THE OFFICE BUILDING is no longer a stable building type. While still accommodating office work, offices are likely to become multiuse, accommodating many other activities.

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Justifying place in a virtual world

IMAGINE AN ENTIRELY VIRTUAL WORLD populated by virtual beings that enjoy all the power and convenience of virtuality. One day a virtual genius within this virtual paradise lights upon the notion of physical place. What arguments would this virtual being need to muster to defy the conventions of virtuality and persuade his or her fellows that real places—physical space as well as virtual space—should complement and enhance the self-evident benefits of virtuality?

ARCHITECTS ARE NOT PARTICULARLY VIRTUAL BEINGS. Addicted to physicality, we adore whatever is concrete—structures, materials, places, things. We tend to underestimate abstract ideas. We take our roles as place-makers and constructors for granted. In office design, particularly in the English-speaking world, we have become integral to the remorseless logic of a long-established supply chain that leads from investors and pension funds, through developers, real estate brokers, and corporate real estate practitioners, to tenants, facilities managers, furniture manufacturers, and other suppliers—and ultimately to Scott Adams' cartoon character, Dilbert, and his hapless colleagues trapped in a bureaucratic maze, abandoned to their fate in an endless, windowless landscape of office cubicles.

This has not always been the case. Just over 100 years ago, architects in Chicago and New York invented the 20th-century city through an imaginative appreciation of the massive changes that were then sweeping through the American economy. They had an equally imaginative grasp of new constructional technologies—steel frames, curtain walls, elevators, and new environmental services—and of new delivery-process development, brokerage, and space planning. This energetic and all-embracing vision, the complete opposite of a passive response to change, generated enormous wealth by creating new

building types—notably the high-rise office—to accommodate what were then novel work processes, new office technologies, and an entirely unprecedented work culture. Even 30 years ago, American office buildings still impressed Europeans with their technological superiority, architectural magnificence, and sophisticated management of design, construction, and facilities. This is no longer the case.

At the mill with slaves

Far too much is taken for granted by architects, and not just those in the United States. Not enough questions are being asked. Yet paradoxically, we are living in a period in which technological and social change has never been faster or more far-reaching.

What are these changes? In the early days of the Industrial Revolution, 200 years ago, when the ancient agrarian way of life—based on a very different calendar of seasons and saints' days—was being superseded, country folk found their way from the hills and fields into mills in the valleys. There they were captured by the twin imperatives of synchrony and co-location: two new and entirely necessary conditions for getting work done, given the limited technology of the time, and the need to work together at the same time, in the same place.[1]

We need to go back to first principles to design workplaces and ways of using cities that are appropriate to the emerging technology, economy, and work culture of the 21st century.

Today, the social implications of technological change are very different but even more pressing. And yet, the increasingly anachronistic logic of the Industrial Revolution continues to be taken for granted in office design. In this changing context, the vast majority of contemporary offices are not good enough—and are getting worse.

Hence the need for a null hypothesis, at least one that is as strong and sweeping as the one illustrated by the imaginary virtual world sketched above, in which the enormous potential of virtuality is

1. William J. Mitchell, *City of Bits: Space, Place and the Infobahn*, (Cambridge MA: MIT Press, 1995).

expressed in a deliberately exaggerated form in order to challenge inherited assumptions about the nature of time and place. Temporal and spatial conventions do not invent themselves. They are cultural constructs for which we are all responsible. Architects in particular have a new opportunity to justify their existence. We need to start again from nothing, going back to first principles to design workplaces and ways of using cities that are appropriate to the emerging technology, economy, and work culture of the 21st century. The only way to reinvent the workplace and, ultimately, the city is to reject outmoded formulae.

A legacy

The realisation that the office building may not continue as a stable building type for much longer, and certainly not in its present form, may be a necessary contribution to the rediscovery of "place to business" in an increasingly virtual world. Understanding how the office has developed in response to technological change is the key to comprehending how knowledge work should be accommodated in an increasingly virtual future.

The history of the office over the last hundred years can be condensed drastically into three main phases:

- The rise of what should be termed the Taylorist Office after Frederick Taylor, the highly influential proponent of "Scientific Management."[2] Deeply influenced by explosive growth and consequent scarcity of labour in the American economy after the Civil War, Taylor's genius in the context of manual work in heavy industry, taken up later with enormous ingenuity and vigour by Henry Ford, was to sideline conventional craft skills in favour of a much more top-down and rigorous "scientific" approach in which the judgement and skill of autonomous craftsmen were replaced by centralised measurement and top-down control. Scientific management was as influential in the office as it was in industry. The pursuit of greater efficiency and more complete managerial control rapidly found architectural expression in strictly uniform grids to accelerate construction; in enclosure to emphasise hierarchal differences; and in highly standardised, open-plan office layouts to facilitate supervision.

2. Siegfried Giedion, *Mechanization Takes Command*, (Oxford University Press, 1948).

The worldwide and continuing success of this North American model of office design throughout much of the 20th century and into the 21st century owes much to Taylor's inspiration.

- The first big exception to the dominant North American model of the office was the Northern European reaction in the 1960s. After a decade of experiments in Büerolandschaft ("office landscape") offices to combine higher environmental standards with cybernetically influenced open-plan layouts, the dominant trend in Northern Europe shifted sharply in the early 1970s[3] toward what might be called the Social Democratic office, which was not characterised by efficiency but rather by the opposite (for example, by establishing the right of all office workers of whatever rank to their own individual office rooms). Such rooms were designed on democratic principles to be the same size; to give everyone external aspect and views; to be naturally lighted and ventilated; and to be equipped with easily rearranged and ergonomic, domestic-style furniture. The process by which these offices were procured was as democratic as their layout, involving user representatives and, eventually by statute, workers' councils. It was not long before established standards found their way into building regulations as statutory norms.
- The emerging model of office design is what might be called the "networked office" (see Figure 1), the physical consequence of rapid development in distributed intelligence in the two decades since the legitimisation of the personal computer by IBM in the early 1980s. The first wave of physical impact was evident internally with the computer having escaped from the computer room, finding its way down the corridor into every corner of the office. The second wave was more about mobility on an intercontinental scale, leading to the rapid globalisation of certain industries—the first of which was financial services, with huge consequences for the economy of cities such as London. The third wave was the discovery by other kinds of enterprises, which all realised very quickly that time and space could be used globally, 24 hours a day, seven days a week, in much more continuous and productive ways. This was led by the IT

3. Francis Duffy, *The Changing Workplace* (Phaidon Press, 1992).

providers themselves, then by the global consultancies, and finally by knowledge-based enterprises such as the oil companies and the pharmaceutical giants. The fourth wave has been smaller enterprises, and even individuals, learning that they, too, could work in the same highly mobile but virtually interconnected ways.

The networked office

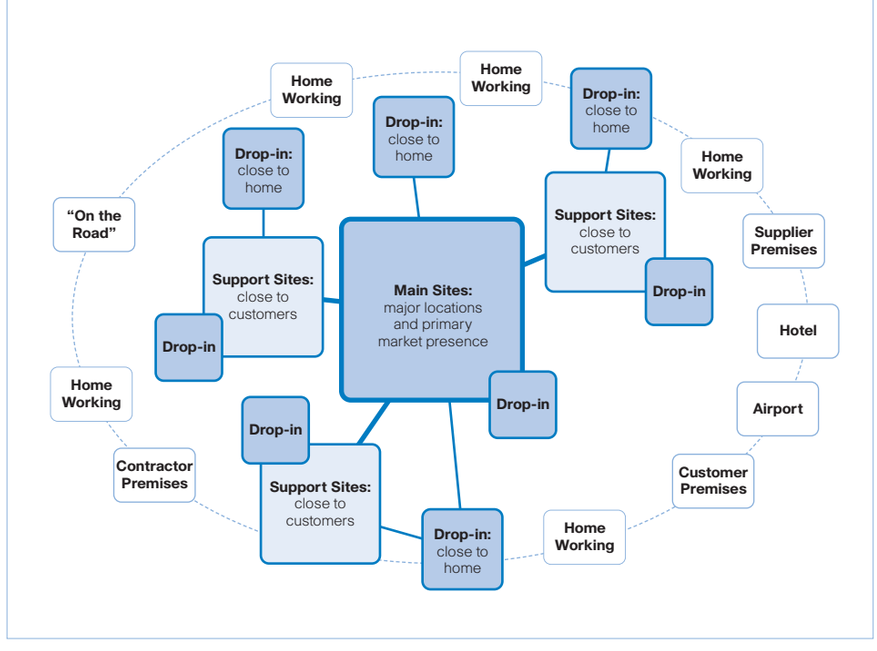

Figure 1 The Networked Office is the emerging model of 21st-century office design. This workplace strategy accommodates a fluid series of customer relationships, office workers, and suppliers distributed over space and time in multiple locations. Source: Frank Duffy, 2006.

From an architectural point of view, the consequences of the networked office are far-reaching. Office design is no longer shaped by fixed relationships between groups of office workers located in particular buildings in predetermined places. Instead, office design now has to accommodate a much more subtle and fluid series of relationships distributed over space and time in multiple locations (some owned, some not), chasing unpredictable patterns of occupancy, all of which are temporary. Hence the phenomenon of the distributed workplace, which

can be distinguished from both Taylorist and Social Democratic Offices not just by unprecedented spontaneity and instability, but by totally novel conceptions of the use of time as well as space.

A century of failed scientific endeavour

A plausible argument could be made that distributed working is likely to diminish the importance of the physical working environment for business; working environments that are temporary and unpredictable may not be as critical to occupants' well-being as environments that are fixed and permanently occupied.

The problem with this hypothesis is that not only is it hard to test on its own terms, but also that we know so little about the wider question of the impact of offices on any sort on business performance. The shocking fact is that almost 100 years of scientific enquiry into the relationship between office design and business performance has produced few replicable results of any practical value. There are practical reasons for the general failure to establish a robust empirical basis to evaluate the design of offices, even of the most conventional kind:

- The inherently complex and multivariate nature of the relationship, even at a single point of time, between the working environment and business processes, organisational structures, and corporate cultures.
- The volatile commercial and economic context within which businesses operate.
- The large-scale, longitudinal, and multilayered nature of the physical working environment.
- The clumsy, fragmented, and largely feedback-free way in which the office supply chain is managed.
- The rapid rate at which office organisations and office technology are changing and developing compared with the sluggish pace at which office buildings are planned, procured, erected, and refitted.
- The plural and highly political nature not only of businesses, which by definition are directed and purposeful, but also of office buildings and interiors, which are used variously by different constituencies to express their culture and values.

Given such a wide canvas of constituencies and interests, and the huge variety of physical and temporal scales within which businesses operate, it is not surprising that conventional social science methods haven't worked. They have excluded too many variables, and they have relied too much on data from individual respondents rather than from the businesses as a whole. Perversely and pointlessly, in business, social, and environmental contexts that are all about purpose, most such studies have aspired to be value-free.

We are at the frontiers of scientific endeavour.[4] Measuring the relationship between the working environment and business performance is possible, but only under certain conditions. Successful performance is never predetermined since it depends firstly on the clarity with which managerial purpose is prioritised and communicated; secondly on how skilfully office workers are involved, so that they become committed to achieving the goals that have been set; thirdly on how rigorously the contribution of design to facilitating the achievement of business goals is measured; and fourthly on the recognition that business purposes and priorities inevitably change. The relationship between design and business performance depends on context. Even more important, the relationship can never be regarded as value-free; it is inherently political.

Powers of design

Recent experience of working with rapidly changing businesses in both the public and private sectors—in Europe as well as in North America and Asia Pacific—has made it possible to reframe research questions about what design can offer office organisations in a much more powerful way.

Buildings are inert. Admittedly, in relatively rare and extreme conditions, offices can harm the human beings who work in them—sick building syndrome is a notorious example. On their own, office environments do no good. Office environments used within a wider business framework, however, have the potential to be used to facilitate the achievement of certain business goals. Consequently, in relation to business purpose, the performance of the working environment can, thus, be measured—not in the abstract, but within specific contexts in terms of its contribution to the achievement of three levels of business objectives, which in DEGW are called the three "Es":

4. John Zeisel, *Inquiry by Design* (W.W. Norton & Company, 2006).

- **Greater efficiency**—cutting occupancy costs and other business costs—for example, fewer and cheaper square meters of office space per employee per year. Office space is an expensive resource but is often grotesquely underused, especially over time. A clever manager can cut costs and drive up the productivity of space use, especially using wireless technology to encourage increased mobility internally and externally.
- **Enhanced effectiveness**—using design to add to business performance—for example, not just cutting costs but providing the conditions under which management can create positive value. Locating attractive meeting places in the right locations can help support interdepartmental interaction. Providing safe, ergonomic workplaces can help attract and retain valuable staff. Lively, interesting environments can help stimulate creative people.
- **More consistent and powerful expression**—using design to communicate business values to specific audiences externally and internally. The design of the workplace can be used internally to broadcast powerful messages to staff about how much certain patterns of behaviour—openness, accessibility, collaboration—are valued. Externally, individual office buildings can be powerful statements of corporate values. Across continents, the way space is allocated is an important means of maintaining cultural consistency within organisations.

Such measures can be used to set targets for the contribution of design to business performance. Both targets and measures, of course, must be expressed operationally in specific contexts, in the same terms—a powerful and practical way of connecting office design with business purpose.

The very fact that office design is now frequently integrated with deliberate attempts on the part of management to change organisational culture has two huge implications for architects. The first is that both the briefing and design processes can be much more actively engaged with stimulating change; that is, briefing becomes an essentially *catalytic* process, deliberately creating the conditions for change. The second is that such active engagement on the part of architects creates the need for much greater ethical responsibility in at least two senses: (1) architects must decide whether they agree with the client's aspirations and act accordingly, and (2) architects must take responsibility for

measuring whether the client's aspirations have been met and, if not, establishing with the client the reasons for failure and acting accordingly. Responsibility itself may be regarded as a kind of ethical feedback loop.

The contribution of place

To return to our virtual beings: what arguments must our virtual genius muster to persuade his or her fellows that real places should complement and enhance the convenience of virtuality?

The first part of the answer lies in the paradoxical growth in popularity of cities in an increasingly wired-up economy. We live in an urban age where, for the first time in history, the majority of the world's population lives in cities. Within the wider phenomenon of urbanisation, and taking a strictly knowledge-management perspective, the real value of cities is that they constitute concentrations of knowledge, communicated in a partly physical and partly virtual way through multiple, overlapping networks.

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For example, mapping the way in which professions work—say, in London and New York—provides cartographic insight into the complex social and intellectual matrices of law, medicine, engineering, or architecture. What makes these professions relevant to this discussion is that they are both pre- and post-Taylorist in their operations; they are more networked, more social, more interdependent, and far more permeable within and between themselves than typical corporate enterprises. Furthermore, some professional practices are large; most are tiny. Such practices are independent and highly competitive, but they take constant collaboration across business boundaries for granted. They operate fluidly and from multiple locations, depending on finely calculated serendipity to maintain open-ended contacts—in the government courts or operating theatres, lecture halls, and clubs. Professionals work in their own offices and

homes but also work socially in restaurants and coffee houses, and even on busy streets—much as cities operated in the 18th century.

Office buildings in their conventional forms, whether Taylorist or Social Democratic, are much more limited and limiting as infrastructure models of 21st-century ways of working. Taylorist offices are too biased toward top-down control. Social Democratic offices are too slanted toward individual comfort and isolation instead of encouraging the open-ended, collective discourse that is the mark of the knowledge economy.

Consequently, the second part of the answer to the question about the relevance of place is to be discovered in the increasingly mobile patterns of work being adopted by millions of people equipped with powerful, portable communications devices. As work spills out into the street, into homes, and into cafes, restaurants, hotel lobbies, and airport lounges, the networked office transcends individual office buildings. Wireless campuses in university cities such as Cambridge, Massachusetts in the United States—where students have already become extremely skilled at using multiple environments to link their complex, knowledge-based lives—are prototypes of the manner in which the networked office will be used. The corollary, stated earlier, is that the office building is probably no longer a stable building type. While still accommodating office work, offices are likely to become multiuse, accommodating many other activities.

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What both cities and networked offices must continue to provide is serendipity, nonlinearity, and chance, as well as meaning, memory, and association—a rich, complex language that will always be attractive because such qualities transcend more elementary forms of communication. Open-ended discourse in cities and networked offices will neither be contradicted nor replaced, but rather enhanced by the accessibility of electronic networks. Concentration of access to people and knowledge of every kind is what will make distributed ways of working successful.

Our virtual genius would probably understand such a vision of the distributed workplace. But in two decades, so changed will be our vision of work and the workplace that most ordinary humans, as well as all virtual beings, are likely to have difficulty understanding what a conventional 20th-century office building was meant to be.

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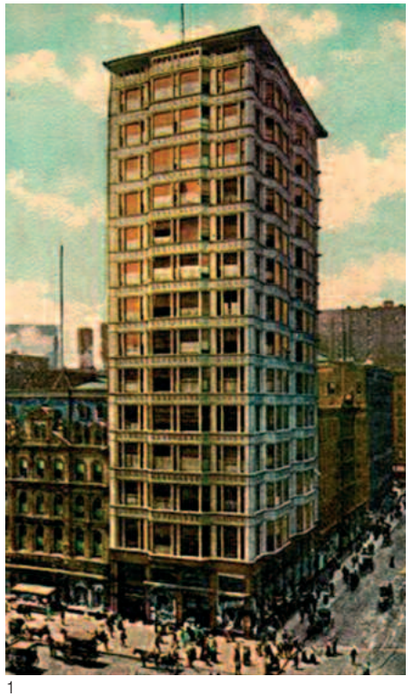
Dr. Frank Duffy founded the DEGW partnership with John Worthington and Luigi Giffone in 1973. DEGW has offices in Amsterdam, Glasgow, London, Madrid, Melbourne, Milan, New York, Paris, and Sydney. Dr. Duffy was chairman of DEGW from 1989 to 1999 and now works from DEGW's London office.

Dr. Duffy has spent his career helping businesses use space more effectively over time, and he is particularly interested in change management and in measuring how effectively and efficiently buildings are being used to meet clients' changing goals. His work at DEGW falls into three main categories: relating changes in organisational structures and information technology to office and other kinds of design, developing DEGW research, and developing the theory and practice of design through writing theoretical and research papers and technical information books for architects.

He is a past president of the Royal Institute of British Architects and of the Architects' Council of Europe. Dr. Duffy was an elected architect member of the U.K. Architects Registration Board from 1996 to 2002 and is a trustee of the Architecture Foundation. He was made a commander of the British Empire in 1997, and in 2004, he received the President's Award for lifetime achievement from the British Council of Offices.

Dr. Duffy trained as an architect at the Architectural Association School in London and was a graduate student at the University of California at Berkeley and at Princeton University. He developed an interest in organisation theory and in the design of office buildings when he was a Harkness Fellow of the Commonwealth Fund in the United States in 1967 and 1970.



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