Why the intelligent workplace is the missing piece of the productivity puzzle
We have observed an increasing trend towards discussing productivity, both in the FM industry and on a national scale. In this paper we explore the topic in the context of intelligent buildings, Internet of Things and traditional FM service delivery and invite further discussion with the wider market on its impact and uses.

1 The productivity puzzle

The UK has a problem; one that could threaten our economic growth, impact on foreign investment and is so serious it’s been described by Chancellor George Osborne as “the challenge of our time.”[1]

The problem is productivity. Since the economic downturn in 2008, the UK’s GDP has returned to pre-crisis levels of growth, yet workplace productivity, historically closely correlated with GDP, has not recovered in tandem. Up until the global economic crisis, the efficiency of UK workers was increasing on average 2-2.5% a year, yet the latest figures from the ONS show that labour productivity, as measured by output per hour, grew by only 1% in 2015.[2]

Underscoring Britain’s sluggish productivity, statistics have measured output per hour to be 14% below where it would have been if pre-downturn trends continued.[3] To put that in context, a UK worker now has to work five days to produce the same output as a French worker does in four.

Productivity is measured by dividing output per period by the total costs incurred or resources consumed in that period.[4] In short - Productivity is a critical determinant of cost efficiency.[5]

So where does the UK rate in terms of productivity and should we be concerned? It is forecast that Britain will grow faster than any other G7 economy in 2016,[6] yet the Office for Budget Responsibility has revised down potential productivity growth still further.[7]

Compared to our peers in the G7, Canada, France, Germany, Italy and the United States all score higher, with Japan the only other G7 nation with a worse productivity score than the UK.

Economists disagree on the reasons behind the UK’s sluggish productivity, and fewer still agree on a solution to combat it. Those with an expert understanding of how a workplace operates, including members of the Chartered Institute for Personnel and Development (CIPD), argue that the impact of the workplace on productivity is being underestimated.[8]

According to the British Institute of Facilities Management (BIFM) only 54% of employees agreed their workplace enables them to work productively, with the overwhelming majority of organisations focussing on cost not value.[9]

Yet research by the Leesman Index provides evidence of the role of the workplace in business performance. Since its launch in 2010 the Leesman Index has gathered data from over 1,200 corporate workplaces in 50 different countries. With over 100,000 lines of data, equating to over 3 million data points, the Index is the largest collection of workplace effectiveness data in the world.

What the Index has shown is that there are a number of areas where employers struggle to address consistent failings in their workplace infrastructure. Areas that include temperature control, noise levels, quiet rooms for working alone or in pairs, as well as a variety of different types of workspaces typically attain average satisfaction levels of less than 30%. In the case of temperature control and noise levels alone, these are important features for more than 75% of employees.[10]

Addressing these issues requires senior level executives to recognise that the workplace environment contributes directly to the bottom line, and that building user comfort correlates with employee productivity.

The question then turns to what measures businesses can take to address this. For property and facilities managers, this means "ensuring that we not only continue to deliver great service but educate people about how the building works, how they can be operated to their greatest potential and how we can maximise some of the great buildings that we have constructed."[11]

In this paper we explore the theories and technologies behind the intelligent workplace, and show how any business, regardless of sector, can boost staff productivity levels by embracing the link between workplace comfort and overall business output.

The latest figures from the ONS show that labour productivity, as measured by output per hour, grew by only 1% in 2015.

Current price productivity

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<th>Country</th>
<th>2013</th>
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Index UK =100

SOURCE: ONS

54% of employees agreed that their workplace enables them to work productively.
THE STODDART REVIEW BIFM
In order to create an environment where occupants can be at their most productive, attention should focus on the place of work, which is why there is a growing body of global research that examines the impact of the workplace on people’s performance.

Over the last ten years the built environment has been working to improve sustainable building standards which focus on environmental efficiencies to reduce carbon output and save energy. For instance, CIBSE’s Guide M is essential reading for everyone involved in designing, installing or operating building services.

However, strategies to enhance human health and wellbeing have played only a small role in the evolution of building standards and businesses property strategies.

A senior property manager within the retail sector commented at one of our recent workshops: “Wellbeing is talked about a lot – but it’s not yet linked to the workplace. You see it coming through in the annual survey, but it hasn’t been applied to the buildings.”

The WELL Building Standard, which is the product of seven years of research, aims to close that gap, as it is the first standard of its kind that focuses solely on the health and wellness of building occupants. Published in February 2016, it approaches the built environment as a vehicle to support human health, which is the key differentiator compared to other standards. It does this by outlining performance metrics, design strategies and policies that can be implemented by the owners, designers, engineers, contractors, users, and operators of a building.

If we take thermal comfort as an example, the standard states that it plays a large role in our experience of the places in which we live and work. In 2006, only 11% of the office buildings surveyed in the U.S. provided thermal environments that met generally accepted goals of occupant satisfaction.

Understanding how buildings and individual space can impact on employee behaviour should be a factor in analysing productivity. We call this the intelligent workplace, and when applied correctly, intelligent building technology has the potential to link seamlessly to the needs of the building occupants, responding in real time to how people are using the space and creating the optimum environment to meet their requirements. These are often referred to as comfort conditions, and the science developed in this area has evolved from achieving the correct thermal settings to far greater opportunities to impact the conditions that affect individual and team performance.

Advancements in IoT capability and lower costs of software applications enable the use of wireless sensors (telemetry) to measure levels of comfort for the occupants including CO2 levels, noise, lighting, temperature, movement, space, and humidity. Analysts are able to model this rich source of data in real-time using the analytical software which offers valuable insights to the FM teams. This allows them to constantly learn and take actions to improve the building users environment.
In an industry pilot, there was a situation where a group of employees in the manufacturing sector had complained of feeling lethargic via a Post Occupancy Survey (POS) which was not conducive to the productivity or the wellbeing of the team. These complaints were rationalised as individual perception until the installation of IoT sensors validated the claims and highlighted significant spikes of CO2 levels at regular periods throughout the day. With the support of the data, the facilities team immediately began work on upgrading the ventilation system to get to the cause of the problem.

There is a growing body of academic studies on comfort, the science behind it, and its impact on productivity. Building A Business Case for workplace productivity, by workplace strategist Nigel Oseland with Adrian Burton the Atomic Weapons Establishment’s Estate Masterplanner shows that there is “a plethora of research in the market. This demonstrates the impact of environmental conditions (such as temperature, noise, light and space) and furniture design on performance.”

Furthermore, research by Barry Haynes of Sheffield Hallam University explains that office evaluations have traditionally been Post Occupancy Evaluation (POE) surveys that assess how satisfied occupants were with their working environments (McDougall et al, 2002).

Although this type of survey assesses the quality of an environment, it does not determine if the environment affects the occupants’ productivity. Dr Haynes outlines the findings from Leaman’s 1995 analysis that people’s perception of their ability to control their own working environment is an important element in their productivity. It’s worth noting Leaman created the BUS Methodology which is used to evaluate and benchmark occupant satisfaction.

Separately, research cited by Leesman also supports that there is a correlation between perceived control over environmental conditions and productivity. Research by the Business Council for Offices on the importance of wellbeing presents the business case for getting offices right, by fostering wellbeing and productivity and prioritising a healthy corporate culture. The BCO’s key finding was that most UK employees believe that the design of their workplace either supported or undermined their physical wellbeing in terms of comfort factors such as access to light, ventilation, noise levels etc.

Another piece of BCO research, ‘Improving the Environmental Performance of Offices’ provides evidence that building owners could enjoy significant savings in their operating costs of up to £50 per square metre as well as improved staff productivity and wellbeing by investing in environmentally friendly offices. This report helps to illustrate the benefits of energy efficient offices and highlight the positive impact they can have on employee productivity.

As the landmark report from the World GBC Health, Wellbeing and Productivity in Offices points out, measuring the impact on health, wellbeing and productivity is vital to all employers by answering the question: “How does my building impact my people?”

The report offers workplace owners and occupiers a simple framework for measuring three important elements: the organisational or financial outcomes, perceptions of the workforce, and the physical features of the office itself. The report advises that to help test the premise that the physical design and operation of your office affects the health, wellbeing and productivity of your staff, you need to gather information about the physical office environment. It adds that the extent to which this can be done ‘in-house’ or requires external expert support varies and is changing as new technology enters the market.

Investing in these technologies should not be ‘nice to have’, but part of a long term investment strategy. In an Investment Association paper entitled: ‘What is productivity? Why a healthier lifestyle, not a shot of espresso, can boost the British economy,’ the authors argue “a crucial element that can govern productivity in the long-term is investment.” The report stresses that there are a number of ways in which companies can be encouraged to invest based on their future productivity, not short-term results, and in doing so the British economy will become more efficient and more productive.

If organisations across the UK adopted this approach to workplace management, the country could see a return to the higher productivity levels required to maintain a growing economy. Perhaps with more collaboration between academia, HR professionals, building designers and operators the ‘Intelligent Workplace’ could be the missing piece of the productivity puzzle.

The technology is there to enable property and facilities managers to impact directly on the bottom line of an organisation, by utilising advanced data and analytics techniques that provide vital insights on performance levels and help improve productivity.

The new normal

It has been predicted in the Cisco Internet of Things report that by 2020 there will be over 50 billion connected devices.

Businesses have to decide the extent to which they embrace technological advancements. For some technologies the cost versus reward will be marginal, but for low cost workplace technology the potential benefits to productivity far outweigh the relatively minor installation cost involved.

Paul Doherty, an architect specialising in Smart City solutions explains the contribution intelligent buildings will make to the growth of Smart Cities. He summarises that buildings are moving towards automating facility management processes to provide a quality environment, streamline tasks and deliver more efficient resources.

The technology available today has the added benefit of being suitable for all types of buildings, old and new. Building operators are able to integrate systems so their buildings become smarter, by aggregating live data from multiple sources to aid decision making and bring greater gains in efficiency and effectiveness.

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