Building the Future:
Innovation, Design and the Virtual

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This article outlines a case for architects and designers to be more involved in discussions of innovation in construction and engineering and more generally in discussions of virtualities including style, community, market, and brand which characterize wealth creation in knowledge societies. The virtual is a strategic topic which is a common aspect of both design and innovation and is approachable through design methodologies.

Virtualities

Architects are amongst the professionals most familiar with the term virtuality – or are they? In the field, the virtual describes a set of shifts associated with information and communication technologies and the emergence of digital visualization and even the interactive design of forms in topological spaces generated by computer software ranging from 'Rhinocerous' to 3D modeling in virtual reality systems. But the virtual is much more significant than this technological vision of 'digital virtuality' and simulation tools admits. This 'representationalist' paradigm reduces the virtual to visualization technologies (Borradori, 2000)

at a time when virtualities have become a preoccupation in the governance of enterprises, the powers of the State and the conduct of war.

The virtual (*virtu*) was classically understood to be the antithesis of a technical tool or instrument. By contrast, the virtual was – and is – a power or capacity for both development and consistency across different situations or states. My argument will be that designers and design methods have more to offer society than the creation of new commodities.

The virtual concerns emergence, newness, and creation (Massumi, 2002; Delanda, 2002) hence its relevance to innovation and design. Examples include brands and what environmental psychologists call 'affordances'. Concrete objects actualize but never exhaust their virtual qualities or character. Dreams and memories are famously defined by Marcel Proust as virtual in his correspondence on Remembrance of Time Past: 'real without being actual, ideal without being abstract'. I argue that the virtual designates the full range of intangible aspects of objects including style, atmosphere, knowledge, community or economic markets – all 'things' irreducible to an inventory of material aspects

of objects. This point of view roots the virtual in cultural processes, not in recent technology.

Intangibles or virtualities include media objects such as brands. Thus 'Nike' can be understood as a brand that is not reducible to specific pair of shoes (Nike manufactures a variety of clothing), nor to a legal business entity, nor a logo (the 'swoosh') nor a slogan ('just do it'). 'Nike' is neither a set of abstract ideas, nor merely a collection of material elements – the virtual designates the distinctiveness of 'Nike' as an intangible 'thing' which is real but ideal. The significance of virtualities such as brands is that they are the basis of non-economic judgements – for example one might choose to buy a 'brand name' product rather than a 'no-name' product or a cheaper version which serves the same function. Similarly, the commodity-form is not just material product + abstract propaganda. 'Community' is also famously hard to define materially – Peoples' conceptions of a community may differ while at the same time they may agree that a given community nonetheless exists.

Virtualities are real, not mere abstractions, not discourses, and not 'social constructions'. Western positivism resists this, dividing the world by prizing the material and devaluing the abstract. But our cultural values and economic practices demonstrate the importance and value of these intangible but real things – brand loyalty, nationalism, our belief in 'markets'. These are not fictions, representations or language games. The virtual is an aspect of everyday experience by which we understand how objects and people endure, retaining their identity even though they change physically and age materially. Furthermore, the virtual allows us to comprehend not only duration and aging but emergence and becoming, newness and change. It is therefore highly pertinent to any appreciation of creativity and design. It is the epistemological centerpiece of any attempt to understand innovation.

One example of environmental virtuality that may be familiar is the notion of 'affordances'. This term, coined in environmental psychology, designates the potential uses and mis-uses of landscapes, buildings and objects (see Gibson, 1982). Affordances are properties of an environment taken relative to an observer or actor. These affordances structure the behaviours and interactions possible in places or spaces. Affordances are thus an aspect of more abstract and virtual social spatialisations (Shields, 2003; Shields, 2005). The infrastructure and resources of cities and regions such as housing can thus be broadly regarded as affordances. Children, for example, frequently discover that the range of affordances of built environments is far greater, and more risky, than their parents imagine. The complaint of social scientists that this recently rediscovered term is poorly defined. However, this points to the virtuality of affordances – they are not what the object is right now but the multiplicity of things it may become, even while remaining substantially the same. An object can be a tool or a weapon, a chair can be for sitting on, or standing on, and so on.

In the context of an informational or so-called knowledge society (Shields & Taborsky, 2001) the prominence of the virtual in the form of media objects and intangibles such as markets marks the virtual as strategic – even if intangibles are not explicitly defined in political discourses nor their distinctiveness recognized in policy making. Virtualities such as organizational knowledge or the learning-capacity of a region are argued to contribute value (Matusik & Hill, 1998). The virtuality of what are otherwise material objects or environments such as cities is highlighted. The tendency to conceive of society in terms of informational and economic networks changes how we think about social and urban problems. This is reflected in the interest in urban images and the move away from purely functional criteria such as traffic planning in urban revitalization (Shields, 2005).

As in the case of branding, the virtual adds value to goods, even as brands threaten to become detached from commodities altogether. The virtual is thus an important field of legal, policy and professional struggles over the governance of objects and environments. As objects of governance, virtualities figure in national debates – around intellectual property, biotechnology products and the trade in information itself – and in understandings of the 'games' in complex product systems and supply-chains, industrial projects and infrastructural developments (Miller, Lessard, Michaud, & Floricel, 2000).

The virtual offers an evaluation mechanism (such as a preferred brand) that is extra-economic and thus open to non-economic decision-making. That is, virtualities add non-monetary regimes of judgement to products (Chiapello, 2003). Here the training of architects and designers in adjudicating and editing complex sets of options down

to a final design has tended to be neglected as a source for understanding governance *through* the virtual.

However, a number of shocks to social and economic systems have arisen. The virtual has not been taken seriously as a means of governance of the material world. Instead when it has been taken seriously it has tended to be fetishized, leading to a neglect of materiality. This can be seen in the over-valuation of the potential of cyberspace, and the late 1990s expectations of biotechnology, information and computing companies without products that led to the dot-com bust, or cases where faith in the virtual mechanisms of unregulated markets worked as a smokescreen for fraud, as in the collapse of Enron (Shields, 2003: Ch 3, 7). What is significant is not the virtual in isolation but its dynamic role along with the material as a component part of the real.

Design

If design seeks to propose and actualize solutions, problems can be understood as virtualities (not merely abstractions), as *problematiques*. As such they allow a multiplicity of possible answers. A perspective on design from the virtual also foregrounds the 'reality' of intangible or ineffable aspects of design, urban life and culture. One inheritance of the Cartesian paradigm within Enlightenment thought has been to render this paradoxical, to assign it to 'art' and to consign it to minor discourses which are epiphenomenal to the 'serious discourse' of governance (cf. Foucault, 1980). Similar to innovation we might then propose an agenda to explore ways in which *Design is the exploration of the virtual and organization of actualization.*

Design research tends toward the interdisciplinary and uses non-linear methodologies that often directly encourage the imagination. Visual methods represent and incorporate different factors and issues which have quite different temporalities and scales. Like simulation, brainstorming approaches attempt to 'assay' and then select amongst the multiple potentialities (virtualities) of a problem without limiting it. User-feedback and ethnographic evaluation research is treated as ways of engaging and learning from the complex 'real life' situations of products and projects. When designers achieve an economy of means it is by structuring every element and relationship so that they serve many purposes and respond consistently despite changing conditions (Milne, 2002). Another way of putting this is to say that well designed solutions maintain the 'virtues', the virtualities, of a product or process in the face of changing demands, milieux, uses and users.

Practitioners may ask, why bother with these new labels? Naming and discriminating between virtualities and abstractions, actualization and realization allows us to focus in on the finer details of design and the problem-solving and innovation role that designers should be playing in society.

Innovation

Often brands lay claim to being 'innovative', even though – and perhaps especially when – specific innovations can't be easily seen (for example 'Goretex' membranes or other innovative textiles may not change the look of jackets or coats). How does the virtual help us understand innovation and design?

In industrial and in economic policy, innovation is contrasted against invention and has been defined only in relation to profit at the scale of the firm. Product innovations are improvements in specific goods, whereas process innovations involve production or management procedures. This is enshrined in OECD policy guidelines such as the *Oslo Manual* which commits member states to coordinate statistical information and policy making around this definition, thus setting the parameters by which economies can be judged more or less 'innovative' and countries more or less competitive. There are two problems with the existing policy definitions, however. (1) Innovations are by definition always successful – there is no room in most texts for learning from 'failed innovations'. The phrase is treated as an oxymoron. And, (2) these are institutionalized definitions which imply the presence of a market and explicitly reject innovations that do not increase profit. Innovation is thus the commercialization of products and processes by firms. This approach goes back to, and often fetishizes, Schumpeter's 1911 definition of innovation as the successful application or commercialization of an invention, to the neglect of the newness of innovations in intellectual terms (Shumpeter, 1976).

There is little or no research on 'social innovations' in society at large, or micro-innovations either in application processes or equipment which skilled labourers make in order to achieve consistent results in a variety of conditions, and from which, Slaughter's research suggests, suppliers in the construction field rarely learn (Slaughter, 1993).

In the economistic discourse on innovation, and in OECD policy discourses in particular, creativity and invention have no place, and there is furthermore no place for discussions of design. Yet design would appear to be the 'moment' not of laboratory 'invention' but in fact a most rigorous way of understanding the process by which inventions are applied or processes improved. Design is the moment when 'innovation' takes place in both the creation of products and in the development of new project-management, production and marketing approaches. Working across architecture and policy disciplines, designers such as Glen Milne have argued that design is a 'missing link' in innovation policy (2002). Because innovation has been reduced to a part of industrial- and economic-policy discourse, the potential contribution of the design professions has been lost. These contributions include enhancements to not just products and processes but the development of brands, including the branding of regions, innovations in the arts and in design areas such as problem-recognition and problem-solving methods, visualization and education.

The Virtuality of Innovation

All innovations are in some way 'new' (*innovare* 'to make something new') and their characteristic novelty harks back to the virtual. Expanding our understanding of the real from what is merely present and static involves embracing the duration and perdurance of things – the capacity to age and change, such as the Portuguese sailing ships that returned from India having been almost entirely rebuilt over the course of their voyages. The virtual also embraces the inherent capacity of things such as buildings to remain materially more or less the same but change their function and identity. In cases where this is more than a matter of description and discursively renaming a building, the virtual designates in ontological terms this latency or potentiality of objects to change and even when they remain 'the same', to continuously differ from themselves from one moment to the next. Elizabeth Grosz comments:

> actualization is a process of creation that resists both a logic of identity and a logic of resemblance and substitutes differentiation, divergence, and innovation. While the concept of the possible doubles that of the real, the virtual is the real of genuine production, innovation, and creativity. It is only actualization that engenders the new (Grosz, 1999:27).

The 'new' is the actualization of virtual presences which are real but not actualized, part of a imminent field of multiple potentialities which form what, in everyday talk, we might call the 'character' of an object or building, or the atmosphere of a place (Bonsdorf, 1995). Thus we refer to the 'virtues' (*virtu*) of a person or thing as their capacity for achieving something. The virtual is in effect a generator of action and form. Affirmation is one typical term by which people refer to the process of actualizing such virtualities (Nietzsche, 1997: 59–123). In short, I am acknowledging and elevating the status of character, or perhaps style, to an important aspect of the real and arguing that it is not merely a discursive fiction or a set of non-existing or conceptual ideas.

Like design, innovation can be reconsidered in the light of the virtual. Promise and hope play an important role in attracting interest in areas and influencing the approaches that have eventually yielded innovations (Van Lente, 2001). But innovation is not just a matter of realizing an abstract idea in material form, rather it involves interventions in the process by which objects or actions are actualized. Rather than focusing just on the material object, 'the' so-called innovation, we must remember the role of the virtual and also the importance of abstract ideas that also play a role. This might then affirm the role of design.

Such a definition opens the possibility of linking innovation with design. Design reminds us that innovation is a process that culminates in something, not a single event (realization) nor the innovation as a reified thing in and of itself (Bijker, 1995:197ff). Design research and methodologies could shed light on how innovation comes about both in creative teams and in the firms that are the more typical site of policy-oriented studies of innovation.

A design-centred view might also balance the new with the old: there are costs involved in discarding established patterns and products. Commercially, apparently obsolete practices and products have a way of returning as loved antiques, nostalgic symbols of tradition and even as preferred approaches, like 'classic' brands, the return of 'original' versions, 'retro-style', or even cotton clothing which has challenged once 'innovative' polyesters in its popularity. This also holds true for building materials – for example, terracotta tile continues to be widely used alongside and/or in preference to vinyl. Re-use and finding new applications

for existing materials all deserve to be examined alongside entirely novel processes and products.

The effect of the avoidance of design as a term in discourses on innovation has had the effect of excluding architects from discussions and policies on innovation in construction and engineering (Manseau & Shields, 2005). This has favoured a quantitative approach focused on the 'bottom line' and share values of major contractors, suppliers and engineering companies or a technical approach focused on reducing building lifecycle costs or improving the performance of specific products. Users are generally missing (Rip & Van den Belt, 1987). The qualitative is not present in this literature – including environmental quality related to health. Other than measures of productivity, the contribution of skilled workers is neglected in most national studies and in the literature (see however Slaughter, 1993). This excludes insights into variations in the ability of trades in particular places to 'make it work' or obtain quality results (Applebaum, 1981). Oversimplifying innovation in this way leads to a classic 'innovation policy' mistake to restrict the conditions for creativity in a belief that innovation can be bureaucratized or happens only in specific circumstances.

Virtuality and the 'Anticipatory Politics' of Societies of Control

If the virtual helps us name and come to terms with an important aspect of contemporary life, economic process and professional practice, it is evidently a strategic site. As both an object of governance and as a means of governance, virtualities involve more than Proustian memories or even the latest simulation exercise. Fortunately, this category of intangible and emergent objects and states has thankfully eluded linear and equilibrium approaches based on the extrapolation of statistical trends. Yet, the desire to structure choice, to simulate situations (virtually), to spot the actualization of, for example, risk (a probability) as it becomes a clear and present danger (a concrete materiality) suggests that acknowledging the virtual ushers in a new model of governance, the so-called 'societies of control', which seek an anticipatory edge on the future (Deleuze, 1992; Hardt & Negri, 2000).

An anticipatory mode of power is distinctly different from the present-tense and localized spatio-temporal matrix of, for example, the society of discipline which Foucault found exemplified in terms of Bentham's Panopticon (Foucault, 1975; see also O'Connor, 2003). Anticipatory power is proscriptive rather than responsive. Anticipation is surveillance extended into the future. Rather than focusing on direct discipline in the context of encounters in the present, or attempting to direct how we define the present ideologically via sets of abstract ideas it attempts to pre-structure the present by intervening in the 'near future' of actualization and becoming. It relies on simulation and moves the terrain of politics forward into the near future, the tense of the 'next' (Delanda, 2002). The use of simulation, is a telltale indicator of the virtualization of the political and of other fields of social action, including the economic. Simulations assay the multiplicity of alternative outcomes and near futures in an effort to structure choices and prepare in advance for emergent situations. This concretises the open 'near future' tense of the virtual into the form of the future perfect – what 'will have happened'. The aim is to shift unfolding processes that are described in everyday talk in terms such as 'virtually', almost', 'as if', and 'about to' into definite outcomes. Examples would be simulation models that work beyond simple probabilities in attempting to anticipate emergent weather patterns or training simulators that do not predict but simply combine a range of factors into a problematic situation that must be surmounted (Hillis, 1999). These are attempts at design, proactively simulating a range of future responses.

This anticipatory mode elicits different responses and forms of resistance than disciplinary modes of power. The shift to the virtual challenges traditional modes of judgement and thus of responsibility and justice in the face of a social system which is made to appear more and more not just as a *fait accompli* but as an inevitable and necessary development. This will require a rethinking of models of critique in order to engage with the anticipatory structuring of choice and attempts to direct the flow of actualization. Political debate must therefore move from the concrete (material conditions) and the abstract (ideology) into the virtual. In this broad, social effort at innovation, the humanities traditions of critique depend on past tradition or distopian utopian models of the future. Social sciences offer probabilistic techniques expressed in the mathematical language of statistics. And design offers simulation meth-

ods which are essential to problem recognition and collaborative problem solving under conditions of complexity.

This paper has attempted to introduce a theoretical appreciation of the virtual as more than a technological artifact and to briefly argue its relevance to architects and designers. Considering both design and innovation as inextricably bound up with the new and hence the virtual, architects and designers have an important perspective and tools to bring to discussions of national innovation policy. Given the importance of the virtual in a society and organizations turned toward the future the absence of designers is striking. They appear to possess important methodologies for working with the virtual which are relevant to firms and government agencies concerned with fostering all forms of innovation. Further, designers, possess critical skills for facilitating collective problem solving (for example participatory design 'charettes'). It is not surprising that they find themselves drawn into community and urban politics.

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References

Applebaum, H. (1981). *Royal Blue, the culture of construction workers*. Orlando Florida: Hold Rinehart and Winston.

Bijker, W. (1995). *Of Bicycles, Bakelites, and Bulbs: Toward a Theory of Sociotechnical Change*. Cambridge MA: MIT Press.

Bonsdorf, P. v. (1995). Future Architecture: The Ethics of Creation. In O. Naukkarinen & O. Immonen (Eds.), *Art and Beyond*. Jyväskylä: Gummerus Kirjapaino OY, 46–65.

Borradori, G. (2000). Virtuality, Philosophy, Architecture. *D: Columbia Documents for Architecture and Theory, 7* (Spring), 57–73.

Chiapello, E. (2003). Reconciling the Two Principal Meanings of the Notion of Ideology. The Example of the Concept of the `Spirit of Capitalism'. *European Journal of Social Theory, 6*(2), 155–171.

Delanda, M. (2002). *Intensive Science and Virtual Philosophy*. New York: Continuum.

Deleuze, G. (1992). Postscript on the Societies of Control. *October*(59), 3–7.

Foucault, M. (1975). *Surveillir et punir*. Paris: Gallimard.

Foucault, M. (1980). *Power/Knowledge*. New York: Pantheon.

Gibson, J. J. (1982). *Reasons for Realism: Selected essays of James J. Gibson*. Hillsdale, N.J.: Lawrence Earlbaum and Assoc.

Grosz, E. (1999). Thinking the new: Of Futures yet unthought. In E. Grosz (Ed.), *Becomings*. Ithaca NY: Cornell University Press, 15–28.

Hardt, M., & Negri, A. (2000). *Empire*. Cambridge Mass.: Harvard University Press.

Hillis, K. (1999). *Digital Sensations: Space, Identity, and Embodiment in Virtual Reality* (Vol. 1). Minneapolis, London: University of Minnesota Press.

Manseau, A., & Shields, R. (Eds.). (2005). *Building Tomorrow: Innovation in Construction and Engineering*. London: Ashgate.

Massumi, B. (2002). *Parables for the Virtual*. Durham NC: Duke University Press.

Matusik, S., & Hill, C. (1998). The Utilization of Contingent Work, Knowledge Creation, and Competitive Advantage. *Academy of Management Review, 23*(4), 680–697.

Milne, G. (2002, Feb 9). *Design, the somewhat unknown but key ingredient in innovation.* Paper presented at the Workshop on Public Sector innovation, Ottawa Canada.

Nietzsche, F. (1997). *Untimely Meditations.* Cambridge: Cambridge University Press.

O'Connor, D. (2003). *Mediated associations : cinematic dimensions of social theory.* Montreal: McGill-Queen's University Press.

Rip, A., & Van den Belt, H. (1987). The Nelson-Winter-Dosi model and synthetic dye chemistry. In W. Bijker, P. Hughes & T. Pinch (Eds.), *The Social Construction of Technological Systems.* Cambridge, MA: MIT Press, 135–158.

Shields, R. (2003). Globalization and sustainable architecture. In R. Cole & R, Lorch (Eds.) *Buildings, Culture and Environment.* Oxford: Blackwell Scientific, 18–36.

Shields, R. (2005). The Virtuality of Urban Culture: Blanks, Dark Moments and Blind Fields. *Soziale Welt-Zeitschrift Fur Sozialwissenschaftliche Forschung Und Praxis,* 377–386.

Shields, R., & Taborsky, E. (2001). The New Knowledge Speak: Implications of contested definitions of knowledge and information. *Australian Journal of Information Systems, 8*(2), 142–149.

Shumpeter, J. A. (1976). *Capitalism, Socialism and Democracy* (5th ed.). London: Allen and Unwin.

Slaughter, E. S. (1993). Builders as Sources of Construction Innovation. *Journal of Construction and Engineering Management – ASCE, 119*(3), 532–549.

Van Lente, H. (2001, 12–15 Aug.). *Construction by Expectation: An Essential Ingredient of Technology Dynamics.* Paper presented at the 4S/EASST joint conference (Society for Social Studies of Science / European Association for the Study of Science and Technology), Gothenburg, Sweden.