

- Architecture journals
- Big data
- Creative process
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Innovation

Interaction

Neuromarketing

Paper

Perception

Lluís Torra

“The printing press has more of a past than a present, but despite the apparent paradox, it has more of a future than a present”

Born into a family of bibliophiles (his grandfather was a printer and his father a bookseller), Lluís Torra's professional career has unfolded in the world of corporate images, communication and marketing. The long hours he has spent working on social projects have enabled him to specialise in the field of social marketing.

Torra has embarked on several personal initiatives and in recent years has worked as director of marketing and communication in the insurance sector. At present he is executive vice-president of Club Marketing Barcelona, vice-president of the Catalan Association of Managers, Directors and Entrepreneurs, and a member of the team that organised 'Business With Social Value', a social initiative for ensuring self-sufficient special work centres for the disabled.

The Art of Printing Sensations

The Graphic Arts Reinvent Themselves in Order to Survive the Digital Impact

When the economic crisis appeared to push us towards digital formats in lieu of ink-scented paper, when e-books and PDF files were beginning to replace printed books and catalogues at a faster pace than had been foreseen, when the demise of the graphic arts seemed to be in sight, some businesses in the sector refused to give up, surprising us with new sensory proposals in printed matter. As well as being visually attractive, these proposals provide olfactory and tactile experiences, and even react to body temperature. Innovation and interaction in a pure state.

More Past and Future than Present

The mid-nineteenth century was a golden age for the printing press, which was developing slowly but steadily, yet few printers of the age would have thought that barely a hundred and fifty years later the profession would be fatally wounded. And even less that this would be due to a digital revolution, which they would have considered science fiction.

Funnily enough, the printing press has more of a past than a present, but despite the apparent paradox, it has more of a future than a present. The present is a period of reinvention and adaptation that is unfortunately striking a blow for hundred-year-old businesses, currently suffering two simultaneous crises, the one (financial) accelerating the other (digital), which would otherwise have unfolded much more gradually. The latter, which has encouraged businesses to try digital impression as a way

of cutting costs and has surprised them with significant improvements in immediacy, saving them money, ink and shipping, I informally call 'the PDF crisis'. It's hard to believe that in a context of presumed economic growth, these companies will resume printing as they had until relatively recently.

But not all is lost. There is still a future. The survival of the sector established in 1450 by Johannes Gutenberg¹ will depend on talent, creativity and a desire to invest in projects with added value in research, design and innovation translated into new applications with commercial possibilities. All this, which has been sensed for a number of years, has gained momentum but sluggish industrial structures have incurred in debt in order to face up to huge changes, disregarding the first signs of change due to the mistaken belief that the age-long profession was free of risks.

The invention of offset and of galleys in place of typography; the explosion of silkscreen printing and of vinyl supports promoted by advertising; the development of computer-publishing programs; the new techniques enabling direct plate printing (with no previous filming) and the voices of designers and

¹ For more information on Johannes Gutenberg (1398-1468), considered the father of the printing press for his invention of mobile metal types, see <<http://www.gutenberg-museum.de>> and *The Gutenberg Bible* [online], Harry Ransom Center, The University of Texas at Austin, Austin, Texas [Accessed: 20 September 2013]. Available at: <http://www.hrc.utexas.edu/exhibitions/permanent/gutenbergbible/#top/project/>

advertisers grudgingly informing of the quality of printing in Japan, with its select varnishes, stochastic networks, hexachrome printing and printing with fluorescent inks have been constant relentless changes that have left no margin for regret.

Aromatic, Tactile, Interactive Finishes and Special Optical Effects

As mentioned, the graphic arts sector has suffered two simultaneous crises, the first (the economic recession) precipitating the second (the change in business model). Cutbacks in spending over the past few years have led companies and publishing houses to propose radical changes in their communication strategies. Adopted unwillingly at first as simply a means of saving money, they are now fully integrated in the digital world thanks to PDF files, digital catalogues, e-books and apps. Furthermore, as a result of the reduction in shipping costs brought about by electronic mail and social networks like Facebook, LinkedIn or Twitter, most of the products on which the graphic arts industries had based their business until the onset of the recession will cease to exist once and for all on paper, and will continue to evolve in the digital field, consequently becoming closer to consumers, more immediate, and promoting more interactive communication.

However, as is usually the case when significant changes are produced, what many companies view with suspicion, many others consider an opportunity to steer their business in a new direction, to evolve and innovate. Collaboration with ink and varnish manufacturers, and with other pioneers in the fields of science and technology, is one of their investments for creating new printing applications

that introduce sensory finishes such as smell and touch, as well as the ability to interact with users. New products and services that are unfeasible in digital systems are now being offered; there is quite a demand for them in Spain, but where neuromarketing² is applied to paper supports and to packaging in particular to a great degree is in the rest of Europe and the United States.

Art and Science to Stimulate Creativity

For a number of years, the introduction of sensory elements in the fields of health, food, cosmetics, retail outlets, printed matter, packaging and promotional articles has been studied from a completely scientific point of view at the Spanish Society of Sensory Sciences (SECS, for its initials in Spanish),³ in connection with companies such as Esparbé, Freixenet, Gaes, Gallina Blanca, Star, Productos Auditivos, Badalona Serveis Assistencials and the Centre for Technological Innovation in Food and Pharmacy. SECS groups together scientists and other professionals related to sensing and perception, and its main objective is to encourage and manage the exchange of knowledge in order to advance these sciences and their applications.

For SECS, the field of sensory sciences includes the areas of neurophysiology, psychobiology, anthropology, analytical chemistry, sensory analysis, engineering, statistics, micro-electronics, and product design and marketing. All the above examine the interaction between environmental stimuli and our senses, their perception and integration, related cognitive processes, and the measuring, interpretation and understanding of human responses to the properties of products perceived by the senses.

Basing themselves on this specialised view, Esparbé graphic arts company established in Manresa realised that its initiative could transcend the visual and be neurological, embracing emotional elements by means of olfactory and tactile applications, as well as others introducing visual or interactive ef-

fects produced by thermal or conductive inks (that react to changes in temperature or low-voltage electricity, respectively). This idea is perfectly in keeping with developments in marketing and communication, increasingly oriented at offering sensory experiences as features distinguishing them from the competition. We are now fully immersed in the age of neuromarketing.

And yet, when it comes to being innovative in an industrial environment that is not used to change, to promote new possibilities in a market that is still unprepared for them also requires a certain degree of education. It also entails a reorientation in relations with clients, to create a collaborative and cross-cutting environment that will enable the commercial and technical staff of graphic industries to learn how new print finishes are applied and how they can be suited to their productive systems. To adapt, in strategic and technological terms, to the market's new sensory trends, habitual clients need training, support and advice both as regards technical and creative or design issues. This will help them make the most of the new capabilities and come up with interesting proposals for their own customers, favouring alliances that can lead to significant progress in the fields of publishing, packaging and outlet promotion, to name but a few examples.

Five Senses ... or More?

From a very early age we have been taught that human beings are able to perceive sensations through five senses. Now, however, scientists and other experts who have studied sensory effects on man have challenged this concept.

According to Doctor Josep de Haro Licer, clinical head of the ORL service at Badalona Serveis As-

sistencials (BSA), to trust only in the senses of smell, taste, touch, hearing and sight is insufficient from a scientific perspective. According to Dr De Haro, in the animal world the senses are classified into two large groups: stimuli activated by waves and stimuli activated by chemical substances. Among the former we find stimuli based on pressure waves (touch and hearing), those based on electromagnetic waves (light) and those produced by thermal waves (temperature); among the latter, smell and taste.

Science is obviously able to detect new ways of stimulating our sensory reactions that, to quote Dr De Haro, can 'measure a host of internal variables such as the sense of balance, blood pressure, the concentration of substances such as glucose, amino acids, fatty acids, CO₂, blood oxygen and blood osmolarity'.⁴

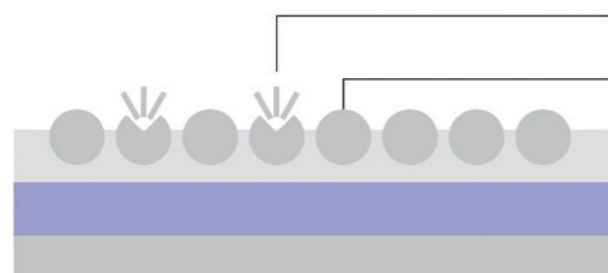
“This sensory universe opens up an extraordinary field that constitutes a unique opportunity for the graphic arts sector to transform and adapt to new trends in communication”

This sensory universe opens up an extraordinary field that constitutes a unique opportunity for the graphic arts sector to transform and adapt to new trends in communication, which integrate perception as a key element to attract consumer attention. The research and development projects undertaken by Esparbé point up some very surprising applications that allow advertising campaigns, packages, special offers, catalogues or books to be customised in new ways that transcend their shape, graphic design and materials.

2 K. Randall, 'Neuromarketing Hope and Hype: 5 Brands Conducting Brain Research [online], *Fast Company Magazine*, 15 September 2009. [Accessed: 20 September 2013]. Available at: <http://www.fastcompany.com/1357239/neuromarketing-hope-and-hype-5-brands-conducting-brain-research>

3 Sociedad Española de Ciencias Sensoriales. Available at: <http://www.percepnet.com/secs/>

4 J. De Haro Licer, 'Sensorialidad básica (3): la multiplicidad de los sentidos,' *Percepnet*, Centro de Recursos sobre percepción y ciencias sensoriales [online], SECS - Rubes Editorial, Girona, 25 September 2007. [Accessed: 13 October 2013]. Available at: http://www.percepnet.com/perc09_07.htm



▲ Micro-encapsulation has opened up a world of possibilities to grant printed matter greater realism. The sense of smell complements the visual experience.

Micro-capsules of Scent

So the world of aromas, that had until recently been confined to the perfume and food industries, in which multinational companies with Catalan infrastructure such as Givaudan have been working for several years in the field of users' perceptions of—and reactions to—smell and texture, is now spreading to other sectors such as the one we are examining here, the graphic arts.

Can a scent be printed? Can we design a scent to measure? The answer to both questions is yes. The technique for manufacturing inks and varnishes for the graphic arts, particularly for silkscreen printing, has developed greatly over recent years, and one of the advances made is the discovery of how to introduce smell into paper through printing.

The process consists in micro-encapsulating the essence of a scent and mixing the micro-capsules with an innocuous and colourless binder so that they are deposited on the support during printing. When friction is then applied, they break and release the fragrance they contain. This process can be carried out with a wide range of standardised essences, or else it can be customised, in which case the product is manufactured starting from the original essence of the scent desired by the customer, that has to be liposoluble without hydrosoluble solvents, tensioactive or glycolic substances, and has to pass a test period to ensure that the aroma that emanates from the printed matter matches that of

Aroma (it is released when the micro-capsules are broken through friction)

Micro-capsules

Colourless varnish

Ink

Base (paper)

the original essence. This technique submerges us in a unique sensory experience. Enhancing the photograph of an orange with the scent of this citrus fruit, for instance, the sensation produced by the image is multiplied to the point of evoking a virtually real experience.

Today, aroma is one of the fields that have a greater scope for growth. Commercial brands that are already used to having their own scent at their sales outlets can now also include their essences in their visiting cards, catalogues or packaging so that they may exude the same corporate scent as the air fresheners in their establishments.

The predicted growth of demand has led to investments in research and to ongoing improvements to products. Esparbé is taking part in a study to find an alternative to micro-encapsulation that will allow fragrances to be released without friction, enabling experts to programme quite precisely during the manufacturing process the amount and duration of the fragrances emitted.

To Touch and to Look: Seeing through Touch

In April 2006, thanks to optician Quim Estrada, the town of Vic welcomed the exhibition entitled *Touch and Look*, organised by French designer and glasses maker Alain Mikli. The commission was originally by photographer Yann Arthus-Bertrand, who had



▲ Seeing a picture of chocolate that smells of chocolate is a highly captivating and emotional experience.

produced wonderful pictures of the most outstanding spots in the world. The show, staged for the first time in Spain after having toured several cities around the globe, presented fifteen photographs made of the same material used to manufacture the glasses' frames, thanks to which the visually impaired were able to touch, see and interpret the images with their hands.⁵ The essay in Braille published in the exhibition catalogue was printed in resin, an innovative technique that improved reading through the sense of touch, as opposed to the traditional technique based on exerting pressure on the paper. This was one of the first experiences in printing Braille texts in resin to be carried out in Spain.

What we must understand to begin with is that the desire to enhance the sensitivity conveyed by an image, a graph, illustration or text, has nothing to do with blindness, for it transcends the idea of adding volume to specific areas of print. The technological development of varnish finishes has managed to recreate complex tactile qualities such as those of peach skin, cork, wood, velvet, the texture of a garment of clothing or the brushstrokes of a painting.

Along the lines of this latter example, we could publish a catalogue of paintings that would present the pictures with the original relief characterising

the artist's brushstrokes. The value this would grant would have been quite inconceivable a few years ago, for the technique has only just been perfected for reproduction by digital means. Another example is the publication of a catalogue of earthenware tiles, by Esparbé and Roca manufacturer, that reproduces the textures and reliefs of the original tiles almost to perfection.

This technique, which could at first appear to be a caprice only within the reach of a few privileged companies, will actually be cost-saving for entrepreneurial communication and marketing. Until recently, tile sellers were burdened by samples of original pieces, of considerable weight and volume, which they could not even leave at their customers' houses. Today they can leave catalogues with visual and tactile reproductions that are identical to the original models. This example is enlightening, for it enables us to envisage the importance of the new technique in improving efficiency, competitiveness and business profits.

“The technological development of varnish finishes has managed to recreate complex tactile qualities such as those of peach skin, cork, wood, velvet”

As well as thickness or relief, a range of finishes provides different materials with special tactile qualities. Clothing that feels like real clothing, cork that feels like real cork also partake of this sensory game. Enhancing the perception of what we see when we touch it with our fingers, these options are now common in packaging design, in the publishing world and in advertising.

⁵ *Regards Tactiles: des expositions à voir du bout des doigts* [online], Group Alain Mikli International, Paris, 2006. [Accessed: 13 October 2013]. Available at: <http://www.mikli.fr/internationalGroup/yannArthusBertrand.php>

Surprising Optical Effects

Our sense of sight also presents many other possibilities that cannot be perceived by digital apparatus. A new system evokes a host of visual effects through the application of a polyester varnish that reflects metallic effects and sparks of light to produce finishes that are pleasant to touch—pure fantasy in relief. The technique facilitates modular compositions of inks, allowing designers to choose the thickness of particles, the colour combination and density. It is thus possible to obtain a wide range of special effects applicable to endless types of printed matter and packaging, befitting each project's need for specific communication. Sectors such as the cosmetic, fashion, jewellery or furniture industries have a lot to gain from improvements in the perception of their products thanks to such effects.



▲ Sectors such as the textile and jewellery industries can benefit from the new applications with metallic effects and sparks of light, that grant much more realism to finishes that are impossible to reproduce in flat inks.

And What If We Interact with Users?

Of late, the graphic applications that have merited the most research are those that preserve interaction between products and users or, to put it plainly, those that manage to bring about visible changes in the appearance of products. As a result, the graphic arts have embraced inks that react to temperature and light, and others that are able to transmit electricity, for instance, opening up a world of possibilities in the fields of communication and technology for the future of the sector.

This interaction between specialities so far unconnected is revolutionising advertising and outlet campaigns. In a short space of time we have moved from traditional raffles and scratch-card promotions to inks that are only perceptible when they react to light and are then contemplated in the dark, or are only visible by black light lamps (previously used in security systems and for legal tender) or when they react to heat, for instance.

The future, however, will bring developments that will no doubt emerge from projects that will play with the senses of taste and smell (fragrances),



▲ The possibility of introducing different textures and reliefs into images is one of the sensory advantages printing has over its digital competitors.

touch, hearing, sight, and chemistry, electronics and physics, to offer us constant changes which will rapidly transform a sector that is already more of a sensory than a graphic art.



▲ Scratch-cards were among the first forms of printing to introduce user participation.

The Future of Communication Will Be Sensory

According to numerous studies of the motives behind consumer purchases, eighty per cent of these are irrational—in other words, we shop following our intuition and the sensations we perceive when we hold the product in our hands. Very often the decision to make a purchase is conditioned by painstaking previous research that begins with the design of the product wrapper or label. This research falls into the field of neuromarketing, a science that 'measures each of the brain's reactions to the various stimuli found in the shop,' to quote marketing consultant Pedro Díaz Cepero.⁶ In the opinion of Stéphane Thiollier, delegate adviser of Careo and ex-president of Procarton, European Association of



▲ Security inks, hitherto only used in this area, now provide endless possibilities of interacting with users in the field of marketing.

Carton and Cartonboard Manufacturers, in future, market success will depend on the mechanisms that encourage the brain to choose certain items instead of others. So what we should be studying are the emotional mechanisms that condition human behaviour.⁷

Apple is one of the clearest examples of a brand of products that have recently been the object of in-depth study to ensure user satisfaction and even to awaken consumer desire. Visionary Steve Jobs repeated time and again that the magic of Apple products began the very moment the user touched the box.

Such visions are totally in keeping with those of companies that are already devoting special attention to innovation and research in their business strategies, as a differential fact and a key tool for their survival. Printing in the twenty-first century is a speciality that can no longer be understood on its own, but as a technical part of cross-cutting, participatory projects designed to create new and increasingly advanced complex projects. And this is the challenge printers now face: it is not enough to print ink, we now need to print sensations.

Photos courtesy by Esparbé.

6 P. Díaz Cepero, 'Neuromarketing, en la frontera de la investigación comercial' [online], *MK Marketing+Ventas*, No. 258 (June 2010), pp. 28-32. [Accessed: 13 October 2013]. Available at: <http://pdfs.wke.es/7/1/2/4/pd0000047124.pdf>

7 S. Thiollier, 'Cartonboard Packaging to Play A Greater Role in the Future' [online], *ED Enballage Digest*, No. 10198 (8 January 2010). [Accessed: 13 October 2013]. Available at: <http://www.emballagedigest.fr/blog.php?2010/01/08/10198-cartonboard-packaging-to-play-a-greater-role-in-the-future>