

Massimo Cremagnani

Digital Printing by Elements

Mini Encyclopedia of the 21st Century Graphic Art



Demo pages from
Digital Printing by Elements,
first book *in the world* approaching the
whole topic in his full complexity

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Digital Printing by Elements

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This book develops in an introductory section (definition, innovation, versatility, humanistic approach and familiarization) and an analytical part (analysis by Elements, perceptual and pragmatic analysis, practical examples).

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An unmatched technological and aesthetic evolution that changed the way we communicate

Digital printing is everywhere

Around the city
In the office
In the stores
On products
For Arts.
At home
On people

Most people use digital printing, and everybody undergoes it every day: papers and posters, t-shirts and bags, packaging and labels, photos and illustrations, invitations and badges... Just look around you!

Let's give a definition

Matrix unloaded
Changes are good
The printing process

Digital printing is not “put your paper and push a button,” but a complex and multifaceted process

Let's give more definitions

Two kinds of images
The digital text.
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To understand the world of digital printing and get the best results, we need some computer graphics knowledge

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Introduction to Elements

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Just like a car.

<i>History teaches</i>	
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Digital printing is not just brands, models and products, but an alchemy of Elements that we can recognize and evaluate with our senses and a bit of knowledge

To facilitate our entry into the world of digital printing, we make a comparison with another well known technology: cars

A matter of scaling.

A necessary distinction
Format and Image
Format and Printing technology
Format and Ink.
Format and Media
Format and Finishing
XSmall format
Small format for a personal use.
Small format for production
Wide and ultra wide format

There are hundreds of printers and thousands of products made with digital printing. Let's see them rearranged into simple categories, from the smallest to bigger. There are many differences, not always so obvious

Image

Image typologies
Photography
Art
Graphics
Text.
Complex design

The Image is the message we print to communicate. Five typologies of images lead to different choices

Printing technology

Basic mechanics
Laser printing (aka electrophotography)
Inkjet printing
More printing technologies
Technology and the other Elements

A closer look at the Technologies, that is how they work and why we use different printers for different products

Ink

Toner
Tape inks.
Common ink names

Even Inks are of many types, each one designed for one or more materials and with unique features

<i>Water based inks (dye and pigmented)</i>	
<i>Solvent inks</i>	
<i>UV inks</i>	
<i>Latex inks</i>	
<i>Solid inks</i>	
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<i>Textyle inks</i>	
<i>How we are introduced to inks</i>	
<i>How we see inks</i>	

Media

<i>General features of media</i>	
<i>Media typologies</i>	
<i>Paper</i>	
<i>Synthetic films</i>	
<i>Adhesive films</i>	
<i>Fabrics</i>	
<i>Rigid media</i>	

Paper, films, plates or tissues that we print represent half of what we see as a finished product

Finishing

<i>Small format finishing</i>	
<i>Cutting</i>	
<i>Bending</i>	
<i>Binding</i>	
<i>Lamination and varnishing</i>	
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<i>Cutting and shaping</i>	
<i>Junctions</i>	
<i>Protection</i>	
<i>Varnishes</i>	
<i>Structures</i>	

At the end, the print must be presentable and usable. Let's analyze the different processes, the accessories and the most widely used techniques

The moral of the tale.

Who is who in digital printing

Printer producers

RIP factories

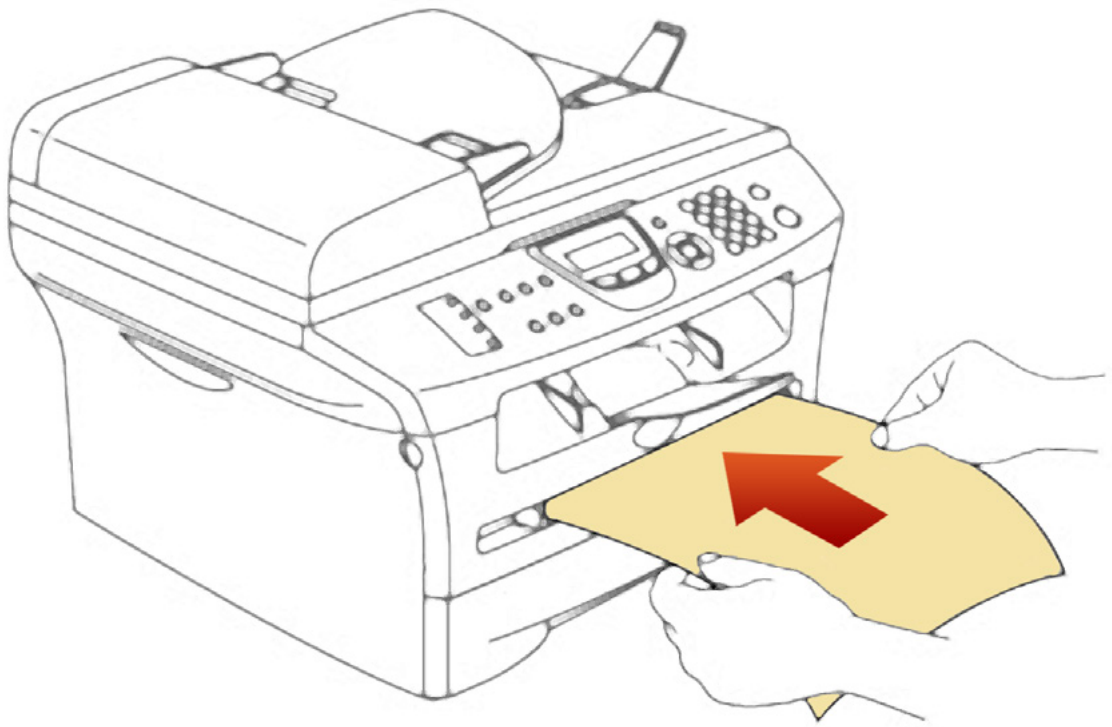
Glossary.

**Why was this book written?
Technical and cultural innovation,
customization accessibility, technical
documentation, creative inspiration ...**



This is the first chapter from
Digital Printing by Elements,
the first book *in the world* approaching the
whole topic in his full complexity
Have a nice reading!

Introduction



- *Written culture and visual culture*
- *What has changed?*
- *Less technical, more emotions*
- *In conclusion, the mission:*

“

*There is a real progress only when the benefits
of a new technology are for everyone.*

Henry Ford

”

1969

after more than
40 years
of just technical
and monographic
documentation

In this year, among other things, Led Zeppelin released their first album, the man went to the moon, the author of this book born and **the first laser printer was invented.**

Digital printing officially had its appearance in 1969, with a laser printer created by Gary Starkweather in the Xerox¹ labs. The technology was implemented in 1971 and made available to the public in 1981, though still very expensive. In the meantime (1976) IBM built the 3800 model: even more expensive and big as a small apartment, which was used for the mass production of transactional documents and postal services. In 1981, Xerox introduced the Star 8010 as a “printer for personal use”, but the price of 17,000 dollars did not encourage its spread. It was only in 1984 that digital printing became a product and a concept for the public domain, thanks to the first HP LaserJet (run by Canon software). Fifteen years later. And that happened because someone else opened a new path, starting to produce and sell the first personal computers.

In a business context (and, from my point of view, even from the creative side), in order to talk about technological innovation we should consider a fundamental element: there is no innovation if the main instruments do not reach the free market. Nobody, before 1984, knew of the possibility to print “on his own”, with a semi-automatic, real-time tool, without having to go and ask to a skilled outer company.

Today, more than a quarter of a century later, everyone knows of the existence of digital



The Macintosh Plus, released in 1986, was submitted together with the LaserWriter, one of the first laser printers for personal use. The desktop publishing era had begun.

¹ A list of the manufacturers of tools and materials for digital printing mentioned in this book is available on page xxx

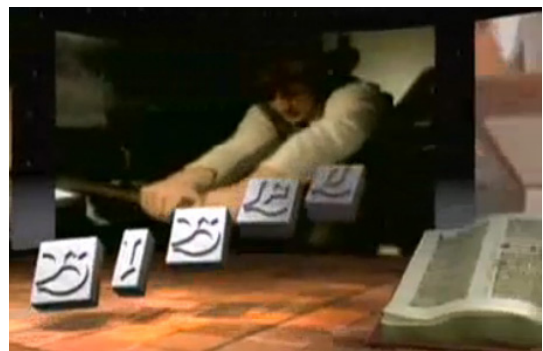
printing, even if in a extremely superficial and detached way. The functional, aesthetic and creative aspects that confirm the potential of this technology are a lot but not always obvious, perhaps because no one expected it: innovation has been so fast and powerful that catch us unprepared, much more than other similar historical events. Strictly speaking, this is the second time that the world is revolutionized by the expansion of the visual reproduction phenomenon that we call printing. Let's step back a few centuries, to better understand how the society was affected.

Written culture and visual culture

Throughout history, printing has experienced two big revolutions.

The first one occurred around 1450, when Johann Gutenberg invented the printing press with moveable type, giving rise to modern typography. Before this change, each page of a book or document was carved out of a single plank, which was then inked and passed through a press. The procedure involved long processing times and also other major problems, since only a single error or a small damage to the matrix was enough to make it unusable. Gutenberg, according to a logic rather shared nowadays, thought to divide the problem into a lot of smaller problems, thereby reducing the extent of any complications. First he broke texts in their **basic elements**, namely the alphabet letters. So, thanks to the developments achieved in the metallurgical fields, he derived many small matrices for each character, using an alloy of lead and tin. Finally he built a grid in which the matrices could be aligned to compose words, sentences or whole texts. Thanks to its practicality, this technique spread throughout Europe so that at the end of the century, more than 30,000 titles had been printed for a total of 12 million books. The movable type printing favored the mass alphabetization and the diffusion of the written culture.

The second revolution, which is still in place, began at the end of the twentieth century as a way to bring to the tangible reality all kinds of images and texts, which now



A promotional video
by Heidelberg that
summarizes the
printing technology
evolution:
[www.youtube.com/
watch?v=P1JHiA_
xf3o](http://www.youtube.com/watch?v=P1JHiA_xf3o)

were (and are) created, managed, or stored in the computers. This technology, commonly referred to as **digital printing**, has given everyone the ability to produce printed, dividing the world population into two different classes. The *homo sapiens*, formerly known as “customer”, lives in the conviction that in digital printing techniques are very simple: he sees it as a unique process highly automated. Its counterpart, a set of different tribes which for convenience we will summarize in *homo graphicus digitalis*, lives in self-taught aiming of a further development of this automation, optimizing and steadily diversifying each type of printing.

If Gutenberg's invention, in its technical simplicity was easily understood, used, copied (at the time there were no patents) and improved on countless times, digital printing has by nature a large number of variables that make it more difficult to use and for a full un-

XV Century

Photo by Typof - www.sxc.hu/profile/typof



moveable characters

XX Century



independent dots

The first printing revolution divided the matrix in letters, the second one in single point of color.

derstanding. What I never stop to point out is that these variables are the real strength of digital printing. The versatility of technologies and materials, when handled with skill, allows you to virtually create any type of print and, if necessary, to reach a value-added and innovative conception. Gutenberg had stopped to text, perhaps adding some glyphs; now we are talking of any kind of images, of more or less complex graphic designs, of direct print on any kind of material. If the mobile characters had, at the time, the ideal solution for the serial production of books, digital printing allows the fast production of single or

multiple prints with endless variations in size, material and specific use.

As shown in the image below, the digital printing technology lived a very fast evolution. In just forty years we have moved from the first prototype to hundreds of models developed to reach thousands of applications. From the early machines, cumbersome and expensive, there is now a wide offer: from the cheapest machines for personal use up to several industrial models with a customizable structure. And if there are all these kinds of printers, that's because lots of needs have been identified: different products, different amount of prints required, different materials to print, and so on. In essence, the innovation of Gutenberg made possible the diffusion of the texts, while digital printing is making easier the production of any type of content on any type of substrate.

Forty years of
printers evolution.

1969



First Xerox printer,
prototype for the 9700
model

1976



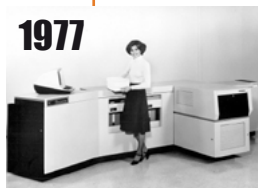
IBM 3800. The first
hi-production printer

1984



HP LaserJet. The first
personal printer

1977



And the DeskJet,
first inkjet



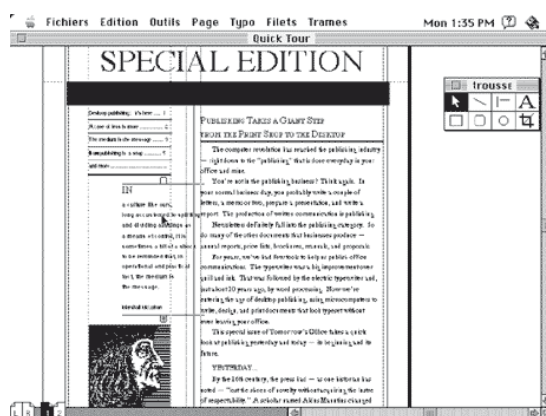
2012

What has changed?

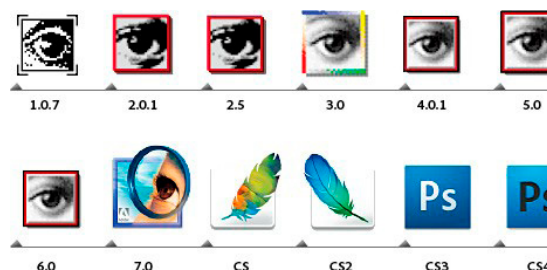
28 years have gone since that fateful 1984 when a worldwide phenomenon, other than that provided by Orwell, radically changed the habits of the entire planet. The personal computer introduced new research methods in the common use, in the information assimilation and management. The subsequent adoption of printers in homes and offices substantially changed the way we communicate and manage documents, putting at our disposal an innovative external memory. The diffusion of specific softwares, from word processors to databases, from photography to graphic design up to desktop publishing (aka DTP), has provided operational independence and new creative methods.

Calligraphy and drawing have been put aside, allowing anyone to publish texts or images with a minimal effort. On the professional level, many print operators adapted themselves (against their plans) to the new technologies, believing or hoping to have found the magic wand. Straddling the millennium, digital printing has had a considerable boom, encouraged by many promises that, unfortunately, exalted innovation without allowing the experimental status of this metamorphosis, the need for a coordinated research nor planning a wide range training system.

Digital printing, more than any other computing practice, is suffering from an approximate, inadequate and fragmented documentation. Up to now, each variable of the printing process was treated independently from others in the form of mainly technical manuals, that are strictly related to one or another system. The monographic documentation of the press tools, without investigating the alleged completeness or the teaching skills of any single edition, features in most cases a strong self-referenced charge, intentionally designed to present the product as the



Aldus Pagemaker, the first DTP software (later acquired by Adobe).

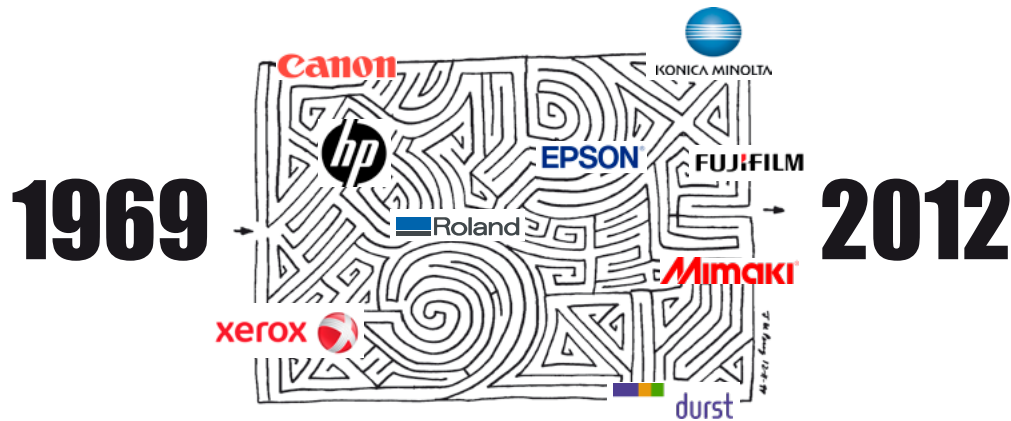


Information technologies are constantly being renewed. In the picture, the icons of the program Adobe Photoshop in 15 years of evolution.

most functional, versatile and complete on the face of the earth; obviously without proposing any comparison. In short, in most cases marketing replaces its targeted information to a real (and useful) knowledge of the new art and its tools.

The common idea of digital printing as “simple and natural evolution of the traditional press systems” also precluded further investigations on the sociological, anthropological and aesthetic levels. There are not many, nor widespread, studies on the creative use, on

Dozens of brands produce digital printing equipments. Everyone tries to impose its own rules.



the change of visual communication (as in the production as well in its perception) and on the environmental influence of this phenomenon. This situation is sadly similar to what happened over a century ago for photography. The potential for a sensitive and synaesthetic usage has not been properly valued. Indeed, the expressive skills have often been discouraged both in ordinary people than in professionals.

The vehicular decoration is growing (and getting more spectacular) with digital printing.

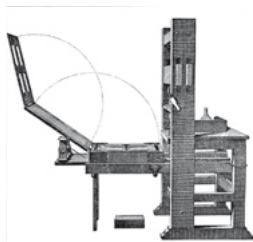


What should have been (and is) a very powerful customization tool has turned into a sinister responsibility transfer for creativity. Most people confuse the advantages of automation, really effective, with a proxy creation. Actually, digital printing is not an evolution of traditional press more than a computer is to the typewriter. And a computer, alone, can not write a novel, a personal letter, an opinion.²

² I don't think that artificial intelligence could replace the human one. As far, it could stand beside.

These inaccurate information formulas must be considered in addition to the rapid evolution of the single technologies and to the changing context of printing, in which innovations affect each other by changing aesthetic trends, production methods and market choices. Commercial promotion, I said before, substitutes information and real-world stimuli, increasing the estrangement inflicted by the other computer tools to the users, both professionals and not. Put more simply, the image (or text) processed by computer and, actually, virtual, have been conceptually stuck within the System, involved in a technological sophistry as well virtual and intangible. This lack of contact made the creative printing process too innovative, abstract and “technical” to be discussed or assimilated with the right timing.

XV-XIX Century



XX-XXI Century



Diffusion of written culture	Diffusion of printing availability
Mechanical technology	Mechanical and electronic technology
Unique technology	Complex and varied technology
Few variables	Many branched variables
Horizontal technical culture	Vertical competitive technical culture

The changes brought by the two revolutions. The digital is much faster and more complex.

For a more reliable evaluation of this phenomenon, we can identify in the graph above the main effects related to the two revolutions. There are at least five points in which digital involves changes much more complex than those worn by the invention of Gutenberg. In addition to the informational aspects previously discussed, here stands out the complexity of the technology in use. In the first case we use mechanics in its most simple aspect, skills that were then developed and articulated over centuries. On the other hand, the digital way features from its birth the complex combination of advanced mechanics and high quality electronics. The versatility of this combination is grown in a few years

flowing in two basic technologies, electrophotographic and inkjet, which in turn have given rise to various specialized technologies. But typography, in good or bad times, remained the same until the advent of photoengraving. Needless to say that the culture on the traditional discipline has developed slowly and in a single direction for engineers, operators and users, while the current situation has created a strong branching. And if the producers exchange patents and technology each other³ to build more complex tools in continuous competition, the operators are hardly sailing in this sea of innovation to find their own way, while the end user can't do anything but suffer silently.

These are large differences, and we did not have the time or way to get used to. Instead, we have the illusion that the transition happened in a natural way, and this erroneous evaluation has had several consequences. The simplicity attributed to digital printing (the fateful *click-to-print*) has given rise to a remarkable entrepreneurial chaos: Many companies born prematurely from the big bang of the new technology, only to realize they have bitten off more than they can chew. Other pre-existing businesses have been converted, even if only in part, to new technologies, trusting in past experiences. Many of them were also hurt by a technology still not explicit, not enough ergonomic and much farther away to those mastered till then than what was reasonable to think.

Just in recent years the professional digital printing reached a certain balance, painfully conquered in the anarchy of individual operators. Some of them, more wisely, have specialized in a particular production area. New professional are born: from prepress operator to the printing ones, skilled in one or another model; from color consultant to production manager for these specific technologies. Software and hardware managing heavy calculations, that are the basis of every print job, grow and evolve every day, focusing on speed, quality and productivity.

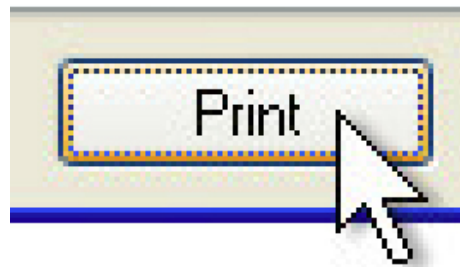
Thanks to digital printing, new products and new markets arise and grow: from automotive decoration to *TransPromo*, from gadgets to fine arts, from urban to interiors design, as far to exhibition stands and many others. With the spread of the Internet, finally, has changed the way to dialogue between suppliers and customers, to send the materials, to manage orders and verify the entire process.

³ Obviously paying for it.

Less technical, more emotions

The overly technical and complex arguments, that we find in every sector but are more evident in the computer area, are often hidden behind a limiting (and limited) form of automation that, pretending to help, keeps control to what man produces. This results a false knowledge (for humans) on one side, and a downwards standardization⁴ (for prints) on the other. The evolution becomes, humanistically, involution.

If you are reading this book, I am ready to bet that you've used a printer. Directly, clicking on the icon in the top left and pulling the paper sheet from the lower tray. Or indirectly, by sending or delivering a graphic file or text to him who was once called



“typographer” and today is generically known as

“printer”. In both cases, you've got an idea, you've developed at your computer checking the drafting on the screen, and finally, you wanted to bring it back to the material world.

With this introduction, I would raise some little doubts: you got exactly what you wanted? Sure it was the right choice or was there a way to do it better? How else could you print your project? And finally, what else could you have done to produce your idea?

These questions must arise because all of us - some more and some less, each in his own way and in relation to his own culture and education - has his own aesthetic, based on senses and tastes, and influenced by a convenience governed by reason. Since we are talking about printing or to (re)production⁵ of images and/or text used to communicate something to others, we must put in the foreground the visual power of communication, the expression of the printed object. This is an essential factor to the success of our ideas.

⁴ In this text, and to fully understand the author's philosophy, the term “standardization” means something like “limitation” as only a limited record of cases can be kept under control. In this context, we will try to identify the standards, as they're laboriously studied and being studied by eminent researchers, accepting the value of “bare minimum” on which to build a wider and more qualitative research.

⁵ Throughout this text we will incur again in the distinction between production, meaning an original realization, and reproduction, as replication of content that is already made. In the first case the process is, or should be, entirely dedicated to the final result since the initial conception, while in the second one we attempt to create a substitute for the initial model while maintaining as much as possible the features. Creative and operating processes for the two projects, as we will see later, are very different.

In conclusion, the mission:

Nowadays the digital printing technologies are many, many more than you think. As we shall see, all of them follow the same path for better or worse production and use similar mechanisms and functions, although the “small” differences lead to very different results in functionality and appearance.

With this book, I would like to bring attention to the taste of digital printing. Print is not just a mechanical action or a series of technologies presets, but an information flow taking shape. This shape must communicate our idea in the best way, respecting both the origin and the destination.

The aim of my purpose is precisely to rectify the above mentioned issues: I will do it providing a general documentation, apolitical and extemporaneous; I will elude technicalities and awaken emotions. But how is it possible to find our way in this new universe without dedicating our life to the research, storing thousands of details, names and acronyms? Without diving into something so alien as computer science, chemistry, mechanics? The answer is: a direct, empirical and tangible experience.

The digital printing technologies - for the first time **all technologies** - will be reported on a material level to facilitate a closer, direct and perceptive analysis. Just as children watch, touch, taste the world to understand its meaning, so we will do with digital printing. Just as Gutenberg broke up the matrix, we will divide the concept of digital printing into smaller pieces, more comprehensible and manageable, regardless of individual culture and technical knowledge. Because digital printing is, as we shall see, a huge and complex world, but reducible to a few primary Elements and their mutual relations.

We will start from the sensitive side of the printed object, because it's the printing result what we are really interested in, what we are aiming for since the starting idea and that we want to make in the best way at all. It's the print that communicates through the senses with sign, colors, content, but also with size, with the way it's handled or it reflects light, with the vibration of the substrate material or the ink density, in the way which it's shown or mounted in a specific context. Perceiving and recognizing all this, with a little care and a few small suggestions, is much more accessible than the cold and detached technical analysis to which we are accustomed. Getting back to the sensible plan takes

full advantage of the phenomenon of imprinting, thanks to which, after an initial learning phase, we will always be able to recognize empirically these details without any effort, and to evaluate them according to our experience and general practice and, why not, our personal taste.

The digital printing nature will then be divided into basic **Elements**: Image, Printing technology, Ink, Media and Finishing. Each element will be compared to its more traditional predecessors and analyzed in the specific use with digital tools. We will highlight the predispositions and the hostilities, the limits and the flexibility, the links with the other elements and with the entire production process.

Starting from finished samples, every single Element of the print will be identified, analyzed and interpreted as if it were an ingredient in a tasty recipe: capturing the appearance, flavor and carried out combinations, investigating the method of preparation and the way of cooking. Once stimulated the senses on the result, it will be easier to go back to the tools that have created, composed and adapted it to the desired purpose.

Actually, the case studies included in this volume can not be complete. It would be a contradiction to these same premises. The examples, however, will be more than enough to handle the topic in its vastness, allowing you to identify from time to time the focal points of each project.

Image**Technology****Ink**

The Digital Printing Elements, as far as a recipe.

Media**Finishing**

The author:

Massimo Cremagnani - aka Capitoulouno - is artist and researcher, but somebody may know him as journalist, teacher or consultant.

He got a Magna cum laude degree at *Brera Fine Arts Academy* (Milano, Italy) in 1999, with a thesis about ethics and aesthetics of digital art, titled “*Digital Art Chapter One*”. In academia, was the first on that topic and the first on interactive CD-ROM. In 1998 he displayed his first digital artwork, *Homo Sapiens Marsupialis*, at the Salon I artshow (Permanente Palace, Milano), while working as assistant to computer graphics and digital photography classes in the Academy. Meanwhile, he started “*Computerarte?*”, the first italian articles about digital art. That was the beginning of an experience, extending over more than 15 years on several professional magazines, that allowed him to directly deepen and try out every digital depiction technology, also familiarizing with the most representative brands.

Massimo Cremagnani³⁵

Digital Printing by Elements

Mini Encyclopedia of Graphic Art

**376 pages
600 figures**

**Developed for
graphic arts, communication
and marketing students,
printing and advertising
operators, businessmen and
common people**

Browse some more pages...

In stores

A store usually contains two kinds of promotional messages: those to promote the selling products that sells and the available services, and those to promote its own identity and brand.

Most of the time, products and services contained in a store have an independent image, as created by individual producers. They can take on various formulas: labels and packaging, flyers and brochures, floor and counter displays made with cardboard or other materials, adhesives and gadgets. The ability of the retailer is to present them in a coherent way and make them visible in the limit of a mutual compatibility and an agreed market hierarchy.

Greater impact is the presentation of the store itself, the way in which customers are invited to get in or view the products. The sign plays a major role, identifying the store, what services are offered and in some way

also its target. With digital printing we can achieve mainly two kinds of sign: printing directly a panel (metal, synthetic materials, wood, or any other type of plate) or realizing an adhesive that will be applied on an existing panel. We can have a backlit sign by printing on transparent or more often opal substrates, or a matte one enlightened from the front.

The shop windows are the second point of strength that draw attention of potential customers. The glass itself can be decorated with adhesive or electrostatic films, using opaque or translucent images. The small theater inside can be equipped with panels or fabric backdrops, and the objects can be placed on decorated structures or shaped displays. To





TAGS
Signs
Windows
Displays
Totem
Backgrounds
Panels
Furniture
Banners
Flyers
Labels

A look ahead
- The small-scale production (price lists, promotion ads, small-format posters, window stickers) will be printed directly by merchants with their own equipment, for a faster visual and commercial renovation.
- Communications to customers will be more customized (variable data for headings, special offers, product selection).
- Business and furniture identity will be better coordinated with dedicated sets and wraps.

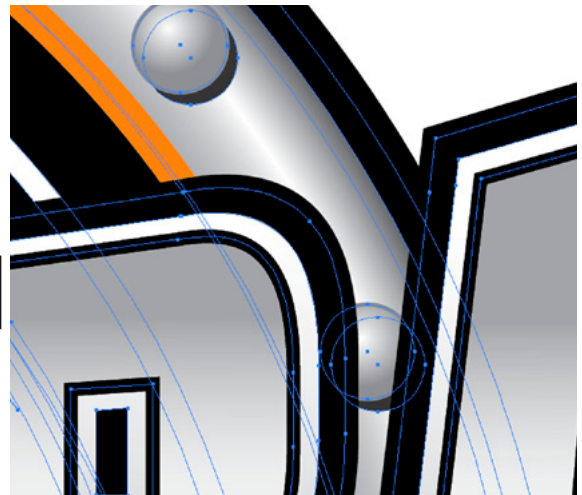
complete the composition, we put some labels with descriptions and prices.

Always on the outside of the store we can find an awning or a veranda, more displays and the friendly promotional totem, some posters embedded in folded or self-supporting structures and more kinds of billboards. An extra touch can be given to the flooring, covered with non-slip adhesive films or enhanced by customized carpets and doormats.

Now we just have to think of the corporate image of the store, with the brand played on receipts and business cards, postcards and promotional leaflets, stickers and gadgets, uniforms for employees and bags for customers.

Otherwise, we call **vector images** the ones composed by dots, lines and fills, and defined by mathematical coordinates. Starting from the most simple geometric primitives it's possible to create well defined complex forms, often used in graphic communication for their clean and sharp impact. These shapes are absolutely virtual, as they're defined in real time by the software and, consequently, they can be resized as we like.

Vector images don't lose definition when enlarged. The blue dots are the vectors, thin blue lines are the paths.



How a vector image is made

A vector shape is defined by a mathematical formula that takes into consideration a) the position of the points necessary to give the desired shape to the path and b) the relationship between them. The points are called **vectors** and are specified by the position and the angle relative to the passing line, called **path**. The orientation angle and its amplitude determine the curves of the path, which may be soft or sharp. Both the path and the area inside can be filled with a full color, a gradient or a tiling pattern. The color of the interior space of the figure is called **fill**.

Summarizing, a vector shape is given by the path, defined by a mathematical curve, by the color with which it is represented, and by the color of its filling. To have a complex image like the one above, we must use more vector shapes. The individual parts are called **objects** because they remain independent from each other. Each letter is an object, another one is the black outline, then any large circle, every bushing and every stripe of the flag. Each object or group of objects can be resized at will, because there are no individual informations such as pixels, but only colored lines and spaces.

In addition to graphic communication, also technical design (CAD) and 3D modeling are based on vector drawing. Another case, more peculiar, concerns the typefaces, but they deserve a separate paragraph.



Typefaces can be considered as vector images

Digital text

Text is a visual code based on the alphabet letters, which are nothing more than graphic symbols. Always maintaining a recognizable structure, these symbols can have different shapes and are commonly called **typefaces** or **fonts**. The fonts are then grouped into **families**, actually files that contain the letters and optionally more signs such as *glyphs* or *ligatures*. A family, finally, can include multiple styles, such as normal, bold and italic text, and then organized in multiple files.

Font: Goodfish
by Typodermic Fonts - www.typodermicfonts.com



A typical typo family

Here is a sample of a typical family of fonts, the Goodfish. The left column shows the four available styles: normal, bold, italic, and bold italic. In the middle we have the font map for the normal style, with upper and lowercase letters and numbers. To the right we find the glyphs, that are a collection of symbols used together with letters such as punctuation marks, accents and some letters other than the western standard. Not all families have the same font glyphs, and so changing from one font family to another can cause “holes” in the text.

The analysis by Elements allows the full understanding of any topic and the professional development despite the previous culture of the reader.

Elements

and their skills

Image



What we have to print

Subject Quality Technique Visual impact Colors Dimension Effects

Printing Technology



The reproduction tool

Capacity Productivity Purpose Reliability Copy fee

Ink



The visual material

Composition Amount Gamut Impact Endurance Density Grip

Media



The composition background

Dimension Endurance Whiteness Surface Matter Price

Finishing



Manufactures and tools

Submission Protection Exaltation Structure Endurance Price

Here are our five basic Elements, whose union every digital print will born. The **Image** represents the contents to be printed in its visual expression, but also the concept that must communicate. The **Printing technology** identifies the printer to be used and any of its specific components. The **Ink** determines the print visibility in its physical and perceptual variables merging with the **Media**, or the material on which it's dropped. The **Finishing** includes all the processes and accessories that are applied to the print in order to protect, show and use it.

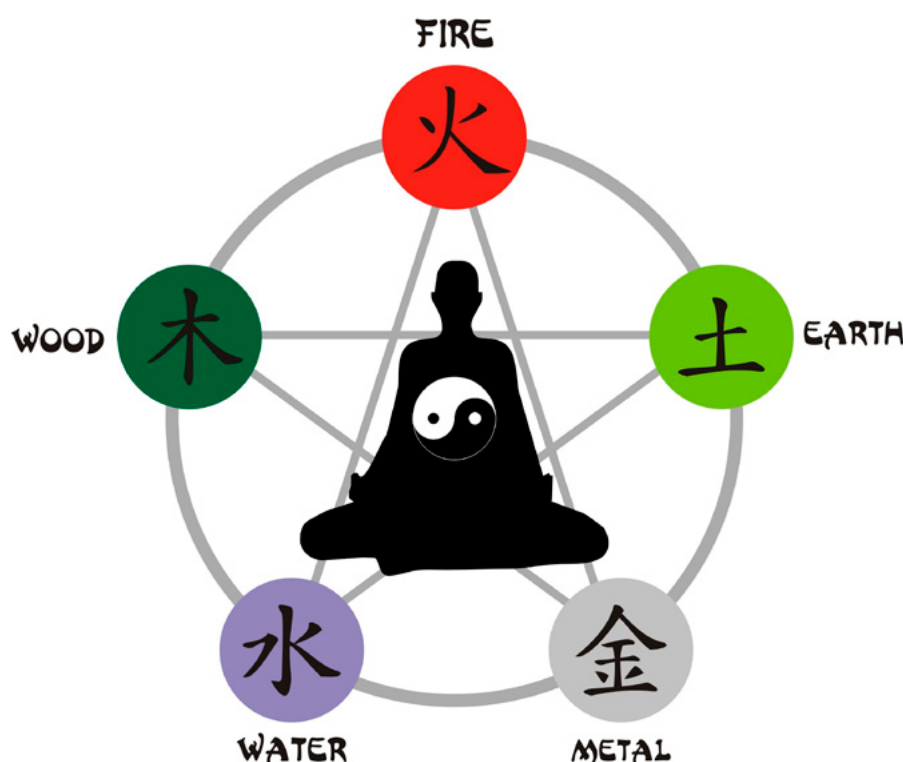
Each Element is linked to a symbol to have more clear descriptions in the following tabs and in the process analysis.

Philosophy and practical approach

Searching for Elements is a practice known to all cultures. Dribbling between science and philosophy, alternating discoveries of physics and chemistry to interpretation methods of varying complexity, there are many versions of the elements theory. In the western world the choice falls on four subjects: earth, fire, air and water, primary components of any existing thing. Buddhism uses similar symbols, while other cultures also use iron (or metal), wood or divine energy.

The most useful elements interpretation to represent our case is an eastern theory, developed by Taoism. First of all, here we have five elements (and four were not enough to build a whole print), but especially, in addition to individual factors, the fundamental relationship between the components is considered very important. According to Taoism, the balance of the elements brings health and control, while an imbalance may cause excessive reactions, mainly negative ones.

The same thing happens to a print: in many cases, even without a proper (or perfect) procedure we can still have a print. But its content will be inaccurate and its appearance won't be so agreeable: in a word, from the communication point of view, we will get a counterproductive or else negative message.



The Taoist depiction of the elements and their relationship with human body. The elements' balance brings control, while an imbalance causes excessive reactions, especially bad ones.

practical insets

Analisis sample 9: transpromo

Member Service 0800 88 88 88
or online at www.tworoadsoutfitters.com

two roads
outfitters

40 Hardcastle Hill
Weston
Someshire
BB1 6XX

Ms Katherine Welch
39 Mulduke Park
Southfork
West Devon
HHO 2PP

Spring Skiing in The Alps
Join like-minded enthusiasts for an unforgettable week
of fresh powder, including a half-day ski hire.
Co-sponsored by Two Roads Outfitters and Lost Coast Travel.
Full itinerary at www.tworoads.com/travel

ACCOUNT INFORMATION

Account Number
4239 1213 3014 9310

Statement Date	New Balance
1/1/07	£1,405.00
Minimum Payment	Payment Due
38.62	2/1/07

ACCOUNT SUMMARY

Previous Balance	424.38
- Payments & Credit	424.38
+ Finance Charge	0.00
+ New Charges	1,405.00
= New Balance	1,405.00
Minimum Payment	38.62

TRANSACTIONS

Date	Ref. Number	Description	Amount
03Dec	42388	Payment—thank you	424.38
07Dec	39281	PFDs/boating vests, kayak accessories	141.05
09Dec	39581	Womens raincoat, books and magazines	145.05
14Dec	41788	Kayak paddle, kayak accessories	131.33
16Dec	43355	Womens running shoes, camping tents, camping stoves	999.83
27Dec	47822	Kayaking DVDs, books and magazines, gloves and mitts	57.73

20% off
Womens Outdoorwear

Valid on all White River and
Two Roads Winter Gear

1 bill 07

Details and mail this invoice with your check to Two Roads Outfitters. Do not send cash.

the Element recipe



- **Complex design**
High definition, colors, readability...



- **Laser or inkjet, small f.**
High productivity, variable data...



- **Toner, pigment**
Endurance, color brightness ...



- **Uncoated paper**
Cheap, low weight...



- **Delivery**
Trimming, enveloping, shipping...

With the arrival of Internet and e-mail, conventional mail has taken a blow. Promotional papers have been most affected, because their low commercial feedback no longer justify the production and shipping costs. But the digital way, in its several aspects, enabled us to develop an alternative strategy, more contemporary and functional.

TransPromo consists in joining targeted advertising messages to communications that would still be sent (and read) as bills, invoices or reports.

TransPromo Image consists in a basic structure containing the "required" information, plus various boxes (or additional pages) filled with targeted advertising.

The high productivity small format Technology mixes these two ingredients in the production phase, using a technique called variable data which combines the recipient informations to well pointed ads. Ink and Media are similar to document production ones, with a good visual impact but, in most cases, without being pretentious.

As Finishing we can find folding and enveloping or similar mail standard packagings, all processed with online or off-line systems.

Analisis sample 10: shaped plates and displays



- **Complex design**
Medium definition, graphics, text...



- **Flatbed, large format**
High speed, medium resolution...



- **UV**
Scratch endurance, grip...



- **Re-board (cardboard)**
Self-supporting, cheap...



- **Structure**
Cut, fold, setup...

Printing on rigid substrates often joins a shaping, done using digital control cutting machines. The realization of three-dimensional self-supporting structures is spreading in stores thanks to the easy customization and to low costs related to the visual impact.

The Image is developed together with the 3D project to take best advantage of the visible points and to coordinate the various levels during assembly. It's always recommended to make a scaled mock-up before proceeding to executive production.

We'll print it with a flatbed Technology with UV inks. The open shape must respect the maximum size of the printer, usually two meters wide.

If Image has an high coverage, the ink polymerization will create a stiffening protective layer on the media, avoiding a Finishing surface coating.

The Re-board used in this sample is a Media composed by vertical flutes, just as a honeycomb. It's covered on both sides with cardboard sheets, that can be resinated for greater rigidity and resistance.

The cut and folded shape is delivered right flat, and then assembled on site.

technological similarities, faster familiarization

Just like a car

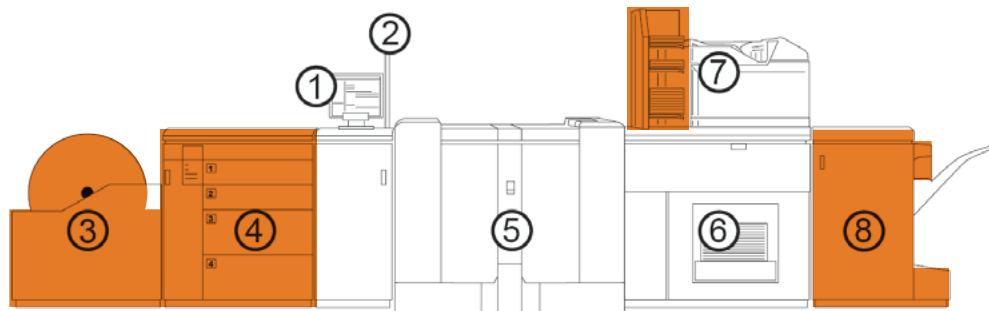


About space and size

A car must have space enough for the number of persons or else for the load usually carried. It's useless to choose a station wagon if you are a single employee, or a Smart if you have four children and a granny to load. Similarly, it is useless to run up (or worse to buy) a three meters wide printer for a single B2 sheet, or hoping to do forty copies of the company's 200-page report with one hundred dollars worth laser printer.

For printers, the trunk is their ability to load media. In the small format, a most productive printer may have more suitable capacity charging systems. In some cases we can have even more of a feeder, to set up "mixed" projects or more consecutive projects although of a different kind.

An high productivity small format printer can be configured with various optional modules according to the requirements. In this drawing we see both the roll (3) and the sheets (4) feeders, in addition to several finishing modules (6,7,8).

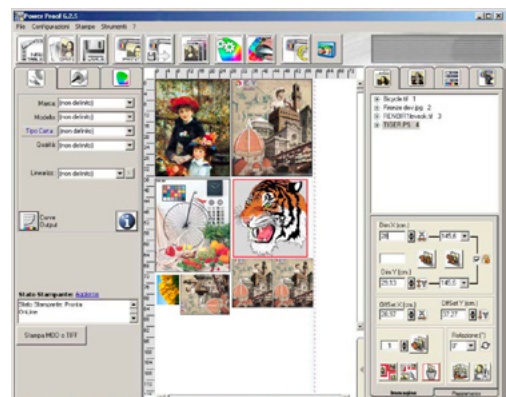


Otherwise, in the wide format, we'll talk about rolls or plates, or rather the ability of the printer to manage their width, diameter and weight. It's important to consider not just the overall dimensions, but also that the mechanics would be able to handle the media moving'em with regularity and absolute precision.

After determining the maximum size of the media, we're always in time to make even smaller products: the space optimization, if not already minded in the graphic project, can be set automatically or manually by software.

Finally, remember that at a higher load capacity may require the need to plenty feed the machine, an operation which may involve a study of logistic spaces and to use handling equipments.

The RIP of professional printers automatically handle different images, positioning them so as to maximize the available print area.



Comfort and ergonomics

Let’s speak of ergonomics, especially about a mix of usability and comfort. Those who travel frequently for business know how much important are comfortable seats, air conditioning and adjustable controls. Those who work closely with a printer, either as operator or simply holding it next to the laptop, must look for the same comforts.



The HP Scitex TJ8500 is as big as a caravan, and for maintenance we can get inside.

As I just mentioned, a printer must have its own operating space for loading and ejecting: it must be positioned so as to make accessible input and output compartments, just as we need space to open doors and tailgate when we park our car. Even controls must be easily accessible, as well as the doors or other parts useful to ordinary maintenance.

Economy

The cost of the car splits into many factors. There is the purchase, of course, but also the transfer (or registration), the road tax, the insurance, fuel and maintenance. Although the printer has its costs, which can be divided in a similar manner.

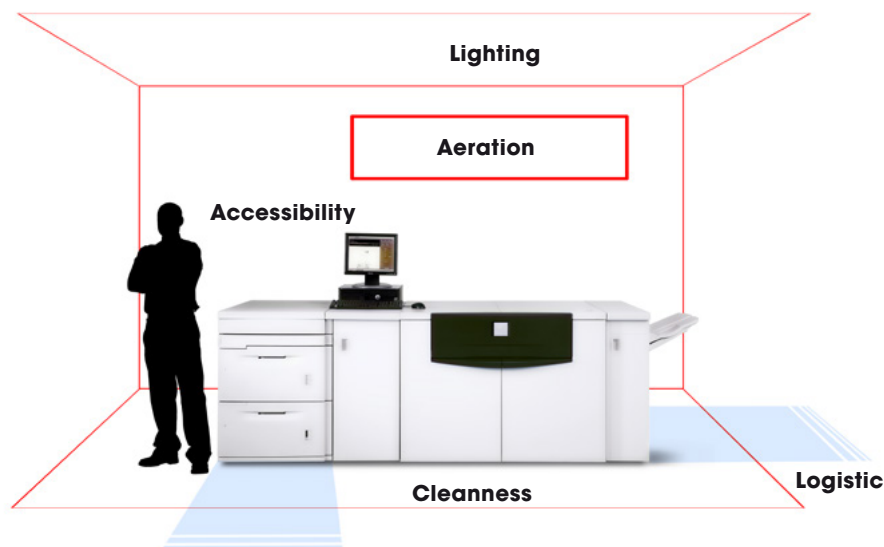


Purchase	=	Purchase, leasing or rent	
Redemption	=	Miles	= Orders
Warehousing	=	Garage	= Factory space (also for supplies)
Consumptions	=	Fuel	= Electricity, inks, media
Management	=	Driver	= Operator/s
Manteinance	=	Mechanic/insurance	= Technical support

First of all we have the purchase, which can be done either with leasing or rentals. The selling packs are mainly customized, and often they include a more or less advanced training service. As well as explaining the printer operations, those courses usually include some ideas on how to carry out the ordinary maintenance; extraordinary maintenance can be purchased by piece rate or fixed rate contracts.

About purchasing, it's good to calculate time and conditions governing the amortization of the machine, that is how much and how long it have to work to pay for itself and so get a profit. For a car this calculation is made considering the number of miles expected in a certain period. With printers we specify a minimum number of prints, in sheets or in square feet depending on their format, and then compare this data with the production time. In short, we may say that our printer produces 100 square meters per hour: if we have a profit X per square meter and our machine cost us a hundred thousand X, we'll make it work for a thousand hours before to get a return. In this calculation, as well as we know for sure to have enough customers, we must also consider the operating costs and the maximum time of operation of the equipment: Some printers can work 24 hours on 24, while others need more care and rest.

To work well and make the printer work well, we must carefully set up the working area.



Now let's think about where to put our purchase. Just as the car needs a garage, our printer must have a space that considers the practicability, media and prints handling, a suitable electrical system and an adequate ventilation. The environmental conditions for

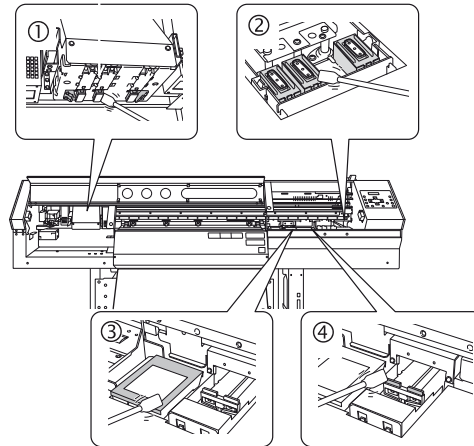
the proper functioning of printers are similar to those favorable to humans, around seventy degrees with a relatively low damp, so this detail should arise spontaneously. Finally, the most difficult thing: cleanness: working space must be cleaned periodically to prevent that dust or other agents, attracted by electrostatic charges issued by the printers, will get onto prints.

Therefore we have the supplies: gasoline, for a printer, is the ink; but we must also consider the wearable parts such as drums, fusers and belts for laser printers and heads, lamps and cleaning items for inkjet printers. Media cost is related to the type of production and to individual orders. If we exclude particularly valuable materials, the preparation of a basic warehouse does not affect too much the budget.

To make it all work we need a driver, or else the operator, the man who makes it run and also keep the equipment in good conditions. He often matches with a pre-production team (file optimization and management) and a post-production one (logistics, storage and print finishing). The two teams will obviously need the right wrenches, then all the necessary equipment to perform their duties: computers, software, scanners...

Such as with cars, printers must be serviced. Instead of water, oil and tires we have to think about the ink circuit, to rollers and drums, to calibration and registration. Many routine operations are becoming well automated, but human intervention has not yet ruled out. Maintenance is partly performed by the operator, but in the most serious cases we should call the mechanic, or else the support service. Duration and costs of interventions are obviously different for each kind of problem but, watching at money may be better to acquire additional warranty services or fixed subscriptions interventions.

As always, variables are really a lot. If you plan to buy a challenging model, be sure to get estimates from several dealers. In most cases, vendors already provide finely calculated statements and suggest solutions well adapted to the production requirements of the purchaser. You can buy a printer or rent it at a fixed monthly cost. Get well balanced offers about ordinary and extraordinary assistance, with both pay-per-click and pay-per-use subscriptions. This works in a professional environment; for the individual who seeks a cheap desktop printer, pay attention to the low purchase price: it cleverly hides the ink cost, often more expensive than the printer itself.



Some printers' printheads cleaning must be done manually.

contents as communication intent

Image

Small format

Books/Publishing
Personal documents
Commercial documents

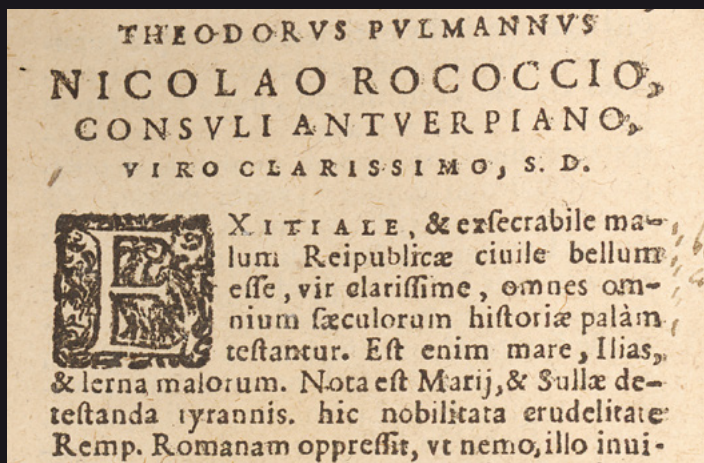
Wide format

Sign
Scenographies
Advices

Text

In previous paragraphs we discussed about the wide range of figurative images that we can meet in a print. In the latter case, we also spoke of logos, names of companies or products that are graphically depicted using attractive and/or sophisticated symbols. But the Image, using this term in its broadest sense, can be composed also by simple texts, intended to inform and describe in a way more conceptual than visual. This simplicity does not mean that a text should not be printed with care, but simply that in most cases requires less resources than a depiction.

Text means description



Text is a visual code composed by symbols which, if positioned in the right order, represent an interpretable language through reading. There are several versions of symbols, collected in families called alphabets and developed more or less independently by different cultures. For each alphabet we can also find different graphical interpretations: the way in which the letters are drawn is called **character**, or better **font**. Each font has its

own personality due to the common shape, to the relationship between straight lines and curved ones, between width and height, to the of solids and voids size, and so on. Each of these factors represents a state of mind, which is perceived while reading along with the objective meaning of the words. The same reading is affected by the type of character: it will be more immediate with sticks fonts (rigid, linear), but only for short texts. Instead, serif characters, those with short appendages at the ends, bind together to facilitate the reading of long texts. More, we can add variations such as bold (strong) or italic (tilted), uppercase and small caps, size and color. In addition to the main alphabetic characters we have glyphs, additional symbols ranging from those used in special languages such as accented letters or umlauts, to characters with special ties between them, until symbols of various kinds (math, punctuation, numbering...). All this contributes, on the whole, to the sense of communication.

In the small size printing, text means mainly production of books but also transactional documents, such as gas bills or bank statements. These products are almost made using monochrome printing technologies, equipped with black ink only, both with laser and inkjet printers. The exceptional speed of these printers is favored by the use of a single color, which avoids any complication related to color calibration and registration.

Variable data printing

At the beginning of the book we saw how digital printing can be distinguished from other technologies by allowing you to easily print a single copy of a document. This feature has evolved in the possibility to produce different prints of a single document but changing a few parts, with the aim of giving a custom message to the recipient. To do this you need a software data management variables, of which there are several versions for all kinds of printers and needs, from billing to advertising. To create a variable data printing we need several ingredients (right picture):

1) a **master document**, or else a basic layout di base on which insert contents: these may be fixed (the same for everybody) or else variable.

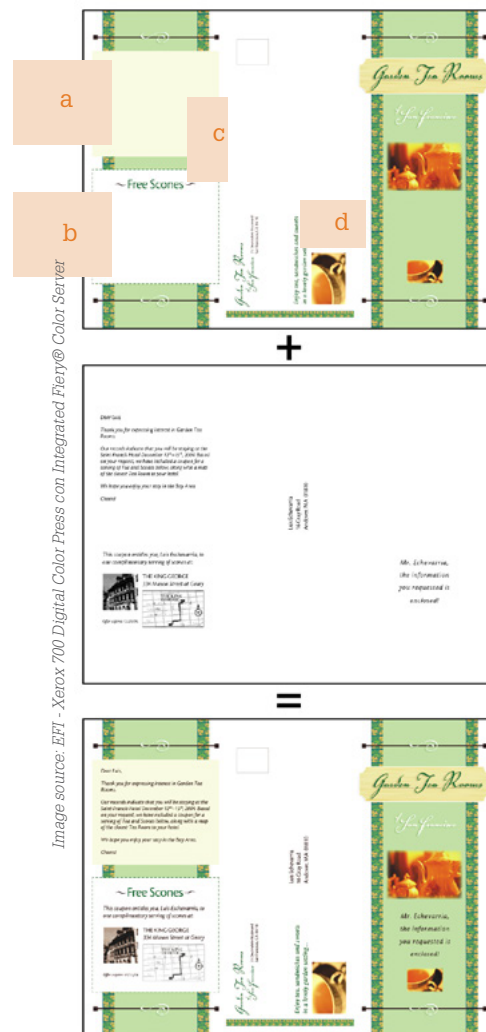
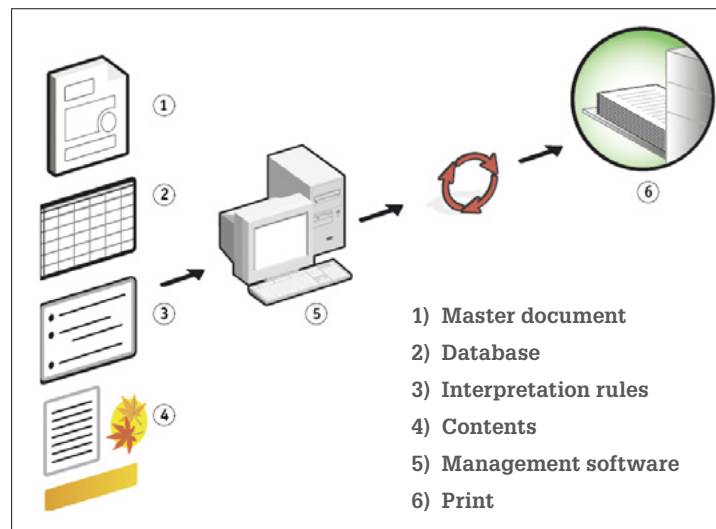
2) a cross-referenced **database** to differentiate content for each recipient. Data can be of any type, from personal records and references to shopping preferences. For instance, an Excel spreadsheet with your name, favorite color and professional interests. 3) a set of **rules**, or else parameters interpreting informations from the database and decide whether and where to place them in the document. 4) the main **contents**, as complex data, text and images associated with database entries, which will be “caught” and applied to the print layout.

Let's have a look at the sample image to the right, which is a promotional flyer. In the upper figure we have the master document, with default graphics that will be the same for everyone. The orange areas, which are not visible in printing but only in the file, determine where to insert the content variables. Each area has an identifying name (a, b, c, d) to be linked with data and formatting rules. The center figure shows the data variables selected and positioned to overlap the layout. This means that in the **a** area, for example, you chose to enter text courtesy created specifically for the recipient's age and profession, in **b** a promotional message tied to his interests and area of residence, in **c** and **d** area a personal greeting (Mr. Echevarria).



A transpromo sample: a bill includes a promotional message related to user preferences

The realization of custom advertising flyers has a greater hold on recipients, which feel personally involved and receive information best suited to their preferences (or so it should be if databases are correct). Nevertheless, a lot of junk mail ends up in the trash without being read anyway. So there's a new promotional tool, the TransPromo, a document that combines transactional data, such as bills or bank statements, with advertisements. Rarely this kind of document will be thrown, so the recipient is then “forced” to see also the joined ads.

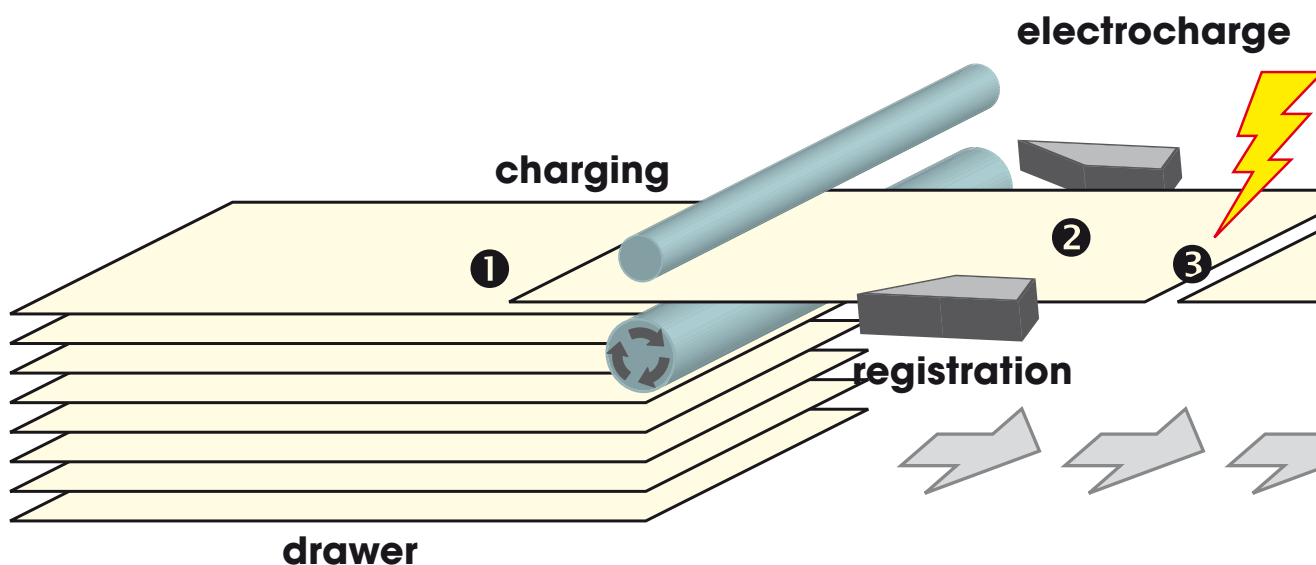


Laser (or better, electro-photographic) printing

We always talk of *laser* printing because this appellation entered in the common language. Many people associate it with a certain type of printer or print, but the official term is *electrophotography*, that is “electronic writing made with light”. That’s an evolution of xerography, also said photocopy, which shares its printing basis with. In photocopy, the original was illuminated and imprinted on a temporary photosensitive matrix, and then reproduced. In digital printing the original is replaced by a digital file, which is projected and imprinted on a similar matrix. Over time occurred a further merging of the two technologies: on many copier models, originals are scanned and digitized before reproduction, with the advantage of making adjustments of brightness, color and size.

Simplified scheme of a black and white laser printer

Paper ❶ is taken from the drawer and realigned in the transport channel ❷, where it is positively charged ❸ so to attract the toner ❹, that is composed by very fine powder. At the same time, the drum ❺ is charged with negative ions, that don't allow the toner to grip. The file is sent to the laser projector ❻ that affects the drum to demagnetize the areas to be inked. The light beam is redirected by a rotating prism ❼, and focused with a lens. By rotating the drum allows the laser to engrave it line by line. Then the toner falls on the drum, attaching to demagnetized areas. Meanwhile, the sheet is closely passing under the drum; it's magnetized with a positive charge, so it attracts the toner detaching it from the drum. The sheet path continues to the fuser ❽, a sort of oven that heats the toner and permanently melt it on the sheet surface.

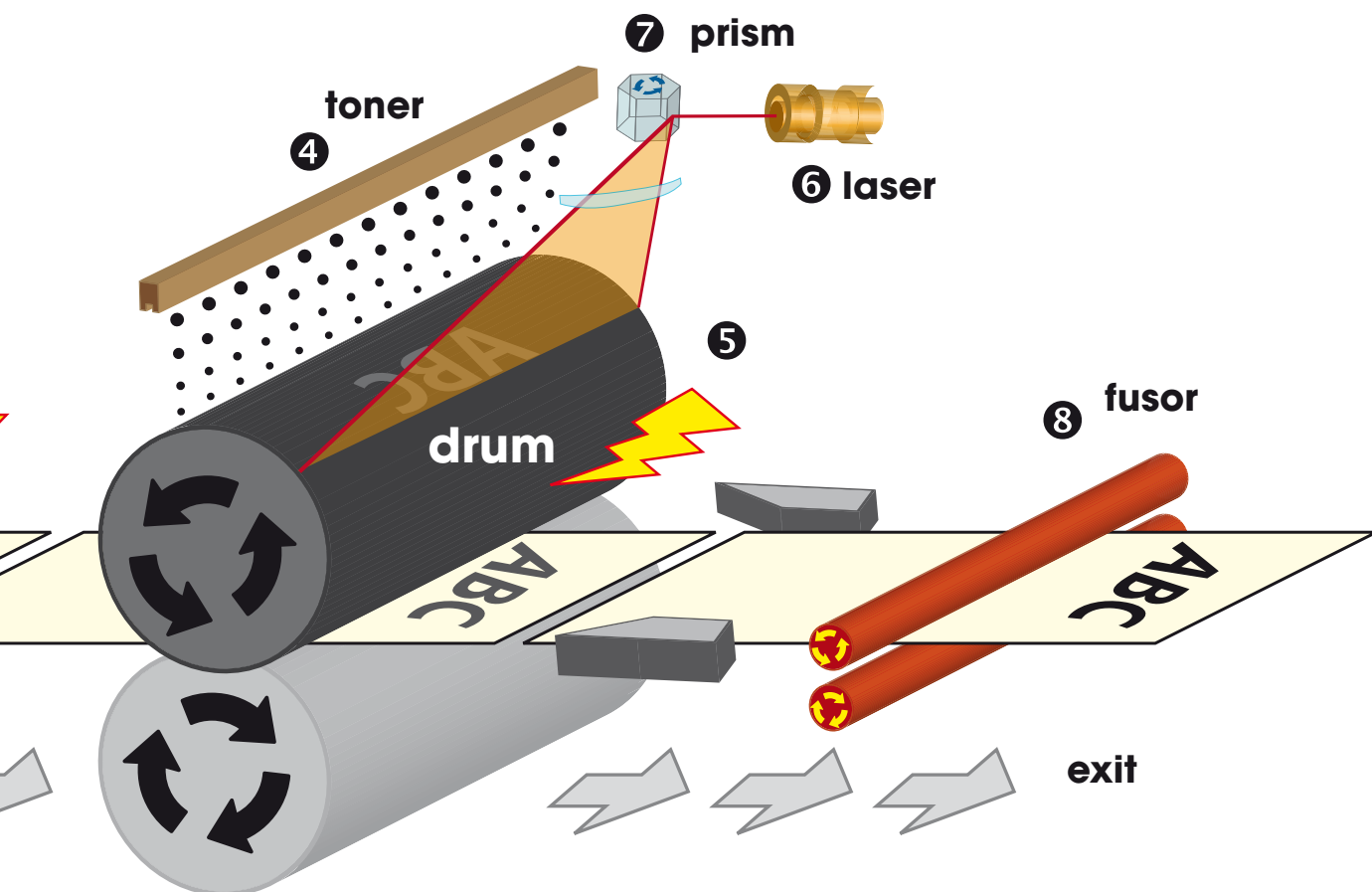


Here we need a small clarification note: in the second chapter we said that digital printing, unlike other technologies, has no matrix. Actually, in electrophotographic printing the matrix exists, but is created in real time and is continuously recycled, while with other systems such as typographic printing the matrices are physical objects, created aside to be implanted in the production system. So we consider the electrophotographic matrix as a temporary vehicle for the image, and not a true matrix.

We will start by illustrating the printing operation in black and white, more understandable, and then we'll move on to color. The process, in short, is this: the source, or the file, is sent to the printer, in which a projector takes care to reproduce it line by line and mirrored.



Laser printing works with the main reproduction principles of copiers. In this photo, Xerox Model A from 1949

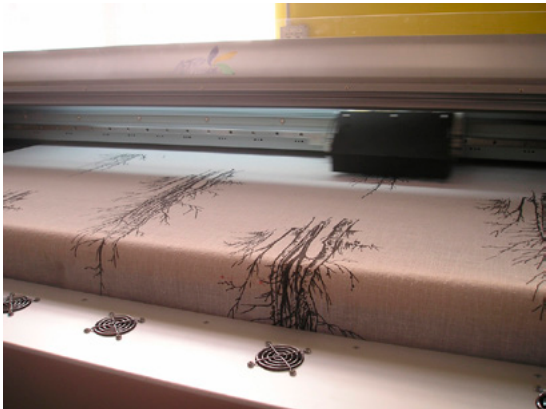


tools and operational methods

Ink

Textile inks

When we talk about textile printing, we have to be very careful about which fabric is intended to work on: each **natural** fiber type requires a different process, mainly due to the different inks. In digital reproduction we have four main inks available, called *reactives*, *acid*, *dispersive* and a *pigmented*.



The digital textile inks variants are very loyal to those used in screen printing, the main technique of traditional textile printing. They maintain the same features as application and endurance. However, to make this happen, we must adopt the same operational criteria related to tissue preparation (before) and color fixing (after).

Most of times, with natural fabrics is required a preparation with a receptive substrate which improves the adhesion of the color and, after printing, a fixing. The preparation is essential because digital inks are much more fluid than traditional ones, and therefore more volatile; this operation avoids the clogging of heads and ink circuits. Fixing is always

TEXTILE INKS

	Fabric	Ink	Preparation	Fixing
N a t u r a l s	Cotton	Reactive	Yes	Vaporization or heatsetting
	Cotton	Pigmented	No	Termofissaggio or calendering
	Silk	Reactive	Yes	Vaporization or heatsetting
	Silk	Acid	Yes	Vaporization
	Wood	Acid	Yes	Vaporization
S y n t h e t i c s	Polyester	Pigmented	Yes	Heatsetting or calendering
	Polyester	Dispersed	Yes	Heatsetting or calendering
	Polyammide	Acid	Yes	Vaporization
	Viscose	Reactive	Yes	Vaporization or calendering
	Viscose	Pigmented	No	Heatsetting or calendering

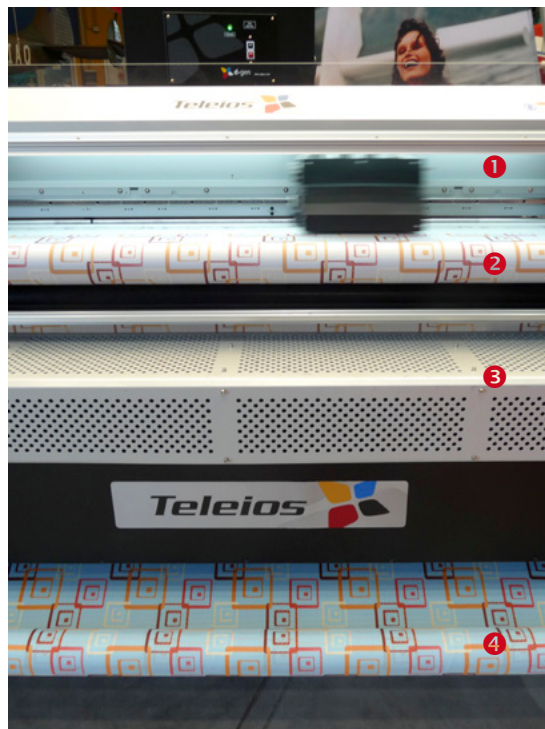
Every kind of fabric is printed with only one or two types of ink. The operation requires different procedures for the fabric preparation and fixing the color. Orange is for natural fabrics, yellow for synthetic ones.

performed through heat, using as appropriate the steam or a heat setting by induction or calendering pressure. These additional processes are not so complex, but can slow down the workflow and become affordable only in quite big productions.

Textile inkjet technologies may be equipped with dryers or fixing calenders. Some printer models are compatible with most types of inks, whose replacement simply involves washing the distribution circuit and the heads. Other models allow greater flexibility thanks to modular modifications, such as replacing the heads or the whole print head. These printers use four to sixteen colors, reaching a virtually unlimited gamut. For maximum color fidelity, ink manufacturers provide color kits different from CMYK that can be managed by special softwares.

The most used way to print on **synthetic** fabrics such as Lycra or polyester is the *direct sublimation* technology, which uses pigmented sublimation inks. The print is made directly on fabric without other measures, but the colors remain unstable and faded until fixing: mostly this happens in line, with a heater placed between the printzone and the rewinder. Extremely affordable in terms of time and processing steps (only one, if we exclude the cut), these solutions typically require a suction or ventilation system for the vapors disposal.

In the small format, such as t-shirts printing, we can also use thermal transfer processes. We make mirrored prints on specially treated sheets (transfer films, see page xxx) and ink will be transferred onto fabrics through heated presses. Media transfers are available in standard size sheets for ink-jet and laser printers that use pigment inks or toner, or else in roll for bigger printers that use with dye, pigment or eco-solvent inks. The chemicals that allow to transfer from sheet to fabric could also give a protective film.



Direct sublimation printing with a d.gen Teleios. The printhead ❶ decorates the fabrics ❷, but color is faded until heat fixing ❸. In a few seconds, inks are cured and real colors arise ❹

materials: physical and aesthetic characteristics

Backlight media need more ink density.

Transparency means how much you can see through the media. This factor affects the correct density of ink to be applied: for example, we'll use the minimum necessary for sided prints, in which the impression on both sides should not overlap. On the contrary, with backlit print media, density is increased to compensate the emitted light.

Glossy media increase contrast.

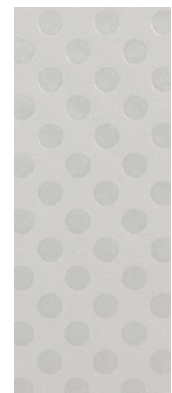
Glossyness is the coefficient of light refraction of the surface, often described as a "mirror effect". It's usually attributed to photographic or coated papers, even if there are also opaque (or matte) versions of both types. High gloss media can give ink adhesion problems, and in many cases may be better to print on matte papers and apply a gloss coating later.

Blend colored media are identified by their colored border.

Media **colors** can occur on the surface, with a coating or pairing different materials. If it is also present within the material, means that the pigments have been incorporated in the original mixture. To notice the difference, simply cut the support and observe its board. A surface color, or else a dominant, may hardly influence the printed image, since the inks are never completely opaque. To overcome this influence we can use white inks as additional fund.

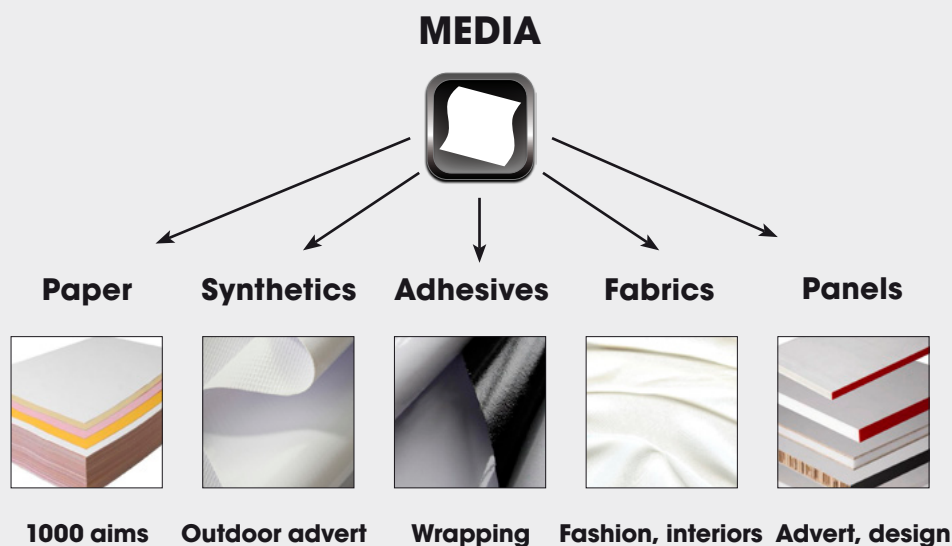
Organic texture and geometrical texture.

The **texture** is a uniform graphic or materic pattern on the surface of the support. We call it *geometrical* when it is composed of regular shapes visibly repeated, or *organic* if consists of irregular elements, usually abstract. The *matic* texture is in relief and touch sensitive, and may cause different kinds of irregularities while inking. With laser printing we'll have a lack of adhesion in the deepest points, which are not in contact with the drum or fail to attract the toner particles. With the ink jet would instead get a diffuse spray, resulting in a blurring of the image.



Different Media typology

The features mentioned above are very useful to recognize and evaluate each kind of media, but possibilities are so many that it's better to put some more labels. In order to simplify the learning of the different variety of media materials we'll split them into five easily recognizable main categories. First of all we have the **paper** in all its amazing variations, specifically created to satisfy most printing needs. Following are the **synthetic films**, apparently less common but widely used for large format outdoor adverts and in the label industry. On their side are the **adhesive films**, intended for wrapping objects, and mainly vehicles. Another case is represented by **tissues**, which we will distinguish between natural and synthetic because of the different uses and the way in which they are printed. At the end we'll talk about **panels**, paying particular attention to those specifically designed for digital printing.



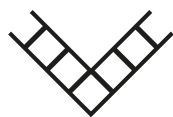
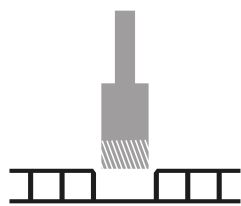
For each project there is an ideal media. Paper reigns supreme in many sectors, from publishing to documents, from communication in small and large format to packaging, photography and art. When the request is a greater resistance we'll switch to synthetic materials, especially for large format displays. Adhesive films are the perfect solution for a more or less temporary covering of vehicles, furniture and walls. In the furniture, scenography and fashion fields, printing on fabric is gaining increasing ground, both with natural and synthetic ones. Panels any different materials, after a long apprenticeship in the world of signage, are conquering new heights in indoor and outdoor spaces setting up.

additional processes

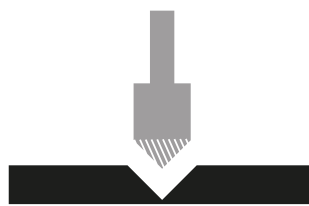
Finishing

Creasing tools are useful for paper, cardboard and plastic sheets up to a certain thickness. When the height of the panel is too much or the material itself is too stiff, the fold is prepared removing an internal part with milling cutters.

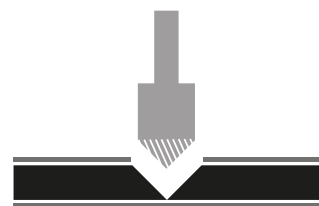
In thick media folding we mill a part of the material at the inner corner. For corrugated cardboard and polystyrene or paper sandwich panels we can use inclined blades instead of milling cutters.



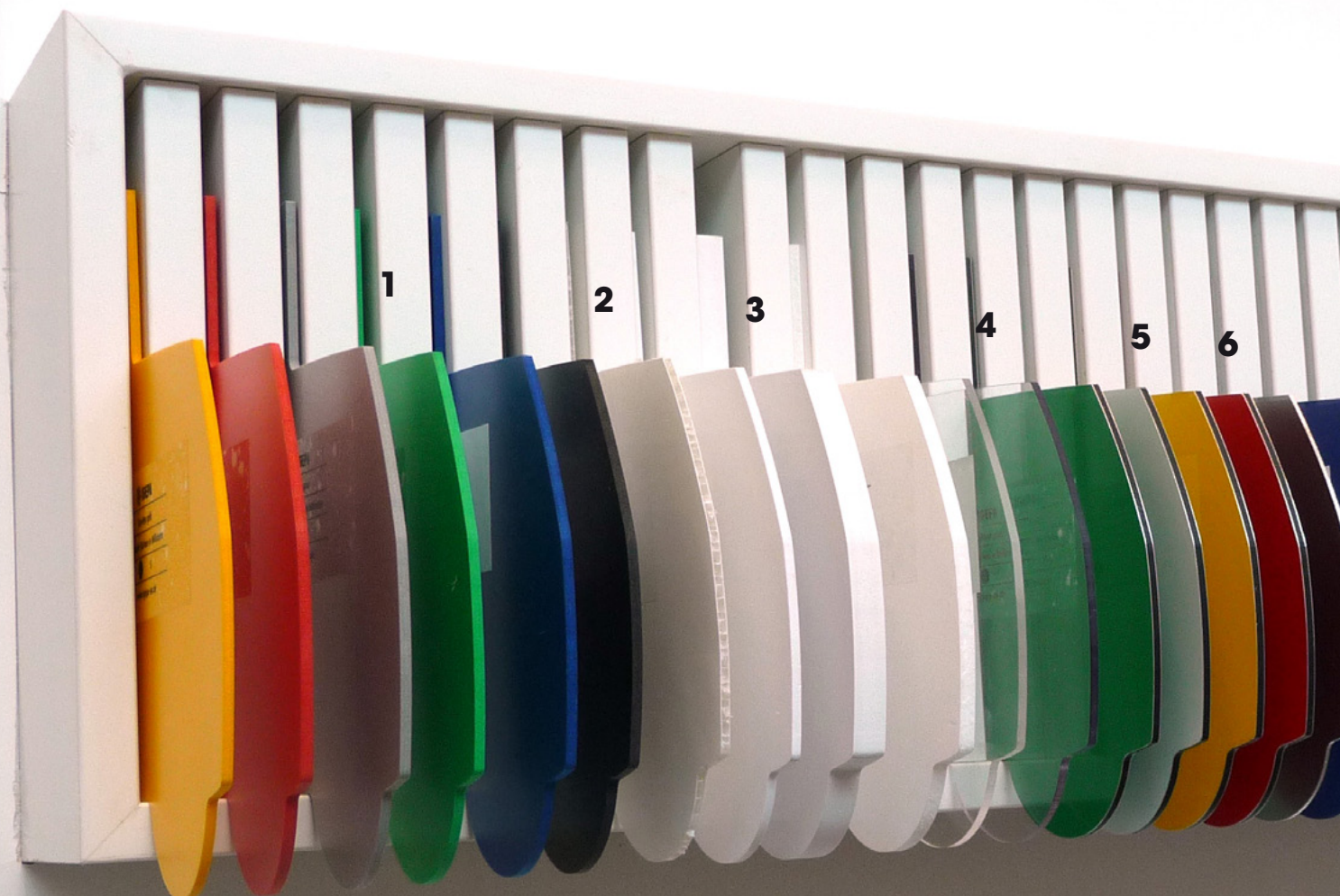
Hollow



Compact



Sandwich



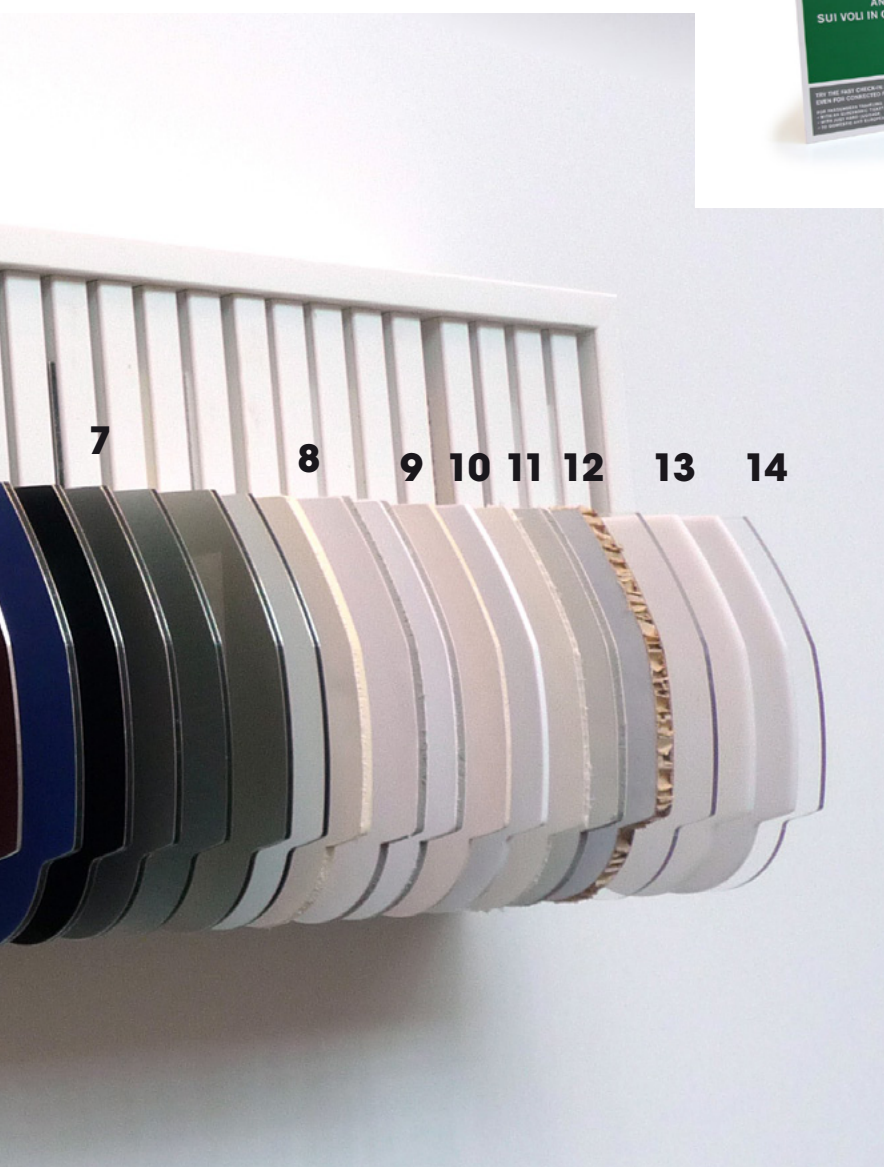
Cutting, bending and shaping that we work with large format machines can also give results of a small size. Are not uncommon, at least in some creative environments, business cards made on wood, metal and various plastic sheets. In other areas we can find packaging and counter displays (pictured below), particularly eccentric invitations, shaped stickers, plaques, gadgets, badges and other similar items whose release is possible only with large format technologies.



Promotional cardboard ads cutting.



Shaped cardboard displays.



The shaping of different materials effects. Even the edge, in some cases, gets a very strong aesthetic value.

1. Acrylics
2. Hollow
3. Forex
4. Transparent Polycarbonate
5. Colored Dibond
6. Aluminium
7. Metal Dibond
8. Kapamount
9. Compact cardboard
10. Corrugated cardboard
11. Kapaline
12. Honeycomb cardboard
13. Opale Plexiglass
14. Transparent Plexiglass

*This book will appeal to all those who routinely work with digital printing.
That is anyone.*

*It is not a technical manual or a treaty of computer graphics, but a more human
approach, direct and understandable, to the common practice of digital printing,
at whatever level you operate.*

*May be useful to graphic designers, creatives, publishers to optimize their graphics
in order to reach the final result.*

*May be useful to managers and businessmen who have to choose a corporate image
and promotion line for their activities.*

*May be useful to photographers and artists, to understand and choose the best
reproduction process for their artworks.*

*May be helpful to printers, to identify instruments best suited to their targets
and to optimize any operation.*

*But above all, it may be useful to the common man, to know and appreciate
(or despise) all those printed images that surround us every day and in every
circumstance.*

