

[Design Issues, Volume 26, Number 2 \(Spring 2010\)](#)

1. [Introduction](#)
Introduction. *Design Issues*, Volume 26, Number 2 (Spring 2010), pp. 1-2
- 2 [Errata](#)
Errata. *Design Issues*, Volume 26, Number 2 (Spring 2010), pp. 2-2
- 3 [Design's Role in Sustainable Consumption](#)

Ann Thorpe. Design's Role in Sustainable Consumption. *Design Issues*, Volume 26, Number 2 (Spring 2010), pp. 3-16
- 17 [The Innovation Dimension: Designing in a Broader Context](#)

Leon Cruickshank. The Innovation Dimension: Designing in a Broader Context. *Design Issues*, Volume 26, Number 2 (Spring 2010), pp. 17-26
- 27 [Formulating National Design Policies in the United States: Recycling the "Emperor's New Clothes"](#)

Jonathan M. Woodham. Formulating National Design Policies in the United States: Recycling the "Emperor's New Clothes". *Design Issues*, Volume 26, Number 2 (Spring 2010), pp. 27-46
- 47 [Phases of Product Development: A Qualitative Complement to the Product Life Cycle](#)

Arthur O. Eger, J. W. Drukker. Phases of Product Development: A Qualitative Complement to the Product Life Cycle. *Design Issues*, Volume 26, Number 2 (Spring 2010), pp. 47-58
- 59 [Learning by Design: Visual Practices and Organizational Transformation in Schools](#)

Jennifer K. Whyte, Paula Cardellino. Learning by Design: Visual Practices and Organizational Transformation in Schools. *Design Issues*, Volume 26, Number 2 (Spring 2010), pp. 59-69
- 70 [Aesthetic Interaction: A Framework.](#)

Paul Locher, Kees Overbeeke, Stephan Wensveen. Aesthetic Interaction: A Framework. *Design Issues*, Volume 26, Number 2 (Spring 2010), pp. 70-79

Introduction

The articles collected for this issue include reports of significant design research, trenchant commentary on design policy, and useful reviews of design scholarship. The list of topics addressed—the nature of innovation, the role of visualization, product cycles, interaction design, sustainability, and the development of design policy—are indicative of the expanding scope of design thinking and the growing maturity of design research. Ann Thorpe’s article on “Design’s Role in Sustainable Consumption” is the latest contribution to a series of articles in the journal on the topic of sustainability. She presses the design community to move beyond well-meaning platitudes and engage in rigorous research and action. Thorpe examines three main areas—environmental policy, psychology, and sociology—in which she sees opportunities for designers to make important contributions. Like sustainability, innovation has become an unavoidable buzzword in business, design, and the popular press promoted as a panacea for a long list of social and economic ailments. Often the ubiquitous nature of such terms implies a simple and shared understanding, yet careful review challenges common usage. In “The Innovation Dimension: Designing in a Broader Context,” Leon Cruickshank explores the concept of innovation and provides a nuanced appreciation of the concept as a multidimensional activity. Arthur O. Eger and J. W. Drukker develop a framework for understanding product life cycles. Their “Phases of Product Development: A Qualitative Complement to the Product Life Cycle” provides some structure for understanding the “careers” of individual products. Organization rather than product design is at the core of Jennifer K. Whyte and Paula Cardellino’s “Learning by Design: Visual Practices and Organizational Transformation in Schools.” The authors begin their exploration of visual practices with the question “what are the roles that visual representation plays in organizational transformation?” In “Aesthetic Interaction: A Framework,” Paul Locher, Kees Overbeeke, and Stephan Wensveen explore the structure of aesthetic experience as it operates in the area of interactive systems. Jonathan M. Woodham’s “Formulating National Design Policies in the USA: Recycling the ‘Emperor’s New Clothes’?” takes as its starting point the American Design Communities’ recently issued policy statement “Redesigning America’s Future: 10 Design Policy Proposals for the United States of America’s Economic Competitiveness & Democratic Governance.” In a masterful demonstration of what an historical perspective contributes to contemporary policy discussions Woodham reviews significant efforts around the globe to develop national design

policies and subjects the latest American effort to informed, contextual, and necessary scrutiny.

Although the list of topics and arguments is disparate, there is a pattern worth noting in the material assembled here. Rather than presenting themselves as isolated voices, the authors are contributing to a communal effort to enrich and advance the state of knowledge in their respective fields in a self-conscious, structured manner. Readers should take note of how contributors introduce their subjects and position their discussions within some larger body of research literature and set of questions. To employ a cartographic metaphor, by citing previous work, authors provide crucial landmarks that help the reader navigate the specific terrain covered in each article while orienting themselves in the larger territory. Furthermore, the authors explore the implications of their work by suggesting fruitful areas for future research. The editors of *Design Issues* believe this kind of approach to design scholarship promotes an atmosphere of intellectual engagement and enriches the entire design community.

Bruce Brown
Richard Buchanan
Dennis Doordan
Victor Margolin

Errata: *In the Summer 2009 issue of Design Issues, several lines were eliminated from the article "National and Post-national Dynamics in the Olympic Design: The Case of the Athens 2004 Olympic Games" by Jilly Traganou. We regret this error. This article has been updated in the online version of Design Issues. The final lines should read:*

The constituents of these events should interrogate rather than sustain the myth of the nation and perform a cultural "hijacking" of international events as a means of disputing established categories of nationhood and otherness, thereby promoting alternative types of allegiances across national borders. At the moment that, using again Sassen's words, "power is increasingly privatized, globalized, and elusive" what is needed is directly engaging forms of power and reinvention of citizenship which designers as cultural agents could help express and cultivate. Instead of resorting to ethnic or parochial glorifications of the nation and its myths, or conforming to the market's demands for ethnically identified design, designers should use their practice as a means of revealing the "crisis of the nation"—as it is experienced by both citizens and "others"—and mobilizing identity politics in order to articulate new allegiances.

Design's Role in Sustainable Consumption

Ann Thorpe

User consumption has been a long-standing concern for sustainability, stemming from the notion that there are “limits” to global resource capacity and we are consuming beyond those limits. Yet as the field of sustainable consumption has matured, it has moved from largely *technical* concerns about efficient resource consumption and minimizing waste in our existing industrial systems to a more recent focus on the very *social* issue of lifestyle change. The emphasis on lifestyle and behavior change is supported by research that suggests consumerism is costly not only in environmental terms, but also possibly in other ways.

Although design is beginning to struggle with the challenges posed by this move toward lifestyle change, the topic of design is mostly absent from the serious discourse on sustainable consumption. In this article, I will examine the research that underpins recent shifts in the sustainable consumption field and investigate how that broader research resonates with design research and practice.¹

After a brief timeline, I will look particularly at three main research areas—environmental policy, psychology, and sociology. I will conclude by examining a question implied by mainstream research—can design move from being a cog in the wheel of consumerism to having a substantial role in supporting sustainable consumption?

Timeline

Consumption itself is a huge field and here I provide only a brief timeline. Interest in consumption as a field of study is long standing and Tim Jackson suggests that the emerging debates about sustainable consumption must be understood in a broad historical context.² He captures this sweep of work on consumer behavior and society neatly when he notes that these older debates:

Have an extraordinary pedigree reaching back to classical philosophy and encompassing the critical social theory of the nineteenth and early twentieth century, the consumer psychology and “motivation research” of the early post-war years, the “ecological humanism” of the 1960s and 1970s, the anthropology and social philosophy of the 1970s and 1980s, and the sociology of modernity, popularized in the 1990s.

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- 1 Throughout this article I write mostly of “consumer goods” in terms of products, but there is a case to be made that architecture is becoming a consumer good on some levels and that many of the points made here apply to at least partially to architecture.
 - 2 Tim Jackson, “Readings in Sustainable Consumption” in *The Earthscan Reader in Sustainable Consumption*, ed. Tim Jackson (London: Earthscan, 2006). Jackson’s *Reader* is a good entry point into the literature on sustainable consumption (and one that I draw upon heavily), because Jackson has assembled a collection largely from pre-existing writings that include many respected consumption scholars from across a range of disciplines and time periods. Another good entry point, particularly for critique of the environmental movement, is the edited volume, *Confronting Consumption*, ed. Thomas Princen, Michael Maniate, and Ken Conca (Cambridge, MA: The MIT Press, 2002).

- 3 Rachel Carson, *Silent Spring* (New York: Houghton Mifflin, 1962), Donella H. Meadows and Club of Rome, *The Limits to Growth: A Report for the Club of Rome's Project on the Predicament of Mankind* (London: Earth Island, 1972).
- 4 R. Buckminster Fuller, *Operating Manual for Spaceship Earth* (Carbondale: Southern Illinois University Press, 1969); Victor J. Papanek, *Design for the Real World: Human Ecology and Social Change* (New York: Pantheon Books, 1972); Chris Zelov and Phil Cousineau, *Design Outlaws on the Ecological Frontier* (Philadelphia: Knossos, 1997).
- 5 Jakki Dehn, "Re-Materialize Exhibition: Materials Made from Waste" (Kingston University, 1996); Susan Subtle Dintenfass, "Hello Again: A New Wave of Recycled Art and Design" (Oakland: Oakland Museum of California, 1997–98).
- 6 Nigel Whiteley, *Design for Society* (London: Reaktion Books, 1993).
- 7 Sim Van der Ryn and Stuart Cowan, *Ecological Design*. (Washington D.C.: Island Press, 1996); H. Brezet and C. van Hemel, "Ecodesign: A Promising Approach to Sustainable Production and Consumption" (Paris: United Nations Environment Programme, 1997); J. H. Gertsakis, H. Lewis, and C. Ryan, *A Guide to EcoRedesign* (Melbourne: Centre for Design, Royal Melbourne Institute of Technology, 1997).
- 8 Tim Jackson, "Readings in Sustainable Consumption."
- 9 Kate Fletcher, "Use Matters" Chapter 3 in *Sustainable Fashion & Textiles: Design Journeys* (London: Earthscan, 2008).
- 10 See for example Karrie Jacobs, "Revenge of the Small," *Metropolis*, December 2006, and Ingrid Spencer "The Acceleration of Single Speed Design," *Architectural Record*, September 2006.
- 11 William J. Mitchell, "Going the Extra Mile to Make Mass Transit More Personal" *Architectural Record*, August 2007.
- 12 See, for example, Thomas de Monchaux "A is for Adaptable" *I.D.*, May 2007, William Weathersby, "Derek Porter Studio elevates the image of FLEX self storage center," *Architectural Record*, November 2006, and Alec Applebaum "Parking Garages Driven to Good Design" *Architectural Record*, August 2007.

When environmental concerns emerged in the 1960s and 1970s, with works such as Rachel Carson's *Silent Spring* (1962) or the Club of Rome's *Limits to Growth* (1972) and events such as the 1973 OPEC oil embargo, scholars of both consumption and design incorporated these concerns into studies and practice.³ On the design side, for example, many of us are familiar with the work of Buckminster Fuller (*Operating Manual for Spaceship Earth*, 1969), Victor Papanek (*Design for the Real World*, 1972), architect Sim Van der Ryn, and "design outlaws" such as Jay Baldwin, among others.⁴

Jackson notes that by the late 1980s, consumption (as part of "sustainable production and consumption") had become a key component of sustainable development. He dates the term "sustainable consumption" to Agenda 21, the main policy document to emerge from the first Earth Summit in Rio in 1992. From that point, sustainable consumption became a more familiar program theme at international policy levels.

On the design side, the 1990s saw a more intense focus on recycled materials, with exhibitions such as "Re-Materialize" (1996) and "Hello Again" (1997–98).⁵ Critiques of consumerist design also appeared, notably Nigel Whiteley's *Design for Society* (1993).⁶ By the late 1990s, "eco-design" emerged as a recognizable field, exemplified by eco-design principles in *Ecological Design* (1996), and by product lifecycle approaches detailed in works such as *A Guide to EcoRedesign* (1997) and *Ecodesign: A Promising Approach to Sustainable Production and Consumption* (1997).⁷

Throughout the 1990s, for the most part neither policy makers nor designers were typically asking for substantial change in lifestyle, rather they were seeking less resource intensive production and consumption methods to facilitate existing lifestyles, as I detail below. It wasn't until 2003 that the UK government, despite the difficult political and social implications, was among the first to adopt a strategy recognizing that substantial behavior and lifestyle change are essential components for achieving sustainability.⁸

The early 2000s have also seen design work that explores lifestyle change explicitly in terms of sustainable consumption. For example, instead of consuming efficiently (buy two shirts instead of six) one design proposal recognizes laundering as one of clothing's biggest eco-impacts and suggests a "no wash" shirt. (It has ventilation and wipe-able surfaces and otherwise wears dirt or stains like a badge.⁹) We also see other interesting proposals such as:

- not simply "greening" our houses, but also substantially reducing the size of houses, or sharing a bigger house among several families,¹⁰
- relinquishing private car ownership in favor of "city cars,"¹¹ or reworking existing use patterns, such as putting schools in with other community facilities, art exhibitions in with self-storage, and cultural facilities in with parking garages.¹²

All of these proposals suggest substantial changes to existing lifestyles, not just in terms of technical efficiency but also in socio-cultural terms. The field of sustainable consumption is starting to call for just such a portfolio of diverse lifestyle changes to meet the challenges of sustainability.

In the next section I move into examining broader research in sustainable consumption and the design resonances with that research, beginning with environmental policy.

Environmental Policy

Environmental policy has typically asked, “can we make environmentally better products and convince people to buy them?” Research in environmental policy and management traditionally starts with conventional economic notions. For example, researchers assume that consumer desires are basically insatiable and that consumers exercise sovereignty over purchases. Here “sovereignty” is the idea that consumers actually control supply by virtue of allocating their “dollar votes” in a free market—demand controls supply. Most importantly, many researchers have until recently accepted the idea that economic growth is a proxy for growth in well-being, that continuous increases in consumption are equal to continuous increases in well-being.

Given these assumptions, the challenge for environmental policy then becomes meeting consumer demand in a more environmentally friendly way. This task has two sides:

Supply: producing less environmentally damaging goods, and

Demand: educating consumers about these improved goods. The approach, sometimes called “informed choice,” hinges on persuading consumers to choose smart/clean/fair/green goods that reduce environmental impacts so that insatiable demand can continue.¹³ Since consumers are rational decision makers, the reasoning goes, when they have better information they’ll make better choices.

In recent years, “informed choice” has been increasingly criticized. Critics claim the economic view of consumers as “insatiable” is inaccurate as many people choose to live within their means.¹⁴ At the same time, consumers are increasingly distanced from the impacts of consumption (they don’t witness firsthand dramatic resource destruction or worker exploitation), so despite being “informed” in an abstract sense, they have relatively little visceral feedback on which to base consumption decisions.¹⁵ Other critiques point out that increases in overall consumption are slated to cancel out any gains made in production efficiency.¹⁶ This reality is made more sobering as increasing numbers of the world’s population move from poverty to “middle class” status, for example in India and China.¹⁷

13 Jackson, “Readings in Sustainable Consumption” and Anja Schaefer and Andrew Crane, “Addressing Sustainability and Consumption,” *Journal of Macromarketing* 25:1 (2005), 76–92.

14 Karl Dake and Michael Thompson, “Making Ends Meet—in the Household and on the Planet,” *The Earthscan Reader in Sustainable Consumption* (London: Earthscan, 2006).

15 Ken Conca, “Consumption and Environment in a Global Economy,” *Confronting Consumption*, ed. Thomas Princen, Michael Maniates, and Ken Conca (Cambridge, MA: The MIT Press, 2002).

16 Jackson, “Readings in Sustainable Consumption.”

17 Conca, “Consumption and Environment in a Global Economy.”

The consumer sovereignty assumption is also criticized. Michael Maniates suggests that corporations and governments use notions of consumer sovereignty to “individualize” the problem—make individuals responsible for voting with their wallets—and thus avoid making changes either to profitable corporate business practices or convenient patterns of government subsidy (e.g., subsidies for oil drilling).¹⁸ But consumers are not individual sovereigns in a free market, they are heavily influenced by marketing and advertising. Moreover, given tremendous concentrations of wealth, a small number of very rich people have tremendous “voting power” in the market whereas most of us have relatively little.¹⁹

The fact that we broadly accept the “individualization” of the problem indicates how much we view ourselves primarily as consumers, as opposed to citizens. Are we left with shopping-as-political-act, in which our dissent is commodified and sold back to us?²⁰ A more positive view sees ethical and green consumerism as an emerging social movement, in which individuals take first steps toward further political action, and various organizations mobilize these many first steps into social change campaigns.²¹ On the other hand, some critics suggest that many consumer “desires” might be met by means other than consumer goods, but our society is commoditized to such an extent that the “non-purchase” options are rarely explored or supported.²² For example, we don’t invest in alternatives to private automobiles because they don’t work well as commodities—they don’t make good profits.

A recent counterpoint to “informed choice” is the controversial notion of “choice editing” stemming from the field of behavioral economics. This approach sees a role for government and other organizations in steering individuals into behavior and lifestyle changes. Rather than assuming people always act rationally in their own best interests, behavioral economics incorporates findings from psychology and sociology to account for seemingly irrational behavior. A recent report, “Creatures of Habit? The Art of Behavioral Change,” highlights areas where we often knowingly act against our own best interests: not saving for retirement, not losing weight, and not reducing our climate change emissions.²³

In these areas, the thinking goes, we need outside intervention to motivate new behaviors that we already know are in our best interests for the long term. It’s controversial because public intervention (such as a ban on smoking in public places) is usually deemed necessary only when actions cause direct harm to others—where there is a social cost. But forcing people to take action for their own good, such as forced saving for retirement, strikes some as paternalistic. The authors of “Creatures of Habit?” suggest there is a threshold “when individual actions carry consequences for the individual further down the track, which they themselves recognize”

18 Michael Maniates, “Individualization: Plant a Tree, Buy a Bike, Save the World?” in *Confronting Consumption*, ed. Thomas Princen, Michael Maniates, and Ken Conca (Cambridge, MA: The MIT Press, 2002).

19 Jeff Gates, *Democracy at Risk* (Cambridge, MA: Perseus Publishing, 2000).

20 For example see Kersty Hobson, “Competing Discourses of Sustainable Consumption: Does the ‘Rationalization of Lifestyles,’ Make Sense?,” in *The Earthscan Reader in Sustainable Consumption* (London: Earthscan, 2006); Maniates, “Individualization: Plant a Tree, Buy a Bike, Save the World?”; Derrick Jensen, “Forget Shorter Showers: Why Personal Change Does Not Equal Political Change” *Orion* July/August (2009).

21 Nick Clarke et al., “Globalising the Consumer: Doing Politics in an Ethical Register,” *Political Geography* 26:3 (2007).

22 Jack Manno, “Consumption and Environment in a Global Economy,” in *Confronting Consumption*, ed. Thomas Princen, Michael Maniates, and Ken Conca (Cambridge, MA: The MIT Press, 2002).

23 Jessica Prendergrast, Beth Foley, Verena Menne, and Alex Karalis Isaac, “Creatures of Habit? The Art of Behavioural Change” (London: The Social Market Foundation, 2008).

24 *Ibid.*, 8.

(emphasis added).²⁴ In other words, the authors view these as cases where most of us acknowledge we need help.

When it comes to consumption of material goods, choice editing comes up against consumer sovereignty. Rather than consumer “sovereigns” who dictate supply, choice editing sees governments and businesses editing out choices that are less sustainable, while ensuring that sustainable options are the norm—re-setting our “default options.” Examples of successful choice editing include the elimination of ozone-depleting chemicals from aerosols and the uptake of efficient fridges and freezers in Europe, where governments banned the low efficiency models and then retailers agreed to remove “middling” rated appliances.²⁵ Choice editing recognizes that mainstream consumers want to make environmentally “good” choices but are mired in habits, norms, and other factors that limit their ability to do so.

Environmental Policy—Design Resonances

In an interesting contrast to debates on informed choice that rarely mention design, researchers exploring environmental policy from a design perspective tend to see design as the heart of the problem. This view is often supported by the statistic that as much as 90% of a product’s environmental impact is fixed during the design stage.²⁶

The predominant design response to the consumption problem has closely followed the informed choice approach. That is, green and eco-designers focus on redesigning products to be more environmentally friendly hoping that better informed consumers will buy them. There has been a great deal of useful work done in this area, resulting in a bundle of principles, toolboxes, and indicators available for designers to use. Examples include:

- “lifecycle” strategies that assess a product’s impact from conception through production, use, and end-of-life
- business case studies for sustainability based on savings from efficiency, etc.
- product and building environmental rating systems such as the US Green Building Council’s “LEED” or McDonough and Brangaurt’s “Cradle-to-Cradle.”

Eco-design is useful, but seems susceptible to many of the criticisms of informed choice. Eco-design generally accepts the individual, voting-with-your-wallet approach, overlooking public policies and corporate finance systems that significantly weaken an individual’s “vote.” Although eco-design may sometimes link consumers to *downstream* consequences of products (e.g., by using recognizable recycled material), few eco-design approaches link consumers to *upstream* social and environmental consequences of making products, perhaps because many designers are as distant as consumers from these upstream effects.

25 Sustainable Consumption Roundtable, “I Will If You Will: Towards Sustainable Consumption” (London: National Consumer Council and Sustainable Development Commission, 2006).

26 Paul Hawken, Amory Lovins, and L. Hunter Lovins, *Natural Capitalism* (New York: Little, Brown and Company, 1999); Helen Lewis and John Gertsakis, *Design + Environment: A Global Guide to Designing Greener Goods* (Sheffield: Greenleaf, 2001).

“Design for behavior change,” an approach that resonates with choice editing policies, has gained ground recently. T. A. Bhamra, D. Lilley, and T. Tang describe a spectrum of design for behavior change.²⁷ On one end, it is the same as informed choice, where a product displays environmental information—such as the miles per gallon readout on the Prius hybrid automobile—thus better enabling a consumer to act upon it. On the other end of the spectrum, a design solution may actually use technical controls or spatial organization to steer consumer behavior—for example to reduce refrigerator door opening, or prevent consumers from over-filling the tea kettle, and so forth.²⁸ Bhamra et al. hint at the controversial nature of this approach, pointing out the ethical implications of allocating the power of decision-making between the consumer and the product.

Criticisms of the informed choice model, as well as the evidence supporting the choice editing model, stem from other disciplines. I turn next to psychologists, who have been looking at the connection between the pursuit of material wealth and mental well-being.

Psychology

At a basic level, psychological research on consumption asks, “can things make us happy?” Clearly there is a significant role for material goods in modern life, but recent research indicates that increasing levels of material wealth do not lead to corresponding increases in happiness, and eventually can become detrimental to psychological and even physical health. Tim Kasser has found that people with highly materialistic values report lower levels of mental and physical well-being; his discovery is bolstered by a number of other researchers who found similar results across age groups (young and old), cultures (Eastern and Western), and income groups (rich and poor).²⁹ The finding suggests that continuous increases in consumption are not a good proxy for increases in well-being.

Underlying these findings is the theory that human beings, in addition to having some universal physical needs (such as for sustenance and shelter) also have universal psychological needs. Needs theory, as it is sometimes known, includes contributions from various scholars on how human needs might be framed. In general, psychological needs tend to fall into the categories of social and personal. Social needs include participation, belonging, and affection, and personal needs include understanding, creativity, authenticity, and freedom.³⁰

In social terms, consumer goods have a darker, anxiety-producing side, in which they help us avoid shame. Novel or expensive consumer goods gain us a certain position in society, a position lost without relentless striving. This is what’s known as “positional” consumption. It’s one way that consumerism advances

27 T. A. Bhamra, D. Lilley, and T. Tang, “Sustainable Use: Changing Consumer Behavior through Product Design” in *Changing the Change Conference Proceedings* (Turin, Italy: Allemandi Conference Press, 2008).

28 Some history and a range of examples are reviewed in Dan Lockton, Professor David Harrison and Professor Neville Stanton, “Making the User More Efficient: Design for Sustainable Behaviour” *International Journal of Sustainable Engineering*, preprint (2008). available from <http://hdl.handle.net/2438/2137> (accessed 9/23/2008).

29 Tim Kasser, *The High Price of Materialism* (Cambridge, MA: The MIT Press, 2002).

30 Tim Jackson, “Consuming Paradise? Towards a Social and Cultural Psychology of Sustainable Consumption,” in *The Earthscan Reader in Sustainable Consumption*, ed. Tim Jackson (London: Earthscan, 2006); Kasser, *The High Price of Materialism*.

31 Tim Jackson, “Prosperity Without Growth: The Transition to a Sustainable Economy” (London: Sustainable Development Commission, 2009), 39, 63–65.

individualism, and suggests that simplistic appeals to “consume less” won’t work.³¹

Kasser notes that individuals who rely primarily on materialism and physical appearances—having the “in” cell phone or the latest hair style—are typically less successful in meeting their psychological needs than people who use a broader range of techniques to develop relationships or pursue inner growth. Perhaps this broadening of techniques gives people alternate ways of gaining or understanding social position.

Studies on how consumption meets psychological needs examine both the act of making a purchase and the state of “happiness.” Daniel Miller argues that the act of making a purchase can articulate caring and authenticity in relationships. To the extent that developing meaningful relationships makes us happy, consumption should improve happiness in this regard. He gives examples of a mother’s search for children’s clothing that balances the child’s aesthetic with the family’s, as well as the case of a man who can, by himself, purchase a suitable garment or pair of shoes for his woman. These examples demonstrate the love of one for the other and its expression through the process of consumption.³²

Miller suggests that critics of consumption are making moral judgments on consumers, and he argues that when we appropriate it, consumption is a way to enhance humanism. Miller celebrates consumption and points out that the elimination of poverty worldwide must rely upon more consumption, not less, and upon mass production. Although not commenting on design directly, he dismisses “craft,” from which the reader infers “local scale production,” as suitable for no more than a hobby.

Mihaly Csikszentmihalyi’s studies examine both happiness and the process of making purchases. His research suggests that we are happiest when our consciousness is “tuned,” a state he calls “flow” that occurs from active engagement in something such as writing or playing music, but not from passive activities such as watching TV. He found activities that have higher physical resource requirements (in this case BTUs—units of energy) typically correlated to lower happiness levels.³³ He hypothesized that lower BTU activities are “happier” because they require greater *psychic* energy and thus better tune our consciousness. In this view, “psychically” active engagement is key to achieving well-being. He suggests that there is a relatively low threshold beyond which increased material wealth does not add to flow, but more importantly there is an additional threshold beyond which material wealth may start to rob us of flow.

In terms of making purchases, he notes that in contemporary life, shopping is one of the main areas where many people experience a tuned consciousness, in the absence of other opportunities or skills. By contrast, in previous eras people would have experienced a tuned consciousness through activities such as

32 Daniel Miller, “The Poverty of Morality,” *The Earthscan Reader in Sustainable Consumption*, ed. Tim Jackson (London: Earthscan, 2006).

33 Mihaly Csikszentmihalyi, “The Costs and Benefits of Consuming,” *The Earthscan Reader in Sustainable Consumption*, ed. Tim Jackson (London: Earthscan, 2006).

34 Maniates, “Individualization: Plant a Tree, Buy a Bike, Save the World?”

making their own entertainment, making their own goods (e.g., sewing or woodworking), or participating in religion, among other things. Other research indicates that personal consumption rates are correlated to the quality of an individual's work. If your job makes you feel powerless, you may compensate by shopping, which appears to put you back in control.³⁴

It bears repeating that consumption and material goods can and do play a positive role in psychological and physical health. I interpret the psychological research not in terms of whether consumption is good or bad, but rather, in terms of searching for the right intensity of consumerism in our lives.

Psychology—Design Resonances

Recent design research and practice reflects the theme of psychological needs, particularly in terms of tuning our consciousness and relationships. Kate Fletcher, Emma Dewberry, and Philip Goggin examine the issue within the context of washing clothes.³⁵ They suggest that social and cultural ideas about cleanliness go far beyond the basic concern of hygiene, to reflect happiness, success, and even affection. Consider the meaning of a clean white shirt to a successful businessman, schoolchild, or a fashionable young woman. The researchers suggest that in designing both clothes and washing machines, these psychological needs must be considered alongside the “material” needs of production, if we are to reduce the intensity of our reliance on material goods.

“Slow design” also addresses psychological needs, based on the notion that the fast pace of contemporary life tends to reduce our time both for internal reflection and connection with others.³⁶ Carolyn F. Strauss and Alastair Fuad-Luke suggest that designed objects and architecture can work to slow us down and help us regain temporal stability, partly by enabling us to shift value from material objects to experiences that perhaps help us tune our consciousness.³⁷ They posit six principles of slow design, ranging from collaborative engagement with end users (as in place-based architecture) to revelation of previously unseen elements of life. Another principle is evolution, a subject also taken up by other designers.

The now defunct Eternally Yours Foundation promoted designing products that would evolve, seeking to strengthen and thus lengthen relationships between people and products.³⁸ In related work, Stuart Walker suggests that rather than flashy, perfect-looking products, which put too much emphasis on themselves and their constant updating, we need “good enough” looking products that will free us to focus on inner, spiritual development.³⁹ He attempts to slow the pace of stylistic change by devising “good enough” products built with local, often recycled, materials supplemented by limited globalized components. Walker uses the notion of enduring products to address sustainable consumption through both informed

35 Kate Fletcher, Emma Dewberry, and Phillip Goggin, “Sustainable Consumption by Design,” *Exploring Sustainable Consumption: Environmental Policy and the Social Sciences*, ed. Maurie J. Cohen and Joseph Murphy (London: Pergamon, 2001).

36 Ann Thorpe. *The Designer's Atlas of Sustainability*, (Washington DC: Island Press, 2007).

37 Carolyn F. Strauss and Alastair Fuad-Luke, “The Slow Design Principles: A New Interrogative and Reflexive Tool for Design Research and Practice,” *Changing the Change Conference Proceedings* (Turin, Italy: Allemandi Conference Press, 2008).

38 Ed Van Hinte and Liesbeth Bonekamp, *Eternally Yours* (Rotterdam: 010 Publishers, 1997).

39 Stewart Walker, *Sustainable by Design* (London: Earthscan, 2006).

40 Jonathan Chapman, *Emotionally Durable Design: Objects, Experiences & Empathy* (London: Earthscan, 2005).

choice (better products to choose) and inner growth (de-emphasis of appearance).

Jonathan Chapman's work also examines lengthening our relationships with our products.⁴⁰ He suggests that current relationships with products fail because although we grow and evolve, our products don't. He offers a toolbox of approaches for involving users in empathetic relationships with products, such as making products endearingly unpredictable or giving them "free will." Although Chapman posits these approaches only for a niche market, he appears to encourage using material goods to meet psychological needs. He notes, "Somewhere during the last 100 years we learned to find refuge outside the species, in the silent embrace of manufactured objects."⁴¹ Rather than question this embrace, Chapman seems to be saying that things can make us happy, as long as designers can create the right kind of empathetic products.

In contrast, Ezio Manzini suggests that design must challenge "product-based" well being, particularly by attending to the quality of our contexts for living.⁴² Manzini looks at the services that products provide and for ways to offer these services with fewer physical resources. For example, few people want a drill per se, they want the hole that it creates. Manzini characterizes this as a shift "from products to results" an approach known as "product-service-systems."⁴³ In addition to potentially reducing the material intensity of life, the implication is that reduced ownership duties (shopping for, maintaining, and decommissioning objects) would free up time and attention for other methods of meeting human needs. This approach also tends to have an element of sharing or collectivism, which may provide opportunities for improved relationships.

Manzini suggests that historically, product-based well being stems from the idea of labor-saving technology, which was then extended to a general notion of bundling knowledge and skills into devices, reducing user involvement. He calls these "disabling" solutions. Others have noted this as a process of "de-skilling."⁴⁴ Seen in the light of "flow" and other elements of psychological wellbeing (e.g., creativity, participation, understanding), technical approaches that reduce skills do appear to some extent to rob the user of chances to tune their consciousness. Manzini promotes "enabling" solutions that move the user from a passive to an active role as co-designer.

The notion of co-design builds upon a trend (outside the realm of sustainable consumption) toward democratic, representative, or user-enabled design.⁴⁵ In the sustainable fashion context, Kate Fletcher (in a publication separate from that cited before) reports on projects that encourage consumers to become co-designers by cutting garments to fit, inventing with mix-n-match or unusually sized garments, or drawing with fabric pens on undergarments.⁴⁶ Work by the Design Council (UK) uses "co-creation" in the context of reinventing public services.⁴⁷ This research emphasizes the importance of social networks as an aspect of co-creation, repeatedly

41 Ibid., 61.

42 For example, see Eva Heiskanen and Mikko Jalas, "Dematerialization through Services—A Review and Evaluation of the Debate" (Helsinki: Ministry of the Environment, 2000); A. S. Bijma, Brezet, and S. Silvester, "The Design of Eco-Efficient Services: Methods, Tools and Review of the Case Study Based 'Designing Eco-Efficient Services' Project" (Delft: Design for Sustainability Program, Delft University of Technology, 2001); and Ezio Manzini, "Design, Ethics and Sustainability: Guidelines for a Transition Phase" (Milan: Politecnico di Milano, 2006).

43 Ezio Manzini, "Design for Sustainability: How to Design Sustainable Solutions" (Milan: Politecnico di Milano, 2006).

44 Albert Borgmann, "The Depth of Design," in *Discovering Design: Explorations in Design Studies*, eds. Richard Buchanan and Victor Margolin (Chicago: University of Chicago Press, 1995).

45 For example, see Gui Bonsiepe, "Design and Democracy," *Design Issues* 22:2 (Spring 2006), 56–63; Jeff Howard, "Toward Participatory Ecological Design of Technological Systems," *Design Issues* 20:3 (Summer 2004), 40–53; and Peter Blundell Jones, Doina Petrescu, and Jeremy Till, eds., *Architecture and Participation* (New York: Spon Press, 2005).

46 Kate Fletcher, "User Maker," Chapter 8 in *Sustainable Fashion & Textiles: Design Journeys*.

47 Hilary Cottam and Charles Leadbeater, "Health: Co-Creating Services," *Red Papers* (London: Design Council, 2004).

48 Kristina Niedderer, "Designing Mindful Interaction: The Category of Performative Object," *Design Issues* 23:1 (Winter 2007), 3–17.

highlighting the correlation between well-being and the quality of a person's relationships with others. Design's role here involves user research, facilitation, visualizing structures and systems, and inventing a shared language for problem solving.

Kristina Niedderer, a product designer who explores products as mediators of relationships, proposes the idea of "performative objects" which create "mindful interactions" among people.⁴⁸ She created "social cups," a group of champagne flutes that only stand up when linked three or more together. In a broader exploration of how objects influence interaction, she observes, "objects are designed to make people independent rather than to make dependency and care acceptable as an integrated part of use."⁴⁹ To the extent that her observation is true, it suggests how consumer goods facilitate individualization and potentially minimize relationships.

To summarize, we recall the basic question about how far consumerism can go in meeting our psychological needs. Can things make us happy? Or do material goods rob us of real relationships and render our consciousness out of tune? If material goods make us happy up to a point, then where is that point? We have seen that designers are exploring how to support behaviors and lifestyles that promote psychological well being, both by building relationships and by considering how objects (and their absence) might better contribute to a tuned consciousness. The ideas reviewed here include slow design, good-enough products, co-creation, empathetic products, product-service-systems, and performative objects.

These approaches raise questions about roles and methods of design. For example, what is a designer's role among a group of enabled users who co-create in what Manzini calls "designing communities"? It's also not clear that design methods exist for some of these new approaches. For example, there are elements of services, such as hospitality and customer care, that are not typically captured in a design education. Similarly, few designers are trained in facilitating "flow" for users.

Sociology

On a basic level, sociological research on consumption asks, "what does consumption mean?" This research examines the role of material objects and consumption in constructing meaning and identity—how we use goods to make sense of our world and ourselves. For sociologists and other cultural theorists, goods have symbolic meaning, and that meaning is negotiated through social interaction.⁵⁰

In a sense, goods have become our main source of "symbols," in the same way that fossil fuels have become our main source of energy. Goods are "symbolic resources" in the same way the oil is an energy resource. Over time, society has lost many of its older sources of symbols, such as rights of passage, seasonal and ceremonial customs, and personal and community rituals and practices.

49 Ibid., 7.

50 Mary Douglas, "Relative Poverty, Relative Communication," *The Earthscan Reader in Sustainable Consumption*, ed. Tim Jackson (London: Earthscan, 2006).

51 See for example John Connolly and Andrea Prothero, "Sustainable Consumption: Consumption, Consumers and the Commodity Discourse," *Consumption, Markets and Culture* 6:4 (2003), 275–91; Mary Douglas and Baron Isherwood, *The World of Goods* (London: Routledge, 1979); Tim Jackson, Wander Jager, and Sigrid Stagl, "Beyond Insatiability: Needs Theory, Consumption and Sustainability," *ESRC Sustainable Technologies Programme Working Papers* (Guildford: Centre for Environmental Strategy, University of Surrey, 2004).

These used to help people navigate community and identity with less emphasis on material goods. In our fast changing world, we increasingly rely on consumer goods and the process of consumption to continually construct, reconstruct, and project our identities and social relationships.⁵¹

There are various models for how social relations and consumer goods allow for construction of the self. For example, Csikszentmihalyi (in a separate study from that previously cited) and Eugene Rochberg-Halton suggest a three-layered self that includes the personal self (the individual), the social self (self in relation to community), and the cosmic self (self in the “larger harmony of things”). They see material objects as templates: the possessions one selects to endow with special meaning out of the total environment of artifacts are both models of the self as well as templates for further development. They serve to give a tangible expression and thus a continued existence through signs to one’s relationships, experiences and values.⁵²

In this model, material objects might express goals or show how they are being achieved, for example professional cookware attests to the goal, and perhaps the achievement, of becoming a gourmet cook. The researchers suggest that this is productive when the psychic energy we put into objects is returned in the form of enjoyment, learning, and creativity—in essence, the form of personal growth. These authors theorize that in recent decades the personal self has dominated and cut us off from wider networks of meaning, leaving the social and especially the “cosmic” self to wither. Without these other selves, it is harder for objects and their meanings to become instruments for personal growth.

Jackson reports on another model for how we construct identity, the “social, symbolic self.”⁵³ Material and symbolic resources make up our daily lives—we operate life with material things—but the social value of the goods and symbols can only be tested and validated in a social milieu. What do you think of my new car? Do my clothes help me gain social status? We must know the social value of our symbolic resources in order to complete the “social, symbolic” self. Seen in the light of identity and meaning, consumer society and material goods are the contemporary response to the need to build a humanly meaningful world—they have become our dominant meaning structure.

Although consumerism arguably fails in environmental terms and to some extent also in psychological terms, to the extent consumerism provides our structure for meaning, the implications for changing lifestyles and behaviors are complex. In this view, the challenge of sustainable consumption lies well beyond the reach of typical informed choice models that environmentalists have tended to pursue.

Jackson concludes that to confront consumerism as the dominant structure for meaning, we must understand it and pose

52 Mihaly Csikszentmihalyi and Eugene Rochberg-Halton, *The Meaning of Things: Domestic Symbols and the Self* (Cambridge, UK: Cambridge University Press, 1981), 188.

53 Jackson, “Consuming Paradise? Towards a Social and Cultural Psychology of Sustainable Consumption.”

alternatives. He also questions, as few of the cultural theorists seem to do, who *controls* the boundless symbolic resources—the meanings to be found in consumer goods. He notes that goods and their system of symbols are not under any sort of democratic or community control, despite a certain level of “appropriation” of symbols by consumers. Rather, the control of symbols is largely in the hands of business and commercial interests seeking profits.

And here at last, we come back to design. He notes, “Marketers, advertisers, designers, and retailers not only have a vested interest in controlling symbolic resources, they also have a long and rather sophisticated experience in effecting this control to their own best advantage.”⁵⁴ Business interests typically have more money available to manipulate symbolic resources than public or social sectors that promote sustainable consumption. Perhaps more worryingly, the “vested interest” he mentions is nothing less than continuous economic growth, which implies a goal of continuous growth in consumption.

At a time when consumption and commoditization are steadily increasing, Jackson’s analysis suggests that to some degree we need to take the way we construct social meaning and disconnect it from commerce. Although not every aspect of social relations and identity are commoditized, there are an increasing number of social needs that we meet through individual purchases. How much do we rely on appearances of clothes, tools, vehicles, or houses as an essential part of our identity? Commercial services now overtake social relations in areas as diverse as food and cooking, daycare, healthcare, elder care, cleaning, dating, and entertainment. As vested commercial interests mine these profitable services, the “purchase” solutions are the ones that are researched, perfected, and patented. They then begin to appear to “work better” than under-supported alternatives such as providing for ourselves, maintaining social capital (e.g. maintenance and preventative care), or developing cooperatives (such as car sharing).⁵⁵

Sociology—Design Resonances

The sociology of consumption seems to pose the biggest challenge yet to design. While there is no doubt that consumerism can and should be made much better, through informed choice, choice editing, and other approaches, there is also little doubt that the dominance of commerce and consumerism in social life is problematic. Elsewhere, based on some of Jackson’s analysis, I have developed the idea that culturally sustainable design allows for more meaning to be generated among individuals and communities, rather than being globally or even nationally broadcast by commerce.⁵⁶ This approach suggests that in parallel with “for profit” design work, we also need design efforts in the nonprofit, social enterprise, and even public sectors.

Seen in this light, solutions that use non-purchase, shared,

54 Ibid., 389.

55 Manno, “Consumption and Environment in a Global Economy.”

56 Thorpe, *The Designer’s Atlas of Sustainability*.

self-provisioned, or community-provisioned options to meet peoples' needs (either for goods or meaning) are not *non-design* solutions. They are solutions that call upon an alternate economic framework within which to organize design activities. For example, instead of forming a consulting business, designers may need to join public sector efforts or form a non-profit design studio. (Designers would still earn a living as employees—we are not talking about volunteering.)

Yet designers typically view themselves, and others view them, as commercial actors. Designers are trained to respond to clients and consumers, and to add value to businesses. Governments develop policies that position design as a tool of economic growth. Professional design associations largely concern themselves with business practices and responsibilities to clients.⁵⁷ Design is a key cog in the wheel of consumerism, so it is no wonder that most designers have trouble conceiving of their work in any other form than commerce and consumerism. Many designers fall back on the idea of making consumerism “better.”

Moving Beyond a Cog

Yet designers are proposing alternatives to “purchased” solutions, though few explicitly recognize how the economic organization of design affects its role. Some of the previously mentioned ideas, such as “designing communities” or local schemes supplemented by global components, suggest a move away from mass production and toward regional production, self-provisioning, or sharing and trading—all activities that would struggle as for profit entities, but thrive as non-profit or social enterprises, perhaps kick started by public investment. Consider a few more examples:

Product service systems. Recent efforts at car sharing have typically been set up and run by nonprofit community organizations.

Design for the elderly. Victor and Sylvia Margolin give an example from the public sector of social interventions in which social workers team with architects to assess how to better meet people's social and physical needs.⁵⁸

Local graphic design. Tremendous global pressure toward a dominant western graphic design can be overcome through awareness of local cultures, via visual traditions and folklore—an awareness best fostered through schools and professional design associations which are typically public institutions or non-profits.⁵⁹

Social self build. In England during the 1970s and 80s, architects employed by the local government (public sector) helped people on housing waiting lists solve their own problems through self build. Government-donated land and simplified building techniques enabled people to design and construct their own housing.⁶⁰

57 See, for example, Peter Dormer, *Design Since 1945* (London: Thames and Hudson, 1993); John Heskest, *Toothpicks and Logos: Design in Everyday Life* (Oxford: Oxford University Press, 2002); Thorpe, *The Designer's Atlas of Sustainability*.

58 Victor Margolin and Sylvia Margolin, “A ‘Social Model’ of Design: Issues of Practice and Research,” *Design Issues* 18:4 (Autumn 2002), 24–30.

59 Sherry Blankenship, “Outside the Center: Defining Who We Are,” *Design Issues* 21:1 (Winter 2005), 24–31.

60 Jon Broome, “Technology and Participation Towards Sustainability,” *Architecture as Initiative* (London: Architecture Association, 2007).

Design strategies that help us meet needs with fewer purchased solutions could lead to more sustainable consumption. Although this approach is not guaranteed to eliminate the development of new products and services—to do away with “stuff”—it could reduce the quantity of stuff and go some way toward changing our lifestyles, potentially by making stuff easier to share, produce locally, repair, or do yourself, which also could have social and psychological benefits.

Even if designers are willing to go in these directions, some might argue that consumers are not. Given the dominance of individualism, consumerism, and private property rights, what is our willingness to share, to be enabled and re-skilled? There is a sense that having lost much of the “civic realm,” we now lack the organizational scale with which to engage people.⁶¹ But perhaps design’s “project” focus can provide the right scale; its “universal” visual language can provide the basis for conversation and new visions. This leads to additional methods questions for designers. Do designers automatically know how to motivate and build social capital? Do designers understand how to operate in nonprofit groups or public agencies?

The possibilities for enabling users and for building local community meaning are alluring in a digital society, with recent applications of open source methods to the areas of law, biology, and news.⁶² Could design be next?⁶³ Where are the opportunities? Although the questions are beyond the scope of this paper, they are relevant to further research into design that supports sustainable consumption.

Conclusion

This review has captured only a small portion of the work in the enormous fields of design and sustainable consumption. In highlighting important themes in mainstream research and their resonances in design, I have attempted to map out some of the key questions and concerns that now face design research and practice. Answers to these questions about methods and forms of organizing design practice may help move design from a cog in the wheel of consumerism to facilitator of sustainable consumption.

61 Hobson, “Competing Discourses of Sustainable Consumption: Does the ‘Rationalization of Lifestyles’ Make Sense?”

62 Geoff Mulgan, Tom Steinberg, and Omar Salem, *Wide Open: Open Source Methods and Their Future Potential* (London: Demos, 2005).

63 See, for example, Bruce Sterling, *Shaping Things* (Cambridge, MA: The MIT Press, 2005); C. Leadbeater, *We Think: Mass Innovation Not Mass Production* (London: Profile Books, 2008); and Alastair Fuad-Luke, *Design Activism: Beautiful Strangeness for a Sustainable World* (London: Earthscan, 2009).

The Innovation Dimension: Designing in a Broader Context

Leon Cruickshank

Context

The term “innovation” has become increasingly prominent in debates in government policy through the establishment of the new UK government department, Department for Innovation, Universities, and Skills (DIUS) and through reports such as “Innovation Nation.”¹ National funding bodies, such as research councils and the Leverhulme Trust, are emphasizing innovation through the “digital economy” and a corresponding prioritization in the design establishment through the activities and publications of the Design Council.

These converging activities have highlighted the complex, overlapping, inconsistent, and incompletely understood relationship of innovation as used in design and innovation in the broader literature of innovation studies. Concentrating on the UK, this paper provides an indicative review of these fields and aims to achieve three goals: 1) describe the wider academic field of innovation and relate this to a design perspective, 2) examine the connections, tensions, and synergies that emerge as these fields converge, and 3) propose active areas for contributions between fields.

Many disciplines are active in innovation research, including management studies, economics, entrepreneurship, psychology, sociology, and, starting to emerge in broader innovation studies, design. The velocity of research, especially in the area of design and innovation, is increasing, driven by the developing needs of the digital or knowledge economy. Specifically, the UK government has committed to spending £3.5bn on innovation through the Technology Strategy Board (TSB).

These initiatives were shaped in the UK by a series of policy papers, including: *Competing in the Global Economy—The Innovation Challenge*,² *Creativity, Design, and Business Performance*,³ *Innovation in the UK: Indicators and Insights*,⁴ *The Cox Review of Creativity in Business: Building on the UK’s Strengths*,⁵ *The Race to the Top: A Review of Government’s Science and Innovation Policies*,⁶ *Innovation Nation*,⁷ and *Creative Britain: New Talents for the New Economy*.⁸

In a European context an engagement with innovation is seen in an ongoing manner through the activities of Euro-Innova,⁹ the EU’s innovation portal. This portal sponsors an ongoing series of activities, from conferences to innovation panels, that look at sector-specific innovation issues ranging from textiles to space to gazelles (fast-growing small and medium enterprises (SMEs)). There has

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- 1 John Denham, *Innovation Nation* (London: Department for Innovation, Universities, and Skills, 2008).
 - 2 DTI Economics Paper No. 7: *Competing in the Global Economy—The Innovation Challenge* (London: Department of Trade and Industry, 2003).
 - 3 DTI Economics Paper No.15: *Creativity, Design, and Business Performance* (London: Department of Trade and Industry, 2005).
 - 4 DTI Occasional Paper No. 6: *Innovation in the UK: Indicators and Insights*. (London: Department of Trade and Industry, 2006).
 - 5 Sir George Cox, *Cox Review of Creativity in Business: Building on the UK’s Strengths*. (London: HM Treasury, 2005).
 - 6 Lord Sainsbury, *The Race to the Top: A Review of Government’s Science and Innovation Policies* (London: Department of Trade and Industry, 2007).
 - 7 See note 1.
 - 8 *Creative Britain: New Talents for the New Economy* (London: DCMS/BERR/DIUS, 2008).
 - 9 Innova, European Innovation Portal. <http://www.europe-innova.org/index.jsp>.

also been a long-standing commitment to investigating innovation through the Community Innovation Survey (CIS), a Europe-wide survey to measure and analyze innovation activity in companies. This survey has been completed every four years since 1993, with the last CIS including responses from more than 140,000 companies.

Beyond Europe there is broader international interest in innovation, seen in the activities of the OECD (Organisation for Economic Co-operation and Development). This group of thirty industrialized nations has developed a widely accepted and implemented international standard for the measure and analysis of innovation, known as the Oslo Manual.¹⁰ This standard allows for the direct comparison of national innovation surveys, and the EU has facilitated this comparison through the ongoing funding of projects, from the 1990s onward, that analyze CIS data.¹¹

To date there has been relatively little direct discussion of innovation in design, although this is changing partly because it is stimulated by government funding and policy that concentrate on innovation. There has been a degree of surprise and skepticism in design journalism that innovation has come to such prominence, questioning any substantive difference between innovation and design. (See Poyner's, "Down with Innovation."¹²) George Cox takes the view that "*design is what links creativity and innovation*,"¹³ although throughout his report innovation and design are usually used together (design innovation) in a way that compresses this distinction. There is evidence to support the assertion that the creative sector is more innovative than other firms. The UK National Innovation Survey of 2005 shows that in a measure of key innovation indicators, the creative industries are twelve percent more likely to demonstrate these indicators than other firms.¹⁴ However, this statistic also demonstrates that innovation is by no means dominated by the creative industries.

Although it is possible to read reports such as *Innovation Nation*¹⁵ from a design perspective and to see design as explicitly core to the development of competitiveness through innovation in the UK, looking a little closer the picture is more complex. *Innovation Nation* describes the key skills for innovation to be developing: science and technology, management, and creativity, as well as softer skills "*for things such as open-innovation*," but the white paper recognizes the creative industries as a component of a subsidiary "hidden innovation," placing design outside the mainstream of innovation activity. In academic studies of innovation, design is often not represented at all. For example, the 650-page *Oxford Handbook of Innovation*¹⁶ does not include any references to design, and in a recent review of the top 50 innovation journals, no design journals were represented.¹⁷

This evidence is presented here not to dislocate innovation from design. As James Utterback argues, product design is more of

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- 10 Oslo Manual, *Guidelines for Collecting and Interpreting Innovation Data* (Paris: OECD, 2005). www.oecdbookshop.org/oecd/display.asp?lang=en&sf1=DI&st1=5LGPBVQFQ4G5 (accessed 1/1/2010.)
 - 11 Keith Smith "Measuring Innovation," in *The Oxford Handbook of Innovation*, ed. J. Fagerberg, D. Mowery, and R. Nelson (Oxford: Oxford University Press, 2005), 148–177.
 - 12 Rick Poyner, "Down with Innovation: Today's Business Buzzwords Reflect a Bad Attitude About Design," *The International Design Magazine* 55:3 (May 2008), 41.
 - 13 See note 5.
 - 14 See note 4.
 - 15 See note 1.
 - 16 Jan Fagerberg, David Mowery, and Richard Nelson, eds. *The Oxford Handbook of Innovation* (Oxford: Oxford University Press, 2005).
 - 17 Jonathan Linton and Narongsak Thongpapanl, "PERSPECTIVE: Ranking the Technology Innovation Management Journals," *Journal of Product Innovation Management* 21:2 (March 2004), 123–139.
 - 18 James Utterback et al., *Design-Inspired Innovation* (London: World Scientific Publishing Co., 2007).

a force in innovation now than 20 years ago.¹⁸ This higher profile for design in innovation studies is reflected in the latest amendments to the Oslo Manual, adding the marketing category to make it easier for design activity to be counted as an indicator of innovation. What is clear is that the relationship between design and innovation is not straightforward or well established.

Innovation Studies

While innovation is a very active area of study now, there is a body of research going back to at least Joseph Schumpeter's *Theory of Economic Development* in 1934,¹⁹ and of course the practice of innovation itself is as old as human activity. Similarly, even the claim of the topicality of innovation is not new. As Downs and Mohr stated in 1976, "Innovation has emerged over the last decade as possibly the most fashionable of social science areas."²⁰

There is a substantial academic tradition of innovation study in the UK, some of the foundations of which were established by Science and Technology Policy Research University (SPRU) of Sussex. Established in 1966, SPRU undertook one of the key early empirical studies of innovation in the UK. Using a team of 300 experts in panels, they analyzed and cataloged every significant innovation in the UK from 1945 to 1983, resulting in a database of 4,300 innovations.²¹ Manchester Institute of Innovation Research (MIIR) at Manchester University is one of the largest academic centers dedicated to innovation in the UK, with more than fifty academics looking at all areas of innovation. This has developed into a field of study collectively known as Innovation Studies.

Also noteworthy is the Open University's Design Innovation Group, formed in 1979 as an early example of innovation explicitly linked to design, although this group's focus is currently directed toward sustainable design rather than innovation.

The Oslo Manual defines innovation as "the implementation of a new or significantly improved product (good or service) or process, a new marketing method, or a new organization in business practices, workplace, organization, or external relations."²² This definition has recently been modified with the removal of the word "technological," broadening the scope of the definition and acknowledging that innovation is not restricted to technology development and exchange.

The Oslo Manual is a guide for the collection (and measurement) of innovation; generating this guide is recognized to be very difficult, not least because there are a select number of aspects of innovation that can be measured.²³ This is achieved at the EU level through the Community Innovation Survey (CIS) and nationally through the innovation surveys (in the UK, see *Innovation in the UK: Indicators and Insights*).²⁴ In these surveys hard empirical data are developed around innovation activity. Because of the acknowledged limitations of measuring innovation, innovation studies tend to be

19 Joseph Schumpeter, *The Theory of Economic Development: An Inquiry into Profits, Capital, Credit, Interest, and the Business Cycle* (Cambridge, MA: Harvard University Press, 1934).

20 G. W. Downs and L. B. Mohr, "Conceptual Issues in the Study of Innovation," *Administrative Science Quarterly* 21:4 (December 1976), 700–714.

21 See note 11.

22 See note 10.

23 See note 11.

24 See note 4.

- 25 See notes 16 and 19.
- 26 See note 22.
- 27 S. J. Kline and N. Rosenberg, "An Overview of Innovation," in *The Positive Sum Strategy: Harnessing Technology for Economic Growth*, eds. F. Landau and N. Rosenberg (Washington, DC: National Academy Press, 1986), 275–305.
- 28 See note 16.
- 29 See note 27.
- 30 Chris Freeman and Luc Soete, *The Economics of Industrial Innovation* (London: Routledge, 1997).
- 31 Clayton Christensen, *The Innovator's Dilemma* (Boston, MA: Harvard Business School Press, 1997).
- 32 William J. Abernathy and Kim B. Clark. "Innovation: Mapping the Winds of Creative Destruction," *Research Policy* 14:1 (February 1985), 3–22.
- 33 For example, see: S. J. Kline, and N. Rosenberg, "An Overview of Innovation," in *The Positive Sum Strategy: Harnessing Technology for Economic Growth*. (Washington, DC: National Academy Press, 1986); Rosanna Garcia and Roger Calantone, "A Critical Look at Technological Innovation Typology and Innovativeness Terminology: A Literature Review," *Journal of Product Innovation Management* 19:2 (March 2002), 110–132; Hubert Gatignon, Michael L. Tushman, Wendy Smith, and Phillip Anderson, "A Structural Approach to Assessing Innovation: Construct Development of Innovation Locus, Type, and Characteristics," *Management Science* 48:9 (September 2002), 1103–1122; and Occasional Paper No. 6, "Innovation in the UK: Indicators and Insights," (London: Department of Trade and Industry, 2006).
- 34 Giovanni Dosi, "Technological Paradigms and Technological Trajectories: A Suggested Interpretation of the Determinants and Directions of Technical Change," *Research Policy* 11:3 (June 1982), 147–162; Pia Hurmelinna-Laukkanen, Liisa-Maija Sainio, and Tiina Jauhiainen, "Appropriability Regime for Radical and Incremental Innovations," *R&D Management* 38:3 (June 2008), 278–289.

skewed toward innovation's empirically accessible aspects. For example, the value of the time and resources put into innovation are measured, rather than the aspects of innovation that are closer to creativity, inspiration, and invention—all areas that resonate strongly with design and are crucial to successful innovation.

A number of different approaches have been used to categorize innovation activity. Schumpeter saw innovation as consisting of one of five types of activity: the creation of new products, new methods of production, new sources of supply, the exploitation of new markets, and, finally, new ways to organize business.²⁵ The legacy of this approach is evident in the Oslo Manual definitions of innovation, which establishes four categories:

- 1 Product innovation: the introduction of products and services that are new or significantly improved
- 2 Process innovation: the implementation of significantly improved production or delivery of methods
- 3 Marketing innovation: the implementation of a new marketing method
- 4 Organizational innovation: the implementation of new organizational methods in a firm's business practices.²⁶

Rather than looking at the sectors of innovation activity, Kline and Rosenberg proposed that the degree of uncertainty for success is a useful metric for looking at innovation processes.²⁷ This proposal resonates with the widely used approach of looking at the degree of innovation as a means of describing and analyzing activities across sectors. Drawing on Schumpeter's work, this approach is useful because the more "energetic" the innovation, the more likely it is to cross boundaries, making the Oslo categories difficult to separate in practice. The degree of innovation is sometimes presented as a spectrum spanning from the lower degrees of innovation (through terms such as incremental, marginal,²⁸ or evolutionary²⁹) to higher degrees of innovation (through terms such as: radical,³⁰ disruptive,³¹ or architectural³²).

The danger here is that there appears to be a smooth continuum or range of innovation, or that a greater jump in innovation is necessarily "better." There is a wide consensus that all innovation activity is multidimensional—that different types of activity and thinking need to come together to enable innovation to occur successfully.³³ This dimensionality contributes to arguments that incremental-type innovation is fundamentally a different class of activity than radical-type innovation, rather than a matter of degree.³⁴

Experience (and the research identified in the preceding paragraphs) shows that in its initial stages radical innovation is not well refined or developed and as a result is often very inefficient or even nonfunctional. Only through the quite different

process of incremental innovation do new services, products, and processes become effective, often many years after the initial radical breakthrough.

Within these frameworks (whether based on sector or degree of innovation), there are many different approaches to innovation research. These approaches include:

- Schumpeterian, concentrating on the market and the identification of waves of creative destruction
- Economic, concentrating on asset creation and the incentives for and effects of innovation
- Organizational behavior and organizational structures
- Sociological views on issues such as the diffusion of technology³⁵
- Managerial, looking at innovation in terms of practices leading to competitive success
- Psychological,³⁶ concentrating on creativity and how people's vision is restricted to one or another set of opportunities
- Marketing, concentrating on consumer behavior and the marketing mix.³⁷

All of these areas (and more) have substantial bodies of knowledge addressing innovation, which makes the development of a coherent picture of innovation research problematic. This complexity has resulted in turbulence throughout the field, especially because, as noted by the key innovation scholar Keith Pavitt, "A growing number of 'innovation studies' shows little allegiance to any particular discipline, and widely disparate theories and methods coexist in relevant journals and handbooks."³⁸

While universal perspectives are rare in the study of innovation, one area of commonality is that a sophisticated understanding of innovation requires going beyond simple collaboration to an engagement with a systemic or networked view of innovation processes.³⁹ Related to this view are the ideas of communities of practice⁴⁰ and networks of innovation⁴¹ as groups or networks involved in complimentary activities and active in the circulation of ideas.

In addition to resonating with service design approaches, thinking in terms of networks raises some important issues, including knowledge transfer between "nodes" in the network (whether people, departments, or institutions). Nodes have different states of knowledge—different capabilities in terms of developing, adopting, and exploiting innovation. Thus, the spread (or diffusion) of innovations becomes an important issue.⁴² Research indicates that a mix of strong ties (productive, reliable, and long established) and weak ties (speculative, unpredictable, facilitating serendipity) are most likely to offer maximum innovative potential.⁴³

One of the most well-known examples of where problems occur in the innovative process is where a high degree of innovation

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- 35 Everett Rogers, *Diffusion of Innovations*, 5th ed. (London: Free Press, 1995).
 - 36 Vinod Goel, *Sketches of Thought* (Cambridge, MA: MIT Press, 1995).
 - 37 William Perreault, E. Jerome McCarthy, and M G H Companies, *Basic Marketing: A Global-Managerial Approach* (London: McGraw-Hill, 2005).
 - 38 Keith Pavitt, "Innovation Processes" in *The Oxford Handbook of Innovation*, eds. J. Fagerberg, D. C. Mowery, and R. Nelson (Oxford: Oxford University Press, 2005), 86–115.
 - 39 For example, see Fagerberg, "Innovation: A Guide to the Literature" in *The Oxford Handbook of Innovation* (New York: Oxford University Press, 2005); Ming-Huei Chen, Yuan-Chieh Chang, and Shih-Chang Hung, "Social Capital and Creativity in R&D Project Teams," *R&D Management* 38:1 (December 2005), 21–34; Pavitt, "Innovation Processes" in *The Oxford Handbook of Innovation*, 86–115; Walter Powel and Stine Grodal, "Networks of Innovators" in *The Oxford Handbook of Innovation*, 56–85.
 - 40 Etienne Wenger, *Communities of Practice: Learning, Meaning, and Identity* (UK: Cambridge University Press, 1999).
 - 41 John Brown and Paul Duguid, "Knowledge and Organization: A Social-Practice Perspective," *Organization Science* 12:2 (March 2001), 198–213.
 - 42 Everett Rogers, *Diffusion of Innovations* 5th Edition. (London: Free Press, 1995)
 - 43 Walter Powell and Stine Grodal, "Networks of Innovators," *The Oxford Handbook of Innovation*, 56–85.
 - 44 Wesley Cohen and Daniel Levinthal, "Absorptive Capacity: A New Perspective on Learning and Innovation," in *Strategic Learning in a Knowledge Economy: Individual, Collective and Organizational Learning Process* (Woburn: Butterworth-Heinmann, 2000), 39–68.

is not matched by a corresponding ability to exploit the results of this innovation, termed a company's absorptive capacity.⁴⁴ To illustrate, consider Parc Xerox in the 1980s. This research laboratory was a hot house for innovation in ICT and digital media, almost simultaneously developing the basis for the personal computer, computer mouse, and graphical user interface. These (and several other) significant innovations were taken out of the company and exploited either by other firms (e.g., Apple) or in new companies set up for the purpose because Xerox (then a photocopier company) was not in a position to recognize the value of the ideas emerging and to exploit these developments effectively. This was a costly limitation: research shows that the market valuation of these spin-out innovations became worth twice the market valuation of the whole of Xerox.⁴⁵

As the potential for innovation to leak or spin out of companies became better understood, knowledge transfer issues and issues related to managing tacit knowledge became much more important.⁴⁶ Open innovation developed as an area of study focused on extending the value of the network and on the ease of diffusion as a facilitator. The field was pioneered by Henry Chesbrough at Berkeley through the popularist *Open Innovation: The New Imperative for Creating and Profiting from Technology*,⁴⁷ as well as the more academic, edited volume, *Open Innovation: A New Paradigm for Understanding Industrial Innovation*.⁴⁸ This term is entering into popular use and is recognized in design circles through articles such as "Anyone Can Have a Good Idea" in the *Design Council Magazine*.⁴⁹

Open innovation is often mistakenly seen as being the same as open source software production, but fundamentally open innovation is a business model that allows for profitable and sustainable business practices that use the sharing of ideas and information to maximize innovative potential. The underlying principle of free work for common good, which is at the core of open source development, is absent from open innovation. Thus, open innovation is presented as a new paradigm by Chesbrough⁵⁰ in the explicitly Khunian sense; however, this has yet to be conclusively evidenced.

Allied to open innovation is an analysis and recognition of innovation in which users, rather than innovation professionals (i.e., scientists, R&D, product engineers, and so on) take the lead. *Democratizing Innovation* by Eric von Hippel⁵¹ is a widely cited analysis of this movement, although there is a rich literature going back to Richard Allen's exploration of "collective invention" in eighteenth century heavy industries, such as blast furnace creation and steam-powered water pumps.⁵² This literature recognizes that innovation professionals tend to produce incremental innovation at a relatively slow pace, while certain groups of advanced users (identified as "lead-users" by von Hippel) often produce more

45 H. Chesbrough, "Graceful Exits and Missed Opportunities: Xerox's Management of its Technology Spin-Off Organizations," *Business History Review* 76: 4 (Winter 2002), 803–837. <http://www.proquest.com/> (accessed 8/29/2008).

46 Richard Nelson and Sidney Winter, *An Evolutionary Theory of Economic Change* (Cambridge, MA: Harvard University Press, 1982).

47 H. Chesbrough, *Open Innovation: The New Imperative for Creating and Profiting from Technology* (Boston: Harvard Business School Press, 2003).

48 H. Chesbrough and A. K. Crowther, "Beyond High Tech: Early Adopters of Open Innovation in Other Industries," *R&D Management* 36:3 (June 2006), 229–236.

49 M. Mendoza, "Anyone Have a Good Idea?" *Design Council*, July 2008 (Issue 4), 36–41.

50 See note 48 and Thomas Kuhn, *The Structure of Scientific Revolutions* (Chicago: University of Chicago Press, 1970).

51 Eric von Hippel, *Democratizing Innovation* (Cambridge, MA: MIT Press, 2005).

52 Robert C. Allen, "Collective Invention," *Journal of Economic Behavior & Organization* 4:1 (March 1983), 1–24.

radical solutions, more quickly—solutions that address market needs more effectively than would be possible otherwise.

There are well-documented examples of this phenomenon in categories as broad as sporting equipment,⁵³ microchip design,⁵⁴ and medical equipment.⁵⁵ Charles Leadbeater calls these users “Pro-Ams” and sees a groundswell of mass innovation changing not just innovation and creative practices but economics and culture as well.⁵⁶ This area of thinking represents one of the important interfaces between academic innovation research and design studies as design also grapples with the notion that innovation (and creativity) are not necessarily the USP (unique selling proposition) of the designer.

Design and Innovation

While the definitions of innovation in innovation studies have a high degree of commonality, the way innovation is used in design is more varied and contentious. This lack of consensus is partly because of the emerging use of innovation in the design literature, but more significantly it represents a predilection of design to engage with aspects of innovation that are not easily quantifiable, are not part of national innovation surveys or the CIS, and so, despite the best of intentions, can be underrepresented in innovation studies.⁵⁷ One aspect of this difference in emphasis in “design innovation” is a closer relationship between thinking about invention and innovation. This is highlighted in Wylant’s paper, “Design Thinking and the Experience of Innovation.”⁵⁸ Here, Wylant argues that innovation is an *abstract* process for conceptual problem solving, using Downs and Mohr’s definition of innovation as “the adoption of means or ends that are new to the adopting unit”⁵⁹ to support this assertion.

This view of innovation as conceptual/creative practice (and so the province of designers) is evident in *The Art of Innovation* and *The Ten Faces of Innovation*.⁶⁰ Drawing on the experience of the design consultancy, IDEO, innovation here is not defined or explicitly addressed but instead is used as an umbrella description for creative practices, such as brainstorming, “unfocus groups,” and ethnographic approaches.

The separation of innovation from practical implementation is in tension with contemporary definitions of innovation used outside design. These include definitions in the *Oxford English Dictionary*, as well as definitions used across the general body of innovation literature; for example see Fagerberg’s *Innovation: A Guide to the Literature*.⁶¹ In innovation studies some definitions go further than just requiring practical implementation. For Lam, innovation occurs when a “new or better product or promotion proven successful is consumed or used”⁶² which makes successful consumption a condition of innovation. The literature is clear that innovation is distinct from invention in that “invention is the first occurrence of an idea for a new product or service while innovation is the first attempt to carry it out in practice.”⁶³ While the blurring of invention

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- 53 Nikolaus Franke and Frank Piller, “Key Research Issues in User Interaction with User Toolkits in a Mass Customisation System,” *International Journal of Technology Management* 26:5 (June 2003), 578–599.
- 54 See note 51.
- 55 Christian Lüthje, “Characteristics of Innovating Users in a Consumer Goods Field: An Empirical Study of Sport-Related Product Consumers,” *Technovation* 24:9 (February 2004), 683–695.
- 56 Charles Leadbeater, *We-Think: The Power of Mass Creativity* (London: Profile, 2007).
- 57 See note 11.
- 58 Barry Wylant, “Design Thinking and the Experience of Innovation,” *Design Issues* 24:2 (Spring 2008), 3–14.
- 59 George Downs and Lawrence Mohr, “Conceptual Issues in the Study of Innovation,” *Administrative Science Quarterly* 21:4 (December 1976), 700–714.
- 60 Tom Kelley and J. Littman, *The Art of Innovation: Success Through Innovation the IDEO Way* (London: HarperCollinsBusiness, 2004); Kelley and Littman, *The Ten Faces of Innovation: Ideo’s Strategies for Beating the Devil’s Advocate & Driving Creativity Throughout Your Organization* (London: Profile Business, 2008).
- 61 See note 16.
- 62 A. Lam, “Organizational Innovation” in *The Oxford Handbook of Innovation*, 115–147; also Pavitt, “Sectoral Patterns of Technical Change: Towards a Taxonomy and a Theory,” *Research Policy* 13:6 (December 1984), 343–373.
- 63 Fagerberg, “Innovation: A Guide to the Literature,” *The Oxford Handbook of Innovation*, 1–27.

and innovation is anomalous when working between design and other areas of innovation research, it also points to an area of fertile research potential: much of innovation studies concentrates on the effects of innovation rather than on the act of innovation directly. As Fagerberg comments, “we know much less about how and why innovation occurs than what it leads to.”⁶⁴

The desire to cross between disciplines (common in design thinking) offers innovation a useful tool when considering the problems of path dependency. Path dependency occurs when circumstances preclude the adoption of innovations because the necessary physical, logistical, or conceptual changes present too great a barrier. This path dependency becomes an issue particularly when systems of innovation become interrelated or heavily specialized, when infrastructure costs are very high, or even when working practices are long established and when people are resistant to change.

As firms become less self-sufficient, either through open innovation processes or conventional organizational development, the firm is increasingly seen as part of a system or community, and path dependency becomes more likely.⁶⁵ This is recognized by the Oslo Manual with the inclusion of new sections that look at innovation management and networking and also with the specific introduction of a measure for organizational innovation. Path dependency is increasingly being seen as a limiting factor for innovating companies; as Leonard-Barton says, “Yesterday’s core competencies are today’s core rigidities.”⁶⁶

In essence the rigidity described by Leonard-Barton is why “innovation occurs at the boundaries between mindsets, not within the provincial territory of one knowledge base,”⁶⁷ innovation tends to happen at the boundaries where path dependency is less established and restrictive. *Innovation Nation* recognizes that the ability to jump between assumptions, practices, paradigms, or established practices is essential for continuing, non-incremental innovation. Reliance on routine and on established patterns of working forms an important component of path dependency. Design theorists such as Lawson,⁶⁸ backed by cognitive psychologists such as Goel,⁶⁹ argue that design thinking is distinctly different from other sorts of thinking and that designers, through the use of drawing as a cognitive tool, are uniquely placed to avoid conceptual path dependency. In Lawson’s terms, designers have a significantly greater perceptual span because of their use of visualization techniques, contrasting the degree of innovation seen in architecture (which has a greater perceptual span through drawing) and in blacksmithing (which has a smaller perceptual span through direct construction). More directly one could use Barnes Wallace’s description of his approach—“I knew nothing except how to think, how to grapple with a problem and then go on grappling with a problem until you had solved it”⁷⁰—thus adopting problem solving as the only core skill and as a method of helping to avoid path dependency. The tension here is that successful

64 Ibid.

65 Pavitt, “Innovation Processes,” in *The Oxford Handbook of Innovation*, 86–114.

66 Dorothy Leonard-Barton, *Wellsprings of Knowledge: Building and Sustaining the Sources of Innovation* (Boston: Harvard Business School Press, 1995).

67 See note 43.

68 Bryan Lawson, *What Designers Know*, (London: Architectural Press, 2004).

69 Vinod Goel, *Sketches of Thought* (Cambridge, MA: MIT Press, 1995).

70 Bryan Lawson, *How Designers Think: The Design Process Demystified* (London: Architectural Press, 1997).

innovation requires this openness to be adopted, not just by the lone inventor, but by manufacturers, financiers, marketers, technologists, and the myriad of other contributors to successful innovation, and that they work in harmony with each other.

There are other dimensions of interface between innovation and design worthy of note, including that in Rick Poynor's polemic article, "Down with Innovation: Today's Business Buzzwords Reflect a Bad Attitude About Design."⁷¹ This article attacks innovation as a term developed by business to take design away from designers. Poynor's position highlights the tensions in the design profession generally about the standing (and even durability) of the design profession, the (self-) perception of the designer as the pre-eminent creative wellspring in industry, and the relationship of design to wider society.

Design and innovation also interact through aesthetics and semantics. Utterback et al., in "Design-Inspired Innovation," offer the most direct example of this interaction when they say, "Are we perhaps closing the circle, coming back to simple, straightforward beauty as an overarching principle [of innovation] for products and services, and demoting technology as something hidden in and relegated to their deeper recesses?"⁷² They go on to propose a "radical innovation of meaning."⁷³ These sentiments are also present in Poynor⁷⁴ and Wylant.⁷⁵ The proposition of a return to simplicity and beauty (in Poynor's case, to being suitable to be displayed in a museum in the future) is difficult to relate to wider movements in design research.

Research Needs

The clear picture here, with regard both to innovation and to innovation and design, is that there *is* no clear picture and that the relationships involved are emerging and chaotic, and although the bodies of knowledge are highly overlapping, there is limited dialogue. To address this situation, some key areas deserve concentrated research attention. The most important of these are:

The role of design thinking and an exploration of the appropriateness and effectiveness of using design thinking approaches in other disciplines, particularly with the aim of collaborating across disciplines to avoid unnecessarily limiting path dependencies.

The importance of semantics and aesthetics to design innovation and wider innovation practices. To an extent, this is reflected in the new category of marketing innovation in the Oslo Manual, allowing new modes of or approaches to communication to be recognized as being innovative.

The relationships between the two differing positions on design—the one in which a concentration on semantics sees design in terms of decoration, versus the one (paralleled in wider innovation thinking) that sees design with

71 See note 12.

72 See note 18.

73 See note 18.

74 See note 12.

75 See note 58.

76 For example, see Richard Buchanan, "Design Research and the New Learning," *Design Issues* 17:4 (Autumn 2001), 3–23; Wolfgang Jonas, "A Scenario for Design," *Design Issues* 17:2 (Spring 2001), 64–80; Ezio Manzini and François Jégou, *Sustainable Everyday: Scenarios of Urban Life* (Milan: Edizioni Ambiente 2002); and John Thackara, *In the Bubble: Designing in a Complex World* (Cambridge, MA: MIT Press, 2005).

a more systematic, networked understanding, personified by service design.⁷⁶ This fluid area of investigation urgently requires more research into the relationships between these two positions.

The changing role of the “innovation professional,” (and, within this category, of design) in light of the emergence of open innovation and, especially, of democratized innovation practices and the developing role of the citizen innovator. Within this shifting economic and creative landscape, design as a discipline has to adapt and, as part of this adaptation, accept that design is not the “gatekeeper” of innovation. Rather, it is one component in a larger network of innovation. Similarly, innovation researchers must come to recognize the position of design in innovation networks (something that is seldom acknowledged), as well as the ways in which the multidisciplinary approaches routinely used in design thinking have applications across broad areas of innovation research and practice.

Formulating National Design Policies in the United States: Recycling the “Emperor’s New Clothes”?

Jonathan M. Woodham

The Emperor walked under his high canopy in the midst of the procession, through the streets of his capital; and all the people standing by, and those at the windows, cried out, “Oh! How beautiful are our Emperor’s new clothes! What a magnificent train there is to the mantle; and how gracefully the scarf hangs!” In short, no one would allow that he could not see these much-admired clothes; because, in doing so, he would have declared himself either a simpleton or unfit for his office. Certainly, none of the Emperor’s various suits had ever made so great an impression, as these invisible ones.

Hans Christian Andersen, *Fairy Tales Told for Children*, 1835

Introduction: Design Policy Proliferation

This article was prompted by the publication on January 5, 2009, of the American design communities’ *Redesigning America’s Future: 10 Design Policy Proposals for the United States of America’s Economic Competitiveness & Democratic Governance*.¹ It considers the extent to which self-confident, yet historically very familiar, assertions about the capacity of design to engender real change in national and international settings stand up to scrutiny. Furthermore, given the often mantra-like repetitiveness of such contentions, it also considers the possibility that their reiteration is more a reflection of an underlying desire to effect transformation than any comprehensive articulation of a series of well-researched arguments that would, in fact, be likely to bring about significant change. Indeed, if such propositions show little that is new, design historians and others with a longitudinal perspective of design activity may see them as reminiscent of the “Emperor’s new clothes,” insofar as it can be argued that “none of design’s various suits had ever made so great an impression as these invisible ones” or, if viewed more positively, their recycled equivalents.

The fact that the “American Design Council,” a title and trademark owned by the AIGA,² was envisaged as “a unified body representing all U.S. design bodies” to be “revitalized as a collective voice for the design community”³ is perhaps one of the reasons why the American design communities’ traditional, conservative,

- 1 American design communities, *Redesigning America’s Future: 10 Design Policy Proposals for the United States of America’s Economic Competitiveness & Democratic Governance*. Also see www.designpolicy.org/files/redesigningamericaredesign.pdf (accessed 1/11/2009).
- 2 Established in 1914, the AIGA was the American Institute of Graphic Art until 2006, when it controversially changed its name to AIGA “the professional association for design.”

and innocuous proposals are largely framed in twentieth-century thinking and emphasize the priorities of the design profession rather than those of society as a whole. In fact, at the original National Design Policy Summit in Washington, DC, on November 11–12, 2008, the “Ten Principles of Design’s Necessity” that were used to frame discussions were thirty-five years old, echoing down the decades from the First Federal Design Assembly of 1973. They reappeared in the January 5, 2009, report on *Redesigning America’s Future: 10 Design Policy Proposals* and again in the more action-based *Report of the U.S. National Design Policy Summit* issued on January 19, 2009. Although both 2009 documents acknowledge the significance of the environment and citizen-centered design, they lack the bite of those created by many external international design organizations that are more fully engaged with the needs of the new millennium. The key participants responsible for drafting the policy proposals at the U.S. Summit included seven representatives from design professional organizations, four representatives of design and design education accreditation bodies, and four representatives from U.S. federal agencies—a questionable cross-section for devising a design policy reflecting the aspirations of society as a whole. If they had not already been documented in their original publication for the Summit of November 2008, there would be no clear indicator that the U.S. policy proposals are in any way mediated by an in-depth knowledge of prevailing design strategies and practices elsewhere in the world.

A rash of national design policies has spread across the world in the first decade of the twenty-first century. In New Zealand the government’s Design Taskforce issued *Success by Design: A Report and Strategic Plan*⁴ (2003); the Singapore government established in the same year the DesignSingapore Council as its national agency for the promotion and development of design, and the Indian government formally adopted a radical National Design Policy in 2007. In fact, numerous countries have developed national design agendas even across the centuries, some characterized, for example, by the visual and material power of the architecture and design of the Roman Empire, the British Empire, Fascist Italy, or Third Reich Germany. Other manifestations include the establishment of the French Royal Manufactories of the Gobelins (tapestry and furniture) and of Sèvres (pottery) under Louis XIV and Louis XV respectively, the founding of an extensive national art and design school network throughout Victorian Britain, following the Parliamentary *Report from the Select Committee on Arts and Manufactures* (1835),⁵ and the proliferation of national design promotion bodies in the decades following the Second World War, including those in Britain, in Canada, in Germany, and in South Korea. More recently Taiwan, Malaysia, Indonesia, Brazil, the Czech Republic, China, Thailand, Finland, and other countries have developed their own national design agendas

3 Press release: “Designers Explore U.S. National Design Policy,” *Designer Today*, 12/1/2008.

4 *Success by Design: A Report and Strategic Plan*, (Wellington: New Zealand Design Taskforce, May 2003).

5 *Report from the Select Committee on Arts and Manufactures* (1835): together the minutes of evidence, and appendix (London: HMSO), 1835. See also the *Report from the Select Committee on Arts and their connexion [sic] with Manufacturers: with the minutes of evidence, and appendix* (London: HMSO, 1836).

and design promotional organizations. (For more complete details, see the Appendix: Selected Twentieth and Twenty-First Century National and International Design Initiatives.)

Changing Priorities, National Agendas, and Redesigning America's Future

Design priorities can shift quite radically in a comparatively short period of time, as can be seen in the contrast between the landmark Indian government-commissioned *Eames Report* (1958, also known as the *India Report*) and the 2007 Indian National Design policy. The former was constructed around possible ways of developing a modern industrial economy while respecting the sub-continent's rich heritage of handicraft traditions and "those values and qualities that Indians hold important to a good life," while the ambitions of the latter foregrounded "global positioning and branding of Indian designs and making *Designed in India* a by-word for quality and utility in conjunction with *Made in India* and *Served from India*."

Among other countries that have experienced considerable adjustments during the past half-century is Japan. Her national design policies have changed significantly, moving from the economically focused policies of the Ministry of International Trade and Industry (MITI), established in 1951, to the Japan Industrial Design Organization (JIDPO), established in 1969⁶ and the global acceptance of Japanese design as sophisticated, innovative, and exciting. A more consumer-oriented plan is seen in the 2007 *Kansei Initiative—from "Manufacturing" to "Storytelling."* "Kansei," a three-year plan, seeks to engage with everyday consumers using a sophisticated understanding of a "high-order function of the brain, including inspiration, intuition, pleasure and pain, taste, curiosity, aesthetics, emotion, sensitivity, attachment, and creativity;"⁷ from this perspective the plan seeks to build emotional ties between consumers and manufactured goods.⁸ The Japanese Ministry of Economy, Trade and Industry (METI), the successor to the Policy Office for Design at the MITI, established in 2001, was responsible for its promotion.

One country that has never had a consistent national design policy on a broad front has been the United States. The publication of the American design communities' *Redesigning America's Future: 10 Design Policy Proposals*,⁹ on January 5, 2009, is one of many American federal design promotion documents produced over a period of four decades. During the past 150 years, such documents and manifestos often have emerged around the world in moments of deep economic uncertainty. Thus, in the wake of the global financial collapse of 2008 and the final months of the George W. Bush administration, *Redesigning America's Future* takes its place as a distant relative of the British Parliamentary *Report from the Select Committee on Arts and Manufactures* (1836),¹⁰ where improved standards of design were seen as a panacea to declining export markets. Nonetheless, it is surprising that, given many of the most pressing concerns facing

6 This resulted from a proposal made by the Design Promotion Council of the Ministry of International Trade and Industry (MITI).

7 "KANSEI" Initiative—*Suggestion of the fourth value axis* (Ministry of Economy, Trade, and Industry, Japan, May 2007).

8 For a fuller discussion of such ideas, see Jonathan Chapman, *Emotionally Durable Design: Objects, Experiences, and Empathy*, (London: Earthscan, 2005).

9 American design communities, *Redesigning America's Future: 10 Design Policy Proposals for the United States of America's Economic Competitiveness & Democratic Governance*, 2009.

10 *Report from the Select Committee on Arts and Manufactures: together the minutes of evidence, and appendix* (London: HMSO, 1835). See also the *Report from the Select Committee on Arts and their connexion [sic] with Manufacturers: with the minutes of evidence, and appendix* (London: HMSO, 1836). There was growing concern in the years following the defeat of the French at the Battle of Waterloo in 1815 that although Britain had held a prominent position in terms of its ability to mass-produce a wide variety of goods, it did not compete in terms of design quality or aesthetic appeal. The parliamentary inquiries resulted in the implementation of a national art and design education system, as indicated.

the world today and despite the American design communities' advocacy of setting a target of 2030 for carbon-neutral buildings (in the third of its ten proposals), the word "sustainability" is mentioned only twice in the text, while use of the term "climate" is relegated to a single appearance in the endnotes.¹¹ In this respect the document follows the pattern of the rather more sophisticated *Good Design Plan: National design strategy and Design Council delivery plan 2008–11*,¹² a 2008 British plan. Sir Michael Bichard, Chair of the Design Council (2008–), maintains in his foreword that:

Solutions frequently seem elusive or at odds with each other. For example, addressing the business challenges of intensified global competition must be reconciled with pressure on natural resources and the threat of climate change. Equally, the universal provision of essential services, such as healthcare, must take account of an aging population, rising levels of chronic disease, and limited resources.

However, such apparent radicalism flattered to deceive when it came to the detailed delivery plan itself: "Climate," "natural resources," and "aging" were never mentioned again, and "healthcare" only twice.

An earlier report published by the UK Treasury and to which significant reference is made in *Redesigning America's Future* is the 2005 *Cox Review of Creativity in Business: Building on the UK's Strengths*.¹³ In it Sir George Cox (Sir Michael Bichard's immediate predecessor as Design Council Chair) wrote of the emergence of the economies of the BRIC countries (Brazil, Russia, India, and China) and their significant rates of production increase, drawing attention to the heightened importance of investing in design as a means of being able to compete in the perceived economic new world order three decades hence. In 2009, only four years after the Cox Review, these BRIC countries already account for more than thirty-five percent of the world's economic growth and have been investing heavily in design programs of their own. As mentioned earlier, the Indian government had confirmed its ambitious national design policy in 2007, with an increase in the number of trained designers by 5,000–6,000 per annum as an essential platform for the future. Meanwhile, China plans to develop its creative industries by twenty percent per year, making a huge investment in design education, which is represented by more than 400 design schools.

It was in this context of international activity that the somewhat self-enclosed and self-referential American design communities' *Redesigning America's Future* (2009) was published.

The NEA and the Federal Design Improvement Program: Through the Years¹⁴

As has been indicated already, the 2008–2009 Federal Design initiatives had a considerable period of germination. In the early 1970s

11 However, in the *Report of the U.S. National Design Policy Summit, January 19, 2009*, global and environmental considerations were given greater consideration.

12 Design Council, *The Good Design Plan: National Design Strategy and Design Council Delivery Plan 2008–11* (London: Design Council, 2008).

13 *Cox Review of Creativity in Business: Building on the UK's Strengths* (London: HMSO, 2005).

14 For a concise history of early NEA initiatives for Federal Design Improvement, see "Setting the Standard: The NEA Initiates the Federal Design Improvement Program," *Highlights in NEA History* at <http://www.nea.gov/about/40th/archive.html>.

15 National Endowment for the Arts, *First Federal Design Assembly Report*, (Cambridge, MA: MIT Press, 1978).

16 The Assembly cost approximately \$100,000 to stage, including the accompanying book, film, and exhibition.

- 17 Ralph Caplan et al., *The Design Necessity: A Casebook of Federally Initiated Projects*, (Cambridge, MA: The MIT Press, 1973); Guest editors Lois Craig, John Massey, Harry Weese et al., "Design and Architecture for the Federal Government," *Design Quarterly* Special Edition 94/95 (1976); Mildred S. Friedman, *Federal Regional Design Assembly, Western States*, (Walker Art Center, Minneapolis, c.1975); and National Endowment for the Arts, *Federal Design Matters: An Exchange of Information and Ideas Related to Federal Design*, Issue 15 (August 1978) featuring guidelines for rating and hiring designers. This was discussed the following month at the Federal Design Assembly's Washington meeting on the theme of "The Agency Team."
- 18 Philip B. Meggs and Alston W. Purvis, *Meggs' History of Graphic Design*, 4th ed. (New Jersey: John Wiley, 2005). 412–14.
- 19 Resulting from Ad Hoc Committee's recommendations to President Kennedy on Federal Office Space in Washington, DC.
- 20 Lois A. Craig, *The Federal Presence: Architecture, Politics and Symbols in United States Government Buildings* (Cambridge, MA: MIT Press, 1978). However, after 1977 the Federal Architecture Project was officially inactive.
- 21 The British Council of Industrial Design (COID) had established a design *Stock List* in the late 1940s in the lead-up to the Festival of Britain of 1951. Providing exemplars of well-designed products, it became the Design Index, located in the Council's central London Design Centre. Here, interested parties could consult photographic exemplars of approved "good design" that also contained contact details of the manufacturer, designer, and retailers. In the United States in 1944, the Walker Art Gallery established the Everyday Art Gallery for the exhibition of design, curated by Hilde Reiss, and launched *Everyday Art Quarterly*, the first American journal on design, in 1946 (becoming *Design Quarterly* in 1954).
- 22 *A Proposal for a White House Council on Design: A Strategy to Harness the Power of Design* (National Endowment for the Arts Design Program, June 1994).

the National Endowment for the Arts (NEA), established in 1965, had responded to Richard Nixon's 1971 call to the heads of federal departments and agencies to consider possible ways that the arts might have a role to play in their operation. The following year a Federal Design Improvement Program was instituted, aided by the sponsorship of the Federal Council on the Arts and the Humanities and leading to a series of annual design assemblies charged with brokering relationships between federal agencies and designers. The first of these assemblies was held in Washington, DC, in April 1973.¹⁵ More than a thousand designers and federal officials attended the opening of this two-day inaugural Federal Design Assembly (FDA);¹⁶ a more modest 300 attended the second day's workshop sessions on architecture and planning, and on graphic, interior, and industrial design. Further FDAs were held in 1974, 1975, and 1978 and were marked by a series of publications.¹⁷

One prominent and visible outcome of the Federal Design Improvement initiative was the Federal Graphics Improvement program, which ran from 1972 to 1981 and brought together prominent graphic designers and more than forty-five government agencies (e.g., NASA and the U.S. Postal Service) for a review and overhaul of their graphic design policies. In his brief coverage of this program, graphic design historian Philip Meggs¹⁸ also drew attention to John Massey's prototype federal graphic standard system for the Department of Labor, laid out in the Department's graphic standards manual in 1974. In addition, Vignelli Associates' Unigrad system was developed for the United States National Park Service in 1977, in collaboration with the Park Service Division of Publications, headed by Vincent Gleason. High on the Federal Design Improvement agenda was the Federal Architecture Project, led by the Task Force on Federal Architecture. It also reviewed and developed further a much earlier 1962 report titled *Guiding Principles for Federal Architecture*¹⁹ and put together *The Federal Presence*,²⁰ a key work on contemporary federal architecture. Also seen as essential to the development of a more effective relationship between federal agencies and the design world was the formulation of a set of guidelines to help commissioning bodies use appropriate design expertise.²¹ Such ideas were moved forward with the establishment of an advisory panel, culminating in the General Services Administration's Design Excellence program for federal architecture.

However, between 1981 and 1993 federal design initiatives of consequence were constrained by the politics of Presidents Ronald Reagan and George H. W. Bush and their commitment to the cutting of government expenditure. With the election of Bill Clinton in the 1992 presidential race, the time once more seemed propitious to float the possibility of a federal design program.

Further Developments in the USA: A Proposal for a White House Council on Design, NEA Design Program, June 1994²²

- 23 Ibid., 1.
- 24 Ibid, Appendix A, 8–10.
- 25 He had also been President of the International Council of the Societies of Industrial Design (ICSID) from 1985 to 1987, had been knighted by Queen Beatrix of the Netherlands in 1991 for his services to design, founded Blaich Associates in 1992, and had written *Product Design and Corporate Strategy: Managing the Connection for Competitive Advantage* (New York: McGraw-Hill, 1993).
- 26 Some of these speeches were published in a special issue on design and national policy of the *Design Management Journal* 4:3 (1993): 3–77.
- 27 Established under the Government's Board of Trade in 1944.
- 28 Founded in 1978 (rather than 1987, as stated in the 1994 *Proposal*) and linked to the Danish Design Council. On May 20, 2008, the DDC merged with Danish organization INDEX: Design to Improve Life (<http://www.indexaward.dk/>), with its design themes of Body, Home, Work, Play, and Community.
- 29 A quasi-governmental organization, IdcN was founded in April 1992. It opened its new offices in Sakae, Nagoya in 1996.
- 30 BCD was legally established as a private not-for-profit foundation in 1973, a design promotion and information center concerned with a wide application of design in business.
- 31 Taiwan Design Promotion Center established under the Taiwan External Trade Development Council. In 2004 it was reorganized and expanded, becoming the national Taiwan Design Center (TDC); by 2007 it had three overseas branches: in Dusseldorf, San Francisco, and Tokyo.
- 32 In Appendix B, *A Proposal for a White House Council on Design* (1994), loc. cit., 11.
- 33 loc. cit.

In June 1993 the NEA Design Program returned to its cyclically repetitive urge to campaign for the establishment of a national Design Council, arguing that the “design of products, communications, and environments is a strategic national resource whose full potential has yet to be realized.”²³ Possible approaches and potential benefits were considered at a three-day conference/workshop sponsored by the NEA Design Program and held at the American Institute of Architects in Washington, DC.²⁴ Robert Blaich, Senior Managing Director at Philips Electronics until 1992 and Design Consultant to the Taiwan Government,²⁵ opened the conference with an address titled “An Overview of Existing Design Councils;” afterward, the directors of a number of overseas national design organizations and institutions offered formal presentations.²⁶ Presenters included Ivor Owen, Director-General of the British Design Council;²⁷ Jens Bernsen of the Danish Design Centre (DDC);²⁸ Kazuo Kimura of the International Design Center NAGOYA (IdcN);²⁹ Mai Felip of the Barcelona Design Center (BDC);³⁰ and Paul Cheng of the Taiwan Design Promotion Centre.³¹ At the conference it was suggested³² that there were more than 100 design councils around the world, no doubt to strengthen the argument for the pro-Federal Design Council lobbyists; in reality, a number of these councils were relatively small and lacking weight, authority, and influence. On the second day, the event concentrated on moving the agenda forward by dividing the participants into four discussion groups. They were asked to consider a number of possible initiatives: the outline development of an American design council and office of federal design quality; the key elements of such an organization’s mission, structure, initiatives, and funding; and a strategic development plan. Each group had to report back in plenary sessions that were held at the end of the day and on the morning of the third day. These sessions were led by Arnold Wasserman, Senior Fellow for Design Strategy at IDEO; Donald Rorke, President at Steuben Glass; Katherine McCoy, co-chair of the Design Department at the Cranbrook Academy of Art; and Tom Hardy, an independent design strategist and former Corporate Manager of the IBM Design Program. After a final open discussion, closing remarks were led by Alan Brangman, Acting Director of the NEA’s Design Arts Program.

The primary outcomes of the Washington, DC meeting were presented at the 1993 International Design Conference at Aspen and were followed up with a series of discussions between the NEA’s Design Arts Program staff and representatives of government, business, education, and the design professions. In March 1994 the Chairs of the four Washington discussion groups met to consider the best way to implement a national design policy, resulting in the publication of *A Proposal for a White House Council on Design*³³ in June 1994. This document was circulated in September to a wide spectrum of potentially interested parties by Thomas R. Grooms, Program Manager for Federal Design Improvement at the NEA.

Unfortunately, this was not as propitious a time for the NEA, or indeed any federal design initiative, as might have been originally envisaged following Democrat Bill Clinton's election as President. When the Republicans took control of Congress in the mid-term elections in 1994³⁴ and then leaders in the House of Representative and conservatives agreed that NEA's budget would be reduced in both 1996 and 1997,³⁵ the likelihood that any proposed White House Design Council would be established became slim.

Even though unrealized, the 1994 *Proposal for a White House Council on Design* embraced an enlightened set of premises. As with almost every national design initiative in history, it included the ever-present and inevitable economic rationale for the place of design in a globally competitive market place; however, from an environmental perspective, design was also seen as "an essential element in providing a clean, safe, and sustainable environment...as well as offering strategies for the long-term use of natural resources, land, and infrastructure."³⁶ In addition, education and society were also seen as important. In fact, design was envisaged as a mechanism for opening the way "for a democratic and economic system that is truly inclusive," achieved "by making products, communications, and environments universally accessible."³⁷

34 Republicans actively sought to publicize past grants to the NEA that they saw as offensive, including the grant to the Institute of Contemporary Art for the *Robert Mapplethorpe: The Perfect Moment* show, curated by Janet Kardon in 1988, seen as undermining "family values."

35 Although in fact it leveled out in 1997.

36 *A Proposal for a White House Council on Design* (1994), loc. cit., 1.

37 Ibid.

38 *Establishing the Basis for the Elaboration and Application of the Estonian Design Policy Measures* (The Danish Business Sector Programme for Eastern Europe and the Estonian Ministry of Economy, 2003); *Forming the Strategic and Operational Basis of Intensified Use of Professional Design Measures in Latvian Enterprises* (The Danish Business Sector Programme for Eastern Europe and the Latvian Ministry of Economy, 2004).

39 Much has been written about Sir George Cox. Prior to becoming Chair of the Design Council, he was Director General of the Institute of Directors between 1999 and 2004, with a background in information technology.

40 *Cox Review of Creativity in Business: Building on the UK's Strengths* (London: HMSO, 2005).

Changing Landscapes for National, International, and Professional Organizational Design Agendas

Before discussing further the federal design initiatives that have recently been undertaken in the United States, we first put it in a broader context by considering the wider contemporary global panorama of design thinking, planning, and organization. (For an overview, see the Appendix, *Selected Twentieth and Twenty-First Century National and International Design Initiatives*.)

There were many significant developments early in the new millennium, including the establishment of the Korean and Hong Kong Design Centers in 2001 and the Thailand Creative and Design Center in the following year. In addition, the Argentinian Plan Nacional de Diseño de la Secretaria de Industria y Comercio was launched in 2002, the Third 5-Year Design Plan (2003–7) was initiated in South Korea, and in 2003 the Design Taskforce/New Zealand Government's *Report and Strategic Plan* was published (to which further reference will be made). Indeed, the extent to which design had become almost a sine qua non for future economic planning was further evidenced in national design policy reports prepared for Estonia and Latvia by the Danish Business Sector Programme for Eastern Europe, in collaboration with the Estonian and Latvian Ministries of Economy in 2003 and 2004.³⁸ Important, too, insofar as it was widely referred to in discussions of national and international design promotional policies in and beyond the UK, was the 2005 *Cox*³⁹ *Review of Creativity in Business*,⁴⁰ which had been commissioned by Gordon Brown, the UK's Chancellor of the Exchequer at the time

of the 2005 Budget. As has been indicated, among many subsequent citations, the Cox Review was also evidenced in the formulation of the sixth of the ten proposals in *Redesigning America's Future: 10 Design Policy Proposals*.⁴¹ This sixth proposal sought to “commission a report to measure and document design’s contribution to the U.S. economy... similar to the United Kingdom’s Cox Review.”

The Cox Review had been researched in parallel to the British Department of Trade and Industry’s investigations into *Creativity, Design and Business Performance*,⁴² also commissioned by Chancellor Brown. Both were generated in response to the view that the “UK’s underlying creative strength and body of design expertise are now seen as a possibly under-utilized source of competitive advantage.”⁴³ As intimated earlier, it had been clear for some time that the UK needed to respond to the pressures of global competition, in particular the emerging BRIC economies in Brazil, Russia, India, and China, which were in the process of changing from low-value, labor-intensive industries to becoming high-technology and high-skilled competitors. Despite reference to the phenomenal growth of the Indian software industry and the country’s increasing prominence as a center for research, the speed of change perhaps accelerated more swiftly than Cox might have envisaged, as the ambitious National Design Policy in India was launched in 2007⁴⁴ and as design developments emerged from the Programa Brasileiro do Design (PBD, Brazilian Design Program), established by the Brazilian government in 1995, and that also embraced the *Programa Imagem do Brasil no Exterior* (Brazil’s Image Abroad Program). The Chinese design agenda was also rapidly developing.

John Thackara, the first Director of the Netherlands Design Institute and co-founder and Director of the design futures network, Doors of Perception (with offices in Amsterdam and Bangalore), commented that the Cox Review had referred to:

“a window of opportunity—perhaps five or ten years—while the new economies develop the kinds of creative skills necessary to compete across the board.” I [Thackara] don’t think those years exist. Pretty much the same words greeted me when I joined the Hong Kong Design Task Force in 2001: we had “ten years to move the Hong Kong design industry up the value chain,” we were told. A single visit to the Pearl River Delta [a major manufacturing centre and leading economic region in China] and an encounter with a room full of PhDs developing acoustic software for Bose, persuaded us that the gap in capability between Hong Kong and the mainland was nearer two years than ten.⁴⁵

For his 2005 review Cox had engaged John Heskett,⁴⁶ who had been appointed as Chair Professor in the School of Design at Hong Kong Polytechnic University in 2004, to undertake a study involving China, Korea, Singapore, and Taiwan. In this study, parallels were

41 Dori Tunstall, *Redesigning America's Future: 10 Design Policy Proposals for the United States of America's Economic Competitiveness & Democratic Governance*, (The American Design Communities, 2009).

42 DTI, Economics Paper No. 15, *Creativity, Design and Business Performance* (London: HMSO, 2005).

43 *Ibid.*, iv.

44 Sulfikar Amir in his article, “Rethinking Design Policy in the Third World.” *Design Issues* 20:4 (Autumn 2004), drew attention on p.71 to the ways in which design policy had an increasingly significant role for governments in emerging economies, including those of Malaysia, Indonesia, the Philippines, Thailand, India, Colombia, Cuba, Mexico, Brazil, and South Africa.

45 John Thackara, “Creativity in Business,” Doors of Perception Archives, December 8, 2005.

46 Best known in Britain as a design historian, Heskett had previously been a professor at the Institute of Design, Illinois Institute of Technology in Chicago for 15 years.

drawn between later twentieth and early twenty-first century developments in Taiwan and South Korea and those of the late nineteenth century in the United States and Germany or, in the decades following the Second World War, in Japan. Cox also referred to the challenges facing the UK in 2005 as analogous to those being experienced by Western Europe and North America. Attention was also drawn to the long-term Finnish design vision in the late twentieth century, underpinned as it was by close collaboration of government and industry, and a deep commitment to R&D and innovation. However, the Cox Review rather underplayed the extent to which, in the years leading up to the publication in June 2001 of the Finnish *Design 2005!* policy paper, there had for a number of years been a strong sense of awareness that Finnish design policies “should be seen in parallel with agendas in Taiwan, South Korea, Brazil, Canada, and, closer to home, those of Denmark, Norway, and Sweden.”⁴⁷ Closer to home, only one year after the publication of the Cox Review, Paul Simpson wrote in the Winter 2006 Issue of the British *Design Council Magazine* that:

the BRIC countries, a term coined by investment bank Goldman Sachs in 2001, are merely the most obvious threat. Just behind BRIC comes TVT—Thailand, Vietnam and Turkey—who have a combined population of 230 million, a collective GDP of £305bn, and are enjoying the kind of economic growth that must have the US Treasury secretary John W. Snow turning the colour of his national currency⁴⁸

The solutions that Cox proposed for the UK centered on “creativity,” “design,” and “innovation” as strategic tools for improved business performance and economic development. They were, in essence, ideas that had been recurring across the years.⁴⁹ Eight years previously, in his foreword to the Design Council’s promotional pamphlet, *Millennium Products* (1997), British Prime Minister Blair had presaged Cox’s three major strategic tools, writing that:

I believe it is time to show a fresh face to the world and reshape Britain as one of the twenty-first century’s most forward thinking and modern nations. We must demonstrate that Britain can lead the world by creating products and services that exemplify our strengths in innovation, creativity in design.⁵⁰

These words, “innovation,” “creativity,” and “design,” were widely used in design policy formulation and aspirations around the world. In New Zealand, for example, the country’s Minister for Industry & Regional Development, in his foreword to the New Zealand Design Taskforce’s *Success by Design: A Report and Strategic Plan* (2003), wrote that:

The [New Zealand] Government recognises that innovation, imagination, and creativity will be the driving forces

47 Pekka Korvenmaa, “Rhetoric and Action: Design Policies in Finland at the Beginning of the Third Millennium,” *Scandinavian Journal of Design History* 11 (2001): 7. This gives a clear and detailed account of the problems facing the Finnish economy in the later years of the twentieth century and shows how close collaboration between government, industry, research funding bodies, and education resulted in a national design blueprint.

48 Paul Simpson, on “How far can they go?” in “Global Warning: Are Emerging Economies a Real Threat?” *Design Council Magazine* 1 (Winter 2008), <http://www.designcouncil.org.uk/en/Design-Council/3/Design-Council-Magazine/Design-Council-Magazine-Issue-1/Global-warning>.

49 These ideas are discussed in some detail in Jonathan M. Woodham, “Design and the State: Post-war Horizons and Pre-millennial Aspirations”, *Utility Reassessed; The Role of Ethics in the Practice of Design*, Judy Attfield, ed. (Manchester: Manchester University Press 1999) 244–260.

50 *Millennium Products* (London: Design Council, 1997).

to get New Zealand back into the top half of the OECD in terms of per capita income.⁵¹

Gordon Brown, who had taken over as British Prime Minister from Tony Blair in 2007, was also to add his support for what was fast becoming seen as a global economic panacea when he echoed his predecessor's words on *Millennium Products* (1997) in his own foreword to *Creative Britain: New Talents for the New Economy* (2008),⁵² in which he wrote:

And today, the force of British creativity is renowned throughout the world. People across the globe are inspired by the sheer diversity of our creative talent and the consistency with which that talent takes the arts in new and exciting directions. They recognise Britain as a hub of creative endeavour, innovation and excellence, and they are drawn to the strength of our creative economy.⁵³

Despite Cox's considered articulation of the economic significance of design and creativity in the highly competitive global marketplace, blended with greater awareness of the ways in which the world map of design innovation was being radically redrawn in the late twentieth and early twenty-first centuries, his underlying design rhetoric is nonetheless one that has periodically recurred over many years, particularly at moments of economic uncertainty. It was suggested in the *Design Council Review for 2004/5: Futureproofed*,⁵⁴ published five months before the Cox Review, that:

To understand the role of design in Britain's future we must first look at the past. It's hardly new. The potential of design to help secure our future has been recognised for at least 150 years. Select Committees of the 1830s and 40s, a Royal Commission on Design in the 1880s, initiatives during and immediately after two world wars and moves by the Thatcher government all sought to strengthen British business with a liberal coating of 'design'.

Although the anonymous author went on to claim that "it worked,"⁵⁵ such a view was immediately qualified by the remark that "while undeniably creative, its application was haphazard."

Much of the efficacy of the Cox Review depended on certain assumptions about the real significance of the creative industries, the promotion of which had been in line with the idea of a knowledge economy,⁵⁶ a concept widely adopted in the previous decade. The endorsement of the creative and cultural industries as an economic tool had originally emerged as a means of countering the widespread notion that the arts were a drain on public finances, parallel to the mid-1990s NEA debates in the United States, already mentioned. James Heartfield, a firm critic of the ways in which the creative and cultural industries were promoted as an economic panacea, and

51 Jim Anderton, *Success by Design: A Report and Strategic Plan* (Wellington: New Zealand Design Taskforce, May 2003), 2.

52 DCMS/BERR/DIUS, *Creative Britain: New Talents for the New Economy*, 2008.

53 *Ibid.*, 1.

54 *Design Council Review 2004/5: Futureproofed* (London: Design Council, 2005). "Futureproof" was a term first used in the early 1980s in relation to computing technologies but by the late 1990s was becoming more widely used.

55 *Ibid.*, 10.

56 DTI, *Economics of the Knowledge-Driven Economy* (Conference Proceedings, Department of Trade and Industry, 1999). The popularizing origins of the idea of a "knowledge economy" may be traced to the concept of the "knowledge worker" in Peter Drucker's *The Effective Executive* (1966).

author of *The Creativity Gap* (2005)⁵⁷ and *Great Expectations: the Creative Industries in the New Economy* (2000),⁵⁸ has suggested that:

Much of the research into the profits and employment in the creative industries cited by the task force was started at the Arts Council, drawn up as ammunition against cuts.⁵⁹

In 1997 Chris Smith, Secretary of State at the UK's Department of Culture, Media and Sport (DCMS), had established the Creative Industries Task Force.⁶⁰ In tune with the ethos of change epitomized by New Labour's landslide victory in the 1997 general election, the Design Council commissioned a report from independent think-tank Demos. Titled *Britain™ Renewing Our Identity*,⁶¹ its author, Mark Leonard, invested considerable energy in seeking to demonstrate the economic value of creative and cultural industries. This was promoted through publication of such documents as the *Creative Industries Mapping Document* (1998),⁶² *Creative Britain: A Design Council Report on Behalf of the Prime Minister* (1998),⁶³ the *Creative Industries Mapping Document* (2001),⁶⁴ and their many successors. Furthermore, shortly before the publication of the Cox Review in late 2005, the Minister for Culture, James Parnell, had launched the British government's Creative Economy Programme (CEP) and went on later to commission a report from the Work Foundation, titled *Staying Ahead: the economic performance of the UK's creative industries* (2007).⁶⁵ The DCMS, in conjunction with the Department for the Business, Enterprise and Regulatory Reform (BERR) and the Department of Innovations, Universities and Skills (DIUS) also responded with its own publication, *Creative Britain: New Talents for the New Economy* (2008),⁶⁶ with its 26 commitments to support the creative industries.

Global Design Debates

In 2003 two of the three major international professional design organizations, the International Council of Societies of Industrial Design (ICSID) and the International Council of Graphic Design Associations (ICOGRADA), had established the International Design Alliance (IDA)⁶⁷ to bring "the benefits of design to world bodies, governments, business, and society" and "working together for a world that is balanced, inclusive, and sustainable." Between them they had more than 300 member organizations in more than 70 countries, representing more than 300,000 designers worldwide and with affiliations to a number of international organizations, such as UNESCO and UNIDO. However, like their national counterparts, these international design, professional, organizational, and promotional bodies also developed a heady and effusive rhetoric about the power of design to change the world in terms of economic prosperity and social, cultural, and environmental well-being. In this context, whether envisaged as a concept, a process, or something to be experienced or consumed, "design" may be seen to have become some-

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- 57 James Heartfield, *The Creativity Gap* (London: Blueprint, 2005).
- 58 James Heartfield, *Great Expectations: the Creative industries in the New Economy* (London: Design Agenda, 2000).
- 59 "Smith's task force for a spot of creative accounting," *The Guardian*, 3/8/1999.
- 60 For a fuller discussion of the shift in emphasis of design outlook and British identity encountered in the late 1990s under the Labour Government, see Jonathan M. Woodham, "Design and the State: Post-war Horizons and Pre-millennial Aspirations", *Utility Reassessed; The Role of Ethics in the Practice of Design*, Judy Attfield, ed. (Manchester: Manchester University Press 1999), 245–260.
- 61 Mark Leonard, *Britain™ Renewing Our Identity* (London: Demos/Design Council, 1997).
- 62 DCMS, *Creative Industries Mapping Document* (1998).
- 63 Design Council, *Creative Britain: A Design Council Report on Behalf of the Prime Minister* (1998).
- 64 DCMS, *Creative Industries Mapping Document* (2001).
- 65 Work Foundation/NESTA, *Staying Ahead: The Economic Performance of the UK's Creative Industries*, 2007.
- 66 DCMS/BERR/DIUS, *Creative Britain: New Talents for the New Economy*, 2008.
- 67 The International Council of Societies of Industrial Design (ICSID) and the International Council of Graphic Design Associations (ICOGRADA) had been founded in London, in 1957 and 1963 respectively. They were joined in the IDA by the third major international design body, the International Federation of Interior Architects/Designers (IFI) in 2008. IFI had been established in Denmark in 1963 and now has seventy member associations in forty-five countries, representing more than 65,000 designers.

thing of a seductive global brand, possessing a univalent face to be marketed like the products of multinational corporations in what is still a pluralistic world. Furthermore, since the national design activity of many countries is directed toward the global marketplace, the extent to which the globalizing initiatives of international design organizations respect national difference is becoming an increasingly significant issue.⁶⁸ Perhaps a belated effort, in light of the design and art historical discourse over a number of years, was the establishment of the IDA's Indigo initiative in 2007, following a pilot project at Monash University, Melbourne. Indigo seeks "to understand what makes design distinctive to its home and the connections to the place where it is made and for whom it is made." How effective and concrete this initiative will become is yet to be seen; little of it is visible as of yet.

One early tangible outcome of the IDA's global ambitions was the World Design Capital initiative: in September 2005 ICSID announced that Turin would become the inaugural World Design Capital 2008.⁶⁹ To be granted such status, the city had to demonstrate that government, industry, educational institutions, designers, and the inhabitants of the city could work both individually and collectively in the pursuit of the beneficial exploration and utilization of design, in ways that were sustainable and visible and enhanced the quality of life for its inhabitants.

As part of the calendar of design events associated with its standing as World City of Design, the Turin organizing committee mounted an international conference⁷⁰ on the theme of *Shaping the Global Design Agenda* in early November 2008.⁷¹ It involved speakers from 16 countries, including China, Finland, Germany, Japan, Italy, and the UK, with about half of the 200 delegates coming from overseas. It was also linked to a week-long International *Design Casa (Design Home)* exhibition mounted in various locations around the center of Turin, where visitors could compare Torinese-Italian design culture with that of other cities and countries: Austria, Belgium, Central and Eastern Europe, France, Japan, Norway, the Netherlands, Seoul, Singapore, and Spain. These "Design Homes" presented national and civic design contexts, design promotion policies, and future design agendas.

Michael Thompson, President of the Bureau of European Design Associations (BEDA)⁷² and *Shaping the Global Design Agenda* conference coordinator, commented that:

The need to develop national design policies as soon as possible is becoming an urgent requirement felt all around the world, from Qatar to Costa Rica, from New Zealand to the Far East. Torino, on the strength of its title as the first World Design Capital, created in these two days of debate the conditions for international dialogue. The hope is that work begins immediately together to ensure that design, underpinned at the institutional level, will become more

68 This has been of increasing concern to design historians, marked by the 1st ICDHDS colloquium in Barcelona in 1999 on "Historiar desde la Periferia: Historia e historias del Diseño/Design History Seen from Abroad: History and Histories of Design." I have followed this up in Jonathan M. Woodham, "Local, National and Global: Redrawing the Design Historical Map," *Journal of Design History* 15:3 (2005), and, more recently, in a keynote on "Design Peripheries, Hidden Histories and the Cartography of Design," at the International Conference for Design History and Design Studies, Osaka, Japan, in 2008. A recent specific case study I authored was "Post-1945 Industrial Design Perspectives—Slovenia and Iskra in a Changing World" in Barbara Predan and Cvetka Poža, *Iskra: Non-Aligned Design 1946–1990*, Architecture Museum Ljubljana/Peckinpah Association, 2009.

69 <http://www.torinoworlddesigncapital.it/portale/>. Accessed 12/16/09.

70 A three-page report/ on the conference, "The challenge of the development of national design policies starts from Torino," was issued on 11/10/2008, by the Turin 2008 World Design Capital, outlining the highlights and reporting on the handover to Seoul, designated World Capital of Design for 2010.

71 <http://www.torinoworlddesigncapital.it/portale/>. Accessed 12/16/09.

72 Founded in 1969, BEDA has 22 national members.

and more a strategic asset in the development of every country, proposing sustainable solutions to people's real needs.⁷³

Importantly, in the context of such debates, Ibrahim Al Jaidah, Managing Director of the Arab Engineering Bureau of Qatar, was critical of the radical modernization of cities like Dubai or Doha and the proliferation of skyscrapers and other buildings representing an architecture that fails to recognize indigenous cultures and traditions. Noting that in Doha there had been increasing attention to architecture that takes into account the climate and everyday needs, alongside restoration of the souks, he argued that design policies must be sensitive to the culture and environment in which they are located.

On November 7, 2008, the day on which the Turin Conference closed, the three-day *World Economic Forum Summit*⁷⁴ titled *the Global Agenda Council (GAC) on Design*, opened in Dubai. Again, in a time of economic crisis, design moves up in the political agenda and on the world stage. This event took on particular significance because it played out in the wake of the global financial crisis that had gathered dramatic pace since August 2008. The Dubai summit embraced many of the aspects of design that were threatened by the global financial crisis and yet, seen through the other end of the telescope, also might offer a way forward for the common good: architecture and urbanism, industrial design, service design, innovation strategy, communications design, and interdisciplinary practice. At the summit, design was also seen as having reached a stage of evolution beyond that of being a mere "tool of consumption, chiefly involved in the production of objects and images;" instead, it was perceived as a mechanism for meaningful engagement with "developing and building systems and strategies, and in changing behaviour often in collaboration with different disciplines." Summit attendees identified the greatest challenges, and opportunities, facing design as well-being,⁷⁵ sustainability,⁷⁶ learning,⁷⁷ and innovation.⁷⁸ At the Dubai meeting the Global Agenda Council on Design was approached by other GACs with a view for collaboration on common themes. Imaginative, design-led solutions were encouraged by a number of GACs, including those representing climate change, demographic shifts, terrorism, global governance, and water security.

U.S. National Design Policy Summit in Washington, DC, November 2008

Commencing only two days after the Global Agenda Council on Design meeting in Dubai, the U.S. National Design Policy Summit was much more constrained and conservative in its scope. It was called in response to a national agenda that sought to "create a shared actionable agenda of U.S. design policy for economic competitiveness and democratic governance among the professional design

73 "The challenge of the development of national design policies starts from Torino," loc.cit., 1.

74 Founded in 1979, the World Economic Forum is an independent, international not-for-profit organization that seeks to improve the state of the world by engaging leaders in partnerships to shape global, regional, and industry agendas. In the early twenty-first century the Forum's annual meetings have involved many heads of government, including those of Canada, China, Japan, Russia, and the UK, as well as many G20 leaders from Africa, Asia, and Latin America.

75 Aiding the world's population, particularly the deprived majority, to lead dignified lives through a particular focus on acute problems, such as aging, youth crime, health, and housing.

76 Through ethical and environmental responsibility in the development, production, delivery, retailing, and disposal of products, systems, and services.

77 Participating in the redesign of the design education system so that it reflects knowledge of wider cross-disciplinary thinking to ensure that it is fit for purpose in the twenty-first century.

78 In the creation of new business models and the adoption of a strategic and systemic role in both the public and private sectors.

79 Goal of Summit statement, *U.S. National Design Policy Summit* program, November 2008, 5.

associations, design educational bodies, and the design-related federal government agencies.”⁷⁹ Such a conservative ideology was reinforced by the Summit’s adopted definition of “design policy” as something firmly located in the language of national design agendas of the post–Second World War Reconstruction Era, rather than in language expressing a more obviously progressive design outlook for the twenty-first century. The assertion, that “Design policy is the promoting of technology and design as a means of gaining economic advantage by enhancing national competitiveness,”⁸⁰ could easily have been written sixty years, or even 160 years, earlier.

Other than a thirty-minute historical overview of U.S. design policy, most of the two-day summit was organized around a series of discussions and knowledge-exchange activities. The accompanying printed program provided participants with a number of brief design promotion and policy “sound-bites” and visual prompts. Awareness of design promotion agencies was signaled by referring to international state-funded design entities and their mission statements, including the Danish Design Center, Copenhagen, the Korean Institute of Design Promotion’s (KIDP) periodical *designdb+*, the Design Forum Finland shop in Helsinki, the Hong Kong Design Centre Competition, including the Design for Asia Award, and exhibition work of Premsele⁸¹ in the Netherlands.

Similar brief references were made to design and human innovation policies seen in the R&D work of the Ireland Centre for Design, the transfer and diffusion processes of the Hong Kong Design Centre, Singaporean intellectual property rights, small and medium enterprise (SME) and large enterprise support exemplified by Design Wales, and the higher education and industrial employment of *designaustria*.

Quality was referenced to the KIDP’s Good Design outlook; sustainability to the work of the Taiwan Design Center; and inclusivity to the Design Quality Label of the International Design Center in Berlin, the German Design Council, and TÜV Nord. Meanwhile, design policy creation was indicated by the UK’s Design Council with a web page that included reference to “design in a changing climate,” the Danish MindLab’s involvement of citizens and enterprise, and DOTT 07’s embrace of design and sustainability in North East England.

Reference was also made to the Federal Design Improvement Program from 1971 to 1981 and the outlook of the Federal Design Assemblies of 1973, 1974, 1975, and 1978, as well as the Federal Graphic Improvement Program and the Federal Architecture Program. However, there is little evidence to show that this extensive bricolage of international design policy and practice “snippets” played any fundamental role in the U.S. Design Summit’s outcomes.

This almost bullet-point informational run-through in the *U.S. National Design Summit* program was concluded with Ten

80 John Heskett, *Toothpicks & Logos: Design in Everyday Life* (New York: Oxford University Press, 1999), 180.

81 A Dutch design promotion organization established in 2002, funded by the Dutch Ministry of Education, Culture, and Science and the City of Amsterdam.

82 A term used by the National Endowment for the Arts in the title of the book produced in conjunction with the first of the NEA-sponsored Federal Design Assemblies: *The Design Necessity: A Casebook of Federally Initiated Projects*, 1973. The *Design Necessity* Exhibition mounted at the 1973 Assembly illustrated maxims of good design and was planned to tour nine states in the Midwest. An identical show was to tour the lobbies of federal office buildings in Washington, DC.

Principles of Design's Necessity,⁸² many of which were characterized by a blandness with which it is difficult to take exception, but all of which have a very familiar ring to historians of national design policy formation, design promotional agencies, and related activities over the past century and more. Indeed, they were drawn directly from the First Federal Design Assembly of 1973, the very first of these Principles proclaiming that "there are sound, proven criteria for judging design effectiveness." What was missing in 2008 had been missing as a response to exactly the same words in the *Design Necessity* publication⁸³—a meaningful discussion about what these criteria actually might be, and recognition that the word "design" might have very different connotations and values in one period than another. Other principles were short and to the point, lacking passion or contagious excitement, as exemplified by the Seventh Principle, that "Design necessity is recognizably present in projects ranging from a postage stamp to a highway," which had none of the lyrical drama of Raymond Loewy's agenda of sixty years earlier: to design everything "from the toothbrush to the locomotive, from the lipstick to the ocean liner." It also seemed rather prosaic when set alongside Ernesto Rogers's 1946 evocative definition of the designer's task: "to transform in poetic song every formal representation of existence, from a spoon to a city,"⁸⁴ in the strong socialist ethos of the early post-war Ricostruzione period in Italy.

The remainder of the 2008 summit involved participation in a "Current Design Policy Self-Assessment" exercise and a series of "U.S. National Design Policy Ideation" breakout sessions and discussions. Although the format of the second day largely followed that of the first, a wider context was acknowledged in the printed program, including a series of what were termed "Design Realities⁸⁵": the total U.S. public debt of \$10.5 trillion, the then-President-elect Obama administration's policy priorities, and the claim that design was still invisible in government policy. Group discussion centered on value to the American people, value to the design communities, operational feasibility, and political feasibility, with a final collective "Wrap up and Evaluation of the Summit."

By January 5, 2009, when the summit discussions were translated into a consolidated document, the American design communities' *Redesigning America's Future: 10 Design Policy Proposals*, there was a fresh agenda based on the belief that "scandals, corruption, and the Iraq War have eroded the American sense of democracy" and the accompanying maxim that:

Design serves to advance the goals of the United States' economic competitiveness by saving time and money and simplifying the use, manufacturing, and maintenance of goods and services. It enhances democratic governance by improving the performance and delivery of government services.⁸⁶

83 See note 80.

84 Ernesto Rogers, "Ricostruzione dal' Oggetto d'Uso alla Città," *Domus*, 215, November 1946.

85 With the term "Design Necessity," so did the summit's term "Design Reality" echo the vocabulary adopted by a Federal Design Assembly publication, "The Design Reality," *Design Quarterly* Special Edition, 94/95, 1974.

86 American design communities, *Redesigning America's Future: 10 Design Policy Proposals for the United States of America's Economic Competitiveness and Democratic Governance*, 1/5/2009, 1.

The ten design policy proposals are entered under two headings: Design Policy for Economic Competitiveness and Design Policy for Democratic Governance. Again, in the follow-up document, published two weeks later on January 19, 2009, *Report of the U.S. National Design Policy Summit*,⁸⁷ further elaboration is accompanied by an action plan on which the U.S. government and the American design communities should collaborate. This plan is divided into four major aspirational initiatives: innovation that supports the country's entrepreneurial spirit and economic vitality, better performance in government communications, effectiveness, and accountability, sustainable communities, environments, cultures, and the earth, and forms of thinking that advance the educational goals of knowledge. Two brief essays are written under the earlier headings, Design Policy for Economic Competitiveness and Design Policy for Democratic Governance, giving rationales for the position. The first is less than 1,000 words in length and the second about 1,400. The latter recognizes the significance of sustainability and the global environmental crisis, as well as promoting a limited view of civic inclusiveness. Overall, this approach results in more substance, but it is ultimately a manifesto based more on aspiration than any deep-rooted or penetrating evaluation. There is also a listing of many of the ideas that had been posted at the Design Policy Summit itself: seventy raw proposals on design promotion, forty on innovation, sixty on design standards, and eighty on policy as designed, alongside a sequence of tabular audits under a number of headings. The latter includes aspects of Design Promotion, Innovation Policy, Design Standards, and Policy as Designed. These areas of projected activity are set against a variety of supportive organizations, including the AIGA, the Professional Association for Design,⁸⁸ the American Institute of Architects (AIA), the American Society of Interior Designers (ASID), the Association for Computing Machinery Special Interest Group on Computer-Human Interface (ACM-SIGCHI), Association of Independent Colleges of Art and Design (AICAD), the Design Management Institute (DMI), the Industrial Designers Society of America (IDSA), the National Endowment of the Arts (NEA), and a number of federal agencies.

Importantly, the document also claims that:

Unfortunately, the U.S. Government does not view the design industries as a major service industry. Because design is handled by many different agencies, there is no way to accurately measure its contribution to the U.S.'s economic vitality.⁸⁹

Measuring Design Competitiveness in the New Millennium

There have in fact been a number of attempts internationally to measure design competitiveness. In South Korea in 2008 the KIDP published a *National Design Competitiveness Report 2008 (NDCR 2008)*.⁹⁰ Earlier attempts at such quantification by the DESIGNIUM

87 American design communities, *Report of the U.S. National Design Policy Summit*, January 19, 2009.

88 AIGA was known as the Institute of Graphic Arts until 2006, when it became AIGA, the Professional Association for Design.

89 *Ibid.*, 11.

90 KIDP, *National Design Competitiveness Report 2008*, http://cdx.designer.com/article/17907/KIDP_National_Design_Competitiveness.pdf.

Position	Design Competitiveness	Average 100	Satisfaction of general companies with government design-related support	Average 3.1	Satisfaction of design firms with government design-related support	Average 39
1	Italy	134	Finland	4.0	Taiwan	380
2	France	132	Taiwan	3.8	Japan	375
3	US	126	India	3.7	China	372
4	Germany	110	China	3.6	Germany	350
5	UK	109	UK	3.5	South Korea	350
6	Japan	108	Brazil	3.3	France	322
7	Sweden	101	Denmark	3.2	Finland	320
8	South Korea	99	South Korea	3.2	Italy	300
9	Denmark	99	Singapore	3.1	Singapore	300
10	Finland	95	Italy	3.0	UK	289
11	Australia	94	Sweden	3.0	Brazil	285
12	Canada	93	Canada	2.9	India	283
13	China	90	Japan	2.7	Canada	267
14	Taiwan	83	Germany	2.6	US	267
15	Singapore	83	US	2.5	Australia	267
16	Brazil	80	Australia	2.5	Sweden	229
17	India	79	France	1.8	Denmark	229

Table 1
 Figures drawn from the KIDP National Design Competitiveness Report 2008

at Helsinki University (2003–08)⁹¹ and the New Zealand Institute of Economic Research (2002)⁹² were dismissed in the *NDCR 2008* as “not sophisticated enough to measure comprehensiveness⁹³”; both rely on indices from the World Economic Forum. The KIDP *NDCR 2008* evaluates 17 countries: three Western European, three Northern European, three American, and six Asian. In the public sector (design policy), manufacturing and corporate sector (design for industry), and consumers (design culture) are each calibrated against performance, human resources, and investment/environment. The overall position of U.S. design competitiveness, compared to that of the perceptions of government support to industry, is clear (see Table 1), and many other interesting findings are in the substrata of the report as well. These include the comparative strengths of three of the four BRIC countries (excluding Russia), particularly in relation to government design-related support.

It is also useful to refer to other data and analytical frameworks to help confirm wider trends (see Table 2). It is debatable whether the evaluation of design policy and promotion programs in selected countries and regions, which was studied in the *Global Design Watch 2008* prepared by DESIGNIUM, the Design Innovation Centre at the University of Art & Design Helsinki, has the capacity to deliver as meaningful a picture of national design competitiveness as that produced by KIDP in 2008. Nonetheless, there are a number of trends that are of significance for discussions on federal design policy in the United States. The three key elements examined in the DESIGNIUM report are: (1) the main objectives and implementation of design programs, (2) the measures used for promoting national design, and (3) the organizations at which they are targeted. Of greatest significance is the downward trend experienced by the United States, falling from second to seventh place in terms of design competitiveness. Unlike Germany, where government, design profes-

91 *Design Policy and Promotion Programmes in Selected Countries and Regions 2003* (Helsinki: Designium, 2003); *Global Design Watch 2006: Update to the 2003 report Design Policy and Promotion Programmes in Selected Countries and Regions 2003* (Helsinki: Designium, 2006); and Katja Sorvali & Eija Nieminen, *Global Design Watch 2008: Update to the 2006 report* (Helsinki: Designium, 2006).
 92 *Building a Case for Added Value Through Design* (New Zealand Institute of Economic Research), 2003.
 93 KIDP, *National Design Competitiveness Report 2008*, http://cdx.designer.com/article/17907/KIDP_National_Design_Competitiveness.pdf

Design Competitiveness Ranking 2007			Design Competitiveness Ranking 2005			Design Competitiveness Ranking 2002		
1	Germany	6.1	1	Japan	6.2	1	Finland	6.3
2	Switzerland	6.1	2	United States	6.2	2	United States	6.2
3	Japan	6.0	3	Germany	6.1	3	Germany	6.1
4	Sweden	5.9	4	Switzerland	5.9	4	France	6.1
5	Denmark	5.9	5	Denmark	5.8	5	Japan	6.1
6	Austria	5.7	6	France	5.7	6	Switzerland	6.0
7	Finland	5.7	7	Finland	5.7	7	Netherlands	6.0
8	United States	5.7	8	Sweden	5.7	8	Sweden	6.0
9	Korea Rep.	5.7	9	Belgium	5.6	9	Denmark	5.8
10	France	5.6	10	Austria	5.6	10	United Kingdom	5.8
Sources: World Economic Forum 2007, <i>Global Design Watch 2008</i>			Sources: World Economic Forum 2005, <i>Global Design Watch 2005</i>			Sources: World Economic Forum 2002, <i>Building a Case for Added Value through Design</i> , NZ Institute of Economic Research 2003		

Table 2

Figures drawn from Katja Sorvali and Eija Nieminen, *Global Design Watch 2008: Update to the 2006 Report*, 2008.

sionals, and industry are seen as the main actors of design programs, the main cast in the United States is seen to be design businesses and organizations, including the IDSA, the Corporate Design Foundation, and the DMI.

A Final Look at *Redesigning America's Future*

To conclude, a brief revisit is made to the original impetus that gave rise to this article: *Redesigning America's Future: 10 Policy Proposals*. As has been suggested, the individuals accredited with putting together these proposals are neither disinterested nor objective parties: eleven are drawn from U.S. design and professional organizations, four (including the convenor) are from U.S. art and design education organizations, and four are from federal organizations. In support of their mission to establish a federal Design Council, they cite President Jimmy Carter's belief in good design as a means of improving governmental efficiency, draw on President Abraham Lincoln's words on "the legitimate object of government" for contextual support, refer to an economic definition of design policy culled from John Heskett's design primer, *Toothpicks & Logos: Design in Everyday Life* (1999),⁹⁴ and seek to ally their quest to the energy of the new political regime by quoting remarks made by President Barack Obama. In a January 2009 speech, Obama spoke of Americans being "a people of boundless industry and ingenuity... innovators and entrepreneurs." All of this is almost incontrovertible. However, as the Presidential campaign publication, *Blueprint for Change: Obama and Biden's Plan for America*, makes clear by omission, there is much to be done to achieve the goal of establishing an American Design Council in partnership with the U.S. government: the word "design" is not mentioned once in any appropriate context. Furthermore, although the design communities' commitment to commissioning a U.S. design version of the British HM Treasury Cox Review is understandable, the basis of the ten design policy proposals is extremely slight in terms of evidence and quantitative and qualitative analysis, and there is little reference in *Redesigning America's Future* to the

94 John Heskett, *Toothpicks & Logos: Design in Everyday Life* (New York: Oxford University Press, 1999).

good practices, or even strengths and weaknesses, in other national design policies around the world. In addition, as indicated earlier, the much-admired Cox Review was not itself without criticism or possible shortcomings and, in the view of some critics, was already out of date by the time it was published in 2005.

The often-intoxicating, self-referential rhetoric of national design promotion has an air of familiarity to design historians and others with a historical and international perspective of design matters. For many of them, the aspirations of the *10 Design Policy Proposals* are unexceptional. In terms of the context in which the proposals were created, they may be seen to exhibit many of the qualities of the “Emperor’s New Clothes,” hallmarked by the tailoring of representatives of the American design profession. To bring full-circle the story of “The Emperor’s New Clothes,” quoted at the beginning of this article, it is worth completing the tale:

*“But the Emperor has nothing at all on!” said a little child.
 “Listen to the voice of innocence!” exclaimed his father; and what the child had said was whispered from one to another.
 “But he has nothing at all on!” at last cried out all the people. The Emperor was vexed, for he knew that the people were right; but he thought the procession must go on now! And the lords of the bedchamber took greater pains than ever, to appear holding up a train, although, in reality, there was no train to hold.*

– Hans Christian Andersen, *Fairy Tales Told for Children*, 1835

APPENDIX (continued on following page)
 Selected Twentieth and Twenty-first Century
 National and International Design Initiatives

Year	Organizations, Institutions, and Reports	Nationality
1944	Establishment of the Council of Industrial Design (COID, restructured as Design Council, 1972) under the government's Board of Trade	Britain
1948	Establishment of National Design Council	Canada
1951	Establishment of the Ministry of International Trade and Industry (MITI)	Japan
1953	Establishment by Parliament of Rat für Formgebung (Design Council)	West Germany
1956	Establishment of the COID's Design Centre in central London	Britain
1958	Establishment of the Design Department (later known as the Design Policy Office) of the Ministry of International Trade and Industry (MITI)	Japan
1958	Industrial Design Council of Australia (IDCA) established, government funded (until 1976)	Australia
1958	<i>Eames Report</i> , also known as the <i>India Report</i> , commissioned by the Indian Government	India
1963	Design Council (NDC, Norsk Designråd) established under the Ministry of Trade and Industry	Norway
1964	Design Centre established in Belgium (closed in 1986)	Belgium
1964	Australian Design Centre opens in Melbourne	Australia
1969	Establishment of the Japan Industrial Design Promotion Organization (JIDPO).	Japan
1970	Korean Design Packaging Centre established	South Korea
1972	Federal Design Improvement Policy developed by Nancy Hanks, Chair of National Endowment for the Arts	

APPENDIX (from previous page)

Selected Twentieth and Twenty-first Century

National and International Design Initiatives

Year	Organizations, Institutions, and Reports	Nationality
1973	Product Development and Design Center of the Philippines (PDDCP, formerly Design Centre Philippines) created by Presidential Decree. Reorganized 1987.	Philippines
1973	Barcelona Design Centre established, partially funded by government agencies	Spain
1978	Danish Design Centre established, working with Ministries of Industry and Education	Denmark
1979	A Product Design Division established under the Taiwan External Trade Development Council (TAITRA) and later expanded to become the Design promotion Center in 1990	Taiwan
1980	Establishment of the Oficina Nacional de Diseño (ONDi)	Cuba
1983	Agence pour la Promotion de la Création Industrielle established in response to the Ministries of Culture and Industry, becoming fully private in 1993	France
1987	Australian Design Council (ADC) replaces IDCA, following Government review	Australia
1989	Australian Design Summit, Canberra	Australia
1991	Design Vlaanderen (Design Flanders) is established under Flemish Minister for Economy	Belgium
1991	Slovak Design Centre (SDC) established by the Ministry of Culture	Slovakia
1992	International Design Center NAGOYA established as a quasi governmental corporation	Japan
1993	Publication by the Design Promotion Council of MITI of New Design Policy in Response to Changes in the Times	Japan
1993	First 5-year Design Plan initiated in South Korea (1993–97)	South Korea
1993	Malaysian Design Council established	Malaysia
1994	A Proposal for a Whitehouse Council on Design: A Strategy to Harness the Power of Design, Design Programme: National Endowment for the Arts, June 1994	USA
1995	Beijing Industrial Design Centre established	China
1995	Indonesian Design Centre established	Indonesia
1995	Competing by Design, National Design Review Report published	Australia
1995	Brazilian Design Program (Programa Brasileiro do Design - PBD) established by Government	Brazil
1997	Czech Trade Promotion Agency/CzechTrade established by the Ministry of Industry and Trade Czech Republic	Czech Republic
1998	Second 5-year Design Plan initiated in South Korea (1998–2002)	South Korea
2000	Metropolitan Design Center (CMD) established by the Government of the City of Buenos Aires	Argentina
2001	Japanese Ministry of Economy, Trade and Industry (METI) established 2001, successor to MITI	Japan
2001	Korean Design Centre established. Korean Institute of Design of Design Promotion (KIDP) renamed, previously Korean Design Packaging Centre	South Korea
2001	Hong Kong Design Centre established, funded by the Hong Kong Special Administrative Region (HKSAR)	China
2002	The Hungarian Design Council established as successor to the Hungarian Council for Industrial Designs and Ergonomics	Hungary
2002	Premesela, funded by the Dutch Ministry of Education, Culture and Science and the City of Amsterdam. Established to promote Dutch design activity.	Holland
2002	Plan Nacional de Disegno de la Secretaria de Industria y Comercio	Argentina
2002	Taiwanese Government's Cultural and Creative Industries Development Program Phase 1 (2002–7)	Taiwan
2003	Thailand Creative & Design Centre (TCDC) project approved by Government Cabinet	Thailand
2003	Third 5-year Design Plan initiated in South Korea (2003–7)	South Korea
2003	Design Taskforce/New Zealand Government: A Report and Strategic Plan	New Zealand
2003	DesignSingapore Council for design promotion and development	Singapore
2003	International Design Alliance (IDA) established by the International Council of Societies of Industrial Design (Icsid) and International Council of Societies of Industrial Design (Icograda)	Global (Montreal)
2004	Taiwan Design Center (TDC), the national design promotion organization established in Taipei with support of the Industrial development Bureau, formerly the Design Promotion Center under the Taiwan External Trade Development Council	Taiwan
2005	Department for Trade & Industry Economics Paper no.15: Creativity, Design and Business Performance	United Kingdom
2005	Cox Review of Creativity in Business: building on the UK's strengths published by UK Design Council	United Kingdom
2005	Thailand Creative & Design Centre opened	Thailand
2006	Designium, the New Centre of Innovation in Design, established to promote national design policy, a cooperation between higher education and Tekes, the National Technology Agency	Finland
2007	National Design Policy launched	India
2008	Taiwanese Government's Cultural and Creative Industries Development Program Phase 2 (2002–7)	Taiwan

Phases of Product Development: A Qualitative Complement to the Product Life Cycle

Arthur O. Eger¹ and J. W. Drukker

Introduction

The well-known economic product life cycle describes the typical pattern of a product's turnover over time. Although it has become a central concept in product development and marketing, it has severe practical limitations, one of the most important of which is its purely quantitative, descriptive nature. It describes the most probable pattern over time in the relative growth and decline of the numbers of a product sold, from its incubence until its extinction, but it does not say anything about the qualitative changes that the product undergoes during the different phases of its own life cycle. In other words, it is impossible to make predictions about the nature of a product's renewal. In this paper, the six phases of the product life cycle are complemented with a set of six qualitative "product phases," which allows for overall predictions regarding functionality, design, pricing, production technology, promotion strategies, and presentation, as well as the service level and the social behavior of a company.

Product Phases and the Economic Product Life Cycle

The economic product life cycle consists of six phases. The first phase, development, shows (essentially R&D) costs of the product before its introduction. The second phase, the pioneering phase, starts immediately after the product is launched on the market. If the product is not rejected, a growth phase will set in, leading to an increased turnover. From now on, imitation by other producers will lead to increasing competition. Next comes the maturity phase, characterized by decreasing growth rates in sales and the elimination of weaker competitors. During the next two phases, saturation and decline, turnover will reach its peak, after which sales will decrease in absolute terms, due to, for instance, the emergence of substitute products. During the last phase, the product will gradually disappear. Sometimes a residual market will remain and another phase will follow—ossification (see Figure 1). It should be noted that most, but not all, products precisely follow this pattern, and that the pattern itself may be influenced by all kinds of external factors. For example, the mandatory wearing of safety belts in the back of cars

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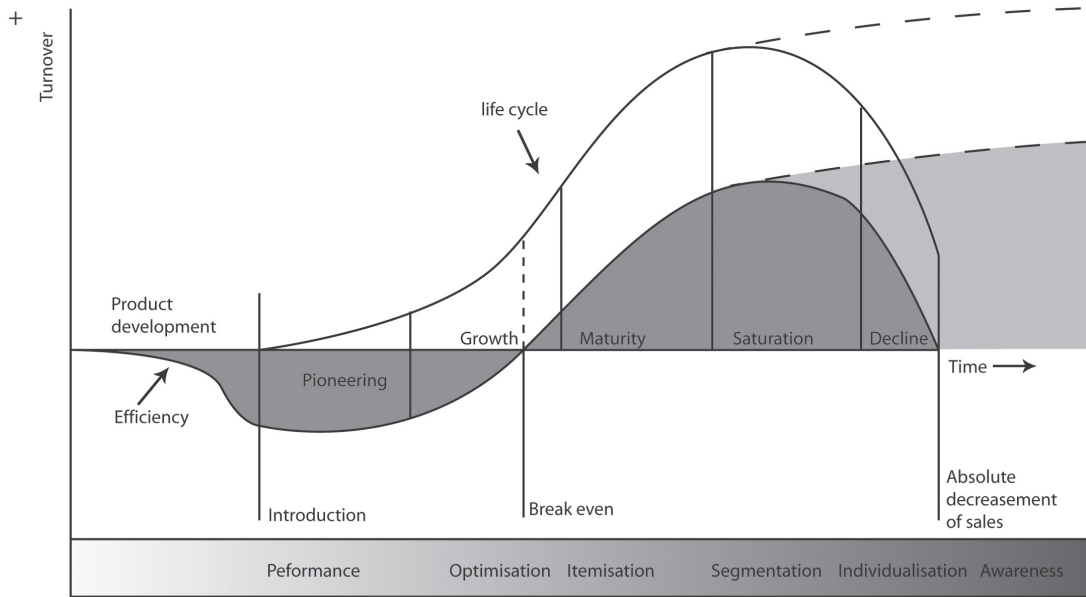


Figure 1
The product life cycle model combined with six qualitative product phases.

may result in doubling sales of safety belts during a short period of time, even if the product itself has reached its maturity phase.

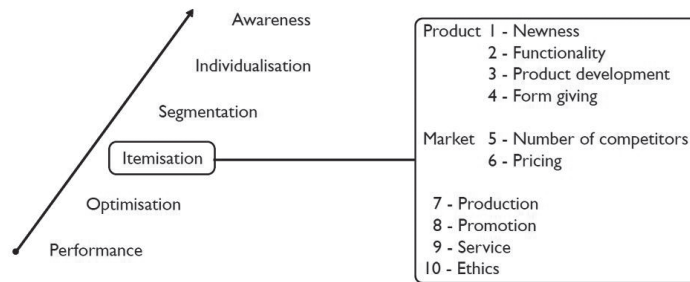
Qualitative Product Phases Can Map the Status Quo of a Product

In industrial design engineering, education and research are generally concentrated in four different fields: ergonomics, marketing, construction, and styling. So far, little has been done to analyze the *relationships* between these fields of research. Introducing six qualitative product phases makes it possible to do so. The physical appearance of a product can be analyzed in relation to its (primary and secondary) functionality, its ergonomic qualities, its production technology, and the marketing techniques that are used to promote it. To demonstrate this, we propose six qualitative product phases—performance, optimization, itemization, segmentation, individualization, and awareness—complementary to the (essentially quantitative) phases of the product life cycle (see Figures 1 and 2). Placed in chronological order, a more or less general pattern reveals itself, which to some extent makes possible predictions about a product's probable future development.

Each product phase can be described in terms of ten product characteristics, of which four apply to the product itself, two to its market, and the remaining four to its production technology, its main promotion instruments, the services that accompany the product, and the ethical aspects of the product in question. The ten product characteristics that we propose are: 1) newness, 2) functionality, 3) product development, 4) styling, 5) number of competitors, 6) pricing, 7) production, 8) promotion, 9) service, and 10) ethics.

Figure 2

The six product phases with their product characteristics. To keep the figure simple, the product characteristics are only shown at the product itemization phase.



Characteristics of the Product Phases

We state that each of the six product phases displays a typical pattern of product characteristics. In this section, these product characteristics will be made explicit for each product phase.

New products normally suffer from teething troubles for some time when they are put on the market. By implication, improvement of primary functionality (i.e., the technical performance of the product) is the most important aspect of product development in this phase. Christensen states that, in the beginning, new products (“disruptive innovations,” as he calls them) perform generally less well than the products they will replace.² Technically, new products often start as status symbols, and usually perform worse than the existing alternatives. The first cars, for example, were much less reliable than the contemporary horse-drawn carriages, but despite these shortcomings some people still wanted to own them.³ According to Eger, the product characteristics of this phase (“performance”) can be summarized as follows.⁴ The product is, technically speaking, new, and results from a “technology push.” The performance of the product is often poor. Product development is primarily aimed at improving the performance. Design in the limited sense of “overall form giving” is unimportant, and therefore product aesthetics are of minor concern. The product is put on the market by a monopolist or a small number of heterogeneous oligopolists, so competition is low, and as a consequence the price per unit can be relatively high. The product is frequently produced by standard machinery equipment, it often has an impractical number of parts, and assembly is mostly done by hand. The product is promoted through fairs, free publicity via public media, and brochures in retail shops, etcetera. There is no proper organized service organization set up by the producer, and the ethical behavior of the producing company is of no concern to the customer.

In the second phase, optimization, product development is broadened to include ergonomic aspects and issues of reliability in use and safety. This phase is characterized as follows. Although the product is, technically speaking, still new, consumer awareness of the product starts to develop. The performance of the product is reasonable, but product development is still aimed at improving performance. Other aspects, like increased reliability, improvement

2 Clayton M. Christensen, *The Innovator's Dilemma: When New Technologies Cause Great Firms to Fail* (Boston: Harvard Business School Press, 1997).

3 Henri Baudet, *Een vertrouwde wereld: 100 Jaar innovatie in Nederland* (Amsterdam: Bert Bakker, 1986).

4 Arthur O. Eger, *Evolutionaire productontwikkeling: productfasen beschrijven de meest waarschijnlijke levensloop van een product* (PhD diss., Delft University of Technology, 2007). English summary published as: Arthur O. Eger, *Evolutionary product development: How “Product Phases” Can Map the Status Quo and Future of a Product* (The Hague: Lemma Publishers, 2007).

of aspects of ergonomics, and safety are becoming serious considerations. The number of competitors starts to grow. The price per unit is still relatively high, but increasing competition creates a tendency towards lower prices.

Both Windemere Associates and Mann and Dewulf find that when producers have improved their product to the point that they satisfy generally accepted standards of functionality and reliability, the edge of competition shifts to convenience, and so itemization comes to the foreground as the next phase in product development.⁵ Buyers will prefer those products that are the most convenient to use and—especially in the business to business market—sellers that are convenient to deal with. With mass produced products, personal selling becomes impossible. The growth of the market is less than five percent and the number of competitors increases. As the product range grows, prices fall and promotion costs increase. Communication channels change from personal selling strategies to direct marketing, and (paid) print, TV, and radio advertising. Product development is aimed at improving performance, reliability, ergonomics, human interfaces, and safety. An endeavor sets in to develop extra features and accessories, including special editions of the product that are developed for different trade channels and target groups. Design—in the limited sense of “styling” (see above)—becomes more important, and product aesthetics become a major concern. The number of competitors is still growing, but the market has usually not yet developed into a perfectly competitive market (homogeneous polypoly). The number of product parts decreases, and mechanical and/or automatic assembly becomes more important. If needed, service organizations are set up to support the product.

In the first three product phases (i.e., performance, optimization, and itemization), the focus was on improved functionality, reliability, ergonomics, and safety. An endeavor to add extra features and accessories, in order to differentiate the product from its competitors, sets in somewhere in the third stage. However, there is an end to these kinds of developments. Actually, there comes a time when the performance offered is actually more than the performance required, and so segmentation—the splitting up of the product in different versions for different groups of users—offers a possibility for extending the product’s life cycle. For relatively uncomplicated products, such as furniture and trinkets, the opportunities to add features or accessories are limited. Moreover, for innovators and early adopters, products become less attractive during the latter product phases. The market share is such that the product is considered to be “accepted.” Owning the product is no longer distinctive, as it does not offer any form of status. Adding emotional benefits to a product is now a possibility.

During this phase, almost all members of the target group know the product from their own experience or have at least heard

5 Darrell Mann and Simon Dewulf, *TRIZ Companion* (Ieper-Belgium: Creax Press, 2002); Windemere Associates, as quoted in Clayton M. Christensen, *The Innovator’s Dilemma*.

of it. As the product, technically speaking, enters the domain of some “dominant design” (or a limited number of “dominant designs”), product development is aimed at adding extra features and accessories, including special editions of the product for different trade channels and target groups. Styling has reached a stage of complete integration of the different parts of the product into a completely unified and recognizable form and design focus shifts from form giving proper to expressive features, aimed at increasing emotional benefits. The market approaches perfect competition. As prices approach average total costs, price decreases come to a halt. Promotion and advertising via various mass media are often costly.

Extrapolation of segmentation (continuous fine tuning of products on ever smaller target groups) ultimately leads to a product well tuned to the individual. In other words, when segmentation comes to its logical end, individualization is the next step. Recent developments in information and production technology make this kind of individualization possible. These developments imply the following changes in characteristics in the product phase “individualization.” In order to make the product discernible from its competitors (i.e., to escape in some way from the “dominant design”), product development is deliberately geared to mass customization and co-creation, allowing the customer to influence the final result. The market starts to change from a homogeneous polypoly into a heterogeneous polypoly. Although prices approach average, technical production costs of the dominant design, co-creation, and mass customization make higher prices possible. Interactive media are used to customize the product to the needs of the individual customer. The ethical behavior of the producing company starts to become of some importance for at least some customers.

A problem with this product phase is that individualization is not possible for each product. Complicated products, such as cars, are already customized to some extent, but choice so far is limited. A system in which a customer can submit a RAL-number for the desired color of his car has yet to be developed. For less complicated, low-priced, and mass-produced products (such as diaries, spectacle cases, writing utensils, etc.), possibilities are even more limited, although it is possible to order these products with one’s own name printed on them, for example.

In 1997, market research bureau Inter/View studied aspects of so called “responsible entrepreneurship.”⁶ The results suggested that consumers are willing to contribute to a better environment and to help solving societal problems by changing their consumption patterns, but only if this can be done without much effort, and only if it does not lead to decrease of consumer satisfaction and to an increase in their financial burden. On the other hand, this research also showed that people do expect companies to play an active role in solving common societal problems. According to Hafkamp, a company can successfully tempt consumers—especially those who

6 Paul Sikkema, “Intensive care, geen camouflagepak,” *Adformatie* s.a.: 19 (1997): 33–6.

are committed to purchasing luxury products—by offering them the possibility to show their ethical involvement by acquiring products that claim in some way to be more environmentally or socially beneficial than their competitors.⁷ This leads to slight changes in the characteristics of the last product phase, “awareness.” Design is focused upon the enhancement of expressive features aimed at increasing emotional benefits, but when these benefits start to include ethical concerns, this can lead to a sudden leap into ascetic and sober forms. The market approaches a heterogeneous polypoly. Co-creation and mass customization offer possibilities to realize higher prices. This tendency is further reinforced by product claims regarding societal and environmental issues. The producing company explicitly communicates company ethics in its promotion campaigns. The ethical behavior of the producing company does to some extent influence consumers’ choices. The company can, for instance, be successful with products that become more attractive with use (“positive aging”).

The Model Empirically Tested

To test the validity of the proposed model, the following questions need to be addressed:⁸

1. Do products generally follow the product phases in the predicted sequence?
2. Do the described product characteristics appear in the order that is predicted by the product phases?
3. To what extent are the product phases an appropriate means to predict the future development of a product based on its history?

As a first attempt to provide at least some preliminary answers to these questions, a number of retrospective case studies and surveys were carried out. Strictly speaking, in a retrospective case study, many aspects of one case are studied, whereas in a survey, one aspect of many cases is studied. In practice, this strict, theoretical distinction is often blurred, namely when—because of a lack of data or for reasons of research efficiency, for instance—a few aspects of some cases are studied. Something similar applies to the testing of this model. A comparative (multiple) retrospective case survey—clearly a hybrid between a survey and a case study—was carried out to test the empirical validity of the concept of product phases, involving five products: shavers, bicycles, mobile phones, shampoo bottles, and—to see whether the development of services also follow the pattern of product phases—holiday arrangements. The case surveys were conducted by the study of literature and interviews with experts. As an example, one of the cases—the bicycle—is discussed in the next section.

A disadvantage of the retrospective case survey is that the products are analyzed by someone who is familiar with the

7 Gertjan Hafkamp, “Bedrijfsleven moet niet zo schromen voor ethiek,” *Adformatie* s.a.: 7 (1997): 54.

8 Overall research methods and results were published in detail in: Arthur O. Eger, *Evolutionaire productontwikkeling* and summarized in English in: Arthur O. Eger, *Evolutionary product development*.

model being tested, because a lay person cannot judge whether the product in question meets the formulated criteria. Thus, there is an inherent risk of a self-fulfilling prophecy, namely that the researcher may unwittingly match the results of his research with the theory of product phases. This problem is bypassed in the second test, a method that was used by ten Klooster, among others.⁹ While developing a method to design packaging, ten Klooster asked experts to rank consequent steps in the design process, on cards. Unlike interviews, this method prevents the researcher from influencing the results by the way he formulates his questions. Secondly, the cards help the interrogated subjects remember aspects that they would not have thought of by themselves. Finally, this method allows for the reaping of detailed knowledge of experts from different backgrounds in the field involved.

The second test was preceded by a pilot study, to investigate whether the formulations of the product characteristics were clear to the interrogated subjects and whether the method used was appropriate. Test persons were asked to attach stickers with predefined written statements to a field—a large piece of paper with indications of a time line (the product's history since its introduction to the market) and the level of market penetration of the product. The statements were sorted by product characteristics and collected in ten folders, which were offered to the interrogated subjects in random order. In the folders, the statements were also randomized. The subjects were then asked to attach the statements to the field in the order they expected them to take place during the course of a product's life cycle. For the test, subjects were randomly selected from a population of experienced industrial designers, design managers, and marketing managers. Results of the test are summarized in the section following the case study of the bicycle.

Case Study: The Bicycle

In 1839, Kirkpatrick MacMillan designed the first bicycle with a system of pedals and bars used to drive the rear wheel. The Frenchman Michaud was the first to fix the pedals directly to the front wheel. His first bicycles were made of wood. In 1866, however, he put a bicycle on the market that was completely made of steel, and that, after an exhibition in Paris in 1869, became quite successful. Riding a Michaud bicycle was not comfortable at all, and required a lot of force and skill.¹⁰ For the first bicycles, participation in exhibitions (like Michaud's in Paris) and free publicity were the most important promotional activities. The pioneers of the bicycle attracted so much attention by simply riding their own bicycles in public that publications in papers and magazines followed "of their own accord." In 1871, James Starley introduced his "Ariel," a bicycle that would become very successful under the names "high bi" (Figure 3) and "ordinary." The "Ariel" was the first bicycle with

9 Roland ten Klooster, *Packaging Design, a Methodological Development and Simulation of the Design Process* (PhD diss., Delft University of Technology, 2002).

10 Koen van der Wal, "Productfasen Fiets: Onderzoek & Ontwerp" (Unpublished manuscript, Department of Industrial Design Engineering, University of Twente, 2005).

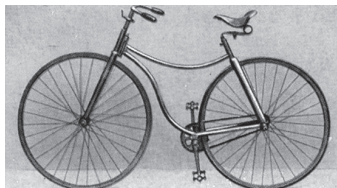
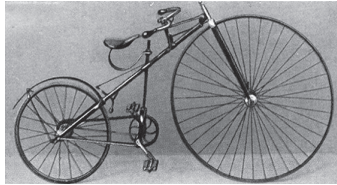


Figure 3 (top)

A so called "high bi" from 1875. Permission to reprint courtesy of Imperial Tobacco UK.

Figure 4 (middle)

Lawson's "Bicyclette" (1879). Permission to reprint courtesy of Imperial Tobacco UK.

Figure 5 (bottom)

"Rover Safety Bicycle" (1885). Permission to reprint courtesy of Imperial Tobacco UK.

spokes. It had solid rubber tires, a front wheel with a diameter of 125 centimeters, and a rear wheel of 35 centimeters.

In the beginning, the bicycle was mainly a product for upper class and higher middle class youngsters, and was used for sports (competitions) and tourism.¹¹ Riding a high bicycle was not without danger. The center of gravity is located quite high—near the axle of the big front wheel—which creates a great risk of falling over. Moreover, in the course of time, the front wheel was made even bigger to allow faster cycling, which increased the risk.¹²

In order to enlarge the market, a lot of manufacturers tried to solve the balance problem that bewitched the high bi. In the beginning, designers sought—and found—solutions in building cycles with three or four wheels. That these efforts were to some extent successful was illustrated by the 1883 Stanley Show, where 289 tricycles were shown alongside 233 bicycles.¹³ Another solution was sought in trying to move the saddle towards the rear wheel. As a result, two cycles became very successful: The "Facile" from Ellis & Co. (1874) and the "Xtraordinary" from Singer (1878).

Another design strategy in these days included cycles that were driven at the rear wheel and with the saddle near the rear axle. Well known examples are the American "Star" (1881) with a small wheel in the front and a bigger one behind, and Lawson's "Bicyclette" (1879) (Figure 4). The latter was the first bicycle driven by a chain on the back wheel. In 1885, John Starley introduced the "Rover Safety Bicycle" (Figure 5), generally considered the last step in the evolution of the bicycle into the ones we know today.

In the product phase "performance," bicycles were exclusively used for sports and tourism. In the later phases, the transportation function slowly crept in. Bicycles enabled people to move to cheaper houses, further away from their work.

Another important development for the bicycle was the invention of the pneumatic tire in 1888 by John Boyd Dunlop. In 1890, about 98% of all tires were solid, while four years later, in 1894, the market share of pneumatic tires had grown to nearly 90%. According to Baudet, it was then that the bicycle reached its final stage: until the early nineties, technical improvements (tires, bearings, transmission, steering, etc.) were quite important, sometimes even of fundamental interest. The bicycle as we know it now reached its form around the year 1895. Fundamental technological innovations, like those in the early stages of development, were not realized after that.¹⁴

The fact that the dominant design of the bicycle was realized around the end of the nineteenth century does not imply that it was completely impossible to make further technical improvements on the bicycle thereafter. Van der Wal mentions:

The development of the aluminium bicycle by the Frenchman Rupalley (1895).

The introduction of the three speed hub gear by Sturmey & Archer (1902).

11 Henri Baudet, *Een Vertrouwde Wereld*.

12 W. E. Bijker, *The Social Construction of Technology* (PhD diss., University of Twente, 1990).

13 Koen van der Wal, "Productfasen Fiets."

14 Henri Baudet, *Een Vertrouwde Wereld*.

The invention of the derailleur in the 1930s, only becoming a success after World War II.

The introduction of the drum brake (1937).

The development of synchronously operating breaks (1960).

But, overall, during the first half of the twentieth century, the basic design of the bicycle remained unchanged. Men's bicycles had a "diamond frame," while women's bicycles had a so-called "lady's curve" to accommodate the long skirts of their riders. (Nowadays these are known in Holland as the "grandma bike," or "omafiets.") Virtually all bicycles were black. It was not until after World War II that, due to the increasing competition from the new motorized bicycle (moped), new models were introduced: so-called "sports bicycles." These cycles did not look like the present sport bikes at all, but compared to their contemporaries they looked quite dynamic, with smaller wheels (66 cm instead of 71 cm), a shorter wheelbase, and narrow tires. They were furnished with color striping and chromium parts and could be equipped with many accessories: decorated gear cases, white grips, special rear lights, saddles, and handle bars, etc. From the 1920s on, production of bicycles became increasingly mechanized. Manufacturers invested in automated lathes and specialized production halls with functional layouts. Despite that, still a lot of handwork was needed for assembly.

The 1960s marked another period of change in bicycle design, exemplified by the introduction of the "Moulton bike" (1962)—a folding bike with aluminium parts, designed by Alexander Moulton—and the BMX (1971), developed in Los Angeles. The last one developed into the now well known mountain bike or "all-terrain bike" (ATB) in 1976 in California. These developments mark the transition from the "itemization" phase to the "segmentation phase." The 1980s saw the introduction of special bicycles for nearly every purpose: ATBs, shopping bicycles, children's bikes, recumbent bicycles, racing bikes, touring bikes, folding bikes, etc. New materials and production methods gave designers more freedom to vary the designs of frame constructions. In this way, the bicycle slowly turned from a mere means of transportation into a fashion and lifestyle product.

Around 1890, in the Netherlands, the price of an average bicycle equaled several months (three to six) salary of an average workman. Despite rising prices during the first decennia of the twentieth century, prices of bicycles fell dramatically. Around 1935, they reached a minimum in absolute terms. At that time, in nominal terms, a bike cost approximately 14% of its 1890 price (in real terms, about 10% of its 1890 price). After the mid 1930s, prices started to rise again, until an average quality bicycle in 1970 would cost (in nominal terms) the same as in 1890, which still means that in real terms (that is, correcting for changes in the general price level), its price in 1970 was 15% of its 1890 price.¹⁵ Stated in other terms, in 1890 the average

15 Calculations based on Ronald van der Bie and Jan Pieter Smits, *200 Jaar Statistiek in Tijdreeksen 1800–1999* (Voorburg, Amsterdam: Centraal Bureau voor de Statistiek; Internationaal Instituut voor Sociale Geschiedenis, 2001), 111–12.

16 Dutch guilders converted into Euros by the official exchange rate at the introduction of the Euro: 1 € = 2.20371 DFL.

Dutchman had to work three to six months to make enough money for a bicycle. In 1935, this had dropped to one month, and in 1965 to half a month. Between 1960 and 1970 bicycle prices could vary between €90 (\$126) and far above €500 (\$700) (that is, a range of 1.39 times the average!), due to segmentation.¹⁶ Since then, the price range of bicycles has broadened even more.

Due to its basic design (a frame as a basis to which all other parts and accessories are attached), the bicycle reached the individualization phase soon after its segmentation phase: the typical layout made it very easy to vary parts and to remove, add, or change accessories—and by doing so, to individualize the bicycle. Since about 1985, completely custom-made bicycles have been widely available.

Bicycles entered the awareness phase somewhere around 1980, but for slightly different reasons than the theory of product phases predicts. In this period, the bicycle is rediscovered as a healthy and environmentally friendly alternative to the “unhealthy and polluting” car. However, these qualities were not deliberately developed by manufacturers—for instance, by using environmentally friendly materials and production processes or by committing to social responsibility. These qualities were simply inherent to the product itself since incubation, and would have been realized even if manufacturers had no environmental conscientiousness at all.

The bicycle follows the theory of product phases to a great extent. The first three phases are passed through in accordance with the theory. Despite that, the history of the bicycle is, at some points, at odds with the theory, which can partly be explained by its long and special history. Of course, the development of the bicycle was influenced by historical developments, but in this case this statement could also be reversed in some respects. The process of suburbanization was made possible, among other things, by the bicycle (and later, to a greater extent, by the introduction of the car). Thanks to the bicycle, people could live further away from their work. Some other interference with the theory can be attributed to a lack of materials caused by the Second World War, and the introduction of the car

Figure 6 (below)
Extent to which the bicycle applies to the theory of product phases: + = applies; - = does not apply; +/- = applies only partially.

Product Characteristics	Performance	Optimisation	Itemisation	Segmentation	Individualisation	Awareness
Newness	+	+	+	+	+	+
Functionality	+	+	+	+	+	+
Product Development	+	+	+	+	+	+
Styling	+	+	+/-	+	+	+
Number of Competitors	+	+	-	+	+	+
Pricing	+	+	+	+	+	+
Production	+	+	+/-	+/-	+	+
Promotion	+	+	-	-	-	-
Service	+	+	+	+	+	+
Ethics	+	+	+	+	+/-	+/-

Figure 7

The percentage of the statements that were confirmed by the experts per product phase.

1) The number of statements that were supposed by the test to apply to this product phase.

2) The number of statements that were matched by the experts to this product phase.

Note: The total number of statements in column 1 adds up to 116, while the total number of statements to be matched was 49. This is explained by the fact that most statements were supposed to apply to more than one product phase.

Product Phase	Number of Statements (1)	Number confirmed (2)	Percentage
Performance	15	14	93%
Optimisation	20	17	85%
Itemisation	16	9	56%
Segmentation	21	14	67%
Individualisation	21	13	62%
Awareness	23	13	57%

and the moped. With regard to promotion, the history of the bicycle contradicts the theory of product phases. Until now, the advertising efforts remained rather small. Direct marketing methods are not really utilized and advertising on radio or television is rare.

The product history of the bicycle shows that the product phases appear in the predicted order. Indeed, some minor disruptions are found, but most of the time these can be explained by disruptive external factors. Similar results were found in four other case studies.¹⁷

A Second Test: Ranking by Experts

A second test was conducted as follows. From the presumed product characteristics in each product phase, a total of forty-nine statements were derived that were supposed to apply to a limited number (one to four) of different product phases. Then seventy-one experts in the field of product development were asked to rank the formulated statements, according to their applicability to the different product phases.¹⁸ The results of the test were mixed, in the sense that the first two product phases were clearly identified, while the results for the other four phases were less convincing (See Figure 7). From the statements about the product performance phase, 93% were confirmed by the experts. For optimization, this percentage reached 85%. Itemization scored lowest, as only 56% of the statements were confirmed by the experts. For segmentation the percentage was 67, for individualization 62%, and for awareness 57%.

Discussion

Both tests suggest that there is at least some empirical evidence for the existence of a scheme of consecutive product phases during the life cycle of a product. However, also some seemingly conflicting findings resulted. It seems that in both tests the first phases were identified with more accuracy than the latter, which suggests that the possible variability of a “product career” increases in the course of its existence. It was also shown (in the first test) that external factors sometimes cause serious disturbances on the “normal”—that is, predicted by the model—course of the product phases. Finally, it appeared that it is sometimes hard to draw a fine line between different, successive product phases, as product phases can—in some cases for quite a long time—sometimes overlap each other.

17 Namely: shavers, mobile phones, shampoo bottles and holidays, offered by travel agencies. C.f.: Arthur O. Eger, *Evolutionaire productontwikkeling*, 95–132. For an English summary of the results: Arthur O. Eger, *Evolutionary Product Development*, 15–20.

18 For full and detailed results of this study, see: Arthur O. Eger, *Evolutionaire Productontwikkeling*, 145–90. For an English summary of the results: Arthur O. Eger, *Evolutionary Product Development* 26–34.

Despite these limitations, the theory of product phases seems to be a promising starting point in trying to apply some structure to the seemingly endless variations in “product careers.”

Of course, there are many aspects that warrant further investigation into the theory of product phases. In the first place, analyzing more products could provide more insight into the general applicability, as well as the limitations, of the model. This would also probably provide some hints with regard to the question of whether the last two product phases form a part of the segmentation phase or whether they should be considered as separate product phases, as was supposed in the original model.

Learning by Design: Visual Practices and Organizational Transformation in Schools

Jennifer K. Whyte and Paula Cardellino

Introduction

Design of an organization usually takes place through incremental and ongoing processes of re-design,¹ however occasionally there are moments when more radical changes and re-framings become possible. From a “practice-based” perspective, we investigate the crucial roles that visual practices play in these moments of organizational transformation, observing how people manipulate, combine, and use visual representations as part of their discussions about the future of organizations. In particular, we draw attention to the circulation of images and to how icons and exemplars are used in the design of both physical environments and organizational forms.

Our empirical study is located within the UK’s Building Schools for the Future (BSF) program—a deliberate attempt to transform organizational practices across the publicly funded (state) schools in the UK by re-building the physical environments that house those schools. In this setting, Gil² notes the tension between the rhetoric of innovation, with strong commitments to design features such as rationalized science labs, open spaces, and community clusters; and the participatory intentions, with a focus on inputs from users, head-teachers, staff, pupils, and other stakeholders. Acting as consultants, architects are central to the negotiation of the tension between innovation and participation and have significant input into the design quality of new schools.

Starting from our theoretical interests in design, we approach the data with the research question: *what are the roles that visual representations play in organizational transformation?* In the next section, we discuss visual practices and design and further articulate the rationale for this research question. The subsequent sections describe the Building Schools for the Future program and the methods used in the study. We then describe two vignettes from practice in this context: 1) the enrollment of the user-brief in an architect-bid; and 2) the presentation to a school entering the program. These vignettes are discussed in the following section, which highlights the circulation of visual representations and the salience of iconic exemplars in the discussion of organizational design and its physical forms. The paper concludes by suggesting directions for further research.

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- 1 K. E. Weick, “Designing for Throwness,” in *Managing as Designing*, ed. Richard J. Boland Jr. and Fred Collopy (Stanford, CA: Stanford University Press, 2005); Youngjin Yoo, Richard J. Boland, and Kalle Lyytinen, “From Organization Design to Organization Designing,” *Organization Science* 17:2 (2006), 215–29.
 - 2 Nuno Gil, “Democratizing New Infrastructure Development: The Case of Teacher Involvement in School Design” (paper presented at the DRUID, Copenhagen, 2008).

Visual Practices and Design

From a number of perspectives, social scientists have become interested in practice, with a commitment to observing what people actually do in organizations³. Recent work on design has built on the tradition of empirical studies in the design studio, but it has begun to explore design practices in more complex organizational settings, such as the firm⁴.

Practice is embodied in and involves a range of aesthetic and kinaesthetic sensibilities, with different organizations having distinctive aesthetic cultures in which sensory forms of knowledge are mobilised. "Visual practices" are characteristic of design and involve the practices of interacting with visual materials, such as drawings, photographs, sketches, and computer graphics. Just as discourse theorists use verbal and written conversations to interrogate organizations; in studies of visual practices, a focus on representations and how they are mobilized and used within organizations provides a means to interrogate broader organizational phenomena. For example, recent work exploring design through its associated visual practices has highlighted the asymmetrical understandings and power relationships between architects and end-users in discussions about design⁵.

The broad literatures on organizations have highlighted the importance of the visual sense more generally as we enter "a society of spectacle, where a great deal of organizational knowledge assumes the form of visual representations" and where a proliferation of images becomes "a mediating and alienating factor in social relations." For some writers in these literatures what is interesting is the circulation of images in which images provide a "linked, directional chain" or "cascade" of representations transporting or translating ideas across contexts⁶.

In this paper, we consider the role of visual practices in organizational transformation, which raises the question: what is organization design? Galbraith's pioneering work argues that the conscious choice of organizational forms can improve effectiveness. He focuses attention on the strategy, mode (structures and decision-making processes) and integrative mechanisms of the organization; and highlights potential organizational responses to task uncertainty, which may involve slack resource, self-contained tasks, vertical information systems, and lateral relations. Recent work has shifted the conversation from organization design—as a static choice between self-contained options—to organization designing with a focus on the managerial practices and design rules involved in making and evaluating organizational design choices in ongoing operations. An analogy between organization design and the movement of a mobile sculpture illustrates this shift in emphasis to dynamic systems⁷.

However, a new or refurbished building may provide an occasion in which more radical changes and re-framings become

- 3 Silvia Gherardi, *Organizations Knowledge: A Practice-Based Approach to Learning in the Workplace* (Oxford: Blackwell, 2006); Wanda J. Orlikowski, "Sociomaterial Practices: Exploring Technology at Work," *Organization Studies* 28:9 (2007), 1435–48; Antonio Strati, "Sensible Knowledge and Practice-Based Learning," *Management Learning* 38:1 (2007), 61–77; Dvora Yanow and Haridimos Tsoukas, "Reflecting in/on Practice" (paper presented at the EGOS [European Group on Organizational Studies], Berlin, 30 June–2 July 2005).
- 4 For the foundational work on the "reflective practitioner," see D.A. Schön and G. Wiggins, "Kinds of Seeing and Their Functions in Designing," *Design Studies* 13:2 (1982), 135–56; Donald A. Schön, *The Reflective Practitioner: How Professionals Think in Action* (New York: Basic Books, 1983). While this empirical work was conducted in the design studio, more recent studies are exploring design in commercial practice, e.g. Boris Ewenstein and Jennifer Whyte, "Knowledge Practices in Design: The Role of Visual Representations as 'Epistemic Objects'," *Organization Studies* (accepted).
- 5 For work on discourse in organization see, for example, C. Hardy, I. Palmer, and N. Phillips, "Discourse as a Strategic Resource," *Human Relations* 53:9 (2000), 1227–48; Nelson Phillips, Thomas B. Lawrence, and Cynthia Hardy, "Discourse and Institutions," *Academy of Management Review* 29:4 (2004), 635–52. For discussion of visual practices in organizations see J. K. Whyte et al., "Visual Practices, and the Objects of Design," *Building Research and Information* 35:1 (2007), 18–27. The findings on user/architect relations are in Rachel Luck, "Using Artifacts to Mediate Understanding in Design Conversations," *Building Research & Information* 35:1 (2007), 28–41, and further discussed in Davide Nicolini, "Studying Visual Practices in Construction," *Building Research and Information* 35:5 (2007), 567–80.

- 6 The first quoted text in this paragraph is from Yiannis Gabriel, "Against the Tyranny of Powerpoint: Technology-in-Use and Technology Abuse," *Organization Studies* 29:2 (2008), 255; the second is from Sherry McKay, "Spectacle: From Critical Theory to Architectural Propositions," *Building Research & Information* 36:5 (2008), 536. Other references are to Charles Goodwin, "Practices of Seeing: Visual Analysis: An Ethnomethodological Approach," in *Handbook of Visual Analysis*, eds. Theo van Leeuwen and Carey Jewitt (London: Sage Publications, 2000); Bruno Latour, "Visualization and Cognition: Thinking with Eyes and Hands," *Knowledge and Society: Studies in the Sociology of Culture Past and Present* 6 (1986), 1–40.
- 7 For the seminal work on organization design see Jay R. Galbraith, *Organization Design* (Reading, MA: Addison-Wesley, 1977). More recent work on organization designing includes Yoo, Boland, and Lyytinen, "From Organization Design to Organization Designing," and R. J. Boland and Fred Collopy, *Managing as Designing* (Stanford, CA: Stanford University Press, 2004). The work on design rules is by A. G. L. Romme, "Making a Difference: Organization as Design," *Organization Science* 14 (2003), 558–73. The analogy with Calder's mobiles is in David Barry and Claus Rerup, "Going Mobile: Aesthetic Design Considerations from Calder and the Constructivists," *Organization Science* 17:2 (2006), 262–76.
- 8 T. J. Allen and M. S. Scott Morton, *Information Technology and the Corporation of the 1990s: Research Studies* (New York: Oxford University Press, 1994); A. Backhouse and P. Drew, "The Design Implications of Social Interaction in a Workplace Setting," *Environment and Planning B: Planning and Design* 19 (1992), 573–84; Frank Duffy, *The New Office* (London: Conran Octopus, 1997); A. Penn, J. Desyllas, and L. Vaughan, "The Space of Innovation: Interaction and Communication in the Work Environment," *Environment and Planning B: Planning and Design* 26 (1999), 193–218; B. Bordass, A. Leaman, and P. Ruyssevelt, "Assessing Building Performance in Use 5: Conclusions and Implications," *Building Research and Information* 29:2 (2001), 144–57. DfES, "Building Schools for the Future: A New Approach to Capital Investment" (London: Department for Education and Skills, 2004).

possible. There is growing interest in this within organization and management studies, related practitioner theorizing, and scientific studies in the architecture field⁸. These literatures suggest links between spatial configuration, frequency of contact, frequency of work-related conversations, and innovative activity. It is in this context that we use the term "organizational transformation" to describe a radical organization re-design.

The Building Schools for the Future Programme

The aim of the Building Schools for the Future (BSF) program is to rebuild or refurbish every secondary school in England by 2020. Launched by the UK government in 2004, the public investment in school buildings reached £5.5 billion (~\$11 billion; €6.9 billion) in 2006. The documentation⁹ sets the aim as providing schools that:

- include a diverse curriculum for students aged 14 to 19;
- acknowledge new ways of teaching and learning taking into consideration the impact of ICT;
- are open to the community;
- include students with special educational needs into mainstream schools;
- use the building as a tool for teaching and learning (e.g. sustainability); and accomplish the pertinent ventilation requirements.

Although this is the largest school-building program since the post-war period, it comes on the back of a significant investment in schools in the 2000 to 2005 period with joint public and private sector funding through the private finance initiative (PFI). There were concerns about the quality and cost of these PFI projects; and in the forming of BSF much was made of how to address this. Current and future developments in education and technology were considered in developing these aims and requirements to inspire new ways of learning and provide "excellent" facilities that benefit the whole community¹⁰. Many decisions that affect design quality are taken at the national level as images and words get circulated and reproduced, and there are many stakeholder roles in non-government and professional organizations that have a significant impact on the parameters for and appraisal of design quality. Architecturally trained professionals hold many of these roles and are also involved at more local levels in both the demand side (or client side) and the supply side; as well as in liaison with local authorities and schools regarding both the organizational design and the physical layout.

Data Collection and Analysis

The research reported here is based on a multi-method interpretative study involving observation, formal and informal interviews with key professionals involved in the provision of schools, and secondary data analysis of program-related documents and reports. The second

author collected data through her participation in related events, including international visits to schools in Denmark and Sweden, a conference called Building Schools Exhibition and Conference in Manchester, and the Design Quality Indicators facilitators' annual conference. She also conducted seventeen semi-structured interviews with key stakeholders at the national level and analyzed more than forty national reports and documents.

In using this case to study questions about organizational transformation, we build on a long tradition of using schools as an appropriate setting for research on organizations¹¹. The analyses presented here were developed through both authors' separate and joint coding of the data to understand visual interactions and their role in the decision-making about organizational and physical designs. There was an ongoing conversation between the authors about the data-set and its interpretation. Literatures are being revisited to understand and develop the emerging themes in the data-set¹² and there is a process of constant comparison between different parts of the data-set and the themes and the literatures. In working on this paper together we have conducted a detailed analysis of visual practices within the program, identifying and discussing in detail a number of vignettes of practice in relation to the literatures on organization design and visual ways of working.

Circulation of Images: The Heart of the Organization— From the User-Brief to the Architect-Bid for a School

The first vignette highlights visual images that circulate from the user to the architects in the briefing stage. Around a version of Figure 1, on his laptop, the Head of Design for Partnership for Schools (the government agency charged with the delivery of BSF) explained the user-brief for an exemplar school:

The starting point ... they want to be able to have an organization that broke the school down into digestible chunks and this is where they started from. If we can organize ourselves over here [pointing at the drawing] through the stages, and if they could relate with each other, but they are actually independent and they can go outside and, we are not sure how to work it out, but we want the students to come in and work with specialist staff. As an organization that is how we see it. And there are several things we want, we want the heart space, we want it somewhere for our school, is a social thing, and we want to have an identity, we want to be a good school, and this space should be the main point of access, should be for break time, for lunch, for exhibition, for assembly.

The user-briefing process involves the understanding and shaping of the organization design. This process engages the local authority and the consultants in partnership with the head teachers, teachers,

9 DfES, "Building Schools for the Future: A New Approach to Capital Investment" (London: Department for Education and Skills, 2004).

10 Concerns about PFI are in Audit Commission, "PFI in Schools" (London: Audit Commission, 2003); CABE, "Creating Excellent Secondary Schools. A Guide for Clients" (London: Commission for Architecture and the Built Environment, 2007).

11 John W. Meyer et al., "Bureaucratization without Centralization: Changes in the Organizational System of U.S. Public Education, 1940–1980," in *Institutional Environments and Organizations: Structural Complexity and Individualism*, ed. W. Richard Scott and John W. Meyer (London: Sage Publications, 1994); Brian Rowan, "Organizational Structure and the Institutional Environment: The Case of Public Schools," *Administrative Science Quarterly* 27 (1982), 259–79; W. Richard Scott and John W. Meyer, "Environmental Linkages and Organizational Complexity: Public and Private Schools," in *Institutional Environments and Organizations: Structural Complexity and Individualism*, ed. W. Richard Scott and John W. Meyer (London: Sage Publications, 1994).

12 K. M. Eisenhardt, "Building Theories from Case Study Research," *Academy of Management Review* 14:4 (1989), 532–50.

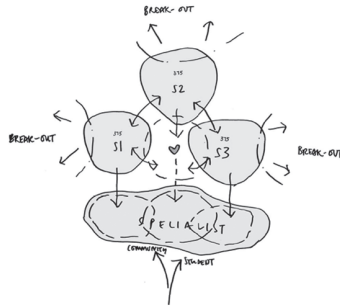


Figure 1
 Sketch of the organization design proposed
 in the user brief.
 © Gensler and BSF Kent

and pupils of each of the participant schools. The consultants include design, educational, legal, and technical advisors. The design advisor is a skilled, experienced architect who advises the local authority on all aspects of design and supports the achievement of high-quality buildings and environments. The client design advisor is involved in the process from the inception of a BSF project through to its completion.

In the above example presented by the Head of Design, who is himself architecturally trained, the local authority's "vision" is centered around the educational strategy of "nurturing autonomous and creative learners," he argues that this is to be addressed in the organization of the school building. He further argues that BSF is about fundamentally changing the organization design within each of the participant schools. As he sees it, a major problem is that "today's learners have inherited yesterday's schools and although the world has changed dramatically, school buildings and organization have largely stayed the same."

Figure 1 shows the sketch of this organization design. While this drawing is not intended to be unchangeable or "immutable," it sets down ideas on paper that are then there to be negotiated around and may also be appropriated. This is a generic view of the organization of the school. The heart of the school is represented as an icon and is clearly intended to be central to the organization design.

This spatial layout is further elaborated in the user brief. Figure 2 shows the detailing of the zone S1, as shown in Figure 1. The briefing process continues to unfold by breaking down the generic organization of the school into "digestible chunks." Each of the spaces subdivided from the general sketch are detailed. This sketch allows the organization of the school in the particular area to be analyzed from an educational point of view. It is called the "learning pattern" adjacency diagram. This sketching exercise serves to develop the brief. It is about translating the users' concept of educational transformation onto a visual representation. During the presentation, the Head of Design for Partnership for Schools argued that users should aspire for these spaces to be

... learning areas, we want classroom areas, we want enclosed spaces, group work, individual work, smaller group work, quiet work ... so, that, we can function. So, they get 3 of those (s1, s2, s3) and they say where do we get the areas from ... look at Building Bulletin '98 and we can manipulate that.

In Figure 2, the space is divided into 3 different sub-spaces where: 1) the dedicated learning spaces (on either side in yellow) allow for a maximum of 30 students while the flexibility of the spaces can accommodate larger teaching sizes up to 90 students; 2) the middle learning zones (in light green) can accommodate approximately 60 students, this zone is open plan and flexible furniture layouts allow

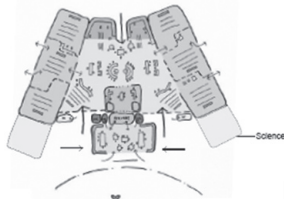


Figure 2 (above)
Detailed sketch of one of the stages of the school organization.
© Gensler and BSF Kent

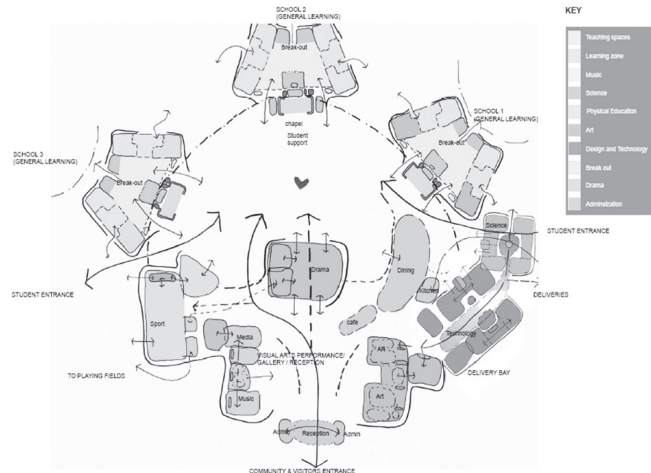


Figure 3 (above right)
Detailed sketch of the school organization proposed in the user brief.
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for smaller learning zones to be created; and 3) the break-out/social area and student resources are located off the central learning zone towards the heart of the school for minimal disruption of learning.

The Head of Design argued that after the detailing of the different areas has been completed, all these sketches “need to come together as an organization.” The final version of the diagram includes all of the sketches detailed separately. Figure 3 illustrates the general organization of the school. At this point in the presentation, the Head of Design pointed out that this “general adjacency diagram” is not the school building, but is the school organization. This diagram is a visual representation of the organization design of the school from the point of view of the local authorities and the architect consultant. The use of different colors and shapes visually contributes to clarify the intentions. This is the type of sample scheme that is issued to the designers charged with designing the school building.

The sketches and relevant written documents are issued to the designers for them to interpret and design their view of the organization design. The Head of Design for Partnership for Schools explains the process of interpreting the sketches in the client brief by the bid architect. This is visualized in the architect’s design proposal in Figure 4:

The market gets hold of this . . . bidder A says I see the 3 schools and that is how I think it could work, [space in the middle figure 4] this special space is your heart space, I have changed it. This is the real BSF process . . . compare contrast, that one with that one [with brief].

The representation of the heart of the school becomes apparent in the design proposed by the architect’s bid. The design does not rework the basic articulation imposed in the sketch presented by the client. On the contrary, the organization design is transformed to become the spatial layout as the architect’s bid develops. The circulation

Figure 4
School building design proposed
by the architect bid.
© Gensler and BSF Kent



and enrollment of visual representations across contexts becomes apparent.

In another context, an architect involved in BSF argued that the user briefs that are issued are not clearly framed. She described these documents as “. . . sometimes they are so nebulous, so strange.” From her point of view it is difficult to translate the “educational” vision into the design of the school. She argued that “. . . the vision is often an educational vision, so it’s very slanted towards education.” The language utilized by the client is educationally contextualized, which in the design world can have different meanings or interpretations. She felt that the role of the architect was to translate the educational concept into a visual representation. In her view, the type of visual information that was easier to replicate in the architect’s building design was to look for examples in other buildings and say: “We went to school that had a central atrium and this is what we loved about it.”

The Head of Design in Partnership for Schools had a very different opinion. He stated that this sketching exercise enables the client to have a clear visual representation of the organization design. These sketches would serve to clarify the client’s thoughts about education. This would enable two very different sectors to talk the same language:

And in fact, because I hear from the document that they want this heart space, somewhere to come together then I am going to suggest that that does not happen here, it happens over here. In this way the school could see what they asked for.

This vignette shows the role of visual representations in the circulation of design ideas across contexts during organizational transformation. Ideas about organization design that are developed in the user-brief become transformed and embodied in the proposals for an architect’s building design.

Entering the Building Schools for the Future Process: Re-combinations of Precedents and Exemplars

The second vignette is of a presentation to a school that was about to enter the BSF program. It was held in a BSF design meeting for a borough council. The architect consultant for Partnership for Schools based his presentation on a set of iconic images of school buildings based on the visual concept of a “good” school. What is extraordinary about the observed presentation is the link between representation of precedent and exemplars in the discussion about organizational design and its physical forms.

In one interview, an architect director involved with BSF noted the importance of looking at how other schools have translated their organization design into a building in one of the interviews. This process encourages the local authority to think about what they want from the school, their likes, and dislikes:

... it forces the people who are commissioning this to really sit down and think about this school, to go and see others, we hope, to say what they like and what they don't like.

After a brief introduction to BSF, the presentation quickly moves on to focus on the iconic images. The presenter is passionate about encouraging clients to start thinking about design from the very beginning of the BSF process. He argues that local authorities should visit a variety of different schools buildings in the UK and abroad. The aim is to build an image in the viewer's mind about what their own school could look like. The use of these contrasting images, building on the dichotomy between “ugly looking” schools and “good” schools is intended as a powerful warning about the need to understand how the building will contribute to the organization design:

I am telling now is the time, not when you are in the middle of it, now go and have a visit. So you are going to spend 25 million pounds and you don't even start to understand what this building could do for you.

Figure 5

Set of photos presented to the school contrasting a good from a bad school design.
© Andrew Beard Architect, Ltd.



However, the presenter insists that the BSF program is not about “pretty buildings” nor is it about “big architecture awards.” Instead, he argues, it is about “kids doing better, kids moving on

to better things.” He adds that “it is about enabling maximum impact on education achievement.” Building on this argument, he presents more sets of images that contrast the “good” school from the “bad” school building. Figure 5 shows two of the contrasting slides. The set of slides have a written message that emphasizes the idea of questioning the ability of the first image to “raise the school aspirations.”

In the next slide (Figure 6), the consultant argues that the recently built school on the left “looks like a prison.” This argument intends to ultimately build some passion into the client’s visual image about their school design. He goes as far as to question the audience about the type of building they think this image is, and in his words, “no one says a school.” He explains that amazingly the images shown in Figure 6 followed the same organization design:

... they are fingers, they both have wings, the concept is the same, the organization is the same, but look what you end up with? So the schedule is the same, the area is the same ... what is missing? Can anybody say what is missing? ... the value of design.

The presenter insists on the importance of highlighting the value of design when entering the bidding process. He wants to make sure that clients have a clear picture of what the school should be. Therefore, the presentation continues to build on the idea of contrasting images. He highlights the importance of how to translate the educational vision onto the building shape:

Translate that vision which could be a very long, “woolly wordy,” some of this visions a very thick, we want to be the best school in the world ... all intentions. That is the “what,” but where is the “how”? So, that vision, what does it mean for the design? Lets develop that through, and if we get that right we will end up with a very good organization for the school, good pedagogy, good flexibility, we are going to get very good environments. And when we talk about environments, we talk about good layout, good lighting, good ventilation, low carbon, and flexibility ... all the things which I think we want in schools.

Figure 6
Set of images contrasting the ‘looks’ of schools. © Andrew Beard Architect, Ltd.



When local authorities go out and look at precedents in exemplar schools, they come back with relevant features from other schools. However if they rely on iconic images of other schools they may underemphasize the social organization of the school and overemphasize what can be easily put into pictures. As these visual images are circulated and used in different contexts, they become used as “shorthand” by the professionals involved. They become seen as having a shared ownership across the community. Such visual images are used by the architecturally trained professionals as a way of building cognitive ability and client capacity. They are understood as a good source to rely on to make the case for design quality when decisions arise about value and money.

This vignette shows how visual representations are used to enroll stakeholders in the wider agenda of the BSF program. The representation of precedent and exemplars become used in the discussion about both organizational design and its physical forms. These images are recombined in PowerPoint to become examples that can be widely mobilized and distributed across different organizational contexts as more schools become involved in the national program.

Discussion and Conclusions

The findings highlight two roles that visual representations play in organizational transformation: they circulate design ideas across context and enroll stakeholders into a broad set of ideals. This circulation and enrollment can be both intended and unintended, for example as elements of the user brief become quite literally interpreted in an architect’s bid; or through different interpretations of the images shown as precedents and exemplars. The vignettes draw theoretical attention to the iconic nature of visual representations and the way they are used to discuss both organizational and building design.

Overall our study tracks the political, cultural, and aesthetic judgments that are being made around visual representations within the BSF program. At this level, architects and other professionals play significant roles in developing the discourses and images associated with transformation. The central government, local authorities, and professions are involved in significant work to negotiate the tension between prescriptive and participatory approaches to the design of new schools and are involved in design decisions that lead to transformations in the organization of schools. There are clear pressures that exert an influence on organization design—visual representations are used to show the desired outputs, convey precedents and exemplars, and develop the professional attitudes and approaches through professional activities.

One question that our data raises is around the dilemmas of visual literacy and expertise. Our data suggest that the representations used by users and designers do not simply visualize

their understanding but are actively used in constructing this understanding. Hence, the types of representations used are not neutral to the types of designs that are constructed. This is an area that is particularly interesting in complex contexts such as BSF, as there are a wide range of advisors that have been introduced into the program to elicit user requirements and involve users in the process.

The analyses presented raise intriguing new questions about the roles that visual representations play in organizational transformation. The data shows the use of both diagrams—that are analytic and used to represent and interrogate potential organizational structures—and more directly mimetic representations that are exact representations of what things look like. Hence, in Vignette 1, organizational designs are articulated in diagrammatic form and these visual representations become the basis for the architectural design of the school. In Vignette 2, images of existing schools are re-combined in PowerPoint and become iconic examples across the organizational field.

There are a number of areas for further research. One theoretical question is the way that the aesthetic culture of the architectural practice affects the organizational design for the school. Different professional practices have different strategies and have codified design knowledge into different sets of design rules¹³. Yet we know little about how these get mobilized in particular design interactions and how they affect both the quality of the outcome and the criteria that are seen as valid for judging this outcome.

13 G. M. Winch and E. Schneider, "Managing the Knowledge-Based Organization: The Case of Architectural Practice," *Journal of Management Studies* 30 (1993), 923–37; Graham M. Winch, "Internationalisation Strategies in Business-to-Business Services: The Case of Architectural Practice," *The Service Industries Journal* 28:1 (2008), 1–13; Romme, "Making a Difference: Organization as Design."

Aesthetic Interaction: A Framework

Paul Locher,¹ Kees Overbeeke,²
and Stephan Wensveen³

The rise in the development of interactive electronic products has been accompanied by growing interest in the aesthetic aspects not only of the artifacts themselves but in the aesthetics of interactive systems. Petersen, Iversen, Krogh, and Ludvigsen⁵ point out that these two approaches to the aesthetics of design reflect Shusterman's⁶ distinction between analytical aesthetics and pragmatic aesthetics, respectively. From an analytic perspective, aesthetics arise as a product property, as "added value" to an artifact. The focus of the design process here is on the aesthetics of appearance, on the creation of artifacts that are attractive and pleasurable. The pragmatic approach, on the other hand, is concerned with the aesthetics of use. According to this view, the aesthetics of an artifact emerge out of a dynamic interaction between a user and this artifact and is an integral part of what has been labeled an *aesthetic interaction* by some researchers⁷ in design and as a *resonant interaction* by others.⁸

At the same time the scope of design is changing from human/artifact interaction, mainly focused on opening up the functionality of a product, toward a broader approach that seeks to enhance interpersonal and societal values, including personal, aesthetic, and socio-cultural ones, through the application of intelligence (i.e., smart electronics) in artifacts.

Much has been written concerning the factors that contribute to the aesthetics of human-artifact interaction. However, to our knowledge, no framework or conceptual model of the structure of the interactive aesthetic experience that incorporates these factors has appeared in the literature. In this paper we integrate an information-processing model of the nature of an aesthetic experience with visual art proposed by Locher and his colleagues^{9,10} with a framework proposed by Wensveen¹¹ that describes the coupling of a user's actions (i.e., handling an artifact) and a product's function; the result is the formation of a general theoretical framework for understanding the nature of a user's aesthetic interaction with design products. Our hope is that the proposed conceptual framework will serve as a valuable basis for the development of experimental studies into the nature of aesthetic interaction to complement the experimental tradition of usability studies among designers.

Before presenting the framework, it is important to note, as have Petersen and her colleagues,¹² that the notion of aesthetic is used in ambiguous ways by theoreticians when it comes to answering the key question: What is the nature of the resulting

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- 3 Department of Industrial Design, Eindhoven University of Technology.
- 4 Stephan Wensveen, *A Tangibility Approach to Affective Interaction* (PhD diss., Delft University of Technology, 2005).
- 5 Marianne Petersen, Ole Iversen, Peter Krogh, and Martin Ludvigsen, "Aesthetic Interaction: A Pragmatist's Aesthetics of Interactive Systems" in *DIS2004—Proceedings of the 5th Conference on Designing Interactive Systems: Processes, Practices, Methods, and Technique* (Cambridge, MA: ACM Press, 2004), 269–276.
- 6 Richard Shusterman, *Pragmatist Aesthetics: Living, Thinking Beauty* (Boston, MA: Rowman and Littlefield Publishers, 2000), 3–33.
- 7 See, for example, Tom Djajadiningrat, William Gaver, and Joep Frens, "Interaction Relabelling and Extreme Characters: Methods for Exploring Aesthetic Interactions" in *Proceedings of DIS2000* (New York: 2000), 66–71; Jodi Forlizzi and Katja Batterbee, "Understanding Experience in Interactive Systems" in *Proceedings of DIS2004* (Cambridge, MA: ACM Press, 2004), 261–269; Kees Overbeeke, Tom Djajadiningrat, Caroline Hummels, and Stephan Wensveen, "Beauty in Usability: Forget About Ease of Use!" in *Pleasure with Products, Beyond Usability*, ed. William Green and Patrick Jordan, (London: Taylor and Francis, 2002), 9–18; Petersen, Iversen, Krogh, and Ludvigsen, "Aesthetic Interaction: A Pragmatist's Aesthetics of Interactive Systems."

- 8 See, for example, Caroline Hummels, Philip Ross, and Kees Overbeeke, "In Search of Resonant Human Computer Interaction: Building and Testing Aesthetic Installations" in *Interact '0*, ed. Matthias Rauterberg, Marino Menozzi, and Janet Wesson, (Amsterdam: IOS Press, 2003), 399–406.
- 9 Paul Locher, "The Contribution of Eye-Movement Research to an Understanding of the Nature of Pictorial Balance Perception: A Review of the Literature," *Empirical Studies of the Arts* 14 (1996), 143–163; Paul Locher, Elizabeth Krupinski, Claudia Mello-Thoms, and Calvin Nodine, "Visual Interest in Pictorial Art During an Aesthetic Experience," *Spatial Vision* 21 (2007), 55–77; Calvin Nodine and Elizabeth Krupinski, "How Do Viewers Look at Artworks?" *Bulletin of Psychology and the Arts* 4 (2003), 65–68.
- 10 And see the model of Helmut Leder, Benno Belke, Andries Oeberst, and Dorothee Augustin, "A Model of Aesthetic Appreciation and Aesthetic Judgments," *British Journal of Psychology* 95 (2004), 498–508.
- 11 Wensveen, *A Tangibility Approach to Affective Interaction*.
- 12 Petersen, Iversen, Krogh, and Ludvigsen, "Aesthetic Interaction: A Pragmatist's Aesthetics of Interactive Systems."
- 13 Mihaly Csikszentmihalyi and Rick Robinson, *The Art of Seeing: An Interpretation of the Aesthetic Encounter* (Malibu, CA: The J. P. Getty Trust, 1990), 6–7.
- 14 See Joep Frens, *Designing for Rich Interaction: Integrating Form, Interaction, and Function* (PhD diss., Eindhoven University of Technology, 2006).
- 15 Tom Djadaningrat, Stephan Wensveen, Joep Frens, and Kees Overbeeke, "Tangible Products: Redressing the Balance Between Appearance and Action," *Personal and Ubiquitous Computing* 8 (2004), 294–309.

emotion arising out of an aesthetic interactive experience? In other words, what is the aesthetic of interactive systems? This ambiguity is evidenced by the many terms found in the literature used to describe the affect generated—terms such as fun, surprise, delight, engagement, and rewarding. Furthermore, the failure to provide technical distinctions among the concepts used to describe the aesthetic outcome of an aesthetic interaction remains a central problem in this field, as well as in the arts. The purpose of this paper is to outline the *structure* of the aesthetic experience; it is beyond the paper's scope to provide an empirically based explanation of the nature of the affect (either positive or negative) that results from this experience. We note, however, that the pragmatic view of the nature of an aesthetic interaction with artifacts presented herein closely mirrors Csikszentmihalyi and Robinson's¹³ empirically based interpretation of a viewer's aesthetic experience with art, which is indistinguishable from what they call a *flow experience*. Briefly stated, their explanation of a flow experience asserts that individuals engage art objects "not because they expect a result or reward after the activity is concluded, but because they enjoy what they are doing to the extent that experiencing the activity becomes its own reward." A flow experience is one that contains its goal in itself; it involves deep involvement in and effortless progression of the activity with an artwork. In our view, this heightened state of awareness when one experiences great art, and during other types of activity, such as sports, hobbies, and challenging work, is the same type of involvement that occurs between a user and an artifact during an aesthetic experience with interactive systems (qualitatively so, if not quantitatively).

We turn now to the framework of the interaction of artifact-driven and cognitively driven processes (referred to as bottom-up and top-down processes, respectively, in Information Processing Theory) underlying user-product interaction and the resulting aesthetic experience described in this paper (see Figure 1). The directions of the arrows in the figure indicate that in the experience of a product there is a continuous, dynamic bottom-up/top-down interaction between the properties (form) and functionality of the artifact, the user's sensory-motor-perceptual (i.e., visual, handling or active touch, auditory) processes involved, and the user's cognitive structure. Thus, as an aesthetic experience progresses, the artifact presents continually changing, "action driven" affordances.¹⁴ These affordances in turn influence the timing, rhythm, flow, and feel of the interaction—factors seen as playing important roles in aesthetics of interaction by Djadaningrat, Wensveen, Frens, and Overbeeke.¹⁵ This interaction is monitored and directed by a "central executive," which in the present account is conceptualized as consisting of limited-capacity, effortful, control processes that direct voluntary attention to the artifact in a cognitively driven, top-down fashion. It forms the crucial interface between perception and memory and

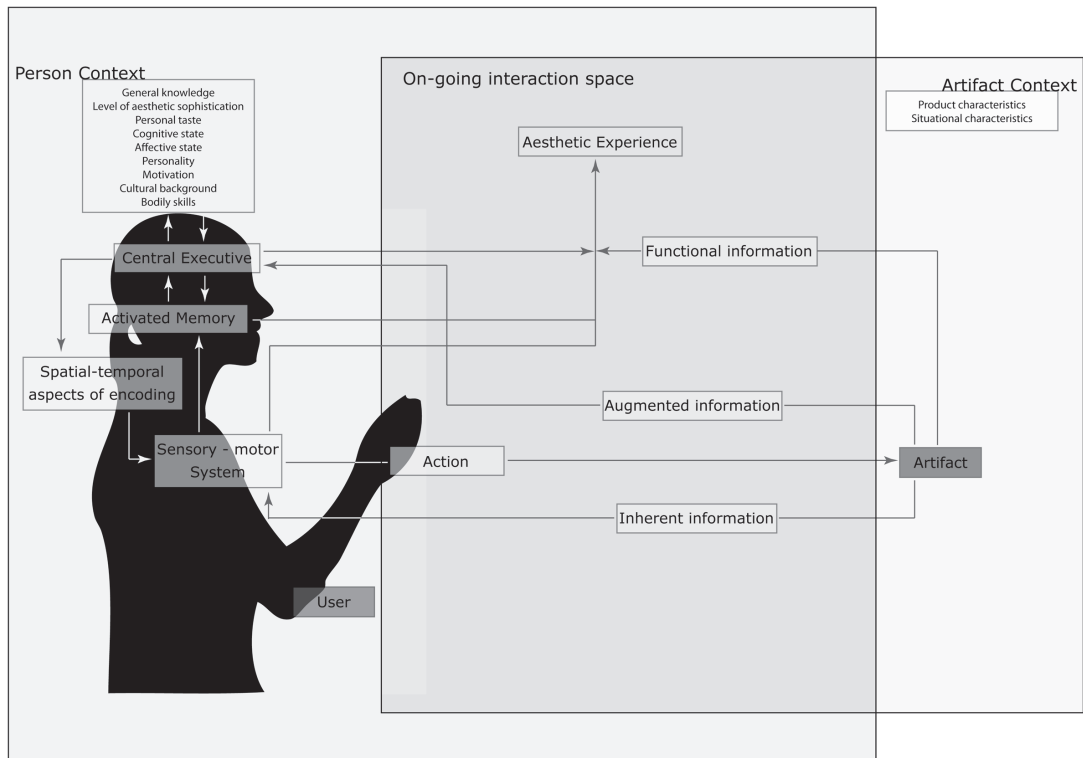


Figure 1
 Framework of the Interaction of Artifact
 and Conceptually-Driven Processes Underlying
 User-Product Interaction Resulting in an
 Aesthetic Experience

between attention and action. According to Baddeley,¹⁶ the central executive, which is one of the three components of working memory (the other two being subsidiary storage systems: the phonological loop and the visuospatial sketchpad), performs four important executive processes: “the capacity to focus attention, to divide attention, to switch attention, and to provide a link between working memory and long-term memory.”

Together the top-down and bottom-up component processes underlying thought and action create both meaning and aesthetic quality of the artifact from which the aesthetic experience with the artifact and the resulting affect emerge. For example, Wensveen¹⁷ designed an alarm clock in such a way that it offers freedom of interaction: The user can set the alarm time in a myriad of ways by moving one of twelve sliders. This allows the alarm clock to measure the user’s mood when the user sets the alarm time in an expressive way. The intertwining of perceptual-motor, cognitive, and emotional elements thus leads to an aesthetic experience. In experiments it was striking to see that when the users were in a good mood, they made symmetric and balanced patterns, and when they were in a bad mood, they made more irregular ones.

As shown in Figure 1, the two driving forces of the system are the artifact itself and a person context that reflects the user’s cognitive structures. The aesthetic experience is a product of the dynamic, ongoing interaction between these two components of the system. With respect to the artifact context, it has been shown

16 Alan Baddeley, *Working Memory, Thought, and Action* (Oxford: Oxford University Press, 2007), 119–120.

17 Wensveen, *A Tangibility Approach to Affective Interaction*, 117.

that features of an artifact provide a user with different types of information. Specifically, research has identified at least six ways in which the appearance of a product influences consumer product evaluation and choice, typically in an artifact-driven or a bottom-up fashion.¹⁸ An artifact's appearance can convey its aesthetic and symbolic value and provide a quality impression; it can communicate functional characteristics and ease of use; it can draw attention by visual novelty and communicate ease of product categorization. In addition to presenting product properties, interactive artifacts can be designed so that their use contributes to a dynamic aesthetic interaction between their form and functionality and the user. Although the primary focus of this paper is the aesthetics of interaction, the aesthetics of appearance of an artifact must always be taken into consideration as contributing factors to a user's interaction with it.

The second major contributing component to an aesthetic interaction is the user's cognitive structure, which contains several types of information (semantic, episodic, and strategic) acquired throughout his or her life. It is also the repository of one's personality, motivations, and emotional state. All these components are brought to bear in a top-down fashion on a user's interaction with a product, and they determine how he or she invites, perceives, and evaluates it.¹⁹ These components simultaneously contribute to and create what we call the "person context" in which the aesthetic experience takes place.

As mentioned, the aesthetics of use emerges out of the dynamic interaction between a user and the product's form and functionality. When using mechanical products, such as a pair of scissors, there is a natural or unmediated coupling between a product's appearance, the action possibilities for its use, the action, and the function, which supports intuitive interaction with the product. Interactive electronic products, on the other hand, require an interface for individuals to interact with them. Users need information from the product, both in the form of feedforward and feedback, to guide their actions toward the couplings between actions and functions. Wensveen²⁰ has presented a framework to conceptualize the person-product interaction that focuses on three types of information the user can receive from an interactive system: inherent, augmented, and functional.

Inherent information is the information provided by the natural consequences of taking an action—that is, by touching an object while simultaneously observing it visually. This type of information ties together the action possibilities of the product and the perceptual/motor abilities of a user. Inherent feedforward information from the product communicates the kind of actions possible when using it, such as pushing, sliding, or rolling its components, and how the action can be carried out (e.g., the amount

18 See Mariëlle Creusen and Jan Schoormans, "The Different Roles of Product Appearance in Consumer Choice," *The Journal of Product Innovation Management* 22 (2005), 63–81.

19 Sharon Shavitt, "Products, Personalities, and Situations in Attitude Functions: Implications for Consumer Behavior," *Advances in Consumer Research* 16 (1989): 300–305.

20 Wensveen, *A Tangibility Approach to Affective Interaction*, 158–78.

of force required to bring about an action). Inherent feedback is the information returned from acting on a product's action possibilities (e.g., the feel and sound of a button on a product when it is pushed). Both feedforward information and feedback information are acquired in a bottom-up fashion by the user as indicated by the arrow drawn from the artifact to the sensory-motor system in Figure 1.

Augmented information comes not from an action on the product itself but from an additional source about either the action possibilities of the artifact or the purpose of the action possibilities. This source informs a user about an internal state of the system through the use of such artifact features as LCDs, light-emitting diodes, and sounds. This type of information draws on the user's knowledge about such artifacts and is added to the product by the central executive (as indicated by the arrow from the artifact to the central executive in Figure 1). Feedforward augmented information provides information about the action possibilities of the product in the form of, for example, on-screen messages (e.g., words, pictograms, or graphical labels) indicating what to do. The information that a user receives when these sources are activated and inform the user of the internal state of the system (indicating, e.g., "processing," "stand by," "log off") is called augmented feedback.

The third type of information, functional information, relates directly to the function of the product; it is the goal of the interaction, the actual purpose of the product. Functional feedforward information is provided by the visible functional parts or components of a product, which inform the user about the functionalities of the product (e.g., the speakers and the screen of a television). When users receive information (feedback) from the functional parts of a product, it is clear to them that their actions were successful. Thus, functional information is generated by the combined output of both bottom-up and top-down processes (i.e., by artifact and central executive processes), as indicated by the arrows and their directions in Figure 1.

Because interaction with a product involves the simultaneous use of visual and haptic (exploratory touch) perception following an initial glance at it, a brief description of the physical relationship between the two sense modalities is in order to understand how handling an object can add to the perception and aesthetic evaluation of an artifact beyond vision's contribution, the basic premise of this framework. Research suggests that vision and haptics are differentially suited to extract and encode information about objects (e.g., haptics for texture and vision for spatial location) and that the two modalities interact in various ways at the encoding stage of processing. The nature of the interaction is mediated by differential attention to an object's features, based on the demand characteristics of the perceptual performance required by the task being performed.²¹ However, there is reasonably good behavioral and neuroscience evidence that visual and haptic object representation

21 For a review of research findings concerning the psychology and neuroscience of haptic perception, see Mark Heller and Soledad Ballesteros, *Touch and Blindness: Psychology and Neuroscience* (Mahwah, NJ: Lawrence Erlbaum Associates, 2006); Mark Heller and William Schiff, *The Psychology of Touch* (Hillsdale, NJ: Lawrence Erlbaum Associates, 1991).

is shared between these two perceptual modalities; thus, stimulus information from an artifact obtained separately by the two senses becomes combined at the cortical level into a common bimodal, cognitive representation of the object. Supporting this assertion are findings by a number of neuroimaging studies,²² which have demonstrated, for example, that haptic exploration of novel objects produces activation not only in the somatosensory cortex when the same objects were later viewed, but also in areas of the occipital cortex associated with visual perception. Findings such as these provide support for the view that the haptic component of a dynamic interaction with an artifact not only makes its own modality-specific contribution to the aesthetic experience with it but, more importantly for the present discussion, also combines with vision's contribution to the aesthetics generated by the user-product interaction at "higher levels" of processing, as described. (It should be noted that the auditory qualities of the artifact likely contribute to the aesthetics of a multi-sensory interaction; however, this modality is not part of the focus of the present discussion.)

Behavioral evidence that tactile information can affect the aesthetic evaluation of artifacts is provided by the findings of a recent study by Jansson-Boyd and Marlow.²³ They asked undergraduate students to rate the aesthetic quality of DVD containers that varied in three types of plastic textures (a smooth surface, a ribbed plastic surface, or a thick matte plastic material) under three viewing conditions (visual only, blind haptic evaluation, or simultaneous visual and tactile sensing of the DVD). The front cover of the DVD (*E.T.: The Extra-Terrestrial* special edition) was the same across conditions. It was found that the aesthetic quality of the DVD containers was influenced by both visual and tactile evaluation and that the extent to which the modalities influenced evaluations, individually and collectively, was a function of which of the three surface textures was being evaluated.

We return now to a description of an aesthetic interaction with an artifact as depicted in Figure 1. As mentioned, the components of the framework and the processes indicated by the arrows are adapted from the model describing the nature of an aesthetic experience with visual art, proposed by Locher and his colleagues.²⁴ According to this two-stage model, exploration of a painting by a viewer starts with rapid encoding of the content of its pictorial field to acquire an initial impression (or gist) of the structural arrangement and semantic meaning of the composition. The gist information detected with the initial glance at a composition drives the second stage of an aesthetic experience, which consists of visual scrutiny or focal analysis of presumably interesting pictorial features detected initially to satisfy cognitive curiosity and to develop aesthetic appreciation of the painting. We propose that a user's experience with a product follows these same two stages.

22 See, for example, Thomas James, G. Keith Humphrey, Joseph Gati, Philip Servos, Ravi Menon, and Melvyn Goodale, "Haptic Study of Three-Dimensional Objects Activates Extrastriate Visual Areas," *Neuropsychologia* 40:10 (2002), 1706–1714.

23 Catherine Jansson-Boyd and Nigel Marlow, "Not Only in the Eye of the Beholder: Tactile Information Can Affect Aesthetic Evaluation," *Psychology of Aesthetics, Creativity, and the Arts* 1 (2007), 170–173.

24 See, for example, Locher, Krupinski, Mello-Thoms, and Nodine, "Visual Interest in Pictorial Art During an Aesthetic Experience," 56.

25 See, for example, Paul Locher and Yvonne Nagy, "Vision Spontaneously Establishes the Percept of Pictorial Balance," *Empirical Studies of the Arts* 14 (1996), 17–31; Christoph Rasche and Christof Koch, "Recognizing the Gist of a Visual Scene: Possible Perceptual and Neural Mechanisms," *Neurocomputing* 44–6 (2002), 979–984.

There is ample evidence²⁵ that many physical properties of an art work (e.g., its structural complexity, symmetry, and organizational balance) are detected by the visual system automatically or pre-attentively by genetically determined, hard-wired perceptual mechanisms. Research²⁶ also shows that the sense of touch is capable of rapidly recognizing stimulus properties of objects simply from sensory information (e.g., shape, texture, “sensuous feelings”). Such innate processes are indicated in Figure 1 by the arrow between the sensory-motor system and the aesthetic experience, which reflects a rapid initial impression of the object by haptics as well as by vision. The initial stage of processing by the visual and haptic sensory systems just described is similar to the first of three levels of processing of artifacts proposed by Norman,²⁷ called the visceral level, which involves the rapid generation of a first impression of the artifact based on hard-wired, automatic processes. Such reactions have been referred to as “natural perceptive responses to products” by Overbeeke and Forlizzi,²⁸ who, like Norman, assert that they are evoked in the absence of significant interaction with products. The aesthetics of artifacts must, therefore, be concerned with the immediate impressions of products, obtained first by visual perception and then by initial handling of the product. That is, designers must create “effective visceral designs,” in Norman’s words, that are attractive at first glance (both visually and then haptically) and that appear pleasurable to use when they present themselves to us. Thus, an analytical approach to aesthetics is, in a sense, an important “first step” of a pragmatic approach to design. A positive first impression of a product is essential if there is to be any further interaction with it. It is most likely the case that a user’s initial reaction to an artifact also influences how the artifact is “processed” during the aesthetic experience, as is the case for artworks, although to our knowledge this influence has not been demonstrated empirically.

In addition to the automatic detection of physical properties of artworks and artifacts, it has also been shown that individuals are capable of rapidly detecting and categorizing learned properties of a stimulus. For example, Locher and others²⁹ have demonstrated that characteristics of the artistic style of a painting (e.g., abstract, representational) and a composition’s pleasantness and interestingness can be detected with a single rapid (100 ms) glance at it. In addition, Creusen and Schoormans³⁰ report that almost all members of a consumer household panel were able to perceive the overall form and appearance of three product alternatives of two artifacts (viz., a clock radio and hairdryer) within 800 ms of presentation onset. These responses occur by a rapid and direct match in activated memory between the structural features of an art object or artifact generated by the sensory-motor system and a viewer’s knowledge about the stimulus stored in his/her cognitive system (person context). The resulting rapid automatic reaction to the stimulus, represented in

26 See Heller and Schiff, *The Psychology of Touch*.

27 Donald Norman, *Emotional Design: Why We Love (or Hate) Everyday Things* (New York: Basic Books, 2004), 21.

28 Kees Overbeeke and Jodi Forlizzi, “Creativity and Design, What the Established Teaches Us” in *New Directions in Aesthetics, Creativity and the Arts*, ed. Paul Locher, Colin Martindale, and Leonid Dorfman, (Amityville, NY: Baywood Publishing Co., 2006), 137–150.

29 Locher, Krupinski, Mello-Thoms, and Nodine, “Visual Interest in Pictorial Art During an Aesthetic Experience,” 69.

30 Mariëlle Creusen and Jan Schoormans, “The Influence of Observation Time on the Role of the Product Design in Consumer Preference,” *Advances in Consumer Research* 25 (1998), 551–556.

the framework by the arrow drawn from activated memory directly to the aesthetic experience in Figure 1, also contributes to one's first impression of it.

Once an initial impression of an artifact is formed based on information obtained from seeing and handling it, the second stage of processing—focused attention to its form and functionality—follows, directed by the central executive. For the visual modality, users gather information about an artifact by moving their eyes over it in a sequence of rapid jumps, or saccades, followed by pauses or fixations. The number, location, and duration of fixations used to visually scrutinize the artifact constitute the spatial-temporal aspects of encoding, in Figure 1. For touch, information about an artifact is similarly obtained by users actively moving one or both hands about the product to select and manipulate its features, usually in concert with vision in sighted individuals. The encoding activity of both modalities is indicated by the action arrow in Figure 1 drawn between the sensory-motor system and the artifact. Once again, it is important to note that the perception and aesthetic evaluation of an artifact emerges out of the dynamic interaction of input obtained by both looking at and handling an artifact. Product information in activated memory, acquired by visual and haptic experience with the artifact during the second phase of processing, spontaneously activates subsets of featural and semantic information in the user's knowledge base. The information drawn into active memory across the time course of the interaction is determined by effortful processing on the part of the central executive as the user/product interaction unfolds within the ongoing interaction space, as shown in Figure 1. This ongoing process is influenced by the factors of the person context shown in the figure, including the user's level of aesthetic sophistication (i.e., experience in the arts and design), personal tastes, level of education, cultural background, personality, and his or her emotional and cognitive state during the aesthetic experience, to name but a few of the factors most relevant to an interaction with a product. In this respect, the central executive corresponds in function to Norman's³¹ reflective level of processing of artifacts, which, along with the behavioral level of processing in his model, are very sensitive to experience, training, culture, and education. However, Norman asserts that the reflective level does not have access or control over sensory input or behavior, whereas these functions of the central executive are critical in the present model.

Research from our laboratory has demonstrated how some of the factors shown in the person context of Figure 1 contribute in an interactive way to a user's aesthetic experience with a product. For example, we³² observed that positive affect, induced by the gift of a small bag of candy, enhanced ratings of the appeal of digital cameras by participants untrained and trained in principles of design, compared to control groups who did not receive candy.

31 Norman, *Emotional Design*, 21.

32 Paul Locher, Joep Frens, and Kees Overbeeke, "The Influence of Induced Positive Affect and Design Experience on Aesthetic Responses to New Product Designs," *Psychology of Aesthetics, Creativity, and the Arts* 2 (2007), 1–7.

Analysis of cognitive process measures obtained from participants' verbal protocols collected as they completed the task revealed that individuals in a positive mood state differentially influenced the way the groups of participants thought about the cameras as they made their rating decisions. For those untrained in design, positive affect cued and facilitated access to more positive material in memory, which enhanced their perception of the cameras' appeal. In contrast, design-trained individuals in whom positive affect had been induced showed greater access and use of design-related information in memory than design-trained students who did not receive candy. This enabled them to identify more aspects of good design in the cameras, and correspondingly, made the cameras more appealing from a design perspective. These findings illustrate how aesthetic expertise (or lack thereof) and motivation (two factors shown in Figure 1) combine in an interactive way through the central executive to influence in a top-down fashion the spatial-temporal aspects of interaction with the cameras (the artifact).

There is yet another set of factors that contributes to a user's interaction with an artifact, and these factors constitute the artifact context in Figure 1. They include product characteristics and situational characteristics.³³ As mentioned previously, the appearance of an artifact communicates at least six different roles of a product, of which the symbolic role was one of the most frequently mentioned by participants in a study by Creusen and Schoormans.³⁴ The social-cultural and socio-economic factors related to an artifact, its historical significance, the quality of the materials out of which the artifact is constructed (e.g., wood vs. plastic), and the marketing programs used to sell the artifact (e.g., brand names) all influence the perceived symbolic associations and social value of products.³⁵ These factors, in turn, contribute to a user's self-perception of his or her cultural taste (i.e., the values and standards to which he or she aspires, either as an individual or as an expression of group membership). The positive or negative values assigned to products are based on pre-existing knowledge in the user's knowledge base (i.e., the person context) and, as such, function to influence an interaction in a cognitively driven or a top-down fashion. Situational characteristics, or the environment in which one experiences an artifact, also provide an artifact context that influences the nature and outcome of an interaction with an artifact. Using a product in either a store, at home, or in a product test situation likely influences in a differential fashion the experience one has with it. Observation time available to process product information is another factor that determines how superficially or intensely one can pay attention to the product. In addition, the salience and functional dimensions of an artifact can be "primed" in a user through subtle factors created by previous advertised exposure.

Hummels, Ross, and Overbeeke³⁶ also see context mode as an important aspect to consider when designing for resonant interaction

33 Shavitt, "Products, Personalities and Situations in Attitude Functions: Implications for Consumer Behavior," 302.

34 Creusen and Schoormans, "The Influence of Observation Time on the Role of the Product Design in Consumer Preference," 554.

35 For an overview of the social value of products see Nathan Crilly, James Moultrie, and P. John Clarkson, "Seeing Things: Consumer Response to the Visual Domain in Product Design," *Design Studies* 25 (2004), 547–577.

between a user and a product. In addition to the influence of where and when an interaction takes place, already discussed, the context factors include “how often,” “how long,” and “how frequently” a product is used. The “use factor” relates to a key question not yet addressed here: At what point will interactive consumer products designed to provide rich interactions become just “things” in users’ lives? If, as is the case with all stimuli, the brain naturally adapts to repeated exposure to a stimulus, how then can repeated experience with an artifact maintain a user’s excitement, interest, and pleasure through an interaction, even after long acquaintance with it? Norman’s³⁷ answer is that, if an artifact is to give continued pleasure, two components are required: the skill of the designer in providing a powerful, rich, and compelling experience, and the skill of the user to detect this richness. He notes that works in the fields of art, music, and literature that have stood the test of time are rich and deep so that there is something new to be encountered on each experience with such “classics.” These two factors fall within the artifact and person context factors, respectively, of the present framework.

In conclusion, we believe the framework presented in this paper provides a comprehensive foundation upon which the nature of an aesthetic experience, in an interaction with a design product, may be better understood. The important point conveyed by the framework presented herein is that there are many moderating factors contributing in complex, dynamic ways to influence a user’s aesthetic experience with a design product. We hope that it suggests promising future research directions and offers the design community the potential for developing concrete guidelines for designing interactive products.³⁸

36 Hummels, Ross, and Overbeeke, “In Search of Resonant Human Computer Interaction: Building and Testing Aesthetic Installations,” 111.

37 Norman, *Emotional Design*, 111.

38 We wish to thank Lilian Admiraal, who designed Figure 1 as part of her M1.2 research project at the TU/e Industrial Design Department.