fostering a happy and healthy workforce can be significantly impacted by the quality of the working environment. The workplace can affect the physiological and psychological performance of people, so it is necessary to work with the users to co-design places that energise, encourage social interaction and collaboration, enhance personal control and provide services and events to manage the blurring of working and living to improve the quality of life.

Work is inherently a social endeavour. The focus of large companies is centred on people, so creating places that provide for the well-being of people at work is critical for business success. David Rock (2009) says, 'social interactions are delicious things to the brain' and that is why we are drawn to them, but he also stresses that:

Productivity is ultimately about choice and autonomy and if we give people the opportunity to move between different



Images: Simon Heath

> **"...Successful co-working environments curate authentic experiences; ubiquitous Wi-Fi, great coffee, healthy food and services, alongside networking events, and demand for them is exploding..."**

spaces to focus when they need, to collaborate when they need and to have great social interactions, we are giving them what they really need at work. These elements of community and mutual support are inherent in the shared workplace culture. Co-working spaces can provide an extremely nurturing context for start-up companies, and while initially were much more prevalent in technology companies, they have now spread across all sectors of economic activity.

Successful co-working environments curate authentic experiences; ubiquitous Wi-Fi, great coffee, healthy food and services, alongside networking events, and demand for them is exploding. In 2011, there were only 1000 coworking spaces worldwide, with a dominant presence in Europe and the USA. The latest survey by CoWorking Europe Conference (2015) demonstrates that four years later, there are almost 7,800 coworking spaces. The forecasts suggest that their growth is unstoppable: by 2018 there will be 37,000 coworking spaces spread across all continents and there will be over 2.5 million professionals who buy membership in a coworking space.

In the City of London, Ramidus (2014) found that around 70 per cent of serviced office space is occupied by SMEs and predicted that the market for serviced offices could grow by 77 per cent by 2025. Potential for growth exists, based on three principal sources of demand.

First, there is strong and sustained growth in the number of small, often technology-enabled, knowledge-based, businesses in London. Second, corporate occupiers are becoming accustomed to supporting their core property needs with flexible on-demand space. Third, small businesses that are occupying secondary properties in conventional leases will likely opt for a different approach, spurred by a diminishing supply of small and short-term office space in the conventional leasing market and by the need for better employee engagement.

In New York City, there have been almost 500 tech start-ups in coworking spaces, incubators and accelerator sites (Bowles and Giles, 2012) but the value of the phenomenon has now been recognised in many finance and media businesses worldwide, with many of the defining characteristics of coworking spaces being adopted in corporate environments, such as an emphasis on collaborative rather than individual working and a range of spaces to support innovation.

These internationally established, 'third-space' workplaces vary in terms of scale, variety of settings and even where they lie on the leisure-work continuum, but they share certain layout characteristics, including zones dedicated to concentrated working, touchdown work areas for collaborative working and short duration visits, formal and informal meeting rooms and areas, a café and other social spaces and business support spaces, including reprographics and technology support. Such is the dominance of this new work style that it can now be met in a range of forms. Some coworking spaces have leisure and social activities at their core, much like private members' clubs such as Soho House, the Hospital and the SocietyM business club in CitizenM hotels. Others have workspace at their core but also offer social and leisure facilities, such as Dryland Business Members' Club in London's Kensington High Street.

The workspace-as-service model means that there is no economic bar to blurring the boundaries, allowing us to rethink space, work and the city. This new blurring of boundaries of space, time and use has served to increase rather than relax the pressure on work settings to perform. The only constant is dynamic change. We can safely say that the office environment will no longer be made up of rows of desks but of a rich variety of settings and curated events which will blur the boundary between personal, shared and public spaces to support organisational innovation.

The nature of corporations is changing so they will be more agile and reliant on dispersed talent networks and open source innovation and, as such, the nature of employment is changing and less likely to provide lifelong careers and job security. Intuit (2008) reckon that more than 80 per cent of corporations are planning to increase their use of flexible workforce in the coming years. In the USA, 45 per cent of workers are already described as contingent, and 33 per cent of the UK workforce is currently described as independent or freelance and this proportion is projected to be 40 per cent by 2020. This trend is now spreading to other regions as it aligns with the desire of

new workers not to work for a company, but instead to be a part of a community.

We live in an economic context that is constantly and rapidly changing and the way we work is central to that change. Economic growth used to mean more jobs but that is no longer the case. Rotman (2013) estimates that output can now grow overall, with no increase in employment. Since 2000, output in the USA has grown faster than employment, suggesting that technology already is destroying more jobs than it creates. Schiller (2014) estimates that the robotics and 3D printing revolutions could accelerate this trend still further, as the comparatively low entry costs for these disruptive technologies make them widely accessible to everyone, including developing economies. Losing occupations does not necessarily mean losing jobs in the conventional sense – just changing what people do. A growing proportion of jobs in the future will require creative intelligence, social intelligence and the ability to leverage artificial intelligence.

The Future of Work Conference (Birnbaum et al., 2014) proposed that physical and reasoning tasks are increasingly being done by machines alongside people, enabling people to work on more strategic things rather than look at spreadsheets. Through the 'creative destruction' of technology, a lot of jobs will disappear (particularly for middle management) and a lot of new jobs we cannot yet imagine will be created. The growth in new jobs will occur as much through crowdsourced freelancers as within the bounds of the corporation.

> **"...the employee-employer relationship is changing from how value can be extracted from workers to how much can be instilled in them..."**

Birnbaum et al. (2014) state: "As machine learning progresses at a rapid pace, top executives will be called on to create the innovative new organisational forms needed to crowdsource the far-flung human talent that's coming online around the globe. Those executives will have to emphasise their creative abilities, their leadership skills and their strategic thinking".

As the war for talent increasingly happens outside the traditional organisational boundaries, the implications are huge. New organisational forms will develop that overlay the responsiveness of start-ups through the nimbleness of network structures with the execution efficiency of a traditional hierarchy.

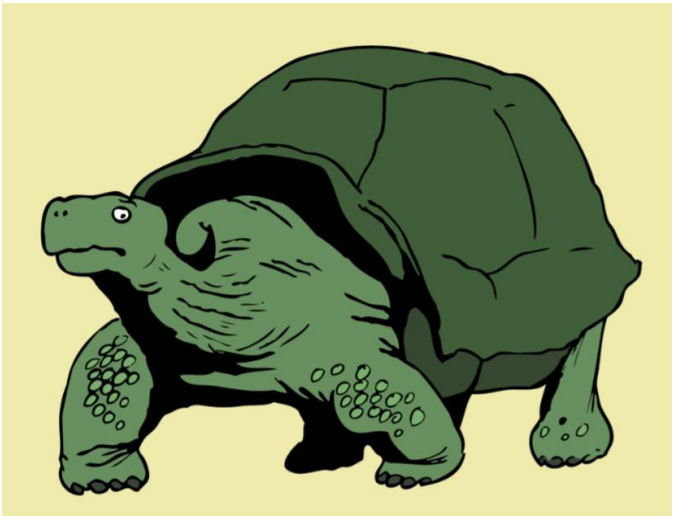
PWC (2014) forecasts that organisations will avoid hierarchy and opt for flexible, flat and fluid organisational structures. They will have a network of relationships with third-party research centres, innovation firms and universities through which they will fund and source new products and process ideas. They will use mechanisms such as idea-sourcing platforms, challenge contests and seeding of venture funds and incubators to bring a constant flow of opportunities on stream. This is validated by Ramidus's (2015) research in the City of London, where differences between sectors are now seen to be eroding as corporations focus on technology work and become reliant on dispersed talent networks and open source innovation.

To facilitate this transformation, the employee-employer relationship is changing from how much value can be extracted from workers to how much can be instilled in them. The benefits of tapping the full range of people's knowledge and talents may be obvious, yet it is surprising that so few companies have done so. Elite universities and hospitals, Goldman Sachs and McKinsey have all been adding value to valuable people for a very long time. Google and Apple are more recent examples. They do this in myriad ways – by providing networks, creative interaction with peers, stretch assignments, training and association with a brand that confers elite status on employees and collaborators.

Connections can lead to new learning. Companies should create environments – both physical and virtual – that help employees to develop new connections and also to strengthen their existing relationships, as it is now well proven that traditional work environments of rows of desks are obsolete in this kind of working. To support effective connections it is essential to create workplace environments that foster serendipitous encounters. Many firms already build their workplace environments with the common areas strategically positioned to allow workers to 'bump into each other'. These types of environments should also be developed in virtual settings. While some companies try to ban access to social media to manage distractions, Waber et al. (2014) estimate that social media has the potential to save companies $1.3 trillion, largely owing to improvements in intra-office collaboration. It is clear that the experience of work needs to be understood and curated inside and outside corporate office space, in both the physical and virtual realms.

The office workplace evolved to support the uninterrupted flow of paper processing, where the main aim was efficiency. As the process of work has changed to focus more on the value of knowledge and the production of ideas, we have become confused about the purpose of the office. In order to successfully create and share knowledge and to innovate, we need to bring the focus of the workplace back to people.

Corporate management teams are increasingly recognising the importance of putting people's needs at the core of their workplace strategy. Piet van Schijndel, a member of the Board of Directors of Rabobank Nederland, says: "I predict that over



> **"...Successful co-working environments curate authentic experiences; ubiquitous Wi-Fi, great coffee, healthy food and services, alongside networking events, and demand for them is exploding..."**

the next ten years, one of the biggest problems we will face is how to get good people to join our company. If you have something to offer where people can balance their work and their home life in a modern way which suits those people, then that would naturally be a way for our company to attract people".

After several years of development Rabobank Nederland, the banking arm of the largest financial services provider in the Netherlands, Rabobank Group, rolled out an organisational and technical infrastructure that allows employees to connect to one another from practically anywhere while still meeting the stringent encryption standards that banking systems require. With no fixed offices or rigid job descriptions, Rabobank's employees are responsible for the results of their work, but they are free to choose how, where, when and with whom to carry it out.

This approach requires managers to place an extraordinary amount of trust in their people, and it demands that employees become more entrepreneurial and collaborative. The business environment of the future needs to trust people and technology and provide flexibility and choice for employees to connect with complementary skills across a network, to work together on challenges, to learn fast, unlock their passion and improve performance.

Such an environment helps people feel energised and connected to the organisation and attracts, inspires and retains talent as well as redefines our definition of places for work. In Duffy's (2008) 'networked office', complexity underpins the next stage of real estate evolution; the moment when knowledge work, supported by promiscuous networked information technology, has eroded all the spatial and temporal conventions of twentieth-century work of all kinds.

The speed of technological progress, such as the popularity of the 'Internet of Things', will have a huge impact on the way we work over the next ten years. Information technology helps us to reimagine space as well as connectivity – it seems to minimise the significance of the synchronicity and colocation of conventional office buildings, while it augments the importance of other aspects of place: physical transport and access, virtual and social connectivity.

Flexible working is therefore not placeless: virtual work and physical place are transforming each other and reinforcing the value of certain places as the hubs of both physical and virtual networks. This apparently counter-intuitive view is widely proposed by economists and theorists: Edward Glaeser, for example, in The Triumph of the City (2011), argues that the role of the city as the most effective way of transferring knowledge has in fact been reinforced by the rise in technological connectivity – 'urban proximity' being a key factor in concentrating, clustering and incubating talent.

- What if – our workplace actively supported our life at work?
- What if – we had a say in the way we work and could make a difference?
- What if – we felt a genuine connection to our community of colleagues?

Connectivity and access to knowledge are the defining features of contemporary business and society and are helping to redefine how and where work is accomplished. By embracing the sociability of where work happens, we can enable people to connect with other like-minded people at inspiring spaces and events – to collide, collaborate and co-create value for themselves, their business and their community.

Healthy employees are significant factors in a healthy bottom line but our entire approach to the workplace requires transformation. Our current well-being paradigm is stuck measuring the cost of various degrees of illness rather than calculating the value of higher levels of wellness and proactively enabling us to thrive. It is not a simple solution; a gym, or a standing desk, but it is an ongoing process that requires an integrated approach by leadership, space, technology and policies to deliver change. Huffington (2014) introduced well-being as the much-needed Third Metric of Success. She makes the point, that there is no work-life balance. We have only one life and a company culture that does not expect employees to be wired and responsive 24/7 needs to become the norm to make our workplaces truly sustainable. BCO's (2014) research estimates that more than a third of participants accuse their employer of not valuing their well-being at all. The report comes up with three starting points to help employers create a culture of well-being: care; control; and collaboration. The study found that nine out of ten workers feel their well-being diminishes if they do not have control over

> **"…When space is designed with people and purpose in mind and has a clear narrative, it can make our life at work more meaningful…"**

their day-to-day activities. In addition, they want the flexibility and control to mix collaboration with colleagues with quiet moments of concentration to help them get 'in the zone'. Nine out of ten workers claim that working 'in the zone' helps them perform better as well as feel better.

However, currently over three-quarters of people feel they are hampered by a noisy open-plan environment and a further quarter are frustrated by a lack of privacy, while more than two thirds would like to see relaxation areas in their workplace. Companies can meet this need for control by offering employees flexibility and choice in how and where they work and trusting them to decide their own working patterns.

Our places of work are always communicating corporate values and culture as well as enabling certain behaviours. It is clear that the office environment can play a key role in supporting our well-being goals by mediating the way we undertake the daily required tasks and activities. People work best when they can move freely between quiet and more social spaces and have choices.

In addition, nine out of ten employees believe that support from colleagues enhances their well-being and makes them more productive. However, building a collaborative environment as flexible, and as remote working grows, means companies need to embrace connectivity to ensure that employees have the tools to work, discuss and innovate together no matter where they are. Contrary to many schools of thought, the survey reveals that virtual connectivity actually contributes to well-being according to more than half of the workers surveyed.

When deciding on the most appropriate space – including physical and virtual 'places' – in which to carry out a work activity, a variety of factors must be taken into account but it all starts with personal awareness of what you need to do, how you feel and having the choice of where to do it. When space is designed with people and purpose in mind and has a clear narrative, it can make our life at work more meaningful. It can help make us more aware of what we are doing and who we are 'being' at work; to more meaningfully connect with others, to share knowledge and ideas, to concentrate and focus, to activate our mind and body, to connect with nature, to recharge our energy and to inspire ourselves and others to thrive.

As the war for talent intensifies, employees are behaving more like customers; being choosy about who they work for and looking for organisations that convey authentic culture and values in their workplace. Everywhere we look there is now a demand for genuine, authentic experiences. From craft beer, artisan cheeses and locally sourced products, to mindfulness meditation, we are constantly looking for ways to increase our awareness and to reconnect with our humanity, with nature and with a sense of purpose.

We need to bring more humanity into the workplace and provide environments with a new purpose – environments that delight, stimulate, energise and connect us with each other.

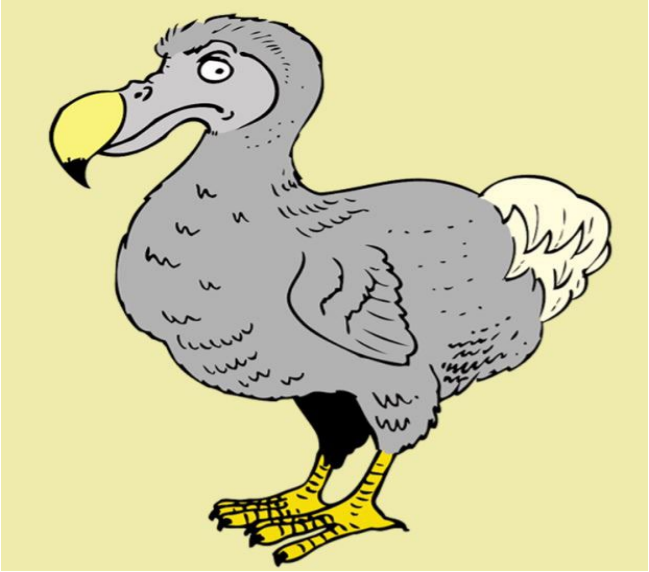
Disconnection from community and limited time with family are common stress factors for people in many large cities, that currently rely on commuting, forcing people to travel to the centre every day to work. In London, the 'average' commute time is 74.2 minutes and the population of the city of London increases by 56 per cent during a normal working day. Leveraging work delocalisation, changes to transport methods and business structures to generate diversified multi-centres, in which coworking spaces become neighbourhood services, thus reducing commute times and car usage will improve not only the work-life balance of millions of people but also will improve local communities and the growth of local economies. Corporations are starting to embrace this by using coworking spaces close to where people live to cut down commute times, access innovative talent through the coworking ecosystem and benefit from 'spaceless growth' – maximising flexibility while minimising fixed costs.

The workplace is now a hub for bringing colleagues together. It has become a 'high-tech coffee shop', where networked individuals meet, share, collaborate and develop ideas, strategies and solutions. As such, the workplace is increasingly being designed and managed less as a static backdrop to routine solitary work, and more as a 'flexible', 'hotel-style' facility that provides a high level of service and experience to its demanding 'guests'.

While we now have four generations at work they are all aligned on their expectations of choice and flexibility, greater transparency, more teamwork and more amenities to support authentic sociability, knowledge, convenience and well-being (Ramidus, 2015).

Puybaraud and Kristensen (2015), looking to 2040, propose a compelling future:

- choice-based restructured patterns of work; personal choice dictates working patterns;
- access to wide range of coworking facilities less than 20 miles away from home;
- mixed facilities in one single location creating a community environment;
- access to a workplace is a reward and provides outstanding experience for users;
- all facilities are multipurpose, mixing different activities (work, leisure, entertainment, sport, medical centres …);



• wellness is at the core of our way of living, moving from wearable to implantable;

• service delivery is people-centric and technology-focused to enhance the user experience.

It is easy to see how real estate portfolios will increasingly become a dispersed network of workplaces; social and adaptive working environments, empowering users and teams across different work contexts and collaboration modes. Our own workplace will be a menu of coworking environments that leverage our social networks and support our personal needs and aspirations day to day and hour by hour.

This context poses some clear directives for the design, leasing and servicing of buildings:

• Space is used as a key medium for expressing corporate culture and values.

• Design and leasing for continuous adaptability and diverse usage and patterns.

• Interiors are loose-fit and focused on activity-based settings for factors such as collaboration, creativity and contemplation.

• Shared spaces are used as a means to facilitate collaboration and community.

• Amenities and service provision, to support life at work (food, well-being, learning, convenience, etc.).

• Technology interfaces, that are intuitive and seamless to improve the user experience.

• Events are curated and managed to create memorable experiences and to attract talent.

• The public realm is permeable and designed to reinforce a sense of community and connection to the city.

The design and management of buildings are much less about the 'hardware' of work – the desks, the partitions, technology, electricity, and so on, and much more about the 'software' of work – the cultural, social and value systems of the organisations. A focus on the 'aspirational' aspects of the workplace: empowering workers to do their best work. The challenge will be breaking down the corporate services silos to integrate workplace and resource planning and focus on creating people-centric experiences **W&P**

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A new generation of CEOs is emerging in the workplace and they are having to address a wide range of new challenges

Francisco Vazquez

The challenge facing CEOs in the new normality

We see new companies arise, and in some cases —more and more often— we see them grow. Some are companies who have reinvented themselves, who have adapted to the new reality; others are modest entrepreneurial or collaborative projects, that start out with good ideas and great hopes —ideas that respond to new needs— but, quite frequently, they don't have enough resources. In the first case, the probability of success is high, in the second, not so much. And in all cases, there is a leader, a CEO, behind the initiative.

Four generations coexist in the current work environment, they have almost nothing to do with each other, they don't share the same experience, knowledge, vision, culture, interest, or strategy, but the tendency is to learn from each other.

> "...the CEO must always be a proactive, motivating and encouraging person, and, above all, he or she must be expendable...."

The situation is the same with the CEOs, there are several very different generations at the forefront of businesses. And I ask myself, as many others have done, whether CEOs are born or are they made? The challenges they have to deal with have changed, and their resilience and ability to adapt to change is imperative.

The challenges of the CEO are becoming more complicated in the #NewNormality, which is how we like to call the current situation of constant transformation that companies —whether they are well established or not— face every day. The role of the CEO is no longer a matter of mere management and control, but of trial and error. In these years of change when globalization, technology and flexibility have taken over, the CEO has to be the first to be able to change, but it's no use denying that he or she is as lost or more than the rest.

We must be able to create humble, generous and open companies, because we don't know where we're headed, we have no clear strategy for five or ten years, and we don't know what the future will bring in the short term. The key is what the CEO chooses for the company: embracing transformation or being a poseur (or poser).

If he or she chooses posing instead of taking action, I have nothing to say, but if the choice is transformation, then the leader must be the first to embrace it. Which does not mean that the CEO is responsible for what happens, but without taking a risk it is impossible to win.

In these days, CEOs do not have all the answers nor do they have the solutions to their problems. They aren't always right, but they must lead their teams with a positive and constructive view, and never forget everybody has the right to make mistakes.

The biggest difficulty or the biggest challenge is to build a team who will be willing to accompany that CEO down the path of the transformation. That team may just be the key to success or to failure. We must learn from failure and accept the mistakes we make on the way. Every experience is a lesson we learn.

Therefore, the CEO must be a proactive, motivating and encouraging person, and, above all, he or she must be expendable. Because the great leaders are the ones who know how to surround themselves with the best professionals, and how to build the finest team of people who will work in a responsible and independent way. The current leader will be the last in line, and will take on different roles, depending on the needs of the moment.

I'm twice the age of these CEOs

According to a report recently released by InfoJobs, more than half of the workers surveyed who are currently over 50 years old have a boss who is younger than they are. The millennials are here already and they're here to stay, which is what we want. In many cases they are the CEOs of those small

projects I mentioned earlier, full of good initiatives and self-confidence.

Once again, technology and diversity in the way we work are key in this new corporate normality. To harness and manage the skills of young leaders is advisable and not as complicated as it seems. According to the mentioned employment web, workers consider that new knowledge, a results oriented work environment and the ability to manage collaborative teams are positive aspects of having a younger boss. However, a lack of experience or maturity is perceived as an inconvenience.

Here are some of the highlights of the new leaders or leaders:

- New ways of working. A more practical training encourages teamwork and multitasking. A job oriented towards results and greater freedom to work are key in the CEO's new management skills.
- Training. Young, very prepared people with double majors, masters degrees, postgraduate studies and knowledge of languages, are able to take the reins of any project that they tackle.
- Beyond leadership. Their concerns lead them to explore new markets and new ways of working in order to implement them in their company. Hard work is more important than the image of leadership. The new leader wants to be expendable.
- The need for change. Most new leaders share the desire for change and new professional challenges. This often makes the company fear their possible lack of attachment to the project they lead.
- ICT. In a world where all companies are now heading directly towards a digital transformation, these leaders who were born in the digital era have an excellent technological training.
- International outlook. A global staff that bets on mobility and provides the tools that make it possible.
- Measuring success. Beyond economic results, satisfaction comes from the values of the company and its impact on society. A message that will be transmitted to their employees.
- Team management. They empathize with the needs of their employees, even though 18% of workers with young bosses do not trust their ability to manage teams. Perhaps that is the key, a horizontal structure.
- Fewer private offices. They aim for mobility and adapt the company to the new models of work environments.
- Energy and creativity. Employees perceive that young leaders are creative, they bring innovative ways of working, and they feel they're a part of the project.

> **"…We have become accustomed to an immediate response that does not allow us to meditate and sometimes such immediacy makes for a poor counsellor. …"**

Work days and productivity

We said earlier that the new CEO should be able to become expendable, however, another common feature among these leaders is their dedication. This summer I read an article about how CEOs achieve maximum productivity in their long working hours. On average, the head of a company works 58 hours per week —between 10 and 11 hours a day, to which we inevitably must add another 6 during the weekend. Some of the secrets I share, presented by renowned CEOs (like Jeff Bezos from Amazon and Washington Post, or Jack Dorsey from Twitter and Square, among others), may be useful to make your time more productive.

Although flexibility is a must in the CEO's job description, being disciplined and carrying out a fixed daily management plan is essential: Monday, planning; Tuesday, marketing and communication; Wednesday, networking; Thursday, balance, and so on, without forgetting to set up some time for oneself, which is as important as all the above.

Starting the day before everyone else, even getting a few things done when everybody's asleep, is one a common trend among new CEOs, and very useful to find those moments in which we have a clear mind and concentration is complete. Time is a scarce commodity for the CEO, and those early hours are the most productive and the most creative.

But no matter how much we work when the rest of the world sleeps or we isolate ourselves in an office at certain times, the phone, social networks and emails do not respect time, unless you disconnect completely during a specific period. We have become accustomed to an immediate response that does not allow us to meditate and sometimes immediacy makes for a poor counsellor. Therefore, the dedication and productivity of the CEO are priceless, and the effort will be measured by their results.

And to come to a conclusion and answer the question of whether the CEO is born or made, I would say it is a mixture of both. A leader is born, but a CEO is made **W&P**

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Modern working practices make it more important than ever that firms can create working environments that foster collaboration and wellbeing

Christine Kohlert and Scott Cooper

Design principles for work and learning environments

The difference between churning out another aircraft engine on an assembly line and developing an engine that can help an airline do its job better is creativity. Creative knowledge work is flourishing. As algorithms and robots replace jobs once done by humans, companies look for ways to leverage the human brain to work on things the robots cannot do—like being creative in finding solutions to problems and in developing "innovations" in the form of new businesses, products, and services. The automation of mundane work activities unleashes tremendous opportunity for focusing workers creatively.

If robots can do most of the work to build the cars at an auto manufacturer, it frees up that company's employees to think and create the next big thing. Maybe that is a self-driving car, but maybe it is the flying cars those of us old enough to remember were promised by the science fiction of the 1960s and 1970s. Or maybe it is some way of transporting that we cannot even imagine.

Making it possible to work creatively and generate knowledge is one of the biggest challenges companies face. It calls for training and retraining. It demands new skills, not of the hands but of the mind. It has spurred rethinking about how work is organized and how it is valued. Other factors linked to the change in work are also impelling companies to change. Millennials view employment differently from previous generations, and what they value in their jobs and workplaces have significant ramifications. On top of that, more and more people work on contract rather than in what used to be jobs for life. Workers come and go, jumping not only from job to job but also sometimes from workplace to workplace within a particular job.

> "…Making it possible to work creatively and generate knowledge is one of the biggest challenges companies currently face…"

Companies around the world are anxious to find the "secret" to how they can support creativity among their workers and succeed in knowledge work. Researchers offer some insights. For instance, Theresa Amabile, a professor at Harvard Business School who has been studying creativity in the workplace for more than thirty years, points to several aspects of the work environment that stimulate creativity: organizational support for new ideas; positive challenges for employees; autonomy in how day-to-day work gets done, along with a sense of ownership and control; resources, including information and materials; and positive challenges with respect to workloads. She also notes all sorts of organizational impediments to creativity as well as obstacles from workload pressures.

Space to support creativity

Whether anyone can settle on a single definition of knowledge work or even creativity, there is no denying the significant implications of the shift. Among these, the question of what kind of physical space is best for creative knowledge work has been posed. The answers so far are quite varied—not as far-flung as the architectural differences of the built world, but certainly not conclusive. Experimentation is rampant as those designing spaces for creative knowledge work try to find the optimal solutions.

To help figure out the direction designers ought to take, two scholars at the Helen Hamlyn Centre for Design at London's Royal College of Art, Catherine Greene and Jeremy Myerson, explored "types" of knowledge workers and developed a categorization scheme based on worker mobility and motivation. They began with the premise that genuine knowledge work has a creative component and that creativity is supported in the most effective knowledge-worker offices. They identified different types of knowledge workers: ones who generally work at their desks at are key to knowledge transfer, prefer schedules, require concentration time; ones who roam around a lot at the workplace, depend on interaction, and need to work freely and visually; and

> **"…what is most important here is that the underlying idea of making workspaces in which we are happier and thus more creative has caught on, and has even become an imperative for companies..."**

others who spend most of their time away from the office. They conclude: "[W]e are faced with a very complex set of requirements. If we take these as our premise for the design brief, we must go beyond the traditional remit of office design."

This, in part, explains why the physical workspace has been changing so dramatically. Many of the changes have been promoted by two disciplines: human factors and ergonomics, with its focus on wellbeing, and environmental psychology, with a focus not only on wellbeing but more specifically on how experiences in the physical world, with places and objects, influence human thoughts and behaviors.

Without going deeply into these disciplines, what is most important here is that the underlying idea of making workspaces in which we are happier and thus more creative has caught on, and has even become an imperative for companies designing new workspaces or altering existing spaces. While many projects stop at providing basic functional support for work and a variety of spaces people can use for different kinds of tasks, the trend is growing; after all, what business does not want to foster creativity among its workers?

Our book shows examples of experimentation with how space can be designed to meet that objective—with the understanding that a space designated specifically for "creativity" or "innovation" may be a space in which all behaviors and activities one associates with the creative "process" play out, but that deliberate spaces all share in common that at best they can facilitate those behaviors and activities.

There is never any guarantee that anything creative or innovative will emerge. To put it another way, there has been extensive research that hospital rooms should be designed to promote healing, psychological wellbeing, and efficient provision of care, and yet the most "perfect" hospital room cannot guarantee that a patient will not die.

Still, though, there is a growing use of so-called "innovation spaces" designed with the belief that the right kind of space can make creative work happen. Many companies have jumped on a kind of design bandwagon that has seen the emergence of so-called "Innovation Labs" around the world, particularly in Europe. Often, they are cookie-cutter versions of what some people believe are the main elements required for a space that supports creative knowledge workers.

Nevertheless, those elements themselves matter. They are a key focus of our book. We delve into some of the underlying conceptual elements of what makes for "good" space for creative thinking and learning: six dimensions of wellbeing and four categories of behavior that designers can use as high-level targets to hit as they design spaces for creative thinking and turn ideas into actual blueprints.

Wellbeing

Psychologists, economists, philosophers, and other social scientists use the term wellbeing as a general term to describe the mental, physical, and social state of an individual or group. It is important to draw a distinction between the strictly bodily concept of wellbeing as a physician might use the term and the broader concept we are employing here in the context of space. Environment plays a major role in human wellbeing.

So does mood. There is considerable research that shows that being in a good, or positive mood, supports wellbeing and, in turn, helps us generate more original ideas. When we are in a better mood, we are more apt to get along with others, reason effectively, be healthier, and—most important for our purposes here—we are more apt to think creatively. This is not only an individual phenomenon, but also one that has been shown for groups working together.

What does this have to do with space design? First, the spaces in which we do anything have a significant influence on our wellbeing as humans, because space affects us emotionally. Therefore, it stands to reason that we can deliberately design spaces to influence us positively. Positive affect—or what has been called "pleasant feelings induced by commonplace events or circumstances"—has been linked to broadened thinking, attention, and repertoires of thought and action compared to negative affects, and positively related to a host of things that factor into working creatively on one's own or with others: increased innovation; improved problem solving and decision making; more flexible, thorough, and efficient thinking on topics meaningful or interesting to the thinker; strategic thinking; constructive and cooperative bargaining; increased

> **“...There is extensive research that ties communication and environments that support it to all sorts of positive outcomes; for instance, there is clearly a strong connection between communication and collaboration...”**

Image: Steelcase

helpfulness and interpersonal understanding; constructive suggestions and improved self-knowledge.

In the context of physical environment, a Steelcase research team identified six dimensions of wellbeing that can be deliberately influenced through design:

- Optimism: fostering creativity and innovation
- Mindfulness: being fully engaged
- Authenticity: being really yourself
- Belonging: connecting to others
- Meaning: a sense of purpose
- Vitality: having “get-up-and-go”

Each of these dimensions can be translated into multiple design choices for physical space aimed at enhancing specific elements of wellbeing.

Behaviors

These six dimensions suggest four definite behaviors associated with wellbeing in a workspace that space design must support. Our observation is that space design choices can either facilitate these behaviors in ways that help create an environment of positive wellbeing or can actually hamper people’s ability to behave in these ways and thus create negative wellbeing with undesirable outcomes for individuals and organizations. These four behaviors are:

- Communication
- Collaboration
- Concentration
- Rejuvenation

There is extensive research that ties communication and environments that support it to all sorts of positive outcomes; for instance, there is clearly a strong connection between communication and collaboration.

Promoting the ability to concentrate in work environments may be the easiest of the four behaviors to support with physical space, but there are still challenges (as we point out in our book). And while spaces for concentration can often also be used for rejuvenation—the act of being made fresh or new again—we also include not only rest but play. Work can be stressful, and rejuvenation is a pathway to eliminating stress that can get in the way of creativity.

Biophilia

We also explore biophilic design, based on the term biophilia —from the ancient Greek for “love of life” or “love of living systems.” It is a term in psychology first used by Erich Fromm to describe a psychological orientation in which one is attracted to whatever is alive and vital. Edward O. Wilson, in his 1984 book Biophilia , introduced a hypothesis that humans possess an innate tendency to seek connections with nature and other forms of life.

By extension, architects and designers define biophilic design as designing in a manner that supports that innate connection with nature. It is the conscious creation in the built world of something more in tune with the natural world humans crave and that contributes to our wellbeing.

We discuss a wide gamut of elements of biophilic design that can help correct the disconnect between people and nature we experience when we are in the built environment: :

- Greenery
- Light and views
- Material and haptics

ENGINEERING A SENSE OF BELONGING SINCE 1946

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> …Communication cannot even begin unless we are aware of others with whom we might communicate, so design space that encourages awareness of everyone else who is also at the same company…

- Shapes
- Color

Space for Creative Thinking brings all these elements and shows numerous examples of where designers have tried to make spaces that promote wellbeing and the four behaviors and correct the disconnect between people and nature. Most of them are not deliberately and specifically meant to be "Innovation Spaces," but a few of them are.

Design principles

From this, we believe it is possible to derive some general principles for the design of workspaces that are conducive to creativity and innovation. These principles are as important for users of space—and those who commission such spaces—as they are for the designers of the spaces. We discuss six such principles in our book.

Principle 1: There are no guarantees. We stated this earlier, and it is worth repeating: no space design can ever guarantee that a single creative thought will be thought or a single innovation will be created within it. The best one can do is to establish the conditions for creative thinking

Principle 2: Comfort is key. Much more than through the ergonomic design of a chair, for instance, our human comfort is established by the degree to which we feel optimism, mindfulness, authenticity, belonging, meaning, and vitality. The spaces in which we work and learn should establish the mindset of comfort and wellbeing with how they look and how they function.

Principle 3: Space can unleash good behaviors. Communication cannot even begin unless we are aware of others with whom we might communicate, so design space that encourages awareness of everyone else who is also at the same company. Likewise with collaboration: we need to be aware of our potential collaborators. And with that awareness, we then need the spaces to communicate and collaborate. Conversely, concentration requires its own spaces and the permission to set ourselves apart in those spaces when needed. And allow rejuvenation—whether of the individual, restful kind or the group, playful kind—to unfold within our work and learning environments, rather than requiring that people go somewhere else to rejuvenate.

Principle 4: Flexibility is a necessity. A very broad view of "flexibility" is best, one that encompasses as well the notion of "variability." It is not only about ensuring that a given room can be reconfigured, which can be accomplished with furniture, rolling walls, and so on, but also about considering every room to have whatever purposes its users decide at a given moment.

Principle 5: Space connected with nature is best. Humans function best in built environments that draw strongly from the natural world.

Principle 6: A space is only as good as those who lead in it.

Applying these six principles, as with setting aside specific space for creative thinking, offers no guarantee. The principles are, though, derived from the successful spaces we show as examples. They would thus be a very good starting point **W&P**

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Firms are changing the way they inhabit office space, and it has the potential to reduce the impact of commercial buildings on the environment

Mark Gilbreath

REAL ESTATE • ENVIRONMENT

How flexible office space drives a sustainable future

There's a simple metaphor I like to use when talking about sustainability and the future of commercial real estate. Start with a glass. Fill it with large stones until you can no longer fill it – you might say it's full. Fill the glass with smaller rocks and you'll realize it wasn't full before. And it's still not full. You can fill it with pebbles, then gravel, then sand, and it won't be full until you pour water into the glass. The point is – the glass isn't completely full if you fill it only with large or medium-sized pieces. You have to fill the spaces between.

We can easily see the analogy in commercial real estate. Companies will technically occupy space, but not fill it completely. Large companies are especially prone to paying for more office space than they need.

Some companies will buy entire buildings (or lease entire floors or huge wings) anticipating growth in the coming years. In the traditional commercial real estate industry, this decision makes sense. Signing a lease was once a long-term investment, and companies had to plan for growth 5-10 years out. Things are different now.

> "...It is now possible for any company to license out any portion of their space on flexible terms, without a lease..."

There's nearly 90 billion estimated sq/ft of commercial floor space in the US, with an office vacancy rate of 13.5% in Q2 2017, according to Statista. That means there's more than 9 billion sq/ft of unused office space in the US alone.

Maximizing occupancy, beyond the numbers

When we look at vacancy rates or common commercial real estate statistics, we can't see the full picture of occupancy. The 9 billion sq/ft of vacant commercial space in the US, is probably much greater when you consider the glass analogy. Large companies might be like the rocks, technically occupying a space, to the point where it seems full. But, saying that a company occupies a space, gives no insight into how – and to what extent – that company occupies the space.

If a company technically occupies an office space but only uses half or a quarter of that space, we still consider it occupied. In many cases, when a large company has an entire building or floor, there are whole sections that go unused or underused. Vacancy rates don't account for those underused spaces.

The traditional CRE industry ignores these spaces between when calculating vacancy rates. So while a 13.5% vacancy rate could be worse, if we look exclusively at that number to tell the occupancy story, we're missing the point. Occupancy might be close to 90%, but true occupancy is likely much lower than offices. When we consider the truth of underused space, we see that solving for a sustainable office future is deeper than it seems.

It is now possible for any company to license out any portion of their space on flexible terms, without a lease. From a single desk, to an entire floor – for an hour, up to three years or longer – we're eliminating the problem of underused space, and increasing true occupancy, one space at a time. Why are we doing this? For a sustainable future for offices.

For commercial real estate to properly develop at the pace of the modern world, the future of office must be sustainable. We commonly view sustainability through the lens of environmental consciousness i.e. "going green". But in the case of office space, sustainability means much more. It also refers to accommodating for technology, company growth, and shifting company needs.

For example, technology is already becoming critical to the office discovery and booking process. In the future, tech will only become more important. Commercial real estate players – from brokers to owners – must incorporate tech into their strategies for a sustainable office future. If they ignore tech, they'll fall behind their counterparts who are adopting more quickly. This is not just a matter of having the latest gadgets. Crucially, technology offers access to information in aggregate that you just can't get from personal relationships. But tech is not a threat to CRE. Technology won't replace the traditional

Figure 1 Employment by enterprise size

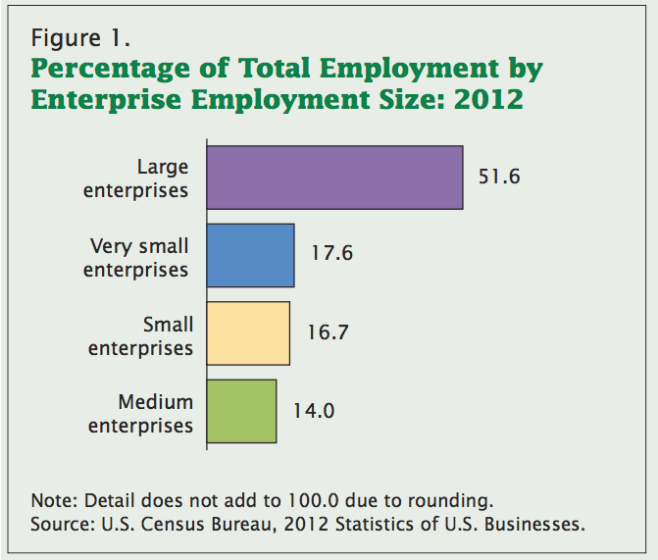

Figure 2 Employment size term

Enterprise Employment Size Term

Term[1]	Enterprise employment size
Very small enterprises	Fewer than 20 employees
Small enterprises	20 to 99 employees
Medium enterprises	100 to 499 employees
Large enterprises	500 or more employees

[1] These terms are not equivalent to those used by the U.S. Small Business Administration.

real estate world. In fact, if properly incorporated, technology will improve the traditional industry and help its largest players grow.

There's a sustainability mandate behind what we're doing at LiquidSpace. Of course that mandate includes a push to implement things like renewable energy, smart technology, and responsible resources. But, that sustainable mandate is about more than just the things we put in the offices of the future. It's also about how people occupy those offices.

Reimagining the traditional model

A traditional commercial real estate model favors big deals, long lease terms, and large companies. But, by exclusively favoring those factors you miss half the market.

According to the BLS, it's about a 50/50 split, the number of US employees working for enterprises versus smaller companies. Dive into that data even further and you'll find that a large portion of Americans work for small companies; 34% of US employees work at companies with fewer than 100 employees.

Bloomberg reports, that in the past twenty years the number of publicly traded corporations has halved. It went from 7,322 in 1996 to 3,659 at the end of 2015. While the truth is that large corporations employ a greater proportion of people than they did 30 years ago, we still can't ignore the little guy. Yes, the large companies have gotten larger and fewer, but small companies still employ about half of the people in the US.

A sustainable office future must account for all companies of all sizes, and must also consider this fact of enterprise consolidation. The fact that there are half as many public companies now than in 1996 indicates a few things. First, it indicates that big companies are getting more powerful, because there are fewer of them. Second, when we consider that fewer enterprises employ a larger proportion of people than they once did, we can infer that those enterprises are getting bigger.

Enterprises need in-between space too

Enterprises that employ more people than ever have significant influence on the commercial real estate industry. In particular, enterprises are often dictating how we consume office space. If we look at some of the largest US corporations (omitting those that largely occupy retail space) we see that many of these companies also have a unique take on office space and commercial real estate.

> "... If we look at some of the largest US corporations we see that many these companies also have a unique take on office space and commercial real estate..."

IBM, the fourth largest employer in the US, and the largest non-retail employer, employed more than 434,000 people in 2012, according to USA Today. And the company is taking some unprecedented steps to put all these employees into workspace. IBM made front-page news in the CRE world when they agreed to sign a membership deal for every single desk in WeWork's 88 University Place location.

IBM's deal with WeWork was first of its kind, but don't expect it to be the last. The allure of coworking and serviced office is huge, especially for enterprise. For a large company to enable "plug and play" office space for its employees is a win-win. The enterprise gets to forgo the lengthy process of scouting locations, finding the right space, reviewing contracts, and building out the space. The employees get to work in an environment built for productivity and creativity. When enterprises work with tech-enabled real estate companies they can expand more rapidly and flexibly.

Not all enterprises sign deals for entire coworking locations. Plenty of large enterprises have urgent short-term workspace needs. In fact, we've dealt with enterprises that required on-the-go mobility for everything from meeting rooms, to coworking, and training space. One enterprise in particular,

a top 20 pharmaceutical company, activated our Mobility Manager program for 400+ sales people on their team, booking thousands of hours of space in 80+ cities.

With access to mobility, the employees at this pharmaceutical company can tap into a network of thousands of venues in more than 750 cities. Individuals get the flexibility of lots of options. The enterprise gets the transparency and simplicity of handling administrative details from one centralized dashboard.

The way forward: core & flex

The commercial real-estate ecosystem is comprised of two major types of office: core and flex. For simplicity's sake we'll consider core as any traditional fixed assets that companies transact on for terms of 5 years or greater.

Flex is synonymous with short term spaces – from coworking, to serviced office, and buildings. Between a traditional 5-year lease and a 1-hour meeting room booking, there's obviously a huge gap. Still, we can identify key differences in the use cases between core and flex office solutions. And by doing so, we can pave the way for the future of offices. Even more importantly, by understanding the distinctions, we can see how and why both core and flex office space must work together to fulfill the essential needs of companies.

Core: starting with the basics

Not much has changed in years about how companies find and procure their core office space. The office HQ is often still the same type of space, with the same kind of lease terms, in the same kinds of cities. Many HQs even incorporate the same design! The traditional commercial real estate industry doesn't take to change easily. But, as tech giants pave the way forward, the core office industry is starting to adapt.

For example, we're seeing companies move to smaller cities to benefit from rising tech talent, tax breaks, and lower costs of living. Amazon is the latest tech giant to make a statement about its core office.

They've opened up the doors to any US city to bid to be the home of the next Amazon headquarters. Perhaps the biggest

shift in core office is the fact that it's had to make room for more flexibility.

Flex: built for mobility

Flex office has grown immensely in the past few years. Customers have historically relied on a few space providers (e.g. Regus and WeWork) to address their flex needs. But things are changing. Enterprises are shifting portfolio allocation toward flex. This creates a greater demand for flex office, which in turn drives the flex space market to grow. Lots of space providers are offering flex solutions, including coworking spaces, serviced office, sublets, and private landlords. It's this last category, landlords, that hold a lot of the power in shifting the tides of core and flex.

For flex solutions and short term stays, landlords don't typically put in much or any capital outlay because the return on investment is limited. It doesn't often make sense to build out a short term space with custom requirements. When the next tenant comes along, it'll be on the landlord to rip out all the undesirable furnishings.

Flex office is valuable. It can fill the spaces between a long term lease; it can function as swing space in case of emergency; or it can serve as the testing grounds for the next unicorn startup. As landlords see the value in flex space, they are more prone to invest in it, like they would for a standard, core office lease. But the thing is – landlords don't have to invest to reap the benefits of flex office.

For example, we're one of the first companies worldwide introducing a flexible buildout solution, called altSpace, at zero or minimal cost to the landlord. This particular solution is also made to plan for growth and so incorporates modular furnishings with 3 tiers options for varying price ranges. We've partnered with the world-renowned BVN Architecture to handle the custom fit out,.

When coworking companies rent space from a landlord, they pay a standard price per square foot. But the coworking companies can charge their tenants double or even triple the standard price per square foot. Private landlords can get in on the action by using a flexible fit-out solution like altSpace. This buildout solution is one example of flexible office taking cues from traditional CRE. Flex will continue to cement itself as an essential piece of any office solution, and in a way it already has.

Consider that 44% of corporations already use some type of flexible office, according to the Occupier Survey by commercial brokerage firm CBRE. As we approach full adoption of flexible office, expect to see more flex options, greater landlord involvement, and a large role from coworking providers and serviced offices. With fast-moving companies developing their flex office needs, the commercial real estate must adapt. And for an industry so used to the same processes and hierarchies, it's due for new players enabling flex office **W&P**

> **"... Enterprises are shifting portfolio allocation toward flex. This creates a greater demand for flex office, which in turn drives the flex space market to grow..."**

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Mark Gilbreath is the founder and CEO of Liquidspace, an online marketplace and workspace network for renting flexible office space. He says his goal isto see more happy people working in fewer buildings.

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Furnishing Knowledge

The public sector is now one of the world's great innovators in workplace thinking and a new network aims to share the knowledge

Bridget Workman

Calling public sector workplace managers and policy makers

Do you work in the public sector providing or managing workplaces for government occupiers? Does your organisation make policies and standards for how and where government workplaces should be built, designed and used? Are you seeking ideas and innovations to make government workplaces more efficient, effective and sustainable?

If so, then The Workplace Network is for you. TWN is a community for executives in public-sector real estate and their staff. Our members are leaders from public-sector organizations worldwide including Ministries, public corporations, departments and agencies in central, federal and local, provincial governments. Among their many functions our members provide 18million sqm of workplaces for hundreds of thousands of public sector office workers. Creating efficient and effective workplaces is crucial to improving public services at the same time as saving public money.

The Network offers members insights into current issues and future trend. This community of global leaders brings together a wealth of knowledge and experience and TWN members can tap into this rich pool of international resources and information at the annual workshop and throughout the year. By being exclusively public sector we find we have much in common that is particular to operating in the sector.

We exchange ideas, strategies and solutions on everything from public policy, strategy and funding to design and construction, technology, sustainability and innovative workplaces. We showcase innovative solutions and offer opportunities for our members to collaborate. The relationships built at our annual workshop have been crucial in helping and inspiring the work of our members. Executives attending our workshop have said they value the opportunity to take what they've learned and apply it to the management and operation of their own organizations.

At this year's workshop in Ottawa members focussed on approaches to creating effective and efficient workplaces, improving sustainability in buildings and communities, security of buildings and infrastructure, the use of smart building technology and BIM, using data in strategic planning and performance evaluation, and of topical interest to several of our members, the rehabilitation of Parliament buildings.

Members also have access to the results of the annual Member Survey for benchmarking, and the TWN's learning and development network, the Worldwide Workplace Web (W4), is open to the up and coming stars among your staff.

Our members' impact and influence is huge. According to this year's Member Survey they directly own or manage around 300million sqm of built assets and manage about 10million hectares of land. They own some of the most important public buildings in major cities, and also many of the properties found in every town throughout their countries, including government offices, heritage buildings, courts, laboratories, hospitals, schools, military buildings and police stations.

As well as owning and managing buildings used by government and the public most of our members commission major public construction and many of them also set policies and standards for all government occupiers – not just for those properties they directly own and manage. Some of our members are involved in planning new cities and most are becoming more involved in setting strategies for development, economic growth and sustainability, co-ordinating across different layers of local and central government.

Our members create and safeguard public places, look after our heritage and are important players in the property market. They are among the leaders of innovation and expected to operate to the highest standards. TWN offers the chance to find out about and keep up with the best in the world.

Any public sector real estate organisation from around the world can apply. Once enrolled the senior executive becomes part of our community, can attend the annual workshop free of charge and gains access to the Network. He or she can nominate members of staff to attend the annual workshop and take part in the W4 network.

Currently the Network extends to 19 member organisations with 170 individual members and associate members. We welcome applications from any public sector real estate organisation. The Network's business is conducted in English, but of course there are many languages spoken among our members, including our Spanish-speaking Secretary Luis del Moral Gonzales. Contact us at admin@theworkplacenetwork.org or visit www.theworkplacenetwork.org **W&P**

Bridget Workman (formerly Bridget Hardy) is TWN Coordinator

A new generation of CEOs is emerging in the workplace and they are having to address a wide range of new challenges

Beatriz Arantes

Breaking down the barriers to creative work

In his 2002 book, *The Rise of the Creative Class*, **Richard Florida** predicted that creativity would become a fundamental economic driver; that it would determine how the workplace is organised, which companies prosper or disappear, even which cities thrive or decline. And while his ideas may not have caught on at the time, with businesses firmly focused on productivity, efficiency and cost-cutting, fast-forward to 2017 and his predictions are now becoming reality. Creativity is rapidly moving up the business agenda, with nearly three quarters (72%) of workers believing their future success depends upon it.

Why creativity?

The creative shift has been driven by a number of interconnected trends that have combined to alter how we deliver success in the modern world. Today's workplace is one of increasing complexity with circumstances changing rapidly and unexpectedly. With less time to make decisions, old hierarchies have broken down, and the need to respond, react, make decisions and solve problems is now required at all levels of an organisation.

> "...Creativity is rapidly moving up the agenda, with nearly three quarters of workers believing their future success depends on it..."

Coupled with this is the rise of automation and artificial intelligence, which promise to completely restructure how work is carried out across a range of industries. Machines are taking on a large proportion of the transactional and process driven work, which leaves humans to focus on activities that are more unstructured; solving new problems and generating new ideas. All of this calls for more creativity.

Death of the creative 'genius'

Added to these drivers is an evolution in attitudes towards creativity and what it means to be creative. In days gone by, organisations would turn to so-called "creative geniuses" to become innovative and competitive, believing that creativity was something only the blessed were born with and that insight struck as they were locked in a garage or lab by themselves. But views have moved on and it is now widely accepted that everybody has the innate ability to be creative, and creation happens in a supportive community.

Creativity constrained

Despite this shift in attitudes and the urgent need for more creative thinking, the majority of today's organisations are still failing to provide the environment and conditions needed for creativity to become culturally ingrained.

This is backed up by research showing that two fifths (40 per cent) of workers say creativity is neither encouraged nor rewarded by their employer and two thirds (69 per cent) say they are not living up to their creative potential .

This failure comes down to the fact that creativity doesn't just happen; it needs to be encouraged and supported in the context of a creative environment, where others are being creative, too. That's why over the course of history we've seen examples of incredible creative movements, such as the Renaissance, when ideas have fed off each other to inspire numerous individuals and build a wide-reaching creative culture.

In contrast, today's business world is too focused on ROI and too nervous about unpredictability to give employees the freedom to be creative. Creativity needs time and mental space to flourish, which doesn't sit well with rigid timelines and deadlines. Boundaries are the enemy of creativity, which demands exposure to ideas from different industries and walks of life. It can't be rewarded in the same way as more traditional

> …In a world where change and uncertainty have become the norm, and where technology is infiltrating so many aspects of work, employees must be empowered to draw on what makes them human …

workplace targets, nor isolated to one person; it takes a community for creativity to really thrive.

Rewiring workplace behaviour

All these restrictions and barriers have become wired into the way we work today, which is why organisations have to reimagine the workplace, to encourage the habits and behaviours where creativity can flourish. Harvard professor Shelley Carson explains in her book *Your Creative Brain* that distinct activation patterns in the brain have been associated with specific modes of creative thought. We cycle between different patterns, absorbing new information, connecting dots, imagining new possibilities, executing on those ideas, and then critiquing and improving them. The activities and tools we need to immerse ourselves properly in these different modes vary, and so the physical and cultural environment of the workplace play a role in facilitating the ebbs and flows of these thought patterns.

Designing for creativity

One way of building a culture of creativity is to look at the physical design of the workspace and how this can better inspire creative workstyles and behaviours.

At Steelcase, we've identified three core workspace design principles for how this can be done:

- A pleasant and relaxing atmosphere can help lower the mental filters and pressures that make us block our unusual ideas. Incorporating thoughtful design elements in the space and seating that encourages comfortable and varied postures fosters emotional connection with and amongst employees.

- Spaces can also nurture creative confidence by providing the right tools and technologies to encourage equal participation, as well as privacy when needed. For example, features such as vertical planes with writable surfaces make thinking visible and allowing others to create a shared understanding and build on each other's ideas.

- When it comes to creativity, one size does not fit all. Employees should be supported through the different stages of creative thinking with a fluid ecosystem of zones, ranging from individual exploration to social connection, co-creation and evaluation. This gives employees the freedom to choose where and how they find their creative spark.

The courage to be creative

In a world where change and uncertainty have become the norm, and where technology is infiltrating so many aspects of work, employees must be empowered to draw on what makes them human. The power to be creative is within everybody, but organisations need the courage to allow it to flourish. Doing so won't just drive greater innovation and business growth, it will also help build a more fulfilled and engaged workforce, ready and confident to face the future **W&P**

Beatriz Arantes

Beatriz Arantes is the manager of Steelcase's global research and foresight group WorkSpace Futures in EMEA, based in the Munich Learning + Innovation Center. She has spent the last 10 years researching the impact of work and work environments on performance and wellbeing. A global nomad, she has lived in eight different countries and today holds degrees in psychology from Brown University in the United States, a degree in clinical and organizational psychology from the Universidade Federal de Santa Catarina in Brazil, and Master's in applied environmental psychology from the Université René Descartes in Paris. Having been confronted with a variety of cultures and standards of living, she is passionate about understanding and improving people's lives. WorkSpace Futures is a multidisciplinary group of researchers from the fields of architecture, industrial, interior and end user design, engineering, ergonomics and economics.

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Contrary to what you might read, workplace hierarchies continue to exist and even play an important role in creating harmony in the workplace

Monica Parker

Workplace hierarchies: harmony or horror?

I am a child of the seventies, and one of my favourite shows when I was just a tyke was The Jeffersons. For those not familiar with The Jeffersons, it was about a black family in New York City who had, through ambition and entrepreneurship, 'made it to the top'. George Jefferson, the patriarch, was a bolshie character. Hijinks usually ensued. But what stuck with me about that show was the catchy theme song, Movin' On Up. The lyrics were 'I'm movin' on up, to the upper east side, to a deluxe apartment in the sky... I finally got a piece of the pie.' Growing up in suburbia, this was probably the first time that I learned the idea of a penthouse, and the notion that the higher up the building, the more important you were. It wasn't until I was about age eight that I realised the word wasn't 'high-archy', but 'hierarchy.'

Hierarchy is a resilient beast. Hierarchies have survived through economic crashes, world wars, tech revolutions, because they are efficient. Our brains are lazy, and hierarchies provide clarity and structure, but the word hierarchy today is emblematic of not only a structure but the resulting culture as well. Embedded in our lexicon from the 'corporate ladder' to the 'glass ceiling', hierarchies define our aspirations and our struggles alike.

'Hierarchy' first appeared in the Oxford English Dictionary in 1880 as a reference to the three orders of angels as depicted by Pseudo-Dionysius the Areopagite. The term was thereafter adopted, not surprisingly, by the military, and later commercially propagated during the industrial revolution. Formal organisational hierarchies were key to the rapid growth of large conglomerates during that period, and so when the great depression of the 1930's hit the United States, the organisations with embedded hierarchies were the ones best able to survive. The halo effect from those survivors was that hierarchical systems became synonymous with strength and stability.

> "...while the Tayloristic approach of human as machines had begun to fade, the utility of hierarchy models continued to strengthen..."

After World War II, there were few businesses that engaged in a single activity; most were large multinational conglomerates. And while the Tayloristic approach of human as machines had begun to fade, the utility of hierarchy models continued to strengthen. By the 1960's there were two schools of thought about workers as McGregor saw it in The Human Side of Enterprise (1960). They were either lazy layabouts who required constant supervision, or ambitious go-getters who performed best in an atmosphere of trust. And so, it's somewhat ironic that it was around this time Maslow's Hierarchy of Needs began to grow in prominence as a rationale for killing off elements of the corporate hierarchical model. A job wasn't just something to pay the bills, but a means for self-expression and self-actualisation. Maslow's theory was a great equaliser of sorts; if every person sought the same fulfilment, then perhaps every person should have access to the same opportunities. Enter, the flat organisation.

Flat is the new black these days. Hierarchy is uncool, man. Supposedly, only 14% of executives believe that the traditional organisational model makes their organisation effective (Bersin, McDowell, Rahnema, & Van Durme, 2017). And people have tried changing systems with (foolish) ideas like Holocracy and the like. But really, when we scratch beneath the surface, not much has fundamentally changed to the cultural underpinning of organisational hierarchy, and there seems to be a lack of genuine interest in trying. It's simply too ingrained. And too hard.

If we want to see just how difficult the cultural impacts of hierarchy are to change, we only need to look at the lingering and in some cases, resurgence of white supremacy. The roots of white supremacy stem from a time when mass colonialism collided with the science of enlightenment. When attempting to explain the ease with which white colonials were able to

subjugate other races, scientists created the now debunked Theory of Racial Hierarchy (Weitz, 2015). The clarity and structure that racial hierarchy created for society kept everyone in their place. It worked well (for those at the top) for centuries. That is, until individuals at the bottom wished to be seen as having value based not on their phrenology but their capability and humanity. Even after a systemic change, the lingering after-effects aren't so easily erased, particularly for those who find their identity wholly integrated into the hierarchy that is being challenged. In search for identity, racists turn to white supremacy. A purely hypothetical question, but what do slighted corporate scions turn to when their hierarchical emblems such as corner offices are taken from them?

Hierarchies soothe us for the very reason that they are so familiar. They give us something to hope for and strive for, they 'give us structure, security, and [a] tangible vision of ourselves climbing the ladder. [They give us] identity' (Leavitt, 2003). Linear & bureaucratic, great for stability and resiliency, they are good for growth but bad for creativity and adaptability. And while we see structure and security as hierarchy's tangible benefits (despite their confines), it is the identity that hierarchies bring us that sits at its crux.

A foreigner takes a job from a local; a partner at a law firm is told that a new office design means they've lost their lofty room with a view. Both slights feel as a violation to the psychological contract that has been so deeply rooted explicitly (structurally) and implicitly (culturally) in our existence. By changing the structure, but not changing the culture, you create dissonance, and our brains loathe dissonance. Neither issue is solved simply and the key to both lies in redefining identity.

As we try to break down systems, many people want to join the bandwagon, some well-meaning, and some who wish to appear that way. Some will do the hard work of systemic-change, and others will virtue signal. Executives can listen to podcasts about leader as servant; they can call themselves the Chief Happiness Officer; they can even (horror!) sit in open plan; but it will amount to no more than corporate virtue signalling if they don't break down the key attributes of cultural hierarchy, chiefly power and choice.

So how do we change hierarchy if we wanted to? The psychological perspective offers a fairly grim outlook to our ability to shift from embedded hierarchies. Behaviourists would say that we are conditioned through centuries of organisational structural evolution. Social Anthropologists would say that humans innately function through categorisation and classification, providing us clarity and certainty. Simultaneously, the centuries past of all manner of working life has been attuned to hegemony under hierarchical structures (Burton, 2017). This is borne out by the secretaries who complain on behalf of their bosses when they lose the corner office. Like a learned helplessness, we submit and actually expect dominance from our bosses and organisations.

If the key lies in a shared identity, then that identity must be mutually constructed, mutually modelled and mutually powered (Hatch, 2011). Decisions should be 'nested,' with each level having autonomy for their piece and the ability to contest the decision that came before (Martin, 2014). But be careful what you wish for, because a mutually modelled organisation means people become emotionally invested in the organisational culture, requiring constant maintenance, support and 'communication through contestation', (i.e. clear channel communication that allows for debate and discourse about the merits and values of a shared corporate identify) (Deloitte, 2017).

> **"... Hierarchy can be beautiful. Without it, there would be insufficient order to create the resonance of harmonics in our brains..."**

Hierarchy doesn't need exploding, it needs editing. Keep the clarity of a networked organisation, but erase the bureaucracy. Keep the managers but make them enablers, not gate-keepers. Keep approval processes, but as peer-reviewed, not management fiat (Martin, 2014). Keep job titles, but reduce the massive inequities.

In the immortal words of Ice-T, 'don't hate the player, hate the game.' Hierarchy can be beautiful. Music, the most elegant of structures, is hierarchical in nature. Without hierarchy, there would be insufficient order to create the resonance of harmonics in our brains (Levitan, 2007). Hierarchy as a tool, absent the turgid, arrogant or predatory culture that frequently accompanies it can be an elegant mechanism for achieving harmony and structure. More likely, it will continue to be used as the blunt instrument of order and oppression it has become..

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The increasing fragmentation of workplace disciplines runs counter to the trend of greater convergence in the way people work

Rob Harris

The folly of workplace fragmentation

In his analysis of the Enlightenment, the great American naturalist Edward O Wilson observed that the main branches of learning emerged in their present form - natural sciences, social sciences and the humanities - out of a unified vision that searched for an ordered, intelligible universe. However, as scientific knowledge expanded exponentially, its key method – reductionism – pushed thinking in the opposite direction. Consequently, scientists became professionally focused, resulting in "physicists who do not know what a gene is, and biologists who guess that string theory has something to do with violins."

Similarly, within the real estate supply industry. For many decades, major European real estate markets have been riven by fragmentation in supply structures. At least four generic groups can be identified, under the professional titles of design, construction, real estate and facilities. And within each of these there are numerous silos of activity, each with their own practices and arcane lexicon.

> "...For many decades now, major European real estate markets have been riven by fragmentation in their supply structures..."

To misquote Wilson, there are real estate professionals who have never visited a construction site and designers who think a yield has something to do with harvest time. This is not to argue against specialism; but it highlights the key issue for this paper: the nature of the customer-supplier interface.

For a customer of the real estate supply industry, which here means an occupier, the array of skills required over the life cycle of occupation is labyrinthine, not to mention inefficient and costly. Some of the symptoms and implications are listed below.

- Separate design, construction, property and facilities management silos defeat presentation of a coherent discipline to customers.
- Duplication in activities and a lack of joined-up planning creates inefficiencies (and costs), and inconsistency in methods, approaches and standards.
- There is a dominant transactional/procurement culture rather than one based on genuine business relationships.
- Property is seen as an end in itself, rather than as an aspect of the customer's corporate resource planning.

Apart from these specific problems, there are two broader implications arising from supply chain fragmentation. First, there is a cultural issue arising from the fact that the customer does not sit at the centre of the supply process. Secondly, there is a structural issue in that the supply process comprises a complex web of technical skill bases rather than an integrated management function.

The customer position. The first point is that the customer does not sit at the centre of our complex industry, but on the fringe. Moreover, the occupier has to share the 'customer' role with investors. Most new buildings are designed and delivered to appeal to investors first, and occupiers second. The real estate industry is dominated by interests that are focused on property as a tradable asset, namely landlords, developers and the large real estate practices. This is not a criticism: property investment is a hugely important function that allows, among other things, the constant rejuvenation of the built environment.

But it does, ipso facto, lead to an industry culture that is more resistant to change than might otherwise be the case. This issue is more important today than at any time in the past, as the occupier customer base undergoes fundamental change. The real estate industry's traditional, core customer base comprised large, steady state, lumbering corporates who were themselves, a part of the property process. But this market is on the brink of extinction.

Technical versus management function. The second point is that the real estate supply process is focused on the highly fragmented delivery of technical skills rather than offering a management function. Other workplace resource functions have evolved into broadly-based management functions. Personnel became HR; purchasing became Procurement and technical support became Technology.

By contrast, real estate services are provided by functions variously known as Property, Facilities, Corporate Real

Figure 1 The Government Hub Programme

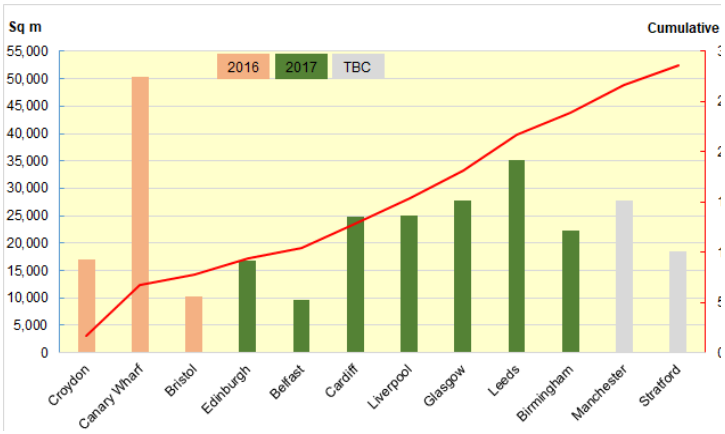
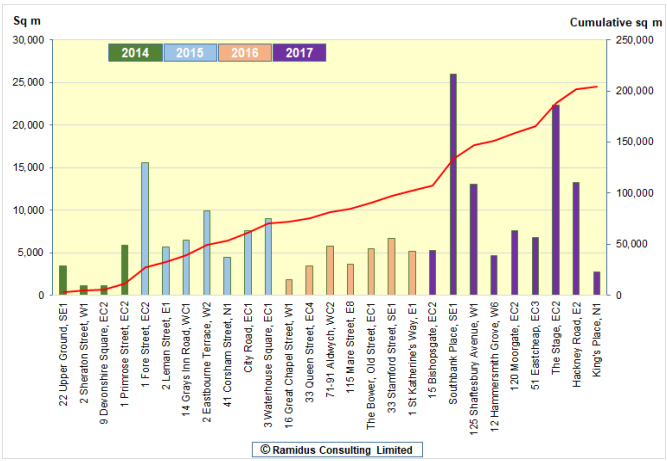


Figure 2 The rise and rise of WeWork



Estate and Accommodation. Various models have been tried: outsourcing/insourcing; intelligent client units and shared service centres among them. The common thread is technical service provision driven by a fragmented supply process. And it is in danger of being marginalised as the technical services are commoditised.

Overcoming fragmentation

Whether looking internally at the client organisation, or externally across the supply chain the only part of the fragmented supply chain which has a customer (occupier) focus as its core activity is the nascent Workplace Management function. That is because it is just another management function. Its roots are in general management, and it is an emerging sub-discipline of Workplace Resource Management.

> **"...Whether looking internally at the client organisation, or externally across the supply chain, the only part of the fragmented supply chain which has a customer (occupier) focus as its core activity is the nascent Workplace Management function..."**

Workplace Management brings together all the fragmented parts of the design, construction, real estate and facilities sectors into an integrated management function, allied to its colleagues in HR, Procurement and Technology, among others, to provide an integrated Workplace Resource Management function.

Whether in healthcare, leisure, logistics, offices or retail, large swathes of the occupational market have been, and continue to undergo, enormous change in their operating models. They are evolving into lean, agile, fleet of foot businesses for whom space is a commodity not a lifelong marriage. This calls for a new customer-supplier relationship, which Workplace Management can provide.

Divergent trends. Before looking at the industry-customer interface in more detail, consider two contrasting phenomena which, in different ways, illustrate the importance of the workplace management function, one from the occupier perspective, the second from the supplier perspective.

First, the UK Government is part way through a process, the Hubs Programme, which will help it to "reduce the government estate from around 800 to 200 buildings by 2023, saving approximately £2.4bn over ten years". The twenty or so hubs will assist in developing a new work culture and allow staff to work from a variety of locations, through its radical The Way We Work programme. To date, seven hubs have been confirmed, while another four have been reported as in the pipeline (Figure 1). If the average size of the planned hubs mirrors the seven confirmed thus far, then the portfolio will measure c450,000 sq m, each building capable of accommodating around 2,000 staff.

Second, consider the rapid rise of WeWork in London (Figure 2). In little more than three years, WeWork has moved from market debutant to, perhaps, London's largest private sector occupier. It has achieved this through 26 property deals, from its first deal on the South Bank (3,500 sq m at 22 Upper Ground) to the most recent (13,300 sq m at Hackney Road in Shoreditch), to take its total occupancy to a shade over 200,000 sq m. WeWork specialises in providing 'cool' workplaces for start-ups and tech businesses, where collaboration and networking are de rigueur.

What do these two vignettes tell us? The Government is busy leasing large units of real estate in order to centralise its increasingly agile employees and manage a changed work culture; while WeWork is busy leasing large units of real estate to attract increasingly agile small businesses who have already adopted new work cultures. The common denominator is that they are both delivering and managing workplaces (not real estate) that respond to today's workforce needs: attractive, dynamic, responsive, experiential, healthy and productive. This is the nexus of Workplace Management.

What the Government and WeWork are doing, in different ways, is changing the customer and supplier interface. In-house and out-of-house workplace management functions, respectively, will deliver and manage the workplace experience, advise the occupier business and plan the future. Along the

> **"…large corporates have been re-organising around more responsive business models, outsourcing of non-core activities, fewer layers of decision making, and the use of contingent workers…"**

way, they will procure technical skills as commoditised services.

To understand the implications of these approaches to workplace provision, we need a very brief trip down memory lane.

Workplace: from factor of production to commodity

The genesis of the 'modern office' dates back to the late-1960s when, in 1968, the designer and inventor Robert Propst created Herman Miller's open plan office system, the 'Action Office'. Often referred to as 'burolandschaft', these open plan offices were expected to improve internal communications and interaction and to enable the faster and cheaper reconfiguration of space and people.

In reality, they did little more than allow offices to be planned at higher occupancy densities. The real leap took place in the mid-1980s.

Thirty years is little more than half a contemporary working life, yet, recalling some of the technology events of 1987 reveals just how much has changed in such a relatively short time. Important launches that year included: Windows 2.0; IBM's PS/2 with 3.5-inch diskette drive; the MAC SE; the Sinclair Z88 portable computer, and the apple.com domain.

New modes of work

These were the early signals of the technological revolution that was to fundamentally re-structure the economy. As early as 1985, one particularly prescient report outlined the impact of technology on the nature of work. Stone & Luchetti's (1985) paper, Your Office is Where You Are , set out to "challenge the customary ways of thinking about offices" and to show how managers could "integrate physical layout, design, and communications to support organizational objectives …" They proposed that managers should rethink how both information and people flow in an office, and adopt 'activity settings' to provide a richer office experience with appropriate environments to suit the work in hand. Such thinking was a world away from the command and control systems of the 1970s.

Implicit in all of this was that workers would become more mobile, or agile, choosing where and when to work. Increasingly the office would become less a place to go to work, largely alone, on a set of prescribed tasks, and more a place to visit and interact with colleagues and use support services. Cairncross argued that the "office will become a place for the social aspects of work, such as celebrating, networking, lunching and gossiping"

And she was right. The ubiquitous impact of mobile phones, laptops, the internet and email presaged an era in which work itself has been transformed, conducted in ways entirely different to even the recent past.

The knowledge worker

The new modes of work reflected the rise of the 'knowledge worker'. In 1992, management guru Peter Drucker predicted that the traditional factors of production – land, labour and capital – would become secondary to knowledge. Today, around a third of the workforce in advanced economies is office-based; employed by businesses that largely trade in the intangible 'knowledge economy'.

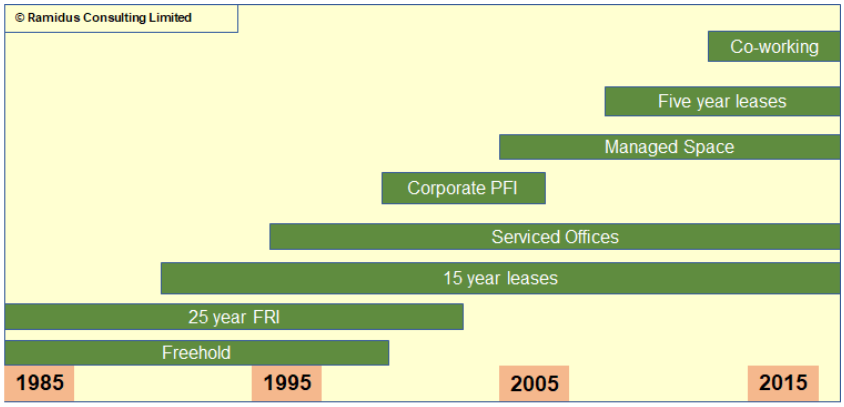
The knowledge economy currently accounts for over a fifth of total UK economic output, and one in eight jobs. It has been responsible for nearly 40% of all economic growth in the UK since 1970, and has created upwards of two million jobs over that period.

At one end of the knowledge economy, large corporates have been re-organising around more responsive business models, outsourcing of non-core activities, fewer layers of decision making, and the use of contingent workers. The corporate island is yielding to the networked business.

At the other end of the scale, the number of small businesses has been growing rapidly. Statistics indicate that most of the growth in the UK in recent years has come from the SME sector, which accounts for over 14 million people and nearly 60% of private sector employment. The fastest growing SME sector is professional, scientific and technical professions. The number of SMEs in London passed one million for the first time in 2016 (obviously, these are not all knowledge businesses, but the trend is important).

So, big changes in work and in the economy: new modes

Figure 3 The growing diversity of product offerings



of work and new workers. How has the real estate supply process responded?

The real estate sector response

As noted, the real estate industry is dominated by interests that are focused on property as a tradable asset, namely landlords, developers and the large real estate practices. The property industry evolved in the way it did in response to the need to mediate between the fixed asset of land and the endeavours of the entrepreneur to organise labour and manipulate capital for production.

Even through much of the twentieth century, this made sense because land, or property, was commonly an integral part of the production process, in the form of factories and other plant (even head offices were often physically attached to plant).

But the technology revolution and rise of the knowledge worker changed this forever. Land and property no longer accorded an advantage for the occupier; it became a millstone.

The fragmented real estate supply process has struggled in its response to new work and new workers. Land, or more precisely, property is now a commodity for occupiers to turn on and off as required. This sits uncomfortably with an industry comprising four major, disconnected tribes, numerous sub-disciplines and an arcane language undecipherable to all except experts and lawyers. But some strides have been made.

Against the backdrop of enormous and on-going change in occupiers' requirements, there have been significant shifts in the nature of the property products available from owners. While the Landlord & Tenant Act (with its attendant feudal terminology), continues to underpin the market, a far more dynamic offering is now available (Figure 4). The illustration's timeline is not intended to be strictly accurate, but seeks to convey how the property industry product range has gradually evolved.

Up until the 1990s, the only real options for an occupier were either to own premises or take them on very long, full repairing and insuring leases, complete with onerous obligations. Very few office occupiers take either option today.

Following the recession of the early-1990s, a number of attempts were made to provide more flexible space. Initially, and rather slowly, landlords started to offer shorter leases, albeit still on full repairing and insuring terms. The serviced office sector materialised at this point (significantly from without, and not embraced by, the property industry).

> "…Most recently, we have seen the emergence of co-working spaces, which have given the smallest businesses the opportunity to benefit from 'corporate style' accommodation…"

The PFI model developed in a different direction providing a total solution for organisations looking to deal with operational and surplus real estate in one transaction. This gained some traction, especially with the UK Government, but failed to become a widely-accepted alternative. Most recently, we have seen the emergence of co-working spaces, which have given the smallest businesses the opportunity to benefit from 'corporate style' accommodation.

Real estate as a commodity The common thread running through the evolution of these property products is ever-greater flexibility, with risk-transfer to the property sector, as occupiers procure real estate as a commodity, like other corporate resources.

In a landmark work, Joroff et al referred to real estate management as the fifth resource, alongside capital, people, technology and information. The challenge, they argued, is to "learn the needs of the corporation … and then to devise a strategy to satisfy them even when the answer may not involve traditional forms of real estate". In the UK, Weatherhead stressed "the importance of real estate as a corporate resource which should be included in corporate strategy".

> **"…There is an opportunity to position Workplace Management as not only the focal point for workplace planning and provision, but as an integral and integrating part of resource management…"**

The notion that real estate should be treated as a corporate resource was fleshed out in a number of publications; notable among these was McLennan, Nutt and Kincaid ; Apgar who argued that "Business real estate is not merely an operating necessity, it's a strategic resource" , and Kadzis, who argued that real estate management is in the "middle of a multi-faceted dynamic that far exceeds the management of facilities, transactions or projects".

The notion of Workplace Management (real estate or facilities) as a strategic management function followed naturally from such thinking, and was developed further in a number of publications, including RICS ; Ware and Carder and Workplace Futures.

But the focus on resource management highlights the different but complimentary roles of those who make buildings work (the supply chain) and the 'workplace professionals' (typically in-house) who focus more directly on ensuring that those facilities serve the needs of the business and the workforce. A recent RICS report argued that both aspects are equally important and strategic, but that they "are different activities that require different but complementary skillsets…", and "they are both necessary for ultimate success". The report argued that whether "facilities are managed in-house or by a contracted service provider, they are a strategic business resource, and must be managed as such" and that both "FM operations and FM workplace resources are critical to business success".

Conclusions

Occupiers, or customers, want flexibility and they want to treat their occupation of space as a corporate lever. The changing world of work will continue to be a primary driver of change within real estate occupation and management, and an outcome of this change is a need to design and manage the workplace less as a static backdrop to sedentary work, and more as a 'hotel' facility where guests demand a high level of service and experience. This requires an alternative approach to the traditional, fragmented provision of real estate by the supply industry: a different customer-supplier interface.

Collaborating and providing support to complex business processes though space and time; translating the needs of the business into a coherent supporting strategy; communicating effectively with managers of the business, and adopting techniques to demonstrate the impact of the workplace on business performance are core skills of the emerging Workplace Management role.

In short, there is an opportunity to position Workplace Management as not only the focal point for workplace planning and provision, but as an integral and integrating part of Workplace Resource Management. At a time when management teams are recognising the direct link between business performance and the quality of the workplace, those responsible for delivering a "high performance" workplace are in a position to take on a front-of-house role.

The central question then is: where will or should the locus of Workplace Management lie as a distinct activity? Will it be within one of the four tribes (design, construction, property, facilities)? The truth is probably that neither the design nor construction professions are set up to respond. Neither has an aptitude towards 'softer' management skills, and neither has an interest outside of the immediate confines of their activities – designing and constructing.

Is it perhaps destined to be subsumed as part of the property supply structure just as, say, Planning and Valuation exist as sub-disciplines? The larger real estate firms have certainly made a major play. CBRE's acquisition of Johnson Controls' Global Workplace Solutions was a move into this arena. But, ultimately, such firms are culturally aligned with owners and developers, with the adversarial world of the Landlord & Tenant Act, and with the world of transactions. Perhaps recent and rapid changes in landlords' approaches to the new economy will create the conditions for change?

So what about the facilities management profession? It could be argued that this has the greatest opportunity: it is after all 'service' based and is responsible, directly, for the management of the workplace. But it carries a lot of baggage. The British Institute of Facilities Management has formally adopted the definition of facilities management as set out in

> **"... Space is being consumed in entirely different ways today, with people and businesses (customers) at the centre of the process, not byproducts. ..."**

new ISO standard 41011:2017, published earlier this year. That definition states that facilities management is the: "organizational function which integrates people, place and process within the built environment with the purpose of improving the quality of life of people and the productivity of the core business".

There is nothing in this definition about a management function: simply providing the environment might not be enough. The critical opportunities for Workplace Management include connecting with the business; work enablement; a focus on people (not simply physical environments) and integrated management. These areas will require a shift in mindset, and a corresponding acquisition of new skills and capabilities. It is difficult to see how such a focus could exist within the FM profession as it is currently structured.

Perhaps the future of Workplace Management will be an element of disruptor activity. We discussed WeWork above in terms of its rapid expansion in London, providing start-ups and small businesses with 'cool' space. But its ambitions are much greater. It is now signing up 'Enterprise Customers', providing large chunks of space to corporate customers and providing the WeWork 'experience'. They have already signed up large corporates including Bank of America, HSBC, IBM, Mastercard, Microsoft and Salesforce. WeWork started its enterprise product in mid-2016, and it now contributes nearly one-third of its revenue. Perhaps the future of Workplace Management will be defined outside the boundaries of the established real estate supply process.

Wherever the locus of Workplace Management settles, it is clear that it is a multi-disciplinary management function alongside its wider Workplace Resource Management colleagues. It is not a sub-set of a traditional facilities management function, nor of a traditional property supply function. Space is being consumed in entirely different ways today, with people and businesses (customers) at the centre of the process, not byproducts. If the traditional supply process is to keep pace, then it will need to evolve quickly and radically **W&P**

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As legislators and business leaders look at new ways to encourage staff to disconnect, could the answer have been in our hands all along?

Aki Stamatis

TECHNOLOGY • WORKPLACE DESIGN • WELLBEING

The global overwork problem and a right to disconnect

Anybody who doubts the importance of work and working culture to people's lives should look at the resistance to President Macron's mooted changes to labour laws. His attempts to modernise and liberalise French workplace legislation marked the first cracks in his reputation and brought millions of French workers to the streets as part of a national strike.

However, one change to French legislation that met with little or no resistance earlier this year was a new right to avoid work emails outside working hours. Under the legislation, firms with more than 50 workers will be obliged to draw up a charter of good conduct, setting out the hours when staff are not supposed to send or respond to emails.

France is not alone in this as awareness grows of the problems associated with long working hours, most of them unpaid. Some of the risks associated with the use of technology, often right up till bedtime include disrupted sleep patterns, depression, burnout and relationship problems.

> "...Japan has such a big problem with overwork that it has its own word for the experience of those who die because of it..."

And it's not even as if long hours equate to greater productivity. In fact, there is some evidence to suggest that long hours have an inverse relationship with productivity. The UK has one of the longest working weeks in the developed world and yet also has persistently low levels of productivity. According to a 2014 study from Stanford University, employee output falls sharply after a 50-hour work-week, and falls off a cliff after 55 hours. Anybody who puts in 70 hours produces literally nothing more with those extra 15 hours.

It's also not apparent that excessive hours do not necessarily do anything for career prospects. In a study of consultants by Erin Reid, a professor at Boston University's Questrom School of Business, managers could not tell the difference between employees who worked 80 hours a week and those who just pretended to. The study found that people who transparently worked fewer hours were penalised, but could find no evidence that these people were less productive or that those who put in extra hours actually achieved more.

Japan has such a big problem with overwork that it has its own word for the experience of those who die because of it. Now even the Japanese are at breaking point with long hours culture that leads to so many cases of 'karoshi', or death from overworking. Yet, to Western eyes the proposals to address the issue still seem inadequate. Proposed new legislation would restrict overtime to an average of 60 hours a month, with a 100-hour limit in busy periods.

This is not unusual by Japanese standards. A government report from 2016 showed employees at nearly one in four companies notched up more than 80 hours of overtime a month, while staff at about one in ten workplaces did an extra 100 hours.

In October, a Japanese advertising firm was fined for making employees work excessive overtime after the case of the death of a young worker called Matsuri Takahashi who killed herself in 2015. Ms Takahashi was reported to have worked around 100 hours of overtime each month for a long period of time before her death. The calls for legislation have intensified as a result.

Even in countries without such an extreme culture are feeling pressure to do something to improve the lives and wellbeing of employees. Germany's largest trade union has pushed for shorter working hours for the 3.9 million workers in the metals and electrical sectors, in a drive for a better work-life

Image: Fourfront Group

balance. Union leaders are calling for a fundamental change in the way managers deal with working time.

Once, this would have been a fairly straightforward issue of changing people's contracts. Now the issue for the majority of the workforce is how to avoid getting drawn into the digital workplace. This is open for 24 hours a day every day and companies may do little or nothing to discourage people from working whenever they like. The legislative response to this around the world centres on an idea that become known as the right to disconnect.

As we have seen, in France, the right to disconnect requires companies of a certain size to negotiate how their employees handle out-of-hours work and availability. In 2016 a similar bill was submitted to the South Korean government, with legislation currently being pushed through Parliament.

In the UK, the right to disconnect law is non-existent. Employees' rights and obligations regarding emails, or phone calls outside of working hours are likely to be a matter of contract for employees who agree to "work such additional hours as necessary to meet the needs of the business", or may constitute overtime, for certain employees.

In the UK there is no right to disconnect and no plans to introduce legislation. Although contracts may often be vague on the issue, including vague clauses stipulating that people may be expected to work the hours needed to meet the needs of the business, there is statutory protection under the Working Time Regulations 1998 although workers may waive these rights.

A similar culture exists in both Australia and the US. In the US, there is no obligation for employers or employees to limit their working hours or availability although there exists some legislative protection under the Fair Labor Standards Act (FLSA) which states that a working week is 40 hours long and work outside that period may be subject to overtime payments and that employers must track the time they spend working.

As well as legislation, there is also the issue of culture. Some firms are already ahead of the curve on this, especially when it comes to email, which continues to be the biggest drain on people's time and productivity. In Germany, the car maker Daimler offers staff an auto delete function for their email while they are on holiday. Meanwhile Volkswagen has set its servers to stop delivering emails to mobile devices for some workers from 30 minutes after the end of the working day time until 30 minutes before it starts.

Ultimately, everybody has the right to disconnect whether it is enshrined in legislation or not. The culture of an organisation may sometimes - or even often – discourage people from taking up this right but it is there nevertheless and it is a right that can be enjoyed by simply not working or even turning devices off **W&P**

Aki Stamatis

Aki Stamatis is the Chairman of Fourfront Group and Chairman and co-founder of The United Workplace, a network of likeminded businesses worldwide, sharing a passion for the workplace – inspiring design, innovation and a culture of collaboration.

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02 OCTOBER 2017 – 12 JANUARY 2018
This exhibition aims to accelerate the decline of the old mind-set with its limited outcomes, in favour of a new one with enormous benefits.
The exhibits are loosely clustered in four zones: the new approach to AI – strengths and weaknesses; fully learnt machines; machines learning at the edge and today's consumer solutions.
The exhibition is part of Arup's Digital Transformation programme, dedicated to assisting colleagues, clients and society-at-large to adapt to the rapid changes in AI.
ARTIFICIAL
INTELLIGENCE

A new era of artificial intelligence and automation will help to transform the workplace, but questions remain about whether this will benefit individuals

Rob Leslie-Carter et al

The future of workplace automation and AI

Two things have happened recently that make the timing of this article on artificial intelligence (AI) particularly serendipitous. The first is the release of an incredible video showcasing the first segment of a steel bridge designed by Arup and MX3D but printed by robots. Amsterdam based start-up MX3D created intelligent software that transforms a robot and a welding machine into a large scale printer, enabling 3D printing of metals on an architectural scale. This new technique provides new opportunities for architects and engineers and has huge potential to reduce the delivery time and amount of material needed to make large structures. The printing and assembly began in March 2017, and the bridge is scheduled to be finalised in early 2018. More information about the printing process can be found at mx3d.com/visitor.

The second coincidence was arriving at our London office to an exhibition in the foyer devoted to AI. The various spaces, robots and screens showcase how new approaches to AI are already revolutionising our lives using real-time data. Visitors experience AI's strengths and weaknesses, exploring the differences between fully learnt machines or machines learning at the edge, and get to play with some of today's consumer solutions. The facial recognition screen correctly confirmed who I am (from my intranet profile photo I think), my 20 second cow sketch was sufficiently poor to flummox Google Quick Draw into concluding I'd been attempting a dog all along, and Amazon's continually learning Echo obeyed my voice request to define 'machine learning'.

> "...Collaboration and communication through increasingly intuitive user-friendly interfaces could lead to fundamental changes in workplace structures and may offer new possibilities for productivity and creativity..."

The exhibition is part of Arup's digital transformation programme, and is dedicated to assisting us to adapt to the rapid changes in AI around us – it runs from 2 October 2017 to 12 January 2018. The exhibits were put together with the collaboration of Arup Inspire, Ambi, Comfy, Autodesk, Google Creative Lab, Manou Mani-Architects, Nvidia, TED and IBM Watson and Yarn. The force behind this provocative event is our global Foresight team - Arup's internal think-tank which deals with the future of the built environment and society at large.

Human Machine Collaboration – the current picture

The world is changing fast. A wide range of trends and challenges have a direct bearing on the future of work and place. It is vital that we understand these trends, so that we can better manage the risks facing our profession, and make the most of emerging opportunities. Our economy is increasingly driven by project-based work characterised by high degrees of collaboration. Innovation and creativity are the key components of value creation, while employee expectations and working cultures are changing all the time.

We are seeing new forms of working that are enabled by digital technologies, on projects that are both complex and global. Understanding and managing these changes is vital, if we want to continue to provide solutions that truly meet the needs of our clients and stakeholders. Driven by rapid advances in digital technologies, the nature of our work is being transformed. While artificial intelligence and robotics grow more sophisticated, jobs are being reinvented. Collaboration and communication through increasingly intuitive user-friendly interfaces could lead to fundamental changes in workplace structures and may offer new possibilities for productivity and creativity in the workforce. Human-machine collaboration will open the way to virtual and network-based companies as everything shifts online.

Organisations are already reconsidering the shape and composition of their workforce. According to Deloitte, 41 percent of surveyed companies have already implemented

aspects of cognitive or artificial intelligence (AI) technologies in their workforce, whilst 37 percent are carrying out pilot programmes. However, only 17 percent of surveyed executives stated a readiness to manage a collaborative workforce of people, robots and AI.

The area with the greatest scope for change is in manufacturing - in the automation of repetitive tasks. In Germany, for example, it is estimated that up to 80 percent of jobs for people with low-level education are at risk from automation, compared with only 18 percent for people with a doctorate degree. It's a similar story when we look at income levels: in the lowest 10 percent income group, 61 percent of jobs are projected to be at risk, while only 20 percent are under threat at the upper end.

As companies redesign jobs and workforces, questions arise around the eventual limits of automation. Could essential human skills, such as empathy, communication, persuasion, personal service, problem-solving, and strategic decision-making become even more valuable?

In moving towards greater automation, companies will have to rethink the role of people and provide training to prepare their employees for this new work environment. Robots and people work side-by-side at Ford's Cologne plant, complementing each other's skills (simple and heavy manual tasks vs creative thinking). Businesses might soon start dividing skills and reframing jobs according to essential human skills and non-essential tasks that could be carried out by machines.

> “...Unlike usual algorithms used to perform specific tasks, machine learning methods are employed to learn how to perform a specific task...”

Machine learning graduates to the built environment

Machine learning applications are already ubiquitous in our everyday life. When you log into Facebook and someone has tagged you in a photo that is a prime example of the roots of machine learning, which reside in image and facial recognition. Not only does it recognise that it is your face, but also that you have a human face based on the features and relationship between your pixels and all other pixels in the image.

When you speak to Siri on an iPhone, it ‘hears’ your words using speech recognition. When you use Google Translate the sequence of words you used is likely being translated now by something called a recurrent neural network.

When you open your email (mostly) free of unwanted messages, you can thank machine learning for the spam filter – which is likely powered by a technique which has classified junk from non-junk based on the nuanced features of many millions of spam-classified emails.

When online shopping, or browsing Netflix, recommendations are given to us on what we are likely to watch from an algorithm of people who are likely similar to us, and have made similar choices to us.

While AI encompasses the broader goal of computers that can learn and act, machine learning is much more specific sub-set of AI which can be used for solving well-defined problems. Deep learning is a further extension of machine learning, which expands the concept of neural networks (which are inspired by the functionality of the human brain).

Unlike usual algorithms used to perform specific tasks, machine learning methods are employed to learn how to perform a specific task – learning as more data is provided. Just as we have different learning styles, there are (quite a few) different ways which a machine can learn. These methods can be categorised into either supervised learning (where the algorithms have a training dataset to learn from) or unsupervised learning (where we are interested more in discovering underlying patterns and structure in data).

As our computing processing power increases, storage becomes cheaper and data sources richer there is an increasing demand to the develop methods and skills to solve problems with machine learning in many domains – which is potentially any that involves data and identifying patterns.

So away from use cases that we can mainly find on our mobile phones and the internet what are some potential applications in the physical, built environment?

Environment and waste management

Several years ago, Volvo announced that it was developing robots to replace the physically-demanding, sometimes dangerous task of garbage collection with a more automated, robotic system. To add to this, machine learning could track and predict waste levels in a city’s bins and manage demand (and charge users) accordingly.

Architecture and urban design

MIT Media lab have collated a large set of data on people’s perceptions of safety to feed a machine-learning algorithm which determines how safe a street may look to the human eye. This kind of research could alter the way we design spaces to suit the potential emotional goals or needs of a space, and help us understand which features we ought to include or exclude from design.

Energy and utilities - optimising consumer energy use

The optimal, sustainable use of our energy systems both at the supply-side and the user-side is critical to sustainable future. Being able to better predict accurate energy consumption forecasts can help implement better energy-saving policies in cities. The Nest Thermostat uses machine learning to learn a homeowner’s preferences and schedules to optimise heating and cooling.

The energy sector in Germany has employed machine learning to optimise the power grid and manage the maximisation of renewable versus non-renewable energy.

Intelligent transportation and autonomous vehicles

Machine learning is well-known to be integral to driverless cars, which use complex image and spatial recognition to identify road features, pedestrians and other vehicles in order to provide seamless, automated travel in cities. Using these

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sensors and on-board analytics, cars are able to recognise objects and react appropriately using Deep Learning. MIT's Moral Machine is an experiment on how machines might decide in crash scenarios, where human moral decisions are collected and analysed against the same decisions machines would need to make.

Transport services on-demand

Whether empty-running or on fixed timetables, bus routes could be dynamically altered to meet passenger needs. When the weather is bad, buses could be put to use to keep up to pace with increase in ridership. Routes could be adjusted dynamically to better fit with door-to-door demand for the users who have opted into that service.

Personalised trip-planning

Mobile phone applications could review the travel options available to you and make personalised recommendations using machine learning to account for preferences such as lifestyle choices, fitness levels, previous locations visited, amenity along the way, budget and dynamic predictions of congestion en-route.

Crash and congestion monitoring and response

Image recognition could monitor and recognise both congestion and road accidents before, during and after they happen. These would allow systems to adjust the road conditions (such as variable message signs and speed limit) systems accordingly, as well as notify traffic control and emergency services.

How digital technology and big data are changing the property sector

The property sector is on the verge of a huge leap forward in how it uses data-driven, digital products and services to make better decisions, construct better projects, and achieve better outcomes. Ubiquitous sensors, flexible and open IT systems and powerful cloud computing are creating more seamless and integrated experiences in many sectors. But property development often hasn't kept pace. For example, traditional project budgeting isn't yet aligned with the needs of a more integrated world. Costing processes fail to deliver the digital experiences that tenants or employees increasingly expect. And the balance of CAPEX and OPEX is changing as some previously fixed products become services with recurring costs and revenues. New thinking is needed.

There are three stages to reimaging property in a digital world. We call the first stage of digital adoption the Run phase. Many firms are at this point, using digital tools and approaches for specific, tactical projects, gaining some tangible benefits.

The Grow phase occurs when leading-edge firms begin to move beyond using isolated tactical digital solutions to solve distinct problems in the lifecycle of their assets. Grow businesses widen their focus to see how the entire asset lifecycle can be improved using digital tools and approaches. In this phase of the digital journey additional emphasis is placed on the transitions and hand-offs between phases.

The third and final phase of digital maturity is Transform. Clients now benefit from a single, integrated, digital master plan that adds value not only across all phases of the lifecycle of any single asset, but also across the entire portfolio of assets, whether local, regional or global. This leads to increased long term valuations, improved end user experiences, and better operational asset performance

Digital transformation improves portfolio efficiency by increasing integration and automation of building operations. It makes the facilities manager's role far more strategic, and maximises use of the building and its assets. It also drives up tenants and occupants' expectations about the experience produced, both functionally and emotionally.

Users benefit from a range of integrated services that support their individual needs and preferences. And given buildings' long lifecycles, digital transformation represents increased agility by giving property owners and managers new abilities to adapt to changing user needs over the lifecycle of the building.

These buildings provide a wealth of actionable data that allow far better portfolio management and planning for the future. For property decision makers, these new cloud-based data systems, powered by artificial intelligence, will make

"...For many organisations in the manufacturing sector, automation is also part of a strategy to deal with the emerging risk of a shrinking and aging labour force, or the ongoing risk of cheaper labour costs in other countries..."

it possible to store, process and visualise data that create portfolio-wide insights.

The Human Factor(y)

"The full potential of the industrial Internet will be felt when the three primary digital elements – intelligent devices, intelligent systems and intelligent automation – fully merge with the physical machines, facilities, fleets and networks. When this occurs, the benefits of enhanced productivity, lower costs and reduced waste will propagate through the entire industrial economy."

—Peter Evans and Macro Annunziata, GE, Industrial Internet: Pushing the Boundaries of Minds and Machines (2012)

A new relationship between people and machines

Since the 1970's the proportion of German workers employed in the manufacturing sector has dropped by more than half, to about 20 percent. At the same time, exports of manufactured goods have increased and Germany continues to rank fourth by global manufacturing output. This trend is a reflection of a continued increase in automation within Germany's production lines, allowing the nation to remain competitive despite relatively high labour costs.

Given a steady rate of production, continued advances in both factory automation and robotics reduce the number of people needed to produce goods. While some argue that this trend could make certain workers' positions redundant, proponents assert that it will make workers more productive and relieve them of unpleasant or unsafe jobs.

Automation increases reliability and product quality, and often makes it easier to adapt production lines and create flexible production processes. For many organisations in the manufacturing sector, automation is also part of a strategy to deal with the emerging risk of a shrinking and aging labour force, or the ongoing risk of cheaper labour costs in other countries.

In Asia, labour costs are continuing to rise, cutting into the region's competitive advantage. Nevertheless, China's factories are still much cheaper than those in wealthier nations - employees' minimum wages are less than a quarter of their counterparts in the United States.

As the global manufacturing hub, rising prices in Asia are reflected in an upwards adjustment of prices worldwide. Average pay in Asia almost doubled between 2000 and 2011, compared to an increase of about 23 percent worldwide (and a 5 percent increase in developed countries). The biggest increase was in China, which saw average salaries triple. Lower wage countries like Cambodia and Vietnam are beginning to attract manufacturers, meaning that China - which accounts for half of Asia's output - is embracing greater automation to ensure that local factories remain competitive.

An example of the automation trend, Flextronics, a Singapore-based company with factories in China, initially made small, simple-to-assemble consumer electronics. But as wages, land costs and competition in China began to rise, shrinking margins prompted a focus on more complex, higher priced products. This required investments in automation, more precise manufacturing and increased staff training.

Higher-priced machines for the aerospace, robotics, automotive, and medical industries now make up 72 percent of the company's Suzhou output. Flextronics has implemented automated processes wherever it has the potential to reduce labour costs and errors. Automated data about the assembly line is now collected in real-time and there is far more transparency of the supply chain.

Asia has become the largest market for industrial robotics, with China showing the fastest growth over the past five years. Global demand for industrial robots also continues to grow. The International Federation of Robotics (IFR) expects that between 2014 and 2016 the worldwide sale of robots will increase by an average of 6 percent per year. By 2016, the annual supply of industrial robots will reach more than 190,000 units. MGI research suggests that 15 to 25 percent of the tasks of industrial workers in developed countries, and 5 to 15 percent of those in developing countries, could be automated by 2025.

One significant development in workplace automation is that the factory robot of the future will be able to safely interact and cooperate with its human co-workers. The aim of industrial designers is to combine the ingenuity and versatility of people with the precision and repeatability of robots, enabling human-machine collaboration in dynamic and reconfigurable

> **"…In the next few decades, new forms of human enhancement and augmented capabilities may support mental performance and physical mobility, helping to counter the effects of an ageing population…"**

manufacturing environments. A world optimised for both humans and robots.

For example, Baxter, a robot manufactured by Rethink Robotics, can safely share a workspace with workers due to its variety of smart sensors and cameras. Interacting with Baxter is more like working with a person than operating a traditional industrial robot. Baxter's sensors, including depth sensors as well as cameras in its wrists (allowing it to see with its hands), means it constantly builds and adjusts a mathematical model of the world, allowing it to recognise different objects.

The robot is also intuitive to use, allowing regular factory workers to function as programmers. A factory worker can show the robot a fragment of the task she is asking the robot to perform, and the robot infers the rest of the task. Workers are therefore not in competition with these machines, because they can serve as supervisors. A Baxter retails for around US$25,000 – roughly equivalent to the annual salary of an unskilled worker in the US.

By 2050, 21 percent of the global population will be 60 years old or older, up from 11 percent in 2013. This trend is even more notable in developed countries where 32 percent of people will be aged 60 or older by 2050. Within these ageing societies, the supply of working age people will decline as a proportion of the total population, and working age people will have to support more dependents. In less developed regions there will be more young people, providing a larger workforce and growing consumer markets.

In the next few decades, new forms of human enhancement and augmented capabilities may support mental performance and physical mobility, helping to counter the effects of an ageing population. This is already evident today in the growing application of cyber-physical systems (CPS). CPS are "physical and engineered systems whose operations are monitored, coordinated, controlled and integrated by a computing and communication core". CPS will transform how people interact with and control the physical world around them. These systems will enable the physical world to merge with the virtual world, allowing factory workers to design products, control processes and manage operations in radically new ways, enabling greater flexibility, productivity and quality.

As production lines and machines become more advanced and specialised, companies must also invest more in training and specialised equipment to enable the workforce to manage and operate complex production lines. There will be a heightened need for skilled workers and managers who are adept in the STEM fields (science, technology, engineering and mathematics) as manufacturing shifts to more complex and technological processes. Collectively, this will lead to a shift to safer, more highly skilled jobs in manufacturing.

An open and engaging customer experience

Many developed and emerging economies are witnessing a transformation in how people consume products and services. In addition to a shift to more service-based consumption, a democratisation of product design and manufacturing is occurring. The maker movement, 3D printing, open product development platforms, crowd funding and peer-to-peer marketplaces are empowering more people to design, produce and share their own goods than ever before. In response, consumer product companies are integrating these types of experiences into their existing service offerings, enabling the mass customisation of products, or participation in open innovation processes. Faster innovation cycles, coupled with constantly changing market conditions and demand patterns, mean that manufacturers will need a more agile and flexible approach to production, both in terms of the machines deployed, but also in terms of the shape and function of buildings and the skillsets of people working within them. Another aspect of this transformation is a growing opportunity to utilise the factory as a showroom. Many companies have built sophisticated customer experiences around their factories. These showroom experiences are part of the larger trend of customers demanding "connected product experiences", rather than just a product.

In Volkswagen's 'Glass Factory', for example, customers and potential buyers of the Phaeton luxury saloon can watch their car's final assembly process at close hand. The concept of the transparent factory and factory experience will gain increased importance as more people get involved in making things themselves or as they expect closer insight into how products are manufactured, especially at a customised level. The opportunity for factory owners and operators lies in adapting

> “...The tipping point has come as robotics has shifted from being the domain of the mechanical engineer to the realm of network experts...”

their existing spaces to enable these types of experiences to take place.

Chrysler is taking this idea one step further with a virtual reality experience of its factory floor. Users put on a headset to experience a four-minute, 4D immersive experience of how the 2015 Chrysler 200 is made. Users can interact with the car in real-time via the headset while exploring the three aspects of the car's building process. In the body shop, 18 state-of-the-art framing robots weld the frame of the car together. The next stage is the paint shop, where the car is prepped for its paint job with the help of ostrich feathers before being given its coating. Finally, in the metrology centre, the vehicle's fit and finish is checked and measured.

Brand experiences are not limited to 'fun' consumer products like cars. Saunier Duval, a manufacturer of heating, ventilation and air-conditioning technology, has created a factory tour at its plant in Nantes, France which takes in a 360 degree, 3D cinema show, an interactive display of the company's products and a meal.

These sorts of consumer experiences help differentiate a company's products. To remain competitive and adapt to changing consumer behaviour, companies are finding new concepts and marketing strategies to build brand loyalty. 'Experience marketing' of this kind can also be very useful in creating an image and corporate identity, capitalising on the idea that people "won't remember what you said, but they will always remember how you made them feel."

New robots will revolutionise the built environment

In the past, robots were used for specialist jobs that were too dull, too dangerous or too dirty for people to do. Today, thanks to their ability to process sensor data in real time, robots do an incredible range of things. They already clean your house. Soon they'll be able to help design and build your house too.

The tipping point has come as robotics has shifted from being the domain of the mechanical engineer to the realm of network experts. They've applied smartphone technology to produce robots that can sense, process data, and communicate with each other via the cloud to learn.

One example is Roomba, a vacuum-cleaning robot. In its first generation, Roomba would bump around your walls. Then it learned how to sense and spare your furniture. Now in its third generation, Roomba takes a picture of your ceiling to know where it is, a technique called robotic mapping.

Telecoms company Qualcomm has demonstrated the potential of this approach by taking a smartphone and adding four wheels and a motor. The power of the smartphone industry's skills and technology might enable developers to leap 30 years of development and produce a robot capable of much more sophisticated actions than anything that has gone before.

What does this mean for construction? Traditionally, building takes place onsite and by hand. In the future, according to conventional thinking, machines will perform construction offsite. But this has been proposed for years. I think there will be an alternative: robots working onsite alongside humans.

This is something researchers at ETH Zürich have begun to explore. Give a robot a pile of bricks, and it will build you a perfect wall. And it can achieve effects that a human bricklayer simply can't, such as turning each brick by exactly one degree to produce a very subtly curved wall. It does the same with timber cladding and tiles.

The leap in robotics has implications for design too. I don't think we'll see robots designing buildings autonomously. But I do think we could see them working alongside designers. You could use a robot to help you build a physical model, for example. And companies such as Skycatch already use drones for 3D scanning to provide cost-effective, high-speed and high-quality data about an area.

Should we be worried about any of this? Are machines going to take our place? I don't think so. As I heard inventor Saul Griffiths point out, robots are still blind, stupid, fat, weak, slow and difficult. They're an opportunity, not a threat.

Autonomy enables adaptive built environments

The future points to an autonomously crafted built working environment in which many assets can adapt intelligently to both users' changing needs and the threats of a changing climate.

Designers' novel thinking about data, tools and methods is advancing to a point where it's possible to foresee an

> **...When built environments' systems possess artificial intelligence (AI) fed by sensors a degree of autonomous decision making becomes possible...**

autonomously crafted built environment, one that mimics nature's ability to adapt to environmental change over time. This technology will be a vital way of dealing with the effects of an increasingly volatile climate.

When built environments' systems possess artificial intelligence (AI) fed by sensors a degree of autonomous decision making becomes possible. Autonomy is achieved by combining local learning from cameras and sensors, correlated to data and intelligence drawn from other AI-enabled assets.

Built environments that respond to a changing climate

This combination of advances means our built assets will be able to respond to their environment, autonomously reacting to changes in temperature, weather, human usage patterns, and other factors. In this convergence, designers and data scientists contribute their insights into the model, to ensure the variety of aspects taken into consideration and sheer volume of data is provided to shape the kinds of adapting preferred scenarios the artificial intelligence understands. These scenarios in turn train machines to rapidly produce the most sensitive and customised design solutions. A continuous feedback loop of data from the asset's environment and its users ensures success.

The comfort and energy performance benefits of this new approach are clear. A feedback loop is used by the Hong Kong-based start-up Ambi Climate, an Internet of Things (IoT) app that controls individual air conditioning units located in different rooms from a smart phone. Ambi Climate learns the inhabitant's preferences (times at work, temperatures enjoyed), applies this knowledge, and autonomously creates a tailored profile.

In the future, because homes, buildings and urban infrastructure will be connected and self-aware through smart components, design updates will occur autonomously. Inefficient, over-scheduled maintenance schemes will be replaced by machine-learning algorithms that are far more capable of knowing when preventative maintenance is needed, based on a growing bank of performance data from sensors. Resources and energy will all be saved.

Challenges of autonomy

Autonomy also represents a challenge to traditional human roles in the design of the built environment, because it can match and surpass human solutions at scale. This approach will be an improvement on today's often outdated, inappropriate designs, ones that often focus only on the requirements of society's top one per cent. The challenge for human designers will be how to embrace this new data paradigm of timely, appropriate and scalable design solutions.

This amount of autonomy also presents a challenge to the operators and regulators of the built environment. Current data privacy and confidentiality barriers will need to be overcome and new local connectivity systems for instant and robust connectivity (hubs) will need to be developed to provide instant yet democratic harmonization of the built environment.

Adoption a question of time?

Fully autonomous operation might still be in the future, but a measure of it has already been achieved on projects like the 3D printed Daedalus Pavilion. On this project an algorithm autonomously adapted the material density required for the building. At the same time, a robot fabricator with cameras connected to AI capabilities was able to judge how far its landing position to deposit material was from the design position, and thus able to correct itself. An AI feedback loop allowed it to be quicker by being more daring – it learnt from its mistakes.

With the amount of investment currently being directed at machine learning and artificial intelligence I think it is more a question of when, not if, autonomous decision making like this will become possible.

Can you imagine having a robotic co-worker?

I believe we appear to be at the tipping point of technology that will enable collaborative robots to be used much more widely in the workplace. Robots of the future will be able to interact safely and co-operate with human co-workers, as well as learn from them.

I am no expert on robotics and artificial intelligence but, as a futurist, I am increasingly drawn to this complex, rapidly

evolving and very exciting field. The implications will be far-reaching, and we may have to adapt our lives to work alongside increasingly sophisticated robots (many of which won't be humanoid in form, but could be a collection of disembodied sensors).

Robots will replace or augment not only unskilled, routine jobs, but also many highly paid and highly skilled jobs. These could include doctors, journalists and financial traders (automated algorithms are already responsible for high volumes of financial transactions).

In our recent Foresight publication *Rethinking the Factory*, we look at the increasing use of collaborative robots in manufacturing. Factories have long used industrial robots for tasks that involve heavy lifting or repetitive jobs that require speed and precision. However, these robots have been too unintelligent and dangerous to work alongside humans, who tend to perform more delicate final assembly jobs or tasks that require flexibility.

This is changing. Take Rethink Robotics' Sawyer robot, which can be taught to perform tasks by human co-workers who have no programming expertise. A human can physically guide Saywer's arm through part of an activity and Sawyer can then infer the rest of the task.

One of the most interesting developments is the ability of robots to learn to perform complex tasks without being reprogrammed, by building knowledge through trial and error. They learn from experience and can adapt their behaviour to improve upon a task.

For example, a robot from the Berkeley Robot Learning Lab called BRETT (which stands for Berkeley Robot for the Elimination of Tedious Tasks) uses deep learning to complete tasks without input from humans. Using trial and error it has learnt to assemble a basic toy plane and to place a Lego brick in the correct position.

In the next decade, we could see robots learning complex tasks from scratch. These robots will learn in a similar way to humans, through consuming information, demonstrations by others, and trial and error.

This ability to learn as well as interact safely with humans will have implications far beyond the factory floor. One day, we could see robots taking over manual labour tasks such as painting walls, cooking meals, repairing roads, folding laundry or walking the dog. But it is a mistake to think only manual labour will be affected; we all have elements of our jobs that are predictable and subject to automation.

While the reality of your employer replacing you with a robot may still be some way off, we need to start considering whether our education and professional training systems are fit for the robotic age. As robots become more flexible and responsive, human workers will need to develop new skills and take on more creative or supervisory roles, or they will become redundant. Ultimately, humans will need to possess more flexible skill sets than their robotic co-workers.

As futurist Alvin Toffler has noted: "The illiterate of the 21st century will not be those who cannot read and write, but those who cannot learn, unlearn, and relearn" **W&P**

"... One of the most interesting developments is the ability of robots to learn to perform complex tasks without being reprogrammed, by building knowledge through trial and error.. ..."

References

The author would like to thank the colleagues from whose work this feature borrows its constituent parts as listed in the references below.

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An event in Finland next year promises to throw open the door to a new era of transdisciplinary research into the modern workplace

Rianne Appel-Meulenbroek

The need for transdisciplinary workplace research

Workplace research is performed within many different disciplinary fields both in academia and in practice. This has the advantage that it is studied from many different angles with many different methodologies, which is helpful to get a grip on such a diverse and multi-disciplinary topic. However, a disadvantage is the fragmentation that has resulted from this, especially regarding academic workplace research and its transfer to practitioners.

We academics tend to publish in our 'own' journals that represent the disciplinary field of the department we are working at. I once performed a review of a sample with published empirical studies on the added value of physical office environment aspects for employee outcomes, together with the real estate group at the TU Darmstadt. We identified the results of 111 scientific studies which were published in 50 different scientific journals. Besides the number of different journals, it was also visible that the real estate academics published mainly in real estate and FM related journals, the psychologists in journals related to psychology and behavior, and those working in health departments in journals on medicine and health. As the university and department that we work for also determines which journals we have access to, this is likely to hamper knowledge transfer between disciplinary fields. The same is true for academic conferences which also have a strong disciplinary focus, and where generally workplace is not the main topic of the conference but only addressed during one or two sessions. So workplace academics from different disciplines also have a poor chance to exchange thoughts face-to-face.

> "...We academics tend to publish in our 'own' journals that represent the disciplinary field of the department we are working at..."

Besides this breach in knowledge transfer between academics, the transfer of academic knowledge to practitioners generally is also somewhat troublesome. The increased workload of academics, combined with the pressure in universities to publish in the best scientific journals only, is further confining the conversion of scientific knowledge into tools that are ready to use in practice. In a time where the question how to manage the workplace is discussed in more board rooms than ever before, this is very undesirable. Now that we have the attention, we need to show our strategic value.

However, to convince general management to allocate costs to workplace in order to achieve optimal benefits, it is necessary to support your business case with evidence for effects of physical workplace aspects on organizational/employee outcomes.

But over the years doing research in this field and visiting both scientific and practitioner conferences, I noticed that several common struggles of corporate real estate (CRE) and facility managers (FM) in making their case have remained unchanged over the past decade.

Therefore, I started to brainstorm with practitioners and workplace academics about which topics are the most important struggles in practice at this time, and how future research could provide insight into these topics. Important questions that came forward were: How can the use of the office environment be steered towards both employee effectiveness and a positive attitude toward the offered workplace? What does an integral business case comprise on the short and long term, with a balanced interest of different stakeholders? How can the workplace increase productivity of knowledge workers and better support their health and wellbeing? Not only are these topics not new on many agendas, they also showed up in the review I mentioned earlier as not receiving much attention from academics from any research discipline.

A consecutive brainstorm with 19 academic workplace researchers last June confirmed my thoughts why this was the case. After discussing how they could approach these topics in future research, I asked them to write down who they would need for performing such studies. They agreed that for all topics both researchers from several different disciplinary backgrounds, and users and experts in practice would be essential. So if we want to tackle such long existing workplace management issues once and for all, we need to cross bridges and start more transdisciplinary studies.

As breaking boundaries is not always easy or self-evident for researchers, I felt the necessity to make them meet face-to-face in order to exchange thoughts and experience and to be able to form new alliances. Therefore, I created the Transdisciplinary Workplace Research (TWR) network, with the intention to organize transdisciplinary conferences dedicated entirely to workplace research. It was great to see that many workplace academics shared my enthusiasm and it thus was easy to create a TWR board with researchers from all kind of different fields (among which real estate, FM, health, psychology, sociology, business administration, management, architecture) and working for universities on several different continents. And it also did not take me long to find a willing and capable host for the 1st TWR conference in Tampere University of Technology (TUT; see the conference website www.tut.fi/en/twr2018). TUT has composed a multi-disciplinary organizing team with representatives from different departments, also including practitioners.

From 19-21 September 2018, this conference will bring together work environment researchers from all relevant disciplines, both from academia and practice. As TWR network we believe that this includes, but is not limited to, physical work environment (e.g. facilities management, real estate, architecture and design, building physics (HVCSE), bio-technology), social work environment (e.g. HRM, behavioral sciences, organizational science, business, health, environmental psychology), digital work environment (e.g. ICT, virtual reality), and work environment management (management, economics, FM, CREM).

During two days, we will be discussing workplace research from all these perspectives, with researchers from around the world in parallel sessions. Delegates can attend by listening to the latest research findings in these sessions and joining us in special workshops aimed at jointly identifying future roadmaps for related sub-themes; this in order to provide the opportunity to form and join transdisciplinary, international research initiatives involving academics and practitioners. Over 30 different workplace studies will be presented, with diverse topics. We will offer you presentations about research findings ranging from social issues, like workplace culture, leadership and work patterns & activities to physical issues, like distributed and collaborative workplaces, to technology issues, like workplace sensors and other smart building technology. And we also want this to be the place to present management issues, such as determining workplace KPI's, dealing with the sharing economy and workplace and employer branding. You are all very much invited to attend and lay your own issues on the future workplace research table **W&P**

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The association between open plan office design and hierarchical management has a precursor in a centuries old idea

Mark Eltringham

A 300 year old idea explains the enduring appeal of the open plan office

In the 18th Century the utilitarian philosopher Jeremy Bentham came up with his idea of the Panopticon, a prison building with a central tower encircled by cells so that each person in the cells knew they could be watched at all times. Whether they were observed or not was actually immaterial. Bentham called it 'a new mode of obtaining power of mind over mind' and while he focused on its use as a prison, he was also aware of the idea's usefulness for schools, asylums and hospitals. Bentham got the original idea following a visit to Belarus to see his brother who was managing sites there and had used the idea of a circular building at the centre of an industrial compound to allow a small number of managers to oversee the activities of a large workforce. This is something of a precursor of the scientific management theories of Frederick Taylor that continue to influence the way we work and manage people.

Indeed the layout of the Panopticon from Bentham's original work – reproduced below – bears more than a passing resemblance to a contemporary open plan office building. And so Bentham's description of the benefits of the Panopticon is like a rallying call for the apparent benefits of the open plan.

Morals reformed—health preserved—industry invigorated—instruction diffused—public burthens lightened—Economy seated, as it were, upon a rock—the Gordian knot of the poor-law not cut, but untied—all by a simple idea in architecture!

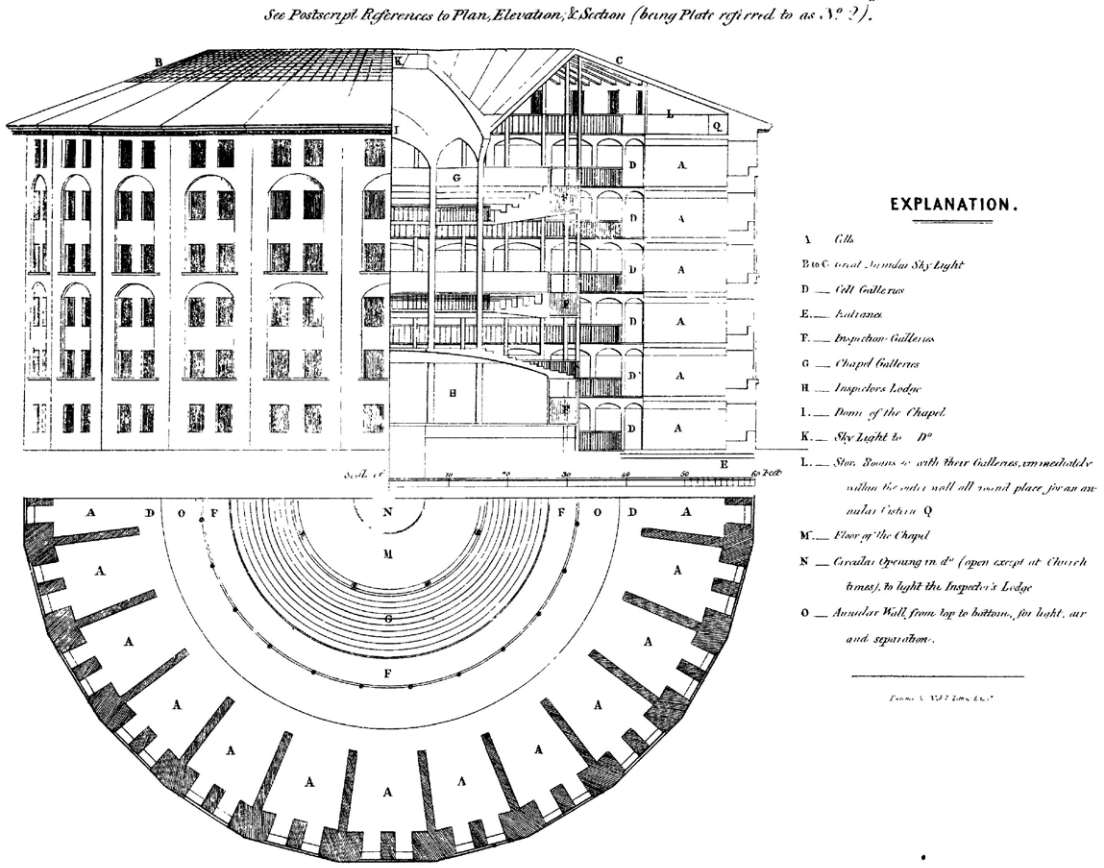
The idea has an enduring appeal. Michel Foucault did most to reapply the thinking behind the panopticon to 20th Century command and control structures in his 1975 book *Discipline and Punish*, in which he wrote "the Panopticon is a marvelous machine which, whatever use one may wish to put it to, produces homogeneous effects of power".

Just as Bentham had drawn inspiration for his idea from a work setting, so Foucault suggested that the idea as applied to prisons was a reflection of how the outside world functioned.

This thinking is explicit in one of the Panopticon's most famous practical examples, the 'Model Prison' in Cuba pictured here.

The symbolic and enduring appeal of the Panopticon is also applied to the technological surveillance of employees by the author Simon Head in his book *Mindless: Why Smarter Machines Are Making Dumber Humans*, in which he explores the consequences of a business culture still in the grip of scientific

Image: Friman, via Wikimedia Commons



management thinking, albeit talking as if it weren't, but now with the technological wherewithal to apply it to minutely observe, regiment and (increasingly) automate the work people do and the way they go about it.

Perhaps this ability to mimic the open plan's all-seeing eye in virtual space will drive the uptake of flexible working, or it may be just another tool of observation along with the building itself. Either way, our enduring love affair with the Panopticon in all its guises shows we are yet to reject the principles of scientific management. The most obvious contemporary manifestation of scientific management and the Panopticon itself is the open plan office.

In fact, there are many reasons why organisations like open plan offices beyond a simple impulse to watch people. When it comes to making the business case for them however, firms prefer to talk about some more than others. So while they prefer to focus on the argument in terms of how openness can foster better lines of communication, collaboration, teamwork and team spirit, they talk rather less about the fact that the open plan is a lot cheaper than its alternatives and how they like it because it allows them to keep an eye on what people are doing.

In theory at least, a great deal more of this surveillance now happens electronically so the need for physical presence should be less pressing, but the residual desire to see with one's own eyes what people are doing remains. This is the instinct that constrains the uptake of flexible working and also means that there is a hierarchical divide in who gets to decide where they work. Practically all UK employees now have an equal right to request flexible working. But some are clearly more equal than others. A 2013 survey of 2,000 UK office workers by OnePoll found that 59 percent of senior staff were granted flexible working privileges compared to just 26 percent of those working lower down in the organisation.

The legal sector gives a particularly good example of how this manifests itself in practice. A recent survey of 3,400 solicitors carried out by the Law Society of Scotland found an increasing number were making use of flexible working. The research shows that while the majority of respondents (77 percent) continue to work full time, two thirds are now allowed to work away from their main place of work. In marked contrast to other professions, around two thirds of respondents did not access emails and work files while away from the office. Amongst the other interesting results from the survey is the fact that men are significantly more likely to be allowed to work from home than women (69 percent compared to 56 percent respectively) or work remotely (66 percent males compared to 51 percent of women).

This discrepancy may be a structural issue according to the report given that female employees in the legal profession have a tendency to fall into the £15,000 to £45,000 salary range whereas male employees are more likely to earn between £65,000 and £150,000 because women are more likely to be employed as administrators, trainees, associates and so on while men are more likely to be partners or directors.

At the heart of these status distinctions, there is evidently a degree of trust involved in the way firms not only offer employees flexible working arrangements but also their fondness for the open plan. Managers like to observe staff, but in return staff react to observation. We all understand that people act differently when they think they are being observed and it's a characteristic that has been applied in interesting ways down the ages **W&P**

***Mark Eltringham is managing editor of* Work&Place**

THE UNITED WORKPLACE

Bringing together workplace experts

The United Workplace is a network of likeminded businesses, sharing a passion for the workplace – inspiring design, innovation and a culture of collaboration underpins everything we do.

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