Data to Design
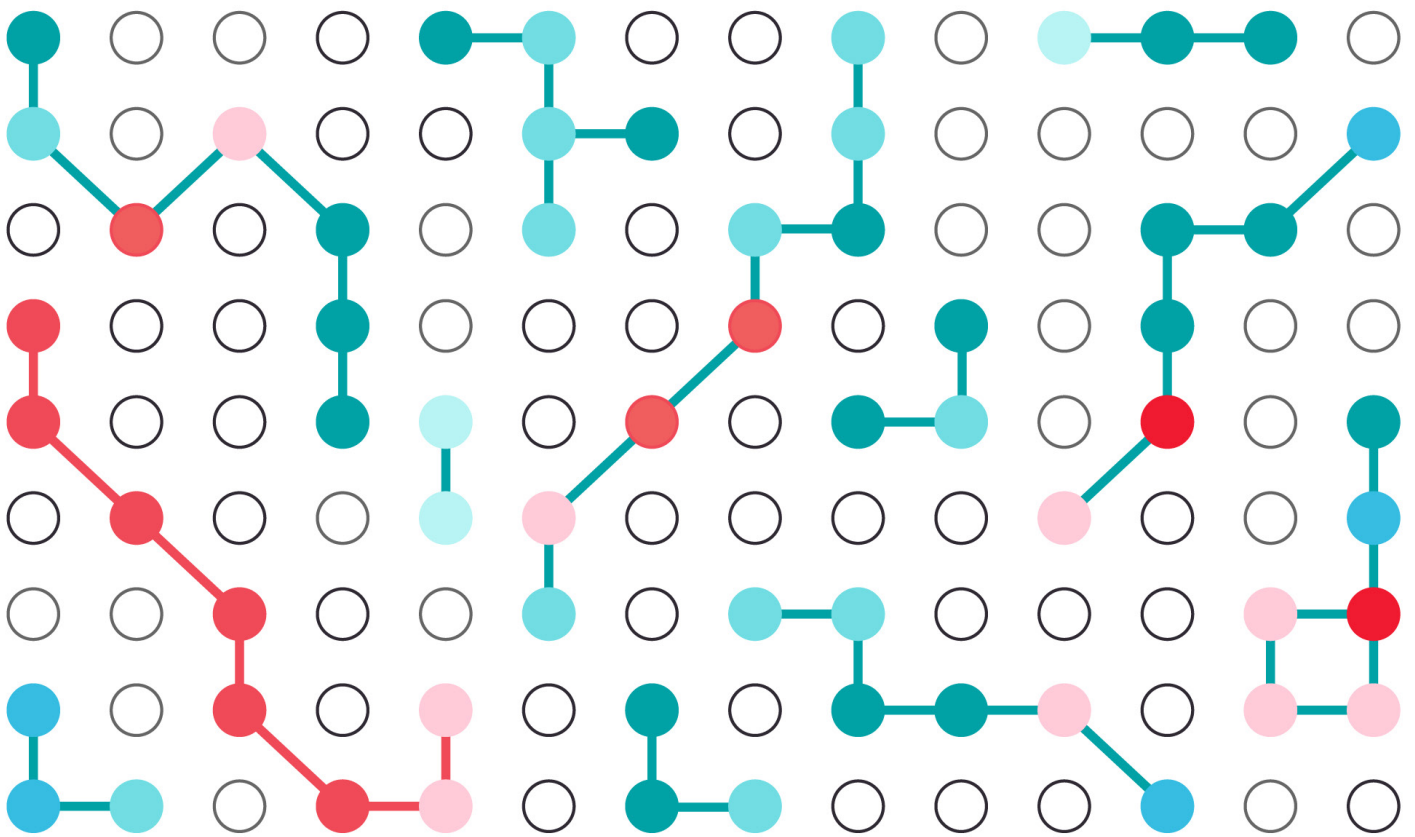
**Bringing the Right Intelligence
to Redesigning the Workplace**

A Discussion Paper by Humanyze and WORKTECH Academy

WORKTECH™ ACADEMY

Humanyze

ABSTRACT

"In God we trust. All others must bring data."
W. Edwards Deming, engineer and statistician

Acres of newsprint, hours of broadcast airtime and millions of web pages are devoted everyday to discussing the digital future of work. But behind all the tech-centric headlines, blogs and analysis, one inescapable fact remains – the built infrastructure of the physical office is not going away.

In fact its presence is looming ever larger, as there is today a wave of extensive investment in the global workplace to redesign our spaces and settings. Behind all this restless experiment is an ambition to make a better fit between corporate structures, human behaviour and the more fluid working patterns of the digital knowledge economy – and it is not an easy task to achieve. As the way we work changes, office buildings are struggling to catch up and designers are being asked to bridge the gap.

What role does data play in the design process? Designers have always used information of different types to shape new workplaces. Traditionally the 'org chart', which sets out the organisational hierarchy like an electrical wiring diagram, was the primary source of data to decide who should sit next to who, how many desks should be provided, team adjacencies or positioning of amenities.

We are, however, on the foothills of a technological revolution in the way that data is gathered and analysed on how people really work in offices. We have access to new information tools with cutting-edge social sensor technologies that can objectively and scientifically reveal the deeper patterns of interaction, communication and team dynamics within the workplace. We can build a firmer empirical base on which to make design decisions that can enhance collaboration and innovation.

This paper sets out the changing landscape of work and workplace, exploring the process of data to design and its role in shaping more ambitious and imaginative workplaces in the future. The first two sections outline the parameters of the changing physical workplace and

the challenge for designers as new, more expansive and complex ways of working are introduced. The third section discusses the emerging roles in managing workplace experience and wellbeing. The final section looks at the process from data to design. The paper concludes with some key messages: workplace design is an investment in communication,

not a cost, and datasets can help validate that angle; you can't manage what you can't measure; large quantitative datasets enabled by new social sensor technology should be combined with the qualitative data designers are familiar with, to get the whole picture; and it is more about designing behaviour rather than designing space. Ultimately this report anticipates a burgeoning relationship between design and data science to create better workplaces for the future.
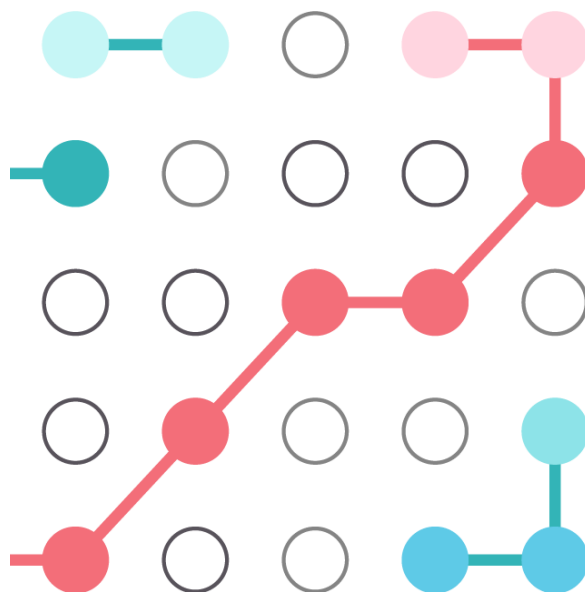
BACK TO THE DRAWING BOARD

"The details are not the details. They make the design."
Charles Eames, architect and furniture designer

Rethinking How We Work

The first thing to recognise in any discussion of the role of data in new workplace design is the extent to which traditional models of working have been challenged and forced into retreat in recent years. No longer do most organisations tether their employees to an assigned desk in rigid teams for long hours. Instead they are introducing more fluid and dynamic styles of working, which promote choice and autonomy within and beyond the office.

Agile and activity-based working is on the rise within office buildings, expanding working life beyond the fixed point of the desk into a series of shared, learning and social spaces dedicated to fostering focus work, collaboration and innovation. To create this more social, less supervised landscape for work requires extensive design remodelling to provide more varied settings.

Flexible working is on the rise beyond the office walls, expanding working life away from the fixed point of the workplace and into a variety of alternative venues for work, including coworking spaces, third spaces and homes. Flexible working takes many different forms and these collectively challenge organisations to come up with a new raison d'etre for office space. If you don't need to be physically present in the office to access files and equipment, then it must take on different purpose – as a destination for training, mentoring, teamwork and social connection. Again, the design of the space needs to change as a different mix of amenities is provided.

Driving Change in the Workplace

This emergence of a 'work when you want, how you want, where you want' approach is being encouraged and driven by a combination of demographic, social and technological factors. The global workforce is becoming more multi-generational, presenting challenges in terms of different behaviours and attitudes right across the age spectrum. The digital natives – Millennials and their Gen Z successors – are currently in the spotlight as they are set to make up three-quarters of the workforce by 2030. But the needs of older workers remaining in the workforce for longer are equally important to consider – and understanding how they work, in order to avoid a 'brain drain' from the organisation, is of growing significance.

This multigenerational workforce will comprise more part-time and project-based workers operating within the orbit of the organisation but more autonomously. Whereas 20 years ago, offices mainly comprised full-time employees, now there is increasingly a diverse population over the working day as partners, suppliers, consultants and freelances join staff members in using the building or campus in a less predictable and more complex and dynamic way.

As the corporate headcount shrinks in some sectors, so the rise of the contingent, on-demand workforce grows – the self-styled 'gig economy' – as companies become more project-based and producer-led, bringing in expertise and talent as required.

As the boundaries between work and life continue to blur, people are expecting the same flexibility and autonomy over their work life as they do their personal life. Organisations have increasingly started to realise the value of their talent, and this has driven a paradigm shift in workplace design.

All About the Experience

Evident signs of this shift can be found in the greater focus being placed on the employee experience – and on health and wellness in the office. The work environment must now become more effective in combatting burnout, depression and anxiety, and this has led organisations to introduce more holistic policies to improve the 'customer experience' in the office and enhance levels of wellbeing.

This focus takes many forms. Not only is water and air quality in the office more closely monitored, but also active commuting such as walking and cycling is more widely promoted, as well as better access to fresh, healthy food. It is all a far cry from the age of efficiency, of time and motion, when people were cogs in the great work machine.

The emergence of new technology is also playing its part in evolving patterns of work and new styles of workplace. The network has replaced the machine as the dominant work motif. Artificial intelligence has started to automate routine tasks, allowing a greater emphasis on creative knowledge work. This type of work places collaboration and innovation at the top of the corporate agenda, and the environment in which this work is done needs to reflect that. There is, for instance, now a rise in accelerator and incubator-stylespaces to boost in-house collaboration.

Each piece of the jigsaw adds up to a picture of workplace change that challenges fundamental assumptions about how office space performs – and challenges organisations to seek a deeper, more rounded understanding of how work gets done inside their buildings. The workforce typically accounts for around 90 per cent of an organisation's operating costs, and how they choose to work directly impacts the physical workplace.

Meanwhile employees will have greater control over their work environment by using apps and digital tools to adjust the settings of their immediate environment, book rooms or order other services. A degree of control and personalisation in the office has been linked to higher productivity and greater employee satisfaction levels.

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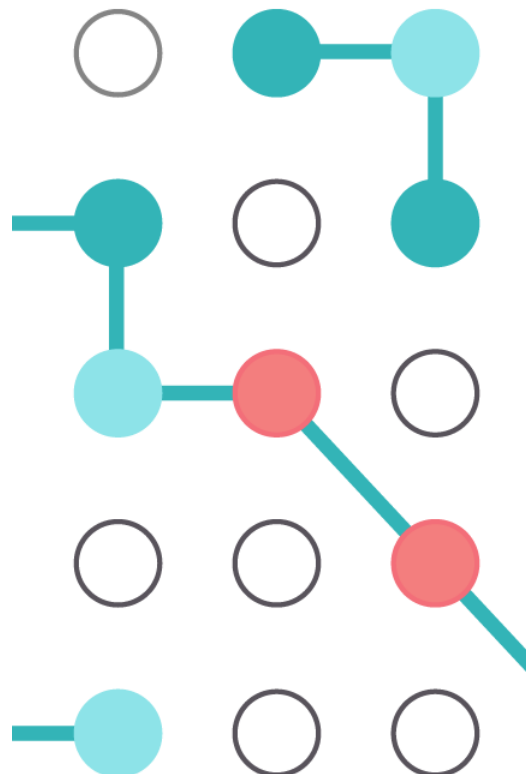
REMODELLING FOR A REASON

"Digital design is like painting except the paint never dries."
Neville Brody, designer and educator

Experiments in Design

Such is the pace of change that all bets are now off in workplace design. We have seen large, coloured 'social staircases' punching holes in the slabs between office floors to boost serendipitous encounters; giant digital screens messaging corporate culture across the office-as-brandscape; authentic food courts carved out in the public plaza-style lower floors of major business headquarters; and folksy neighbourhoods with wooden structures, hearths and 'camp fires' crafted in the midst of open plan space.

Such design experiments cannot be dismissed as mere novelties – they have a serious intent to grasp the important human challenges of the office. Companies today have little choice but to embrace the new if they want to improve talent recruitment and retention, stimulate innovation and lift productivity from the low into which it has sunk in most advanced economies since the 2008 economic crash.

What organisations also want to know is whether their design remodelling of the workplace – those expensively and painstakingly assembled changes – are having the desired effect on behaviour. This is where data capture and analysis is so important.

Improving the workplace experience is now regarded as essential to winning the war on talent. Frictionless working, seamless connectivity, vibrant amenities and better ambient conditions and controls are all part of this story. Doing the right thing in terms of sustainability and social responsibility is also important for the millennial workforce in particular. Employees are looking for a broader purpose in work than just holding down a job and getting a paycheck.

Turning up the dial on collaboration, creativity and innovation within the organisation depends on getting the right people into the right places with the right tools at the right time. Changing work styles influence how people use different settings and spaces, with whom they interact and for how long.

Companies once satisfied with pre-planned cycle of regular meetings and reports now recognise that you can't simply mark 'innovation' on the calendar in the expectation that it will automatically happen.

As for productivity, organisations are facing up to a 'wellbeing deficit' in the workplace that is affecting levels of performance and engagement. Until that is fixed, the traditional output-oriented metrics of productivity are not going to shift. Cue changes to the physical workplace around natural light penetration, visual enrichment, acoustic privacy, ergonomic furniture, introduction of biophilia and breakout space, and access to fresh food and fitness facilities.

Smart Building to the Rescue?

Such is the long list of things that need attention in the workplace that it is no surprise that the promise of the smart building should command growing attention. The smart building essentially uses digital technologies to bring all its key operating systems and services under central control, so that a whole range of different elements work in tandem to create a better workplace.

The versatility of these buildings depends on the smart interaction between intelligent building management systems that use open protocols to bring systems

together over one single network and the Internet of Things (IoT), which connects all the devices in a building and generates large amounts of useful data.

The smart building started out with a tight focus on cost control and reducing environmental impact, managing energy use for example. Now its value and appeal is being framed more broadly around delivering a tailored experience that can build brand and culture, attract and retain talent, and raise levels of collaboration and innovation. The potential for people, space and resources to be managed more effectively in real time within the smart building, using digital dashboards and predictive analytics, brings workplace design into the era of the 'digital ecosystem'.

The digital ecosystem is where a combination of unprecedented computational power, billions of connected devices, faster and more widespread connectivity, and huge volumes of data will have an undeniable impact. For example it will allow architects and designers to model office schemes digitally and pilot changes onscreen before actually building them.

But already there is a growing view that the smart building by itself is too small a unit of focus. Most investors, owners and occupiers are concerned with a portfolio of buildings, rather than one, and want to compare performance across several of their sites. Many organisations occupy entire campuses, which have been around for decades, or are moving into smart precincts that are relatively new.

The Rise of Smart Precincts

Smart precincts have been described as the 'building blocks' of the future smart city. They exist at an intermediate scale between the single facility of the smart building and the vast urban plan of the smart city. Essentially they are mixed-use districts – typically carved out of underperforming Central Business Districts or redundant industrial sites or unoccupied stretches of urban waterfront – that combine the latest technologies and smart services with novel real estate and place-making strategies.

Smart precincts are playing a key role in urban regeneration in many cities around the world; importantly, they offer a whole new range of possibilities for the relationship between behavioural data and workplace design.

Within the smart precinct, workplaces do not sit alone – they are woven into a complex tapestry of use alongside retail, residential, transport, cultural, educational and hospitality facilities, creating vibrant, mixed use communities. The public and the private, the nimble start-up and large corporate, the physical and the digital all share the same urban quarter. This mix is attractive to the new workforce operating in a more mobile and permeable relationship with the city and home life.

Smart precincts are being built around around mobility hubs or shopping centres or academic life-science clusters, or to anchor a major employer in the city, as in the case of Port Covington in SouthBaltimore, which is giving the local sportwear giant Under Armour a new campus alongside new homes, shops and waterfront tourist facilities. But while smart precincts may vary in character, they all share the potential for data sharing across typologies. One can imagine a scenario in which data collected on workspace occupancy and movement can be matched with real-time travel information or smart home data or retail data to provide a fine-grained perspective on behaviour in the precinct.

For designers of workspace within the smart precinct, such rich information will be a goldmine for deciding how to organise the working environment in the context of accessible mixed-useschemes that might offer ready alternatives to in-company restaurants, auditoria or boardrooms. Patterns of movement and interaction can be tracked not just within the office building but also across the precinct. At the smart precinct scale, the org chart is irrelevant to how work gets done. Instead accurate and detailed datasets must guide the design of the new, urban-connected workplace.
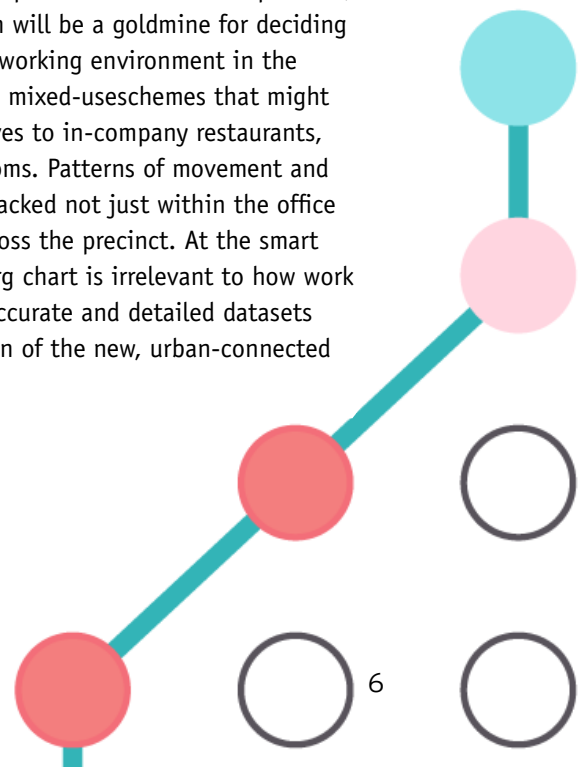
FROM EFFICIENCY TO EXPERIENCE

"People ignore designs that ignore people"
Frank Chimera, Designer and Author

New Employee Expectations

Remaking the physical workplace to focus on experience and wellbeing and catalyse innovation and collaboration requires new thinking about how office buildings, campuses and precincts are planned, designed and managed. If the workforce is beginning to break out of traditional hierarchies and formal reporting structures to operate more autonomously and independently, supported and augmented by new technologies including AI, it follows that roles and systems in the workplace will change too.

Management structures are becoming flatter and more distributed. Managers themselves are becoming facilitators rather than leaders with followers. Workplace strategy, which aims at an alignment between work patterns and work environment in order to meet the organisation's core business objectives, is shifting from boosting efficiency and output to expressing culture and improving experience.

Faced with these shifts, and faced too with the weight of changing employee expectations about a better work-life balance or blend, the old silo mentality of human resources, facilities management and IT all operating in their own worlds makes less sense. Companies increasingly expect people, place and technology to be managed more holistically, with a greater accent on service and mission. This is what the popular coworking movement has delivered with great panache and style as an alternative to the corporate workplace.

Indeed it is instructive to compare the grumpy, jobsworth, janitorial services of the traditional FMdiscipline with the new glamour of the fashion and hospitality sectors that WeWork and its peers have brought to the office real estate sector. Almost overnight, facilities teams are being forced to learn new soft skills and the meaning of service. If they don't, the workforce will migrate elsewhere where the coffee is better and the décor is brighter.

New Kids on the Block

To direct the workplace experience, like an art or movie director, new roles are springing up within the senior echelons of the organisation. These roles have titles like Chief People Officer (CPO), Chief Digital Officer (CDO) or Chief Technology Officer (CTO). An emerging favourite is the CEXO – Chief Experience Officer. Each of these roles has a slightly different emphasis depending on the company, but the general line is clear: workplace experience is becoming a top priority and tech is central to making this happen.

Theatre metaphors in which the workplace is made up of actors, sets, scenery, scripts, rehearsals, first night and rave reviews have started to creep into language of facilities design and management.

The influence of the start-up scene, which is where job titles such as Vibe Manager first appeared, is also having an impact on the corporate workplace. The idea of small enterprises devoting an entire senior salary to the function of keeping people happy marks a sea change in attitude – and it has jolted the facilities management industry to think again.

FM teams which once looked after the separate entities of AV, photocopying, printing and so on must now understand not only the holistic nature of experience

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but also the whole digital picture, as everything is connected. As a more diverse mix of building users engage with the physical environment in more fluid and unpredictable ways, office designers and managers are increasingly viewing office populations as communities, with all the richness and complexity that suggests, rather than 'the workforce'.

Unsurprisingly, Community Managers, once seen only in public, neighbourhood and lesiure plazas, are coming into the workplace. This is another new, bell-weather title to indicate which way the wind is blowing. Again, the coworking vanguard has pioneered the concept of the community manager at work. It has taken the concierge or host/hostess service model aimed at individuals in smart office developments and widened its focus to to concentrate on the mood and wellbeing of the collective.

The Architecture of Collision

Just as you'd run into people by chance in your local community, so new workplace design is focusing on what has been termed the 'architecture of collision' to boost levels of interaction and innovation. Companies that put in new features such as large staircases to generate more unplanned encounters, for example, want those interactions measured to see if they are having the desired effect. At Boston Consulting Group's new HQ in the Hudson Yards smart precinct in New York, Humanyze scientifically measured the 'collision coefficient' of 100 people to analyse the impact of the new space design.

One can begin to see the office as a giant social-physical network that twins place with the digital. Social networking online is replicated in architectural space, as key areas of the workplace are geared towards a constant whirl of collaboration, connection and social interaction. How do you capture the data around that?
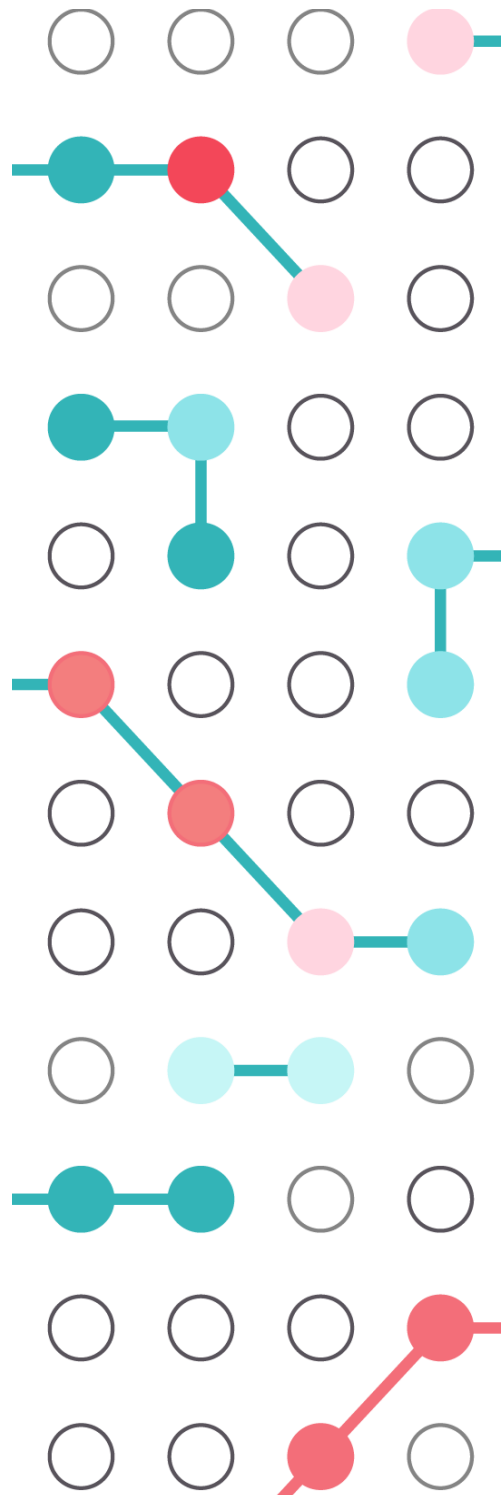
DATA DIVIDEND

"It's difficult to imagine the power that you're going to have when so many different sorts of data are available."
Tim Berners- Lee, father of the Worldwide Web

As organisations focus ever more closely on employee experience, they are realizing that experience is influenced by two things. One is organizational design, which provides a governing framework for workflow, procedures, structures and systems within companies. The other is the design of workspace itself, which helps to shape human behaviour.

The transformation from command-and-control structures to more community-oriented and networked organizational design will support a better workplace experience in most companies. So will designing physical spaces and settings (whether in the building or across a campus or precinct) in a way that allows people to work where and how they want, and gives them an element of choice, personalization and control.

The bad news is that people at work are notoriously difficult to measure. The good news is that, whereas in the past employee performance was based largely on a mix of observation studies and interview data, today there are new information tools capable of giving us more and better data on which to base design decisions.

Deployment of sensor technology in offices has opened the door to a new era of quantitative data for companies to learn about the real behaviour and the real needs of their employees. A modern workplace can collect data on a scale that would have been incomprehensible just a few years ago. The challenge is converting this vast reservoir of information into tangible knowledge on performance and employee interaction that can be acted upon through the design process.

Which Data Matters?

Organisations need to outline a clear business strategy when they decide to collect data. If a company's goal is to reduce its real estate portfolio and understand building performance, the most effective data to collect would be utilisation data inside the office. However, when mapping behavioural patterns and performance of employees, perhaps with a view to enhancing collaboration, it is often communication data that is the most valuable.

Data obtained through email traffic, meeting schedules, communication records and socio-metric employee ID badges, which have integrated proximity sensors, generate a great deal of useful information. If this has big-brother overtones, we should point out that Humanyze anonymises all data to the cloud and does not look at individual communication content. The intention is to look for those larger collaborative networks and patterns through a quantitative process of analysis. In this way we measure two types of communication data: cohesion data (the connection within teams) and exploration (the connection between different teams).

We also believe that quantitative data only tells one side of the story. Quantitative and qualitative data are complementary in understanding employee behaviours as they provide a new level of accuracy. Designers love qualitative data – it has been their currency for a long time and they are comfortable with it. But remember that quantitative data provides the numbers that help convince business leaders about the value of workplace design. It plays to the enduring idea that you can't manage what you can't measure.

DATA TO DESIGN

Using Data to Inform Decisions

Not only are we collecting more data but the introduction of AI and machine learning will create statistical tools to help make sense of the data and recognise small but significant behavioural patterns in employees. This technology, which spots these patterns at a macro scale invisible to the human eye and brain, will shift the workplace from a reactive state to a predictive one. It will identify patterns and correlations that can prove or disprove certain design hypotheses. We describe this as 'evidence-based knowledge'. In order to gain the most value from data, it should be integrated into a single platform for analysis as looking at silos does not give the bigger picture.

There are three key steps in using data. The first step is measurement – collecting and quantifying the data. The second is diagnosis - understanding what different behaviours mean and giving the organisation feedback on how work is being done. The third step is the aggregation of a large pool of data that can help predict how different factors may affect collaboration and gain a deeper understanding of what the behavioural 'norms' are.

Objective quantitative measurement means that companies can experiment workplace design of the workplace and discover interesting relationships between different variables. For instance, we learned over time that the placement of a coffee machine in the office can contribute to increased collaboration. The coffee machine drives people to the same space, and this is heightened when the company has invested in a high-quality coffee machine. If the coffee machine is moved to a more favourable location, there could be a small percentage increase in people visiting the area. That may not seem significant until machine learning tracks that pattern and identifies an increase of people collaborating in that area. Not visible to the human eye but it is right there in the numbers.

In For the Long Run

Quantitative data can be used not only to create new workspace design – it can also validate existing designs over a long period of time. This will lead to a continuing relationship between companies and their designers, as changes are constantly researched, modelled and adjusted on a real-time basis. This plays to the idea of office design being in what has been termed as 'a constant state of beta' as part of an ongoing dialogue between people, space, environment and business.

The client organisation and designer need to establish a strategy before the data is analysed so that architectural decision-making is aligned to business objectives. One can see a future in which designers build digital data libraries of different behaviours in the way they ran libraries for materials, fixtures and finishes in the past. Design proposals will no longer be based on aesthetic preference, hunch or intuition but grounded in robust data. This is evidence-based design and it appeals to many clients.

One of the key results of data-designed workplaces will be the creation of more innovative types of space, because people are more willing to take risks when the outcomes can be proved in quantifiable evidence. Having a lot of data to play with does not restrict creative freedom and imagination – it channels it in the right hands.

DATA TO DESIGN

We believe the next frontier of data to design will be on a larger inter-company and urban scale – as systems combine intelligently and smart precincts open up the possibilities beyond the office walls. Interaction data can already be measured on a campus level – smart cities present new opportunities although the analysis has not reached that scale yet. But the same principles apply: network structure is overlayed with location data and then the challenge is understanding what information is relevantand how it can be applied to design.

The design world has not yet adopted data to its full potential, but everywhere there are encouraging signs of a new relationship emerging between architects and designers, occupier companies and data scientists. Data brings into the focus the idea that today we must design behaviour and not simply design space. It can help create new workplaces that are more tailored to new work styles, and support all those people with those fancy new titles like CEXO (Chief Experience Officer) to make a difference.

Designers have suffered in the past from boardroom executives treating the workplace design budget as a cost, not an investment. Data helps to identify what the investment is achieving and what the payback might be. We believe that design is an investment in communication - and ultimately better communication is what makes companies successful.
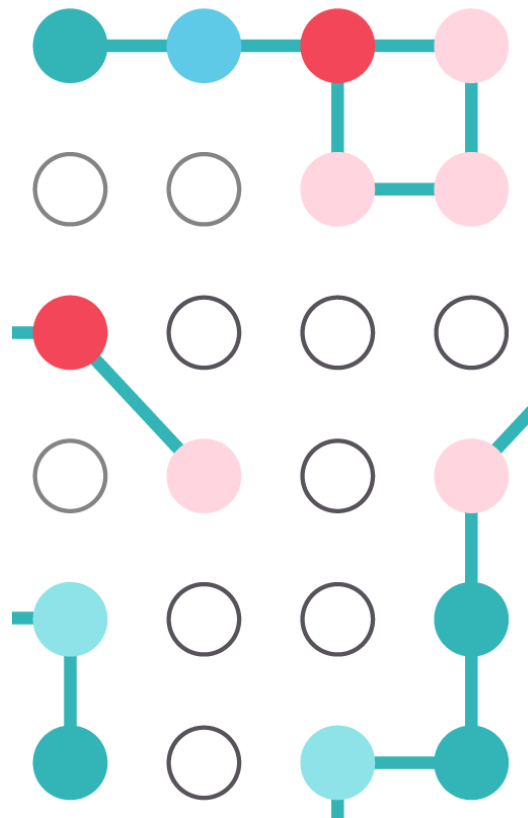
About Humanyze

Humanyze helps companies make more informed people decisions. Born out of the MIT Media Lab, Humanyze helps companies measure corporate communication data to uncover patterns on how work gets done. Humanyze's world-leading People Analytics Platform is used by top Fortune 500 companies to answer specific business questions around organizational health, business process optimization, and workplace strategy. Learn more at www.humanyze.com.

About WORKTECH Academy

WORKTECH Academy is a global knowledge platform for the future of work and workplace. It brings the best insights, ideas and evidence from the WORKTECH conference series, now in more than 20 cities around the world, to a community of professionals all over the world. The Academy's content is curated in six streams: people, place, technology culture, design and innovation. Humanyze is a Corporate Member of WORKTECH Academy.

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