The refurbished HM Treasury building, winner of the 2003 BCO Refurbished Workplace of the Year Award.

The impact of office design on business performance

In a 2003 survey by *Management Today* magazine, virtually all (94 per cent) of those responding said that they regarded their place of work as a symbol of whether or not they were valued by their employer. Yet only 39 per cent thought that their offices had been designed 'with people in mind'; and in another study no less than a third said that they were too ashamed of their offices to bring back colleagues or clients.

Why do so many companies continue to dress themselves in rags? The answer may be that a company's most natural response to the force of competition is to seek to drive down its costs - and premises represent a cost that is both readily identified and readily comprehended. As in so many facets of life, however, a preoccupation with cost may actually destroy value, but the ways in which office accommodation can create value for a business, not just through economy, but also through improving the effectiveness of its people and broadcasting positive messages about its values, are inadequately understood.

Why office design matters

When Frank Lloyd Wright designed a new office building for the Larkin Company in Buffalo, New York, 100 years ago, he wasn't working on his own. His clients were pioneers in the rapidly expanding mail order business and they wanted a new office building to enhance their chances of commercial success. They chose Wright as the best architect available to help them reinvent the workplace to take advantage of the latest ideas in technology and management. Wright, despite his notorious ego, played a deftly handled part within a carefully directed and completely self-conscious managerial programme. Each detail in

the architecture had a business purpose: to support a commercial strategy, to accommodate innovative work processes, and to broadcast a particular set of business values.

Why aren't all office buildings today as purposeful as the Larkin? How did we get from this shining example of using architecture as the infrastructure of business achievement to where we are today - in the land of Scott Adams' melancholy comic strip, *Dilbert*, based on his own experience of working in the offices of Pacific Bell, where cubes and labyrinthine interiors had become metaphors of bureaucratic frustration?

Research on the relationship between office design and business productivity has generally started from design variables and then has sought to establish some organisational or business consequence. We have come to believe that one of the reasons for the relatively small amount of progress that has been made by such endeavours in this field is that this may well be the wrong starting point. An alternative perspective has been expressed occasionally by business writers such as Tom Peters, who have looked at office design through the business end of the same telescope. They are far less curious about the consequences of design variables on business, and much more interested in the office design implications of business drivers and priorities.

The drive for efficiency

The cost of providing accommodation for office workers in terms of both capital (construction) costs and building running costs is dwarfed by the costs of their salaries and benefits. Looking at the discounted present value of developing, owning and operating a typical office building over the 25 years of a traditional occupational lease, this shows that, excluding land, 6.5 per cent of the total goes on the construction cost; 8.5 per cent goes on furnishing, maintaining and operating the facility; and, dramatically, the balance of 85 per cent goes on the salary costs of the occupiers.

These figures are based on the analysis of a real building and will vary depending upon the specification of the building, and its location, occupational density, etc. However, as a generalisation, for a typical service business, construction costs, building running costs and business operations may be in the ratio of 1:1.5:15, where 1 represents the amortised cost of construction, 1.5 the cost of running the building and 15 the staff salaries and other business operating costs. The context for considering savings is therefore that factors that influence the effectiveness of staff will lead to far greater financial impact than those which affect efficiency.

Nonetheless, in corporate real estate 'efficiency' has principally come to mean spatial efficiency. This has four components:

Landlord efficiency: The proportion of gross floor area which is rent-earning, after the deduction of structure, cores, etc - typically 75 to 85 per cent;

Tenant efficiency: The percentage of rentable area which is genuinely useable, after the deduction of secondary circulation - typically 85 per cent;

Density of occupation: The amount of net lettable space allocated to each desk space, which will vary between one desk per 5-7m^2 in trading rooms or other densely occupied office spaces to one desk per 15m^2 in companies having a high degree of cellularisation. There are indications that there is some loss of effectiveness, however, when densities are squeezed too tight, say, below one desk per 5m^2;

Utilisation: The number of people allocated to each desk space (rising above one person per desk space if there is some home working, desk sharing, etc) and the proportion of the working week for which each desk is occupied (typically 45 per cent where every member of staff is allocated a desk, but much higher where efficiently run programmes of desk sharing are implemented).

Reductions of 30 per cent in occupancy cost have been recorded through the efficient design of office layouts. Greater savings emerge where efficient layout is combined with ways of working that permit desk sharing. Efficiency must therefore be considered holistically, identifying the impact of substitution effects (such as a reduction in the need for physical facilities following investment in IT) and utilisation effects (the business benefits produced by effective workplace strategies).

'Poorly designed offices could be cutting UK productivity by a fifth, costing up to £135bn every year'

Staff satisfaction and performance

In assessing staff satisfaction, organisational factors (hierarchy, culture, reward systems, leadership) have the largest influence, followed by individual factors (such as aspiration, reward, loyalty, self-motivation, aptitude, experience and training). The extent to which office infrastructure contributes to these factors is difficult to quantify, but claims have been made that the workplace is responsible for 24 per cent of job satisfaction and that this can affect staff performance by five per cent for individuals and (because of the benefits of improved interaction) by 11 per cent for teams. To put this in context, it has also been estimated that a 2-5 per cent increase in staff performance can cover the total cost of providing their accommodation.

A few companies that have tracked turnover levels have made an explicit link to changes in the workplace, with measurable reductions in staff turnover and absenteeism, and measurable improvements in output.

At a financial services firm in Sydney, staff turnover was reported to be down from 25 per cent to 11 per cent following an office refurbishment, although separating out the extent to which this was due to operational or design improvements requires validation.

Similarly, in a major UK company, staff turnover in a call centre operation reduced by 11 per cent after a move to new premises (where the company estimated training costs at £13,000 per employee); whilst output more than doubled (from 35 calls per employee handled pre-move to 74 calls post move) over the same period.

Staff turnover is costly. Replacing mid-level managers costs an estimated

Bad offices 'cost UK business billions'

Poorly designed offices could be cutting UK productivity by a fifth, costing British business up to £135 billion every year, according to new research by international architects, Gensler.

These Four Walls: The Real British Office report is based on research amongst senior and middle managers in the legal, financial services and media sectors. Professionals claimed that an improved workplace would increase employee productivity by 19 per cent.

The research also highlights the importance of office design to job satisfaction, recruitment and retention with four in five (79%) professionals considering the quality of their working environment very important to job satisfaction and more than one third stating that the working environment has been a factor in accepting or rejecting a job offer. Only half of those surveyed rate their working environment as above average, whilst close to one fifth (19%) would actually be embarrassed to show customers their office.
www.gensler.com

50 per cent of salary, and there is a business benefit in investing to retain staff. Studies also show that high performers have 40-80 per cent greater impact on firm performance than do average employees, so satisfaction measures for these staff are vital for organisational success. Increasingly, the knowledge of an organisation is tacit, its nature hard to codify. But this firm-specific tacit knowledge is increasingly the source of competitive advantage, and companies are increasingly vulnerable to the loss of key knowledge workers.

A study that considered absenteeism, showed a clear effect in reduced absence from work in a group that had moved to new premises, by comparison with staff continuing at five other company locations.

In striving for staff satisfaction, there is a need to achieve best practice in the basics, specifically including health and comfort. A research study has shown that 14 million days are lost each year in the UK through absenteeism from work, at least 70 per cent of which is related to health issues, a small component of which may be attributed to comfort in offices. The most important factors in achieving comfort are a rapid response to reported problems, manageability, and the integration of air conditioning, lighting and related building systems. Post-occupancy feedback regularly shows, however, that these basic requirements of human comfort are not being delivered.

Comfort

Differences in productivity as high as 25 per cent have been reported between comfortable and uncomfortable staff. People cannot work at their best if they are distracted by not being able to breathe, hear and see properly. Individuals react differently to different stimuli (some being extremely sensitive to sound, others more sensitive to temperature), but the most important factors in achieving health and comfort are air quality, temperature, overall comfort, noise and lighting.

Air quality

The focus is on a decrease in reported symptoms attributed to sick building syndrome as a result of the improved delivery of fresh air. In one study three per cent of workers surveyed left early or stayed at home, and eight per cent had reduced ability to work, due to symptoms attributable to insufficient fresh air in the workplace, and it was estimated that this lost time could be reduced by 20 per cent by improving the delivery of outdoor air.

Temperature

Decreases in productivity of the order of 30 per cent have been found in offices experiencing extreme temperature conditions. In a research study, 23.5°C was reported as the preferred temperature, but 30 per cent of individuals prefer spaces warmer or cooler than this level. Anecdotal reports indicate that individuals perceive air quality (and self-assessed productivity) to be better when the temperature is cooler. An early 20th century controlled experiment reported a 46 per cent reduction in typing speed and accuracy at temperatures warmer than 24°C.

Noise

Workplaces are often perceived as either too noisy or too quiet, but major improvements have been reported in the performance of both simple and complex tasks (38 per cent and 27 per cent respectively) when acoustic conditions have been optimised .

Lighting

Good lighting design and adequate daylight in particular have been linked to 15 per cent reductions in absenteeism and increases of between three per cent and 20 per cent in productivity. To this can be added significant savings in energy costs achieved by an integrated approach to lighting design.

Does office art improve productivity?

Why do some companies invest so much in something that doesn't seem to help their bottom line? In a recent American study, researchers established a positive relationship between on-the-job productivity and the presence of art in the workplace. The study also looked at other human factors including stress, morale and creativity.

The survey polled employees from a variety of companies across industry lines, and overwhelmingly found that it helps combat stress, improves employee morale, heightens creativity, improves productivity, and encourages expression and creativity.

The inclusion of artwork in company offices also has a strategic importance in business planning. For example, it may be a good marketing strategy, especially if the company is in the service sector where outside customers visit company premises.

HM Treasury building.

Variances in individual preference and the growing importance of staff autonomy both point to the value of introducing a means of personal control to the greatest degree consistent with efficient operation of the air conditioning, lighting and related building systems. This particularly relates to temperature and lighting, and tolerance to sub-optimal conditions is also increased where individuals have the ability to influence those conditions.

Spatial arrangement

The second major aspect of the way that the workplace aids performance is in supporting work processes through the way that space is arranged. The key factor here is in the balance between private offices and open plan, which itself turns on the balance between concentration/privacy and communication/interaction. Whilst there is a perception that open plan will encourage communication, and whilst it clearly sends a strong message about the presence or absence of organisational hierarchies, no definitive causal relationship has been found between the increased use of open space, increased communication and improved productivity.

The conclusion must be that there is no general rule, and that the answer is dependent upon the unique characteristics of individual organisations. The challenge is in balancing an organisation's requirements for both communication and concentration, and devising spaces that can respond to and catalyse the highly complex process of social interaction at work. There is also a need to balance a paradox: that the best transfers of tacit knowledge tend to be serendipitous, personal and private; yet the best insights need periods of intense and private reflection as well as periods of communal activity.

'The ways in which office accommodation can create value are inadequately understood'

Even with open plan, there is evidence that the probability of interaction between individuals declines significantly after 50m of separation, and that both horizontal separation, and separation between floors, are obstacles to interaction. Clear visual contact improves interaction, as does easy vertical circulation, and the provision of places for informal encounter. In one study, communication between engineers on separate floors provided with visual contact and easy vertical movement was found to be 14 times higher than in buildings without either.

By contrast, other research shows the importance of quiet spaces for those engaged in tasks that require uninterrupted concentration. In one study, individuals working in quiet spaces achieved 16 per cent higher performance scores in memory tests and almost 40 per cent higher in mental arithmetic tests by comparison with others working in open office environments with significant levels of background noise.

Other studies show significant levels of lost time as a result of interruptions caused by general conversation, and the need for 15 minutes of 'immersion time' before returning to optimum levels of concentration following an interruption.

Attention should also be paid to whether people work individually or in a team, and to the size of that team and its dynamics so that the work setting supports group activity.

The key lesson from this research is that a variety of work settings should be available, based on the activity undertaken by each individual and team, balancing the need for concentration and communication.

If this is not done knowingly, though, it is also possible to produce the worst of both worlds: a setting in which an individual is separated from his work colleagues in a way that prevents interaction, but does not secure privacy or quiet - of which the arch example is the office cubicle from the world of ***Dilbert***.

This article was compiled from *The impact of office design on business performance* published by the Commission for Architecture and the Built Environment, and the British Council for Offices, May 2005. An electronic copy of the report may be downloaded from the CABE website at www.cabe.org.uk/publications