

Shaping the Global City: The Digital Culture of Markets, Norbert Wiener and the Musings of Archigram

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Abstract

The contemporary “built environment” as conceived by designers – be it actual or virtual; be it architecture, landscape, industrial products or, more purely, art – is increasingly generated using powerful computational tools that are shaping the culture of the design professions, so much so that the phrase “digital culture” aptly applies. Designers are rightly inclined to believe that the emerging contemporary landscape – especially in thriving global cities like New York, London and Tokyo – has recently been and will continue to be shaped in important ways by digital design. That will surely be the case. However, design does not exist in a material vacuum. Someone pays for it. This essay argues that the primary shaper of global cities today is another “digital culture”, one defined by the confluence of professions and institutions that constitute our global financial markets. The essay explores the common origins of these two cultures – design and finance; the prescient insights of Archigram into the cybernetic future of cities; the spatial implications of nomadic “digitized” capital and the hazards of desensitizing – in many ways, dematerializing – the professional practices of design and finance. The purpose of the essay is not to establish primacy of one over the other. Especially in the case of urban design, they are interdependent. The purpose is to explore the connection.

Overview

“Cities, like dreams, are made of desires and fears, even if the thread of their discourse is secret, their rules are absurd, their perspective deceitful and everything conceals something else.”

-Italo Calvino
Invisible Cities

While much attention is rightly being focused on contemporary digital culture and design, this paper explores the origins and implications of a closely related, but quite different digital culture – a largely antecedent one spawned by financial theorists, market specialists and computer engineers in the 1970s – that has had a defining impact on the identity, purpose, culture and physical presence of our largest global cities including New York, Tokyo and London. This essay argues that the convergence of finance and digital technology that began in the 1970s was both central to the shaping of global cities today and anticipated by very few urban seers, Cedric Price and Dennis Compton of Archigram among the few. The paper concludes with two short speculations: first, on the implications of nomadic capital – integral to the digital culture of open financial markets – for major urban centers; and, second, on the common hazard of dematerializing the practice of digital design and digital

finance. My aim is to remind critics exploring the relationship between digital culture and the built environment that a parallel digital culture – the digitized culture of global financial markets – has had a powerful shaping impact on cities as we know them today and, presumably, on the design profession itself. Somewhat alien and largely invisible to the design community, this close digital cousin is too powerful to ignore.

Norbert Wiener, digital technologies and financial theory

In 1994 at a centennial symposium celebrating the 100th anniversary of Norbert Wiener's birth, Nobel financial economist Robert Merton credited Wiener's pioneering work on continuous-time stochastic processes - mathematical models keying off of Brownian motion – as the foundation supporting modern portfolio finance in the 1970s. Nobelist Paul Samuelson and leading finance theorists Andrew Lo and Stephen Ross also spoke on Wiener's behalf. More relevant for our purpose – and, on the surface, a surprising participant – Charles S. Sanford, Jr., the chairman of Bankers Trust Company, presented a paper co-authored with Daniel Borge entitled, "The Risk Management Revolution". Sanford noted that he was "here today...to help you honor Norbert Wiener, whose work provided a mathematical foundation for many of the financial models that have fueled the changes now taking place." ¹ The chairman of what some considered the world's most innovative trading house knew first hand that computationally sophisticated financial techniques were re-shaping global financial markets and, in the process, shifting the fates of major financial centers throughout the world.

The link between Norbert Wiener and global finance is appreciated by specialists with an interest in history, but is otherwise obscure. The link between global finance and the relative prosperity, the demographics, the culture and – quite literally - the skyline of our major cities is visibly evident. In New York City one of the most important variable revenue lines in the annual budget consists of tax-receipts generated by Wall Street bonuses.² In Tokyo, Shun'ichi Suzuki governed the city from 1979 until 1995 and explicitly positioned it as a world city - *sekai no Tokyo* as the intellectual Koda Rohan had put it earlier³ - a city whose global influence, whose very identity, was principally derived from its economic stature and investing power. London used financial deregulation, its so-called Big Bang in the 1980s, to distance itself decisively from other European financial capitals like Paris, Frankfurt and Amsterdam. This all had a direct bearing on urban design. Three of the largest urban developments in each of these cities during the past thirty years – Battery Park in New York, Shinjuku West in Tokyo and Canary Wharf in London – physically signify the material importance of global financial markets. An analysis of commercially significant urban and regional peripherals - entertainment, residential real estate valuations, restaurants, philanthropy etc. – would reveal the same dependence on global finance, particularly in New York and London.

As noted above, this was made possible by a convergence between financial theory and information technology which had begun in earnest some two decades earlier. Four cybernetic innovations independently developed in the 1970s have combined to create the basic command-and-control architecture – the fundamental information and feedback mechanisms generalized by Norbert Wiener – of the global financial system today. Three of the innovations – the relational database, the large-scale integrated circuit and the Ethernet – are innovations in information theory and computer engineering. The fourth – the Black-Scholes option pricing model – is an

innovation in applied economic theory. The first three provide a framework for collecting, manipulating and communicating data – converting bits into useful information. The fourth provides an analytic framework for using the information to determine whether or not market prices are in equilibrium or if there are arbitrage opportunities that traders can exploit — acting as financial versions of Maxwell's Demon creating dynamic equilibriums both across and within markets throughout the world...at least in theory.

While each of these innovations is compelling in its own right, it is the interplay between them that interests us here. More flexible and efficiently codified databases permitted higher transaction volumes that, in turn, required more computing power to process. Faster and more reliable communication protocols permitted more distributed processing that, in turn, required increasingly supply data base architecture. Sophisticated arbitrage finance required much faster processing power, real time data base access and secure, 'fat pipe' global communications links. Data was transformed into information by the first three innovations and into actionable models for allocating risk capital by the fourth.

Over the past two decades, R&D on all four innovations has effectively been supported by leading securities firms whose prospects have depended increasingly on their global trading and risk management activities. Simple technological determinism – the stirrup changing the political landscape of medieval Europe – is a fun party game, but the powerful and sustained interplay between seemingly unrelated technologies – spinning and weaving in 18th century England and India – offers richer insights into historical developments. In this case, the combination of better data bases, faster processing capacity, more efficient communication protocols and more sophisticated financial analytics created a financial revolution when paired with global de-regulation and higher market volatility throughout the world. The virtues of this are contestable, but the radical impact on our global cities is undeniable.

City planning and cybernetics: RAND and Archigram

Between 1966 and 1975, New York City spent several hundred million dollars (nearly \$3.0 billion in 2007 dollars) on a series of ill-fated, cybernetically-derived and secretly administered projects administered by the NYC RAND Institute, a joint venture of the RAND Corporation and New York City.⁴ Supported by Mayor Lindsay, the Institute's mission was to beat the sword of defense department information systems into the ploughshares of urban analytics. Sophisticated computer models predicated on Wiener's feedback-and-control principles were designed to help the Lindsay administration manage the city more efficiently. By virtually all accounts, the ambitious effort was a very expensive failure and the program was shuttered by Abe Beame in 1975 just as the city was entering its darkest fiscal crisis – the era of "Ford to City: 'Drop dead!'" as the *Daily News* starkly reported.

While New York City was wasting millions of dollars trying to get a handle on its future, the loose architectural collaborative of Archigram was displaying prescient visions of London's future for free. Ironically, both Archigram and RAND viewed urban life through a cybernetic lens. In New York, technically gifted planners tinkered with complex computer models designed to track, simulate and forecast information flows. In London, Archigram took an entirely different tack and critiqued the planning profession with partially polemical, partially playful, often prescient projects – *Plug-*

In City, Fun Palace, Living City are examples – that, in retrospect, contained the metaphoric seeds of the cybernetic urban future that was beginning to unfold.

Although financial markets, specifically, and capitalism, more generally, were off Archigram's radar screen – or, if on, more as vice than virtue - cybernetics was a central thrust, especially for *Plug-In City*, Peter Cook's iconic vision of the city as a restless network of constant, but actively modulated flows. As a complement to *Plug-In City*, fellow Archigramist, Dennis Crompton, designed *Computer City* to provide the infrastructural pipes and monitors - the system of information feedback and control in Wiener's terminology - needed to make *Plug-In City* conceptually viable. In 1966, the BBC succinctly summarized Archigram's *mutatis mutandum* take on the cybernetic city: "Gadgets are less important than the new ability to understand and control a hundred or a thousand different things, all happening at once."⁵ Given Archigram's fascination with information flows, the step to understanding money as little more than a digital message, a debit or credit entry tracked in a computer bank, is a short one. The future was there to be seen, not spelled out, but made suggestively accessible through a remarkable Gestalt intended for imaginative viewers with open minds.

The Archigram influence does not end there. In 1969, *New Society* published "Non-Plan: An Experiment in Freedom", a provocative article directly attacking the top-down, command-and-control planning establishment in England and most everywhere else at the time. Jointly written by Reyner Baynham, Peter Hall, Paul Barker and Archigramist Cedric Price, the article posed the simple question: "could things be any worse if there were no planning at all?"⁶ Recalling the article three decades later, Barker drew a straight line from the concept of "Non-Plan" to the development of London's monumental Canary Wharf.⁷ Alfred Sherman, an "ex-communist turned Tory", used the "Non-Plan" concept to convince his boss, the new Prime Minister Margaret Thatcher, that the Docklands should be treated as an "enterprise zone" – in effect, a series of "small Non-Plan zones" where government intervention on development projects would be minimal.

Spatial gravity and the digital culture of nomadic finance

Saskia Sassen has astutely observed that even in an age of distributed communications, the modern day capital markets – deeply cybernetic phenomena as we have discussed – are so complex that the principals and their accountants and their lawyers and their computer specialists need to work closely together to manage transactions.⁸ At the moment – whether it be Silicon Valley, Marunouchi, the City of London or Wall Street – place still matters. Even in William Mitchell's "city of bits", place retains its commercial gravity. But, when bodies move fast, gravitational relationships change.

While Sassen makes a strong case for the importance of place, she also highlights the urban vulnerability caused by gravitational shifts in economic geography. Amsterdam once dominated London as a financial center. In 1949, Shanghai was the leading financial center in Asia, not Tokyo or Hong Kong. And urban competition is not just between national capitals. Leading cities *within* countries compete as well. During the past four decades Montreal has been supplanted by Toronto, Osaka by Tokyo, Calcutta by Bombay, Melbourne by Sydney, Rio de Janeiro by Sao Paulo and virtually every American city by New York as the primary node in the highly charged circuitry of global finance. More recently, finer scale, intra-regional competition has

emerged. Greenwich, Connecticut, a leafy – gold leafy – residential suburb of New York City, is now considered the “hedge fund capital of the world”.⁹ Talented traders using a combination of advanced cybernetic communications, real-time data management and state-of-the art analytics have created a financial ‘neighborhood’ in Greenwich that rivals Wall Street in certain markets. Unfortunately for New York, Greenwich is outside their tax jurisdiction. The hedge funds clustered in Greenwich – some of the largest hedge funds in the world – demonstrate both the sustained importance of place, in general, and the vulnerability of any place, in particular, especially a place dependent on digitized, global finance.

The risk for erstwhile prospering financial centers like New York is that Greenwich is not an isolated example: Newport Beach is home to PIMCO, the largest bond fund in the world; Setauket, New York, on Long Island is home to Renaissance Technologies, one of the largest and most successful hedge funds in the world; resort towns like Sarasota, Aspen, Marion, Jackson Hole and Coral Gables are home to sophisticated global fund managers; While financial capital – as the phrase “flight capital” suggests - has been relatively mobile for several centuries, financial talent has been far stickier, far more tied to a specific place. This is less true today, primarily due to cybernetic technologies that “re-spatialize” economic geography rather than “de-spatializing” it. New York is a robust beneficiary today, but should be wary of its overdependence on global finance. The cybernetic financial technologies that powered New York out of the doldrums of the 1970s are increasingly capable of empowering a critical mass of nomadic capitalists – mimicking the nomadic nature of capital – to seek new places, new tax and regulatory regimes, outside the control of the larger city, but close enough to benefit from it. And these days, “close enough” for the most successful cybernetic capitalists is measured by the range of a private jet, not just a limousine.

The hazards of dematerializing the culture and practice of design and finance

While genealogy is not destiny, the digital technology of both finance and design share some common DNA that deserves attention. As a contemporary example, the architectural modeling tools that helped Meyer and Schooten design the headquarters for the ING bank in Amsterdam share some common origins with the financial trading models used by the bankers inside the building who are allocating risk capital throughout the world. The shared roots are partially technical – processors, compression algorithms, vector graphics – but they are also cultural. The software user, be she an architect or an options trader, is professionally abstracted from a tactile connection to what is being created. Symbols representing mathematical relationships intervene – shapes in the case of the architect, formulas in the case of the trader. These symbols are generated, analyzed and shared by specialists employed in subtly alienating work cultures that defy materiality. The cultural ‘real estate’ they share is an LCD screen, not the ground outside.

Some good things can come from this, of course. The ING headquarters is architecturally clever, engaging and Green. The ING traders provide needed liquidity throughout the developing world. But, seemingly so different in terms of surface culture, the two digital professions – the architects and the traders – share a certain alienation, a certain unworldly separation, because what they create on their screens is computationally powerful, but sensually remote. There are profound material consequences in the work performed – buildings get built, markets move – but the

creative experience for the designer and the trader can be strikingly cerebral and solipsistic. Technical facility is privileged in each profession over social imagination and purpose. As employees hover intently at their computer stations, some design studios and architectural firms bear more than a modest resemblance to the trading floors of large security firms. The work itself is similarly abstract and disengaged from the material world. What looks convincing on a computer screen – a particularly elegant shape or a compelling arbitrage opportunity – can deceive the fabricator unless she can meaningfully position it in the contextual messiness of what we loosely call the “real world”, that increasingly foreign territory just beyond the computer screen.

The point is not to trade the processor for the T-square or the abacus. Computing *power* is not the problem. It is a neurological liberator. The concern is that the cerebral enrichment of computing experience is often sense-depriving. Taken to a solitary extreme, what we trumpet as “social computing” becomes oxymoronic. We should be wary of any digital culture – be it design or finance – that desensitizes us too much; that seduces us with anesthetizing digital creations that coolly distance us from the material world with its feverish animal spirits and unknowable unknowns. An immediate and pressing example of digital finance gone badly awry – of being fundamentally unhinged from the way real people act and behave – is the securitization of sub-prime mortgages in which the underlying assets were improperly appraised and the creditworthiness of borrowers was evaluated using mechanical credit scoring algorithms based on unverified data. Computationally fabricated and defensible in moderation, these financial structures violated common sense as they grew in scale and complexity. Although fault remains at issue, the leaks in Gehry’s otherwise invigorating Strata Center at MIT have surprised few building engineers. Computationally derived shapes, however magical, are hard to bind. The more dematerialized the professions of design or finance become in actual practice, the wider the likely divide between practitioner intent and client outcome.

Conclusion

Although the two cultures of design and finance share common tools – the processors, the graphics cards, the computational algorithms, the technocratic apparatus – they are largely alien to each other. As the digital culture of design evolves in centrality and complexity, it behooves design practitioners to keep the influence and reach of their seemingly distant digital cousin squarely in mind. While Giles Deleuze may have been too singular when he asserted that “the operation of markets is now the instrument of social control”,¹⁰ digital financial markets are having an undeniable impact on the shape – and fates - of global cities today and our built environment, more generally. Architects and urban designers increasingly devoted to their own richly digital culture would do well not to ignore the more arcane digital culture of global finance. When it comes to what actually gets built, where and by whom, digital markets play a commanding, if opaque, role. Identified by Castells and examined more closely by Sassen, their influence is waxing, not waning.

Conversely, it is important to remember the provocations and prescience of Archigram in the 1960s. They let their imaginations loose on The City, and in the process saw trends and developments that traditional urban analysts missed. As designers, they were better positioned to “connect the dots” in a forward-looking Gestalt that trumped more conventional planning techniques based on quantified

model building. The design professions have the social license to make conceptually intuitive leaps that challenge, refine, engage, disturb, violate and, on occasion, even embrace the conventional wisdom. The more experientially remote and computationally cerebral the practice of design becomes, the harder it will be for designers to conjure fresh visions that reach beyond the display screen into the messy flux of life outside the digital box. A digital design culture that loses touch with its deeply tactile roots will have lots more byte than bite.

Endnotes

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