

It is also necessary to create a common language between designers and managers that helps to overcome existing communication problems between both groups, as well as including an understanding of design in business education and an understanding of business aspects in design training, helping to generate the synergies required to boost innovation in firms.

The great challenge for design is still to convince people of the benefits of adding together design and company by building on the strong points of both. To achieve this objective, the educational world and the associations

dedicated to design and innovation must play a key role, promoting an understanding of design in business training, as well as an understanding of business aspects in design training, and generating and disseminating information that helps to justify to companies their investment in design.

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# Design: research and innovation

**Xavier Costa**

Xavier Costa is director of ELISAVA, PhD from the University of Pennsylvania and an architect from the Universitat Politècnica de Catalunya. He has lectured at Cornell University, Columbia University and the Architectural Association. He has run the architecture and design department of the Museum of Contemporary Art of Barcelona (MACBA), the Metròpolis programme (CCCB-UPC) and is advisor to the Mies van der Rohe Foundation. As curator of architecture and design exhibitions, he has worked with the Museum of Modern Art, the Wexner Center for the Arts and the San Francisco MOMA.

He has published extensively on architecture and design, both in specialist journals and European and North American editorials.

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**Throughout the last decade, the relationship between design research and the transfer resulting from this research in the form of innovation has been undergoing a process of change. The usual "cause-effect" relationship, which assumes a sequence in which research is produced first and is then applied, could give way to more integral experiences combining research and innovation in different formats.**

This article examines some contemporary experiences that are examples of how transition comes about from design research to innovation, focusing on specific experiences in some centres of reference and particularly on the so-called "*milieux of innovation*". In some of these cases, the concept of design research carried out at university centres and institutes is transformed and broadened out to a process ranging from prospective actions to the materialisation and utilisation of new proposals.

**Innovation and its milieu**

Manuel Castells, in his influential study on the information society, *The Information Age: Economy, Society and Culture*, published in 1996<sup>1</sup>, outlines a broad and lucid panorama of the civilisation emerging since the social and economic revolution of the new information age and fully identifies the role played by innovation. According to Castells, the instantaneous and universal communication flows that are characteristic of post-industrial societies increasingly

<sup>1</sup> MANUEL CASTELLS. *The Information Age: Economy, Society and Culture*. (3 vols: The Rise of the Network Society, The Power of Identity, End of Mil- lenium). Oxford: Blackwell, 1996.

influence the logic of production and consumption. In this new scenario, the rapid pace of innovation and its applications plays a decisive role.

From another perspective on culture that emerged in the last few decades of the 20th century, the critic Hal Foster has shown that certain avant garde values of the previous century, such as radical “novelty” in artistic products, have been reclaimed in the culture of the last few decades, in spite of the fact that this recovery (or “return”, as Foster calls it) may decontextualise some of these values with regard to the context in which they appeared<sup>2</sup>.

Within the context of his book on the information age, according to Manuel Castells the production processes within an information society (as opposed to those of industrial societies) have the following characteristics:

- Innovation is the main contributor of added value to processes and products.
- Innovation depends on two conditions: research potential and the capacity to make this specific. New knowledge must be discovered and applied afterwards to specific goals in a specific organisational context.
- Information technologies become a critical ingredient in these processes due to their capacity to generate innovation.

Castells, together with Peter Hall and Philippe Ayalot, has also introduced the concept of “*milieux of innova-*

*tion*”<sup>3</sup>. Milieux of innovation are defined as a “set of relationships of production and management, based on a social organisation that shares a work culture and instrumental goals aimed at generating new knowledge, new processes and new products.”<sup>4</sup>

Castells adds that spatial proximity is a necessary condition for these milieux to exist as this encourages synergy, i.e. additional value resulting from the interaction between the elements that go to make up this environment. “Milieux of innovation are the fundamental sources of innovation and of generation of added value in the process of industrial production in the information age.”<sup>5</sup>

The urban formats of these milieux may be diverse. Firstly, large metropolitan concentrations, which used to play a predominant role in industrialisation processes, continue to have significant capacity to cumulate some innovation-inducing factors and at the same time generate the necessary synergies with production sectors and advanced services.

During the 1990’s, large urban concentrations that acted as milieux of innovation were, according to Castells, the following: in Europe - Paris, London and the M4 corridor to Reading and Milan; in Asia - Tokyo, Singapore and Shanghai; and in South America - Sao Paulo. But the main examples were in North America, particularly in the areas of Boston and southern California (Los Angeles-San Diego), Seattle and Austin.

However, during this period other milieux became particularly relevant that did not exactly coincide with industrial

<sup>2</sup> HAL FOSTER. *The Return of the Real: Art and Theory at the End of the Century*. Cambridge, Mass.: The MIT Press, 1996.

<sup>3</sup> MANUEL CASTELLS i PETER HALL. *Technopoles of the World: The Making of 21st Century Industrial Complexes*. London: Routledge, 1994.

<sup>4</sup> CASTELLS, vol I, p. 388.

<sup>5</sup> CASTELLS, vol I, p. 390.

metropolises. The paradigmatic case was that of Silicon Valley, a suburban area on the outskirts of the city of San Francisco, that was identified with the technological and design revolution occurring in the 90’s. Other comparable phenomena include the 128 corridor to Boston, resulting from the renovation of an old manufacturing structure, and the research “triangle” in North Carolina, principally made up of university centres. These places owe much of their existence to pioneering centres of innovation, such as Stanford University, near Silicon Valley, the Massachusetts Institute of Technology (MIT) in Boston and CalTech in southern California.

Silicon Valley grew up around a concentration of industries dedicated to the production of computers and semiconductors and is named after the use of silicone in this sector. The term had appeared for the first time in the newspaper Electronic News in 1971, invented by the journalist Don Hoefler. The creation of the first *Stanford Industrial Park*, a complex of small industrial areas rented out at low cost to emerging companies since 1951, developed towards what would later be called the Stanford Research Park, a key catalyst in the development of the *Valley*.

Among the main companies born or located in Silicon Valley we can find names such as Adobe, Apple, Cisco, DreamWorks, Google, Hewlett-Packard, Intel, Logitech, Oracle, Sun Microsystems, Symantec and Yahoo! The concentration of universities around Silicon Valley and the south of San Francisco was also notable and clearly one of the fostering conditions for this development. In addition to the two leading institutions, Stanford University and the University of California at Berkeley, there were also other centres such as UC Davis, UC Santa Cruz, Carnegie Mellon West Coast Campus, San Jose State and Santa Clara University.

Internationally, other developments have also proli-

ferated that sometimes attempt to match the case of Silicon Valley, for example the Sophia Antipolis corridor between Naples and Cannes, the Digital Hub of Dublin, the new concentrations of activity in Bangalore and the various versions of Silicon Valley in cities such as Ottawa, Guadalajara (Mexico), Beijing, Stockholm, Campinas (Brazil), Kuala Lumpur and Dubai.

As a definitive component of milieux of innovation we also have the role of social networks that drive these milieux through the communication of ideas, the circulation of professionals, the role of design as a defining element of this stage in industrial technological innovation and the fertile cross-relations between technological innovation and the entrepreneurs of this milieu.

Milieux of innovation tend to generate a network between them that favours relations and competitiveness. Castells also points out that these milieux of innovation can run global production and distribution networks extending throughout the planet, thereby defining a new dynamic that is both local and global at the same time.

The culture of the so-called “new economy” that appeared at the end of the 1990’s also helped to emphasise the role of innovation in the new conditions of the information society. Kevin Kelly, editor of the magazine Wired and author of *New Rules for the New Economy*, outlined the central role of innovation in the new economic, cultural and productive condition of this society that experienced a notable slow-down at the end of the decade when the bubble burst of the so-called dotcom’s (companies based on information technologies and their implementation via the internet). “Like a chain reaction, one well-placed innovation can trigger dozens, if not hundreds, of innovation offspring down the line”, Kelly says, at the same time as “in the new economy, innovation is more important than price, as price is merely a derivative of innovation<sup>6</sup>”.

### Media Lab: research, design and innovation

In this context, a key centre in developing a model of design and technology research that also includes its transfer to companies and the innovation process has been the Media Laboratory, or Media Lab, as it is normally known.

The Media Laboratory concept was proposed in 1978 by the professor at Massachusetts Institute of Technology (MIT), Nicholas Negroponte, after having worked on it together with Jerome Wiesner, dean of the Institute in the 1970's. The Lab was imagined as an interdisciplinary experiment where the design, information technology, art and science of the time would converge to outline the directions of the future.

But the Media Lab didn't fully materialise until 1985. In spite of being a significantly independent institution, it has always officially belonged to the School of Architecture and Urban Planning of MIT. Media Lab's mission is to teach and carry out research into design and digital technologies to be applied to different areas of communication.

Negroponte published the book *Being Digital* in 1996, conceived as a collection of articles originally published in the magazine *Wired* in previous years, which condensed the philosophy of the Media Lab and widely publicised the project and, naturally, the person of Negroponte, who can never be disassociated from the Laboratory<sup>7</sup>.

The research carried out within the context of the Media Lab emphasised interdisciplinary work. Research does

not focus so much on developing basic technologies but rather on the application or combination of this technological knowledge. The concept of interface has also been one of its main areas of work, focusing on the different ways people relate to objects and the information these objects carry. This is the notion of "intelligent object", i.e. products that can gather data from their environment and thereby predict what the user wants or might desire and therefore be used more efficiently. In the Media Lab, design and technology merge into a single process, which at the same time also looks toward research and its subsequent use within the context of the companies sponsoring this work.

The Media Lab is organised as a consortium of working groups acting relatively independently. Some of these groups work directly in design areas per se, while others have defined other, more technological areas of work or areas related to information technology. Some of the groups associated most closely with design are the *Sociable Media Group*, that researches and also develops installations and interfaces exploring new forms of social interaction; the *Tangible Media Group*, that generates continuous interfaces between people, digital information and physical environments; and the *Responsive Environments Group*, focusing on applications of interactive technology in everyday objects, such as medical instruments, garments and motorways. Another team, called the *Lifelong Kindergarten*, works on objects that help learning processes, and the consortium *Things that Think* brings together various projects revolving around the concept of intelligent objects.

Unlike other university centres, the Media Lab depends solely on large corporations and companies. In 2003 there was a group of 125 firms that each contributed \$200,000 per year for free access to the findings of the different groups. Most recently, however, the Media Lab has experienced financial difficulties that have delayed its new site on the MIT campus and have led to other programmes being interrupted, such as Media Lab Europe.

Due to the success of the centre in the 1990's MIT decided to set up a second Media Lab. Various sites were considered, particularly Japan, but Dublin was finally chosen. So Media Lab Europe (MLE) was created, a project supported by the Irish government, which saw MLE as a potential attraction for other projects yet to crystallise in the area of the city of Dublin, known as the Digital Hub. But this project has not progressed as hoped. High implementation costs in the city of Dublin, together with insufficient infrastructure, have attracted fewer projects than initially forecast. In January 2005, MLE announced that it could not guarantee it would continue its operations.

A second Media Lab project that has brought together design and innovation is the proposal "the \$100 computer". After a project identified as "e-development", which attempted to implement new technologies in poor communities in Asia, in particular in India, Media Lab has initiated this proposal, presented publicly by Nicholas Negroponte at the World Economic Forum in Davos in 2005. Organised as "OLPC" or "one laptop per child", its aim is to universalise the use of computers via this model, reaching children and young people through governmental channels<sup>8</sup>.



Figs 1-3: 100\$ Laptop prototype (<http://laptop.org>)

### ELISAVA and the Media House project

In 2001 the Media House project appeared in Barcelona, resulting from collaboration between ELISAVA Escola Superior de Disseny, Media Lab and its consortium Things that Think, and the Metàpolis group, made up of architects and designers from Barcelona. ELISAVA took part in the project via its Master programme in Interactive Interface Design. Barcelona City Council also collaborated by contributing the space and infrastructures of the old Mercat de les Flors in Montjuïc for this project<sup>9</sup>.

The Media Lab had developed a prototype of an electric device/switch for domestic use that was actually a micro internet server. This meant that any electrical circuit in the household, or in any other inhabitable area, could be activated via the internet and the functioning and interface of the home could be integrated into the network.

Entitled "The House is the Computer, the Structure is the Network", the impact was investigated that the internet might have on inhabited areas, a phenomenon that started to appear in general use in the middle of the 1990's. In spite of the fact that the technology for these micro servers had been developed at MIT, in Barcelona a real-scale prototype for households was produced for the first time.

<sup>6</sup> KEVIN KELLY, *New Rules for the New Economy*. Harmondsworth: Penguin, 1998, p.90. See CARL SHAPIRO & HAL R. VARIAN. *Information Rules: A Strategic Guide to the Network Economy*. Cambridge: Harvard Business School Press, 1998.

<sup>7</sup> NICHOLAS NEGROPONTE. *Being Digital*. New York: Vintage, 1996.

<sup>8</sup> About Media Lab, the internal vision has been in STEWART BRAND. *The Media Lab: Inventing the Future at MIT*. Penguin, 1988. A chronicle of recent events can be found in the article by BRENDAN KOERNER. "The Lab that Fell to Earth". *Wired* 11.05 (May 2003).

<sup>9</sup> METÀPOLIS [ed]. *Media House Project: The House Is The Computer, The Structure The Network*. Barcelona: ACTAR, 2004. The Metàpolis group was made up of Vicente Guallart, Manuel Gausa, Willy Muller, Enric Ruiz-Geli, Ramon Prat and Xavier Costa.