

*For the third year in a row, I am pleased to participate in the contest launched by Intergraf, allowing us to express our ideas when we are a young actor of the graphic industries. It is a privilege and an honor to be able to express one's ideas, and therefore I want to thank the Intergraf association.*

*About me, my name is Cédric, and I am 25 years old since a few days. After having completed a BTEC National, an HND, a BSC Degree, I started an engineering course in graphic industry at Grenoble INP-Pagora school. After 8 years of apprenticeship in 5 different companies, I will finish this diploma this year and wish to focus on the ecological transition and the optimization of the graphic industry. This exciting world has attracted me very quickly, and arouses in me curiosity and involvement.*

*I will now share with you my thoughts on the following two questions :*

*-How do you see graphic products (packaging and graphics) in the circular economy ?*

*-What is your vision of printing for a sustainable future ?*

*I wish you a good reading!*

In order to present my ideas regarding the first question (**How do you see graphic products (packaging and graphics) in the circular economy ?**), I will organize the development into several parts. I will address in turn themes such as ecology, waste recovery, future evolution of the sector as well as unsuspected uses of certain materials.

### **Biobased & reusable material**

First of all, I think that the need to use biosourced materials is very important. This kind of material, of biological origin, allows to consider a more serene end of life and a possible reuse of the material easier. Recently, famous companies have turned to plant materials such as mycelium, mushroom root, to design their packaging elements. It is therefore no longer rare to find cushioning elements made from this type of material. The gain in terms of carbon footprint is significant, but in addition to that, the reuse of this material is unlimited! It is possible to recycle this material in different ways, but above all, it is «Home compostable», which means that a customer will be able to simply deposit this element in a domestic compost, and use it as a natural fertilizer afterwards. A dunnage element will thus become a natural fertilizer.

Recently, a large Scandinavian company has also developed cellulose-based foams with similar characteristics to current materials (plastic in particular). Thus, the use of cellulose, in addition to reducing the carbon footprint of the product, considerably reduces the energy cost of manufacturing. In addition, the major advantage of this type of material is its reusability: it is possible to recycle this material in a paper-cardboard process, and to be reused afterwards. We can also think of molded cellulose which has the advantage of being recyclable and reusable a very large number of times, without seeing its properties being altered. Thus, it is not impossible in the coming years to see the emergence of various innovative materials, recyclable, compostable or reusable.

### **The unsuspected value of waste**

Moreover, products that can be recovered at the end of their life will have a head start. Materials used in the design of the product that could be recovered after a first use will be

highly valued since they will stand out from materials that are unusable for a second use. For example, the use of paper in the packaging allows to consider a valorization in several ways. The first, the most classical, concerns basic recycling, via a specialized company. Thus, the paper can be treated and then reused in different ways (molded cellulose for example). The second way of recovering the waste concerns the energy gain. Incineration of the combustible material under controlled conditions will allow heat and therefore energy recovery. Finally, a third way to valorize waste is the extraction of certain components for a second use. One of the most striking examples concerns pomace. A material derived from plants such as grapes, it is reused for various applications. Recently, a major brand has succeeded in using grape pomace to replace leather in its shoes, thus considerably reducing the product's carbon footprint. Finally, specialized companies can buy materials considered as «waste» in order to treat them, transform them and use them in another way. Thus, many ways of recovery are possible, and allow the manufacturing materials of a packaging to be included in a circular economy.

### We recover everything!

One of the aspects in strong development for a few years in certain sectors concerns the recovery of certain materials. Indeed, it is not uncommon when we go out for a drink with friends to pay a deposit for the cup. This deposit is returned to us when we bring the empty glass back to the bar. The operation would be identical here, but on a larger scale. It would be quite possible to consider a deposit for certain materials, which would be returned to us when we return the material to the sender. Thus, when a delivery company brings us a package, we could open it immediately, keep the contents and return the packaging to the delivery person. Afterwards, the company to which we placed the order would return the deposit to us, either directly to our bank account or in the form of a voucher. Thus, the reuse of the packaging would be possible and the recycling or the second life of the cardboard, a problem solved.

### Multi-purpose components

Another possibility is to turn the entire packaging into a usable object. A few years ago, a video game supplier proposed to pack its game in a cardboard box, which had been pre-cut to allow the cardboard to be folded, so that it could be used as an augmented reality headset. This way, the entire product is used and therefore no component is considered waste. More recently, a company has developed the same system of pre-cut cardboard to pack a computer. Once received, the user could fold the cardboard to make a computer holder with the necessary components (ventilation grid, blocking), and the ergonomics to hold the computer properly. It was also possible to transform this packaging into a carrying case for the product. Thus, the packaging is diverted from its primary use, to have a second life by being used in another way. The reduction in the amount of waste will be significant, and the cost of processing and the carbon footprint of the product will also decrease.

### A single material for more convenience

One of the solutions that can be quickly considered to include graphic and packaging elements in a circular economy is the non-separation of materials. Indeed, often, the consumer will not take the time to separate the different materials of a packaging before throwing it in a trash can. Thus, the product cannot be easily recycled and reused later. By using identical materials for the packaging, the cushioning and eventually the wrapping, the problem will be solved. Indeed, a monomaterial product will allow the consumer not to worry about the separation of materials, which will be recycled in the same way. Thus, the labor costs for sorting and separating materials will decrease.

In addition, the use of a single material can give the product a second life. Indeed, if we take the example of a product only made of cardboard: the case would only need to be de-inked, the cushioning solution would not need any treatment, and consequently the cardboard would be recycled, and then reused for a similar, or totally different application.

### Clean packaging for responsible consumption

Today, the need to process old packaging and printed material represents a significant portion of carbon emissions. Harmful inks, multi-layers, finishing are all graphic and printing operations that generate additional treatments at the end of the product's life. For several years and in particular the restrictions of the various monitoring bodies (REACH for example), the components have become more and more environmentally friendly. Thus, it is not uncommon to find printing inks composed of more than 60% of vegetable oils, or even packaging products composed of a single material, without chemical additives (cellulose for example). The use of this kind of material allows to avoid additional chemical treatments and to consider a less heavy end of life of the product.

### Act at the source for a sustainable future!

Finally, to close this section, I will talk about reducing waste at the source. The first possible modification concerns the optimization of the use of materials. Indeed, often, during the production of printed matter, or packaging, a lot of material for cushioning, cleaning, waste is used. Although necessary to start a production, all this material is not only a loss for the company, but it also represents a significant amount of material to be processed. By reducing this amount of material, we reduce the cost of processing, and especially the waste of material (substrate, ink, energy). This material could be reused in various applications: realization of proofs, characterization of consumables or even presentation of the company's solutions.

Moreover, most of the industrialists are not able to treat directly the waste they produce. As a result, companies are forced to work with service providers specialized in waste treatment. This means that costs related to the storage and transportation of these materials are added. As a result, the company's carbon footprint increases. By reducing the amount of material to be processed, the company's overall carbon footprint will decrease, and the use of materials will be optimal. A solution that is not immediately obvious but can be extremely effective.

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Now, I will address the second question of the contest which is : **What is your vision of printing for a sustainable future ?** To address this second question, I have also chosen to develop my ideas in several parts. Thus, I will address the topics of the evolution of printing with its time. Then, I will address the reduction of the global carbon footprint, the use of environmentally friendly materials as well as the replacement of plastic in printing, the reuse of certain materials, before concluding on the social aspect of our core business.

### When innovation and respect for the environment become one!

Today, innovation is a major issue in the graphic arts sector. On the other hand, this aspect cannot make us forget the environmental side of the products, which is the point on which the consumer will linger. In my opinion, it is necessary to envisage a future combining innovation



and respect for the environment. For that, the use of innovative materials is a relevant solution, but for which it will be important to privilege the environmental aspect. Indeed, many innovative components are not necessarily environmentally friendly (conductive ink based on metallic particles, inks based on Carcinogenic Mutagenic Reprotoxic components...). Replacing these components with eco-responsible materials with similar properties would allow for innovation, while having a low environmental impact. For example, today indium tin oxide is used to dope certain substrates to increase their conductivity. However, this material is in no way environmentally friendly, and worse, non-renewable. Innovative materials would be a plausible alternative to replace non-renewable materials.

### Personalize the content!

Another possibility for maintaining the appeal of print would be to make prints customizable to best target the consumer. Today's consumers like to have a personalized experience that is specifically targeted to them. It seems obvious that different consumers will have different expectations based on their age, gender, social background or even location. Thus, the printing companies that succeed in targeting the different audiences in a precise way will be able to stand out and advance effectively in the market.

The strong development of machines making small print runs and allowing personalization (HP Indigo for example), are therefore machines with a promising future. The personalization of the printed matter will allow to target in a precise way the various consumers, and consequently to perpetuate the customers of the company.

The world of printing being in constant movement, it must be able to adapt with its time. In a society where things evolve at an incredible speed, the capacity that this sector will have to adapt to the new evolutions, restrictions and recommendations will be determining. The consumer being more and more demanding, he will want his requests to be fulfilled quickly. Thus, by offering flexible services according to the target, the printing company will stand out, while ensuring a quality service.

### The second life of our products

The environment being at the center of all the attentions, it seems essential to me to insist on this point, by developing certain aspects. Reducing a company's carbon footprint will have two major consequences: the first will be internal to its operation and will allow it to consider an activity based on evolution, adaptation and duration over time. The second will be quite different as it will concern the company's image. In addition to having a positive aspect internally, the image of the company will be improved, and will be a guarantee of quality with consumers.

To do this, various means are available to the industrialists of the sector. The simplest concerns the recycling and sorting of waste, while more complex solutions can be oriented towards life cycle analysis of materials, impact transfer studies to then act at the source of the problem. It is also possible to study the possibilities of second life of the products used within the company in order to valorize them afterwards. Simple cardboard packaging could then be reused for secondary or tertiary packaging applications. It is important to understand that each industrial, no matter its size, its activity or any other parameter can act to change things in its own way.

## The hidden wealth of poor materials

I would also like to address the subject of the so-called «poor» materials in the field of printing. Today seen as materials destined to a sometimes degraded use, they could well be the main actors of tomorrow! Kraft paper currently seems to be a little used paper, and not being put on the front of the stage in all sectors. Molded cellulose is seen as a common egg carton, with a very average appearance. These two examples are part of a group of inexpensive materials that are not well promoted. And yet they have undeniable properties that could be suitable for multiple and varied applications.

This brief part on the poor materials allows me to draw the attention on an important point for the perpetuation of the printing industry. The use of all materials to their full potential. It is very common to meet people who are unaware of the hidden properties of a material, which could fulfill a function just as well as another one, only because it is seen as a «cheap» material. Adding value to materials that are used in some way today could take the printing world to the next level in terms of resource utilization. It is necessary to fully exploit the capabilities of each of the materials in order to reduce raw material consumption. The planet is running out of steam, and it is necessary for everyone to give it a second wind. The exploitation of the full potential of each of the materials would allow a definite decrease in the consumption of resources.

## Beauty, Equality, Carefully,

Finally, one of the last points I want to focus on in this presentation is the social aspect of our beautiful profession. Today, the world is evolving, at the pace of a society that is changing radically. That's why I think we need to look very hard at equality within the graphic arts. Having worked in many different companies, I have clearly seen that the printing industry is predominantly made up of a male population. By encouraging the insertion of women in this world, inequalities would be reduced, while ideas would be diversified. In a more general way, the world of printing should not be reserved only for certain people, but should touch everyone. The beauty of this world deserves to be known by everyone. The increase of diversity in this sector will surely attract a new public, while keeping the authenticity present until today.

Moreover, coming from a professional training in the field of graphic arts, I could notice that few students knew this field. Indeed, the professional world not being necessarily put forward within all the countries, the graphic arts, very particular medium, does not have the necessary radiation to attract a number of student proportional to the multiple possibilities which it offers. I believe it is of utmost importance to promote this field. Word-of-mouth, interventions with students, advertising campaigns or even media communication are all ways to promote the printing professions, and thus to inscribe these professions in the long term.

*All these ideas are only a glimpse of the many possibilities that the future offers to develop, perpetuate and make the world of printing even more beautiful. These possibilities are within everyone's reach and do not necessarily require a great deal of effort, but certainly a lot of willpower.*

*And as Charles Darwin said: **The species that survive are not the strongest, nor the most intelligent, but those that adapt best to change**, so let us adapt.*

*I thank once again Intergraf, and all the people who will take the time to read these few lines.*