PACKAGING READY FOR ITS REVOLUTION

Four changes in society
that will drive change in packaging

Analysis and insights
by Fabrice PELTIER for the trade show ALL4PACK Paris 2018

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IF PACKAGING IS THE MIRROR
IMAGE OF OUR SOCIETY,
THE CHALLENGES FACING
TOMORROW'S SOCIETY
WILL SHAPE THE PACKAGING OF
THE FUTURE…

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CHANGES IN SOCIETY THAT WILL DRIVE CHANGE IN PACKAGING

1/ Packaging and population ageing
2/ Packaging and the Earth's resources
3/ Packaging and artificial intelligence
4/ Packaging and mobility

As has repeatedly been illustrated by the research conducted for many years by the international exhibition for packaging and intralogistics ALL4PACK Paris, *"Packaging is the mirror image of our society."*

Packaging today constantly readjusts and reshapes to fulfil the expectations of consumers and meet the concerns of contemporary society, such as: awareness of environmental issues, the fight against waste, the impact of products on health, the guarantee of fool-proof safety and security, etc.

But let's take a look even further. What could packaging be like by 2050?

To answer this question, we selected four challenges for society that lie ahead for the European population, and more broadly for the human race, in the coming thirty years.

Our first step was to find out the point of view of people who design packaging in their everyday lives. In association with the EPDA (European Brand and Packaging Design Association), we surveyed 23 designers based in 16 different countries in July 2018 to find out their views and source their foresight in relation to these four changes in society.

Then, building on the learnings and proposals from these designers, we reached out to a panel of 8,253 consumers in six countries: France, the United Kingdom, Belgium, Spain, Italy and Germany, to measure the likely avenues that will lead us, sometime around 2050, into the packaging revolution.

This report offers an analysis of the contributions of the designers, together with insight from its author. It aims to help readers gain a better understanding of the type of revolution that awaits the packaging of the 21st-century.

Four major challenges that will transform how we live and drive change in packaging:

- Population ageing,
- Resource depletion,
- Development of artificial intelligence in all areas,
- Increased mobility with autonomous vehicles, and as far into space.

1 PACKAGING AND POPULATION AGEING

One thing has been clear for many years now: we are living to an increasingly older age. And this is going to continue for the coming decades. The number of people over the age of 100 in the world is set to rise from 500,000 today to more than 26 million by 2100

DID YOU KNOW:

On 1 January 2016, there were 21,000 people over 100 in France; there were only 100 in 1900 and there will be nearly 200,000 in 2050.
Today, five out of six over-100s are women, and half of them still live in their own home.

Source INSEE

Population ageing is a worldwide phenomenon which has been in evidence in Europe for a long time, making our continent's population one of the oldest on the planet. In 2016, more than 19.2% of Europeans (EU 28) were 65 years of age or older.
Population ageing affects both developed countries, such as Japan, and emerging nations, such as China. It is the consequence of a demographic transition illustrated by decreased fertility and longer life expectancy. In France, Nielsen's 2017 consumer trends report concluded that **over-50s now account for the majority of consumer spending.** On this date, they made up for 53% of the consumption of fast-moving consumer goods. And this trend is set to amplify with population ageing. Looking to 2022, Nielsen predicts that the proportion of overall spending attributable to this senior population will be 56%! While living longer is a perfectly valid objective, there remains the issue of how to adapt products - and more specifically packaging - to cater to elderly people who are gradually losing their physical and intellectual abilities.

POPULATION AGEING IN FRANCE: PROJECTIONS FOR 2050

On the basis of current demographic trends, the French population will be 70 million by 1 January 2050.
The proportion of the population that is elderly will also be higher:
• One in three inhabitants will be 60 or over, compared with one in five in 2005.
• 22.3 million people will be 60 or over, as against 12.6 million in 2005; an increase of 80% in 45 years.

This is because the Millennial population will be 50 and the "baby boomer" generation will be in very old age, with the youngest among them being over 80. It is at this point that the growth in population ageing will be the strongest.
The figures leave no room for doubt: it will be necessary to take this monumental development into account in the coming decades. Population ageing is having and will necessarily continue to have an impact on our society.

WHAT TYPE OF PACKAGING CAN AN AGEING POPULATION HOPE FOR?

IS PACKAGING TODAY SUITABLE FOR ELDERLY CONSUMERS?

With a virtually unanimous voice, the 23 designers surveyed declared that packaging is entirely unsuitable for the needs of elderly people. Worse: in some cases, designers believe that some market-available packaging could be dangerous for older people. They note that the firms with which they work every day to create packaging do not pay the slightest attention to this target. According to the designers, brands are currently more interested in the Millennial population - young people born between 1980 and 2000 who grew up in the midst of the digital revolution, also known as generation Y - than in the senior citizen target.

This observation leads to another: only one of the 22 surveyed designers points out that the ageing population in 2050 will be chiefly made up of these famous Millennials, who will be over 50 years of age by them. This appears to me to reflect a certain reticence towards old age and a refusal to accept it. And yet this issue must be faced and dealt with, since it doesn't just happen to other people.

A FEW GOOD REASONS TO CATER TO THE NEEDS OF THE AGEING POPULATION:

"Fast-moving consumer goods (FMCG) brands focus on family products aimed at the hallowed 'under-50 home keeper' and/or more customised products for so-called niche markets." According to the designers, Millennials are also a much-prized target since many brands see them as new customers that should be won over at any cost. This means that attitudes will have to change, given that over 50s now account for more than half of the purchases of FMCGs.

"The majority of FMCG firms care more about reducing their production costs to increase their profit than about improving the functions of packaging to make their consumers' life easier." Adapting packaging to suit an ageing population better does not necessarily entail higher costs. Indeed, since this population is growing, this can even lead to economies of scale.

- "Most packaging for younger targets is not easy to use and is hard to read due to the large quantities of information, sometimes in several languages: from two up to 10. This is not therefore a problem just for the elderly." This may be true, but safety and health issues are totally different for people

who are still independent in mind and body and those who are gradually losing their autonomy.

"Elderly people are set in habit. They remain loyal to the products that they have used for many years and do not wish to change." This is what most young people think, except that older people have exactly the same expectations as younger people in terms of packaging: they prefer packaging which is easy to use, and they rarely repurchase a product with which they have had a negative user experience. Let's not forget that products which they hitherto used without any problems can, several years down the line, become increasingly difficult to handle – thereby becoming a source of disappointment.

A QUITE DIFFERENT ENVIRONMENT IN COUNTRIES IN WHICH PACKAGING IS DEVELOPING

In Tunisia, Algeria, Morocco, designers naturally agree that packaging causes many problems to elderly people. However, according to all designers interviewed, in these countries this affects all population categories. The cost of packaging must be as low as possible so as to make its contents economically accessible to the widest possible population. In addition, local manufacturers' technical resources do not permit them to make sophisticated packaging.

Two other notable differences in comparison with European countries can be identified:

"In our countries, the age pyramid is upside down compared with Europe." In some of these countries, such as Morocco for example, the population spread is entirely dissimilar. The population is very young in its majority. The main concern of these countries' citizens is to try and get by in a society still under construction and where nothing is easy.

"In our countries, people aged over 65 are normally retired. They therefore earn much less." Elderly people in these countries are not well-off, not to say financially insecure. The functions of packaging are therefore the least of their concerns.

AT WHAT AGE AND/OR AT WHAT MOMENT DO YOU THINK AN ELDERLY PERSON MIGHT ENCOUNTER

DIFFICULTIES WITH PACKAGING?

We start to lose our physical abilities much earlier than we think: in our 40s, some people's sight starts to get worse and the first signs of arthritis can appear at 45… Generally speaking, the age of 65 appears to be the point at which health problems start to pile up. However, age appears immaterial since this affects different people at different times. As many designers point out, the real problems with packaging appear at the same time that people start to lose certain abilities.

Four critical consequences of ageing are given spontaneously:

Loss of vision
Subject to blurred, double or distorted vision of objects, eyes grow older just like all other organs and are more often subject to ailments. People aged over 45 must put up with this fact: after this age, it is generally no longer possible to read comfortably without a corrective aid, due to long sightedness. Around 65 years of age, the first signs of cataracts appear: the lens loses transparency, making it harder for light rays to reach the retina. Vision thus becomes hazier, colours fade, and the designs on packaging appear veiled. After 75 years of age, two thirds of the population have a cataract which affects their vision. Other causes of blindness may appear at 70 years of age onwards, such as glaucoma which blurs peripheral vision, and AMD (age-related macular degeneration) which affects one in 3/75, causing gradual and sometimes substantial loss of central vision, which becomes increasingly blurred.

Lower motor abilities
While rheumatism and its chronic inflammatory forms such as arthritis can appear very early, things tend to get worse and lead to disability in the 60s. Over time, these illnesses can lead to gripping problems and reduced strength. These have a substantial effect on the most ordinary everyday movements, and of course on the handling of packaging.

Lower mental abilities
People often believe that ageing unavoidably leads to significant decline in cognitive processes and loss of memory. We now know with certainty that it is possible to maintain one's mental health until the end of one's life, and that most old people succeed in this. However, ageing naturally leads to a slight slowdown in motor abilities (movements and reflexes) and mental abilities. As people grow old, the time needed to process a piece of information increases. There is therefore a general

slowdown which has a knock-on effect on intellectual functioning. As data is processed more slowly, it is difficult to manage a lot of information at once, which explains why people forget things. This particularity should be taken into consideration so as to avoid causing older people problems with packaging which has over-complex information and instructions.

Dependency and loss of autonomy

While not unavoidable, old age may lead to a state of dependency which may come on gradually (very slowly in the event of degenerative illnesses) and lead to total loss of autonomy. Autonomy is defined as the person's ability to manage their own life themselves (choose, plan, etc). Dependency, meanwhile, means the need for help to perform everyday tasks. These states are among the most important concerns of senior citizens, who see them as a form of decay. In these situations, packaging should be designed for use by four hands: those of the helper and those of the consumer who continues to use the packet. Indeed, whatever the state of progress towards loss of autonomy, it is important for the psychological well-being of the person to continue to be the main actor in their own life and the purchasing decision-maker.

WHAT ARE THE ISSUES THAT MIGHT POSE PROBLEMS TO ELDERLY PEOPLE DEALING WITH AN ITEM OF PACKAGING?

Readability is the point most quoted by designers. Next, almost level, come opening packaging and resealing it between two uses. The ability to grip the product is also almost automatically cited. Other interesting points are also very significant, such as vocabulary, words used and visual signs. All of this clearly shows that if we do not take care with the design of packaging for an ageing target, the products which they previously used and which they wish to continue to have may become totally useless to people who are getting on in age.

Five major problems posed by packaging to elderly people:

Poor readability

"Hard to read information." While it is the reason most often given by designers, poor readability of packing is only is not only due to small font size of the characters used to supply information. The colour of the text and the background on which it is printed also contributes to readability. The less contrast, the harder it is for tired eyes to read it. In general, designers raise the issue of the quantity of information that they are obliged to fit into packaging. And also the fact that this has to sometimes be written in several languages. *"We have to use up to 3 languages - and sometimes more - on packaging, with an increasing amount of legal information."* Designers in Belgium and from North Africa for example tell us how impossible it is to make packaging clear and readable when they are required to use at least two languages. They admit that they have to "shoe horn" long sequences of text into a small space, making it impossible to lay the information out clearly and legibly. And there's more: it is not a rare occurrence to find three, nine, 12 or even more than 20 languages on the packaging of certain major multinational brands. In this scenario, even an alert and well-trained eye would have problems deciphering anything

Difficult opening and resealing

The common characteristic of the majority of packaging is that it has to be opened by the hand of the users who wish to gain access to its contents. Then, for packages designed for multiple and partial use, the packet needs to be resealed between two uses. *"Opening and closing (resealing) are essential factors."* These two user techniques, while they appear straightforward for most people, may, according to the surveyed designers, turn out to be a real test for elderly people, in particular those affected by arthritis. In addition to the pain that they experience in trying to unscrew a top, they may injure themselves, or subsequently jeopardise the conservation of the contents, since they rarely succeed in closing the container tightly.

Product weight

The container-content combination of many market-available products is generally deemed too heavy by designers. *"Elderly people don't have the strength to lift or carry naturally heavy products."* Indeed, older people are offered the same types of packing and the same volumes as younger people, and yet they no longer have the physical abilities they need to handle them. This leads to several problems. For and elderly person, shopping becomes a trade-off according to the weight of the basket to be carried back home. A product that is too heavy has every chance of simply staying on the shelves. Finally, when products are too heavy, such as liquids, they cannot pour the right amount of product for their needs, leading to a certain amount of inconvenience.

Unsuitable format

When people get older, their bodies change, as do their nutritional needs. Contrary to received wisdom, these do not reduce with age and may in some cases even increase. To help the over 60s stay healthy, it is important that they maintain or adopt a balanced diet in the right quantities. As they experience difficulty in handling packaging, elderly people, more than other consumers, need packaging to be fitted with simple and accurate measurement systems to help them obtain the quantity to suit their needs, or pre-measured products in single use portions.

Message complexity

"First of all, making the product and its benefits easy to understand." Communication appearing on packages is generally written by young marketing teams, working with designers who are usually up with the latest graphic trends. With the explosion of digital communication tools, everything is moving at breakneck speed: vocabulary, visual codes, pictograms, leading brand communications to also change unceasingly. Every day, a new trend follows on from another. In our working lives, it is already difficult to follow this perpetual change, but once we have left the world of work, the gap widens. Elderly people do not understand communicators' codes or jargon, or the frills that appear on packaging in an attempt to keep the product on-trend. In addition, some designers are critical of the quantity and utility of information appearing on some packaging: *"Information in excessive quantity or irrelevant to elderly people often leads to them experiencing difficulties."*

DON'T DO ANYTHING TO CHANGE THEIR HABITS AND DON'T HAVE PACKAGING WHICH MAKES THEM FEEL OLD!

Fully aware of the difficulties experienced by old people with packaging, designers raise our attention to certain points which need to be addressed simultaneously to offer them better suited packaging. *"One key point is that the older you are, the less open you are to new products."* According to some designers, senior citizens appear less open to change than younger people. In fact, they are even sceptical towards anything with which they are unfamiliar and are only reassured by what they have got used to buying and consuming with standard packaging. The second point is that many elderly people do not wish to be considered as such. *"Often, elderly people do not want to be treated like elderly people. A woman likes to remain a young woman until she is 80."* Elderly people resent being addressed as elderly. They have no desire to be seen with packaging that displays their age and the problems which result from it. The challenge is therefore to create packaging which does not stand out as specifically for the elderly, so as not to be rejected by this audience.

WHAT DEVELOPMENTS ARE YOU STUDYING IN ORDER TO MAKE PACKAGING EASIER TO HANDLE BY ELDERLY PEOPLE?

Our 22 designers have drawn up a few proposals to help packaging evolve in the right direction and fulfil the expectations of ageing consumers:

Readability

According to the designers surveyed, graphic and visual design of packaging aimed at elderly people should be much simpler. *"The aim should be to highlight only the information to which elderly people are sensitive."* This implies that emphasis should only be placed on the information they really need: use-by date, product ingredients, warnings, etc., all of which in larger characters (font size 12 at least), on very light-coloured backgrounds. Specific attention should be paid to the clarity of instructions, advice for use and serving size. These should have an allotted space on the packaging and be almost standardised so as to require the least effort from the older reader. As for the marketing blurb, it should be limited and regulated so as not to affect the discernment of what is essential for the elderly person. *"Brands should attach greater importance to the health and safety of their customers than to the promotion of their image."*

Opening and resealing

A wide range of opening and resealing systems exists on different types of packaging. However, the designers surveyed remind us that certain user-friendly common-sense rules could be adopted to make packaging easy and safe to use. *"Easy opening and resealing are a must on all packaging and an obligation for packaging aimed at elderly people."*

A few examples:
- Screw-on tops: add wings or notches to make them easier to grip and try to reduce the number of twists (half to a full twist maximum). Next, ensure that the strength required to twist open the top for the first time is not excessive.
- For the seals of many packets (plastic, paper, aluminium): considerably enlarge the pull flap and highlight it using a colour and an arrow indicating the direction in which to

pull. Next, ensure that the strength required to pull off the seal is not excessive (it should not exceed 10 N).
- For cans with an opening ring: adapt the ring to make it easy to lift and ensure that the strength required to open a can is not excessive (it should not exceed 10 N).
- For squeezable tubes and bottles: limit the thickness of the container and the resistance of the material to make the walls easy to squeeze without creating too wide a grip or requiring excessive force to squeeze.

Product weight
"We should be offering elderly people much lighter products than conventional standards." For the surveyed designers, 1 kg for solid products is the top limit. As for liquid volume, 1 litre is considered almost too much, 750 ml appears more suitable to enable elderly people to handle and pour the contents.

Format
Some designers discuss the best way to help elderly people to serve themselves the right amount of product without thinking too hard and with no risk of mistakes. *"Small containers should be offered, single serving containers that are easy to store and convenient."* Consequently, individual serving packs, frequently criticised for being wasteful of packaging, appears to be the best solution to address the quantity problems experienced by elderly people. It is interesting to note that none of the professionals surveyed dreams of a highly sophisticated packaging solution that offers more accurate dosing serving, according to the requirements and the wishes of its user. Nevertheless, single use packaging for elderly people should be well-thought out and be convenient, fitted with good grips and notches to place their fingers, well-balanced handles… in conclusion, everything that can make the product easy and safe to hold and handle.

Messages
Several designers admit that the vocabulary and graphic signs that they use to communicate on packaging are totally incomprehensible by elderly people, because they use a "borderline hipster" young peoples' language that appeals to marketing teams. *"We must communicate with the desire to be understood and build trust, rather than to appear modern and in tune with the times."* In addition, many people also find the words on packaging to be muddled and complex. *"Clarity, simplicity, whatever the age of the consumer!"*

ELDERLY PEOPLE AND PACKAGING RECYCLING

In northern European countries and France, where waste sorting and recycling is well-established, designers agree that elderly people are better eco-citizens than young people. Several reasons put forward by the designers surveyed to support this argument:

"This generation has more of a sense of thrift and does not like waste. It also remembers the time when drinks were sold in returnable glass bottles."

"Yes, I think they sort their waste packaging partly because they have more time on their hands."

"We would say that they will sort their packaging more, because we feel that elderly people (today) generally have a higher sense of responsibility and more appreciation for resources."

"Yes, although it depends on how easy it is to recycle where they live, in their neighbourhood."

In Southern Europe and countries where waste sorting is less efficient, or even inexistent, the opposite is true. It is not the problem of elderly people and it is the role of young people to set the example:

"I don't think they care much about sorting waste packaging: they don't do it. Younger people do it. It's a question of culture, but there is growing awareness."

"Probably, they will gradually become interested in recycling due to experience they have acquired over the years. In recent years there's been no environmental awareness and now it is growing exponentially."

"Unfortunately not! Packaging recycling remains a pipe dream for elderly people."

"Packaging recycling does not relate to old people any more than to young people insofar that there is no system in place in our country."
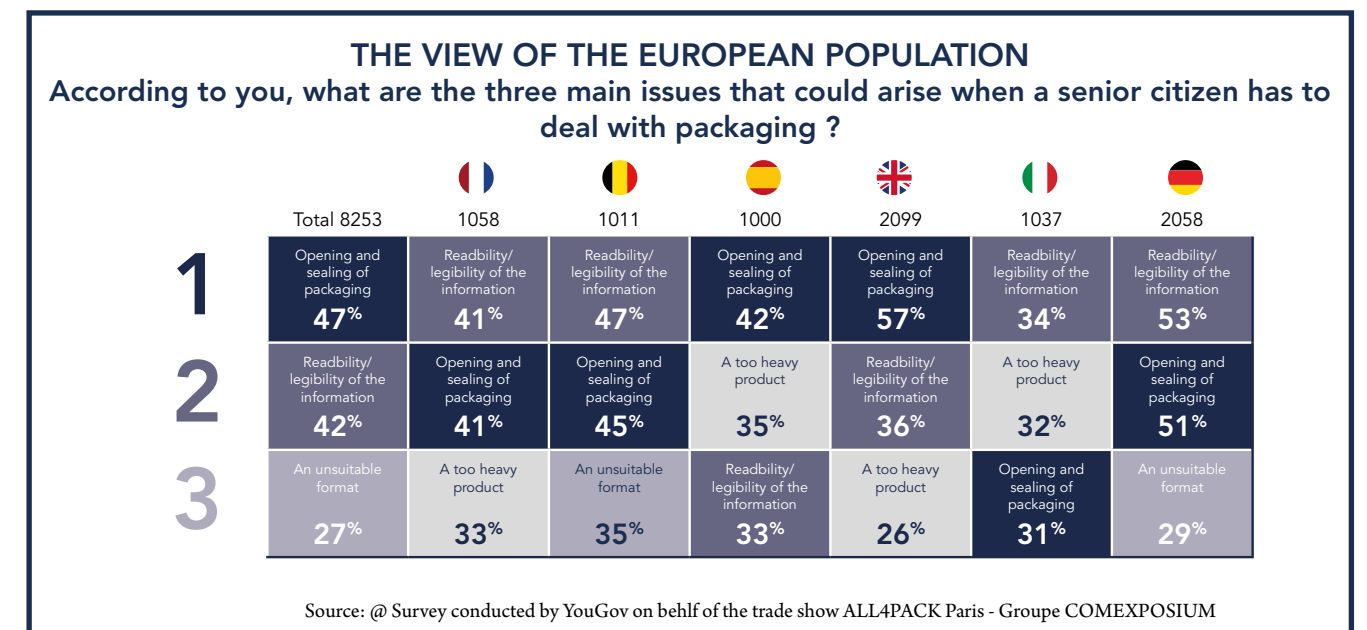
"Past generations did nothing for recycling. In my opinion, the future of the environment is in the hands of the children of today."

DO CLIENTS WHO CALL ON DESIGNERS TO MAKE THEIR PACKAGING APPEAR INTERESTED IN POPULATION AGEING, DO THEY ASK THEM FOR THEIR

CONTRIBUTION ON THIS SUBJECT?

On the strength of the responses of the 23 survey designers, the elderly target does not seem in the slightest to be a priority for manufacturers. With the exception of a few hesitant responses such as "this has been known to occur" or "on a very occasional basis", none of the designers have observed their clients showing specific interest, or even any form of awareness, of this genuine transformation in the demographic profile and the development opportunity that this constitutes.

This, in my opinion, is quite astonishing - particularly if we observe the exponential growth in the "elderly people" target and note that a 60-year-old person is loyal to brands that give them satisfaction; that in developed countries they have ample purchasing power; and that they could potentially remain a captive customer for two or three decades. I sincerely believe that it is really worth doing everything to try to include the Millennials of today among our good customers who will have become elderly by 2050.

THE VIEW OF THE EUROPEAN POPULATION
According to you, what are the three main issues that could arise when a senior citizen has to deal with packaging ?

	Total 8253	1058	1011	1000	2099	1037	2058
1	Opening and sealing of packaging 47%	Readbility/ legibility of the information 41%	Readbility/ legibility of the information 47%	Opening and sealing of packaging 42%	Opening and sealing of packaging 57%	Readbility/ legibility of the information 34%	Readbility/ legibility of the information 53%
2	Readbility/ legibility of the information 42%	Opening and sealing of packaging 41%	Opening and sealing of packaging 45%	A too heavy product 35%	Readbility/ legibility of the information 36%	A too heavy product 32%	Opening and sealing of packaging 51%
3	An unsuitable format 27%	A too heavy product 33%	An unsuitable format 35%	Readbility/ legibility of the information 33%	A too heavy product 26%	Opening and sealing of packaging 31%	An unsuitable format 29%

Source: @ Survey conducted by YouGov on behlf of the trade show ALL4PACK Paris - Groupe COMEXPOSIUM

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PACKAGING AND THE EARTH'S RESOURCES

This is now an acknowledged and undisputable fact: the Earth's resources are no longer inexhaustible. At the speed at which things are going, it is estimated that many natural resources will be exhausted in the next three decades and, with certainty, before the end of the century.

DID YOU KNOW

Every year, Earth Overshoot Day is calculated by comparing the annual consumption of humanity in terms of ecological resources (ecological footprint), with the regenerative capacity of planet Earth (biocapacity).
In 1970, this date was 29 December; in 2018 it was 1 August. If nothing changes, by 2050 it will be one day in April.

Source Earth Overshoot day

Resource depletion will be a crucial issue in the coming years. It will become impossible to ignore, because as soon as in 2050 and in all events before the end of the 21st century, **we can expect to see the end of crude oil, iron ore and silica: materials widely used to make packaging.**
In addition, the disappearance of these natural resources is accompanied by an increase in pollution through the waste which is piling up all over the world. Plastic packaging is increasingly being singled out, since we find it accumulating in large quantities in the oceans and washed up on coastlines. An increasing number of people want packaging to be made from alternative renewable materials at the same pace as the planet is capable of supplying, and that it is 100% recyclable and actually recycled. The most radical individuals advocate a packaging-free world.
Whatever our level of commitment to the environment, it appears certain that we are going to have to review our habits in terms of packaging in order to address the environmental emergency which appears unavoidable if nothing changes.

DEPLETION OF FOSSIL FUELS

The planet's fuel reserves are irreversibly running down: at the current pace of consumption, crude oil will run out in 54 years, gas in 63 years, coal in 112 years and uranium within the next 100 years (for resources currently identified).

WHAT EFFORTS SHOULD WE BE MAKING AND WHAT ISSUES SHOULD WE BE CALLING INTO QUESTION WITH REGARD TO PACKAGING?

DO YOU THINK THAT PACKAGING TODAY IS WELL ADAPTED TO THE ENVIRONMENTAL CHALLENGES AHEAD?

Our 23 designers respond in unison with a big "no", together with many remarks, some of them nuanced, but most often quite forceful. In general, they think that the packaging industry, just like all industry sectors in general, does not give enough consideration to resource depletion in its productive model. While they acknowledge that certain firms have shown initiatives, they claim that it is too late for observations, discussion and small-scale measures. To address an obvious environmental emergency, it is necessary to act and review things drastically.

The designers therefore call for a deep-rooted change because they are convinced that we will not change things simply with a few more pictograms on packaging to encourage customers to sort and recycle their waste, or by merely continuing to reduce the weight of packaging.

SEVERAL GOOD REASONS TO ACT QUICKLY AND CONVINCINGLY:

- While far from being experts in environmental matters, consumers are nonetheless aware that something isn't quite right. They are increasingly concerned and expect real answers from manufacturers. *"There is a lot of discussion on environmental problems and challenges, but not many concrete actions for the time being."*

- Packaging made from plastic of fossil fuel origin has a poor and worsening image and is suspected in its majority of not being recyclable. *"We have a serious problem with petroleum-based packaging materials such as bottles and other plastic packaging because they are not recyclable."*

- Communication about the recycling and sorting of used packaging, in countries where such a system exists, has gradually transformed the notion of 100% recyclable into a sort of ultimate goal which all packaging must attain. *"Only a small minority of packs can be fully recycled, since a large number use different materials and several separable components. 100% of packs should be 100% recyclable!"*

- The idea of replacing packaging made from non-renewable fossil fuels with packaging made from renewable materials is growing in popularity and becoming a genuine expectation. This could even be a sales claim and a form of differentiation for brands who

adopt it. *"Renewable and sustainable materials are at the centre of the concerns of many packaging manufacturers and industrial firms because they are favourably regarded by consumers."*

HIGH AWARENESS AND MATURITY IN COUNTRIES WHERE PACKAGING WASTE IS NOT YET SORTED OR RECYCLED

Designers who work in North African countries seem to be extremely concerned by the damage that packaging can cause to the environment. Indeed, in these countries which have not yet implemented a packaging waste recovery collection and recycling system, the damage is visible. They all protest at the proliferation of plastic packaging waste both in the natural environment and on the Mediterranean coast. They call for the immediate introduction of strict and compulsory rules to design more environmentally friendly packaging and recycle it. They have a lot of hope in the future of agro materials which they consider to be a very good opportunity for job creation and development in their countries. *"Our country has genuine assets in the development of renewable origin materials. Research has begun to shine the spotlight back on traditional materials such as alfa, or has developed the use of by-products such as olive pomace."* Finally, some of them complain that producing packaging which is more protective of the environment is not economically feasible in their country, and that packaging eco-design is mainly done by companies exporting towards Europe in order to comply with European Union legislation. *"Unfortunately, it seems that you have to be rich to save the planet!"*

SHOULD WE BE BANNING CERTAIN TYPES OF PACKAGING TODAY?

There are increasing calls for a ban on certain types of packaging. Non-governmental organisations actively campaign, politicians discuss and debate, in some countries, laws are passed which are more or less stringent. Rwanda led the way in 2008 with a radical approach which quite simply prohibits all types of plastic bags, with offenders liable to receive fines and/or imprisonment. We have not yet reached that stage in Europe, since our bans are more lenient (to put it mildly), and there are virtually no penalties for offenders. Is our legislation strict enough? It appears that our designers have nothing against going much further. They put forward more radical measures.

Five types of packaging which we should have the bravery

to ban:

-Useless packaging
The saying goes that you can always find a use for everything if you look hard enough, yet it is not always easy to prove this usefulness. Some packaging provides no added value in terms of conservation, protection and/or use with regard to the product that it contains. Marketing objectives alone aiming to increase the perceived value of the product can no longer justify the use of useless packaging.

Over-packaging
Too bulky, too protective, too wasteful of materials: over-packaging may take several forms which all lead to the same result: wasting resources. Enough is enough! Nothing can justify, and nothing should permit over-packaging.

Composite packaging
Many products are wrapped using combinations of several different types of materials. This type of packaging should only be accepted if it proves unfeasible to find a solution using a single material and or a single item providing the same conservation, protective and/or use properties to the product.

Nonrecyclable packaging
Given that our consumer society has started to recycle packaging and that consumers finance the system through an eco-tax (which manufacturers inevitably pass on to them), nonrecyclable packaging should not really need to exist.

Packaging made from fossil fuel plastic
As a consequence of the current tidal wave of alarming news relating to plastic waste, many designers are extremely critical towards this material. Among the surveyed designers, a lot of them unwaveringly place all plastic packaging on their blacklist and call for rapid alternative solutions.

HOW CAN PACKAGING EXIST WITHOUT IRREVERSIBLY DIGGING INTO THE RESOURCES OF OUR PLANET?

Several designers surveyed remind us from the beginning that the primary role of most packaging is to protect and conserve the goods which themselves come from natural resources. Consequently, they consider packaging as a necessary evil when their environmental impact is controlled and substantially lower than that of the product it contains. To make packaging more responsible,

they put forward several solutions, among which recyclable packaging and new bio-sourced materials are unanimously popular. However, several voices stand out to say stop to packaging! They say that there is too much packaging which is useless. The dream of a packaging-free world with products which would not need packaging or with edible packaging is something to ponder…

Five solutions that might make packaging more responsible:

Restrict the number of packaging layers

"Do we really need this much packaging?" asks one designer. *It is not rare to find wrapped products which should not be wrapped, such as fruit and vegetable for example. Today we are seeing a wide range of service offerings displayed in packaging. Is it reasonable to wrap up immaterial products in packs to make them more presentable and give them greater added value? "We should be much more selective with what needs to be packaged."*

Promote recyclable materials

"The question isn't only about how we can use less resources to produce packaging, but how all packaging might become reusable resources." The majority of designers think that if all packaging was well-designed, with the right materials, it could become easily-recyclable raw material resources. They therefore call for packaging design specifications to include its ease of recycling, in the same way as any other function.

Develop bio sourced materials

With options such as alfa, seaweed, bamboo, agricultural by-products and waste which is not used to feed people or livestock, the designers surveyed identified some promising solutions. In general, they would like these agro-materials to replace fossil fuel resources as quickly as possible to make plastics. But they also dream of new "biomaterials" which are totally innovative and renewable, with which they could be much more responsible in their creativity.

Relaunch the concept of reusable packaging

With the example of the returnable bottle system, reusing packaging for the same purpose used to exist in certain consumer areas, and still exists in some trades such as food service. This idea has a certain following, with some designers wishing to see it come back and extend to plastic containers used for everyday products. "We should create purchase/return loops for packaging for certain regularly used products." However they do not speak of simply taking the container to a "bank", but rather a new "loop" supply system which would include returning the

item of packaging at the same time as buying a new item.

Create products which do not need to be prepacked anymore

Some designers think that avoiding packaging remains the best way of reducing its environmental impact. This is hard to argue with. However, what designers refer to is much subtler. They dream of disruptive innovation, with products which would no longer need primary wrapping. This naturally requires a change in distribution model: bulk selling, vending, etc. Some people might call this a pipe dream. But dreams are a good starting point for research. *"There may be some potential in packaging-free…"*

E-COMMERCE AND DIGITAL COMMUNICATION TOOLS SHOULD HELP TO REDUCE PRIMARY PACKAGING

The vast majority of packaging today was designed to be sold in traditional self-service retail circuits, in physical points of sale of various sizes. This form of packing has become more sophisticated to meet all requirements of mass retail which enforced its rules and restrictions from the 1960s onwards, to become the type of multifunction primary packaging with which we are familiar today. Today we have entered another era: that of "digital everything" with the exponential growth of online shopping. This has spurred designers into thinking that traditional mass retail packaging - which has to be wrapped to be shipped - belongs to a bygone era. "We will have to reinvent packaging for e-commerce." Indeed, packaging is no better suited to environmental issues than to product distribution modes that await in 2050. "We have to start over." Tomorrow, packaging will therefore no longer be the promotional tool destined for display on crammed shelves, as it is today. In these circumstances, its shape and look will probably be nothing like what we know today. Packaging will become purely functional in order to protect and conserve products that we order from a screen. We will receive our products at home by different means to which packaging will have to adapt to avoid damaging the product. Then we will store it and use it in our homes. The simple practice of picking a product off a shop shelf will undoubtedly be a thing of the past.

HOW CAN PACKAGING BE CHANGED TO BECOME A RESOURCE RATHER THAN WASTE?

Between obligation, taxation, enforcement and punishment, our 23 designers believe that the measures

currently in force for manufacturers are not stringent enough. Education and information are still prerequisites. However, many wish to see sorting simplified and infrastructure enhanced. Some call for an encouragement and/or reward scheme for people who sort well and recycle well. Finally, there is a unanimous feeling that the advent of new materials and the design of easier-to-recycle packaging will help us to get close to the goal of 100% recycled packaging.

Education

"Older people should lead by example and educate and support younger people like a sage would do." Since the middle of the 1970s, UNESCO recommends *"educating about the environment so as to acquire the knowledge, values, behaviour and practical skills necessary to contribute responsibly and efficiently to protecting and solving the problems of the environment and managing the quality of the environment."* Indeed, everything starts with education, information and training of citizens, both the younger members of society and their elders. But designers demand additional education for another population, that of their clients. *"Ultimately, I believe most in the virtue of education, not only at school for young people but also in companies where it is crucial to persuade marketing departments of the utility of eco-responsible packaging."*

Obligation

"We would like to say that this should be achieved by education and information… while it would be more realistic in the short term to consider passing more restrictive laws." *"We are wasting time if we rely on ethics or goodwill, we have to introduce laws."* We can distinctly see the emergence among designers of a desire for stricter laws to require industry to speed up its transformation towards more sustainable and 100% recyclable materials. One designer goes as far as comparing nonrecyclable packaging with cigarette packets. *"I think that fundamental change can only truly happen when governments at local or worldwide level decide to introduce restrictive laws/reforms to force companies to change their practices… What about making non-recyclable packaging blank, like cigarette packets, with the obligation to display messages explaining its environmental impact?"*

Enforcement

Some designers are even more vehement: "*Passing laws to force manufacturers to design packaging that is more environmentally friendly is not enough. You have to check that it works and that everyone obeys these laws without trying to get around them.*" Indeed, both in countries where eco-bodies are in place and in those where there is nothing structured, the most radical designers believe that legislation is not always obeyed because no one actually checks what happens in terms of packaging. "*These rules*

must be strictly enforced, and all offenders should be fined, because hitting the wallet is an easy way of getting people to understand some things."

Taxation

"We should oblige people who create a lot of plastic packaging to invest in research that will lead to the development of more sustainable materials." In other words, some designers think that we should introduce additional taxes. Today, eco-bodies charge higher fees for packaging which is hard to recycle or not recyclable at all. This helps to pay for the higher costs of recycling or disposal of this packaging waste. We should indeed continue in this direction and perhaps be even more severe. But in order for it not to be perceived as being a licence to waste, which would only ultimately be a luxury affordable by rich countries, we should also be taxing manufacturers who produce materials and packaging so as to fund major research and development programmes working to find new materials and new more environmentally-friendly types of packaging.

Facilitation

Judging from what the designers say, even in countries that boast the highest recycling rates, it still appears that there is a lot of improvement to be made to simplify waste sorting and recycling. Designers mainly point to issues where they would like to see improvements. The first relates to the sorting of used packaging. "It is far too complex, a clear and visible logo on the front face which would indicate that goes into this bin or that bin would be great." Even these experts in packaging in their own country are sometimes unsure as to what should be considered as a recycling piece of packaging to be placed in a specific bin and what constitutes a non-recyclable item of waste, as is often the case with plastic containers. The second issue relates to packaging made of several materials. *"We should make the separation of different components of packaging easier and reduce the possibilities of combining different materials for a single piece of packaging."* Whether materials are to be separated in the home, the sorting centre or the recycling plant, designers are well aware that this is a sizeable problem which acts as an obstacle to improving the recycling rate.

Reward

"To make packaging recycling collection effective, it should function in the form of a compulsory and verified deposit with a reward system." Here, the designer has dreamt up a principal verging on return deposits. *"To collect the maximum number of used packaging containers, you have to give them value."* Many designers suggest introducing a reward mechanism to encourage sorting or improving the quality of sorting at home. They foresee the consumer becoming a sort of partner of their waste sorting or

recycling centre, supplying them with the right packaging waste for recycling in return for financial reward.

New materials

Designers naturally have little knowledge in fundamental research to design new materials. This is undoubtedly what has given them the artistic licence to dream up the magical formulation: that of a material bio-sourced from plants which can grow without fertilisers, without consuming too much water, without damaging soil quality, unusable for pharmaceutical applications, unsuitable for human or animal consumption and for any other existing activity and, of course, infinitely recyclable. There are no laws against dreaming. However, designers do want the packaging industries, and primarily those using plastic, to look towards plant-based renewable resources between now and 2050 and beyond.

New models

According to a report by the World Bank, in 2050, cities will be home to 6 billion people, representing nearly 70% of the world population. There is no doubt that the sustainable city of tomorrow will be a resource-efficient city, in keeping with a planet with limited resources. It will offer city-dwellers the chance to benefit from many goods and services in the right place at the right time. All forward-looking scenarios forecast that the cities of the future will blend living spaces with food cultivation spaces: vertical farms taking the form of huge agricultural buildings. We will therefore without a doubt revert to short distribution circuit models, fully incorporated within the city limits. *"Just think that in less than 20 years' time, part of our food production will happen in cities, in "agritectural" buildings, close to consumers. This will help to reduce logistics to a minimum and as a result the quantity of packaging required."*

WHAT ROLE CAN YOU PLAY TO MAKE PACKAGING MORE RESPONSIBLE??

All the designers surveyed agree that they have a real role to play. *"Absolutely! While every individual is responsible for taking a hard look at their own behaviour and habits, it is also our role as packaging designers to work and put forward alternative solutions, and create opportunities that clients could seize." "We supply creativity as external consultants and sparring partners for our clients; this is how we can help to push things in the right direction."* Designers feel truly responsible and some of them have already introduced actions to raise awareness of the clients and current encourage them to reduce their consumption of packaging. However, all of their answers show that their action is essentially limited to gospel spreading: *"Yes*

we must convince industry as well as consumers." Many of them wish to go further: *"We must be more proactive."* However, they regret their inability to do so, owing to lack of investment and resources from their clients. *"Yes, we try to steer choices, but if the company has no real desire to make a commitment, we can't do much."* In addition, addressing these issues is a job for wide-ranging teams of professionals from a host of different disciplines, often a long way upstream of projects. And designers complain that they are not included early enough in the thought process.

DO YOUR CLIENTS APPEAR TO CARE ABOUT THE DETERIORATING ENVIRONMENT AND DO THEY ASK YOU FOR YOUR CONTRIBUTION ON THE SUBJECT?

The opinions of the 23 surveyed designers vary on this point. Whatever the country, there seems to be two sides. The people who care: *"Yes, they are very aware of environmental problems, climate change and the dwindling resources for packaging materials, and ask to use renewable resources when possible.* In general, major international groups appear to be quite sensitive to this. *"Our clients who own major brands didn't wait for our contribution to define their own ecological and sustainable objectives. In addition, they encourage us to pass on all the best practices of which we are aware."* But unfortunately, many diehards still remain: *"This is quite disappointing. Customers are quite reserved, and it is quite difficult to incorporate environmental thinking into everyday activity. They all want to be 'greener' but only react to things without displaying any real enthusiasm."* Furthermore, certain designers point to the gap in some companies between the reality of their commitment and the expectations of their consumers. *"We do not see many brands becoming concerned about this issue, unless their current customers start nagging them about it,"* and one designer concludes with this disillusioned remark: *"Very rarely, no. It's as if they weren't consumers themselves."*

THE PERCEPTION OF THE EUROPEAN POPULATION
What do you think would help to continue using effective packaging without irreversibly damaging the planet?

	Total 8253	1058	1001	1000	2099	1037	2058
1	Forbid non recyclable packaging **40%**	Forbid «over packaging» **39%**	Forbid non recyclable packaging **38%**	A monetary reward for returning used packaging **52%**	Forbid «over packaging» **47%**	A monetary reward for returning used packaging **40%**	Forbid «over packaging» **49%**
2	Forbid «over packaging» **38%**	Forbid non recyclable packaging **39%**	Forbid «over packaging» **37%**	Forbid non recyclable packaging **44%**	Forbid non recyclable packaging **46%**	Forbid non recyclable packaging **39%**	Forbid non recyclable packaging **34%**
3	A monetary reward for returning used packaging **31%**	A monetary reward for returning used packaging **31%**	A monetary reward for returning used packaging **28%**	Educate and support consumers for them to recycle more **40%**	Enforce the usage of more packaging made of renewable resources **37%**	Educate and support consumers for them to recycle more **31%**	Enforce the usage of more packaging made of renewable resources **31%**

Source: @ Survey conducted by YouGov on behlf of the trade show ALL4PACK Paris - Groupe COMEXPOSIUM

3
PACKAGING AND ARTIFICIAL INTELLIGENCE

We are heading towards a radical change in our way of life thanks to artificial intelligence which will soon be everywhere around us. The subject of many interpretations, fantasies or fears, **artificial intelligence is already widely applied in everyday life and it will undoubtedly make its presence felt soon in the packaging world.**

DID YOU KNOW:
While the American billionaire and founder of Tesla Elon Musk promised the worst scenarios for the world of work due to AI, reports and research suggest quite the opposite. In a report, Dell and the Institute for the Future claim that 85% of jobs that will exist in 2030 do not yet exist today! Artificial intelligence is certain to destroy jobs, but it will create others. According to a survey conducted by the American firm Cognizant Technology Solutions, and reported by the Wall Street Journal, artificial intelligence could create 21 million jobs. Finally, at the end of 2017, a report by the United Nations played down the impact of robots on jobs.

The major innovations of the coming decades to improve the living conditions of human beings will be governed by **artificial intelligence which is already developing fast.** Artificial intelligence, often abbreviated to AI, consists of implementing a certain number of complex computer programming techniques capable of simulating forms of human intelligence (reasoning, learning, etc.) so as to enable machines to imitate a form of actual intelligence. Artificial intelligence already has a large number of applications in everyday life such as: machine language translation, shape recognition, face recognition, specialist analysis and decision-making aids in a range of fields, etc. Within the next few years, it is highly probable that it will spread to all areas of our everyday life, to support and help us throughout our existence. **Artificial intelligence will undoubtedly be deployed on and around consumer product packaging,** to provide more safety, information, guarantees and services to consumers. Whatever their degree of enthusiasm, scepticism or even pessimism relating to new technology and artificial intelligence in particular, one thing is certain: young people today who in theory are the least reticent, will tomorrow be handling packaging fitted with some form of artificial intelligence.

ARTIFICIAL INTELLIGENCE: SEEMINGLY UNLIMITED DEVELOPMENT

Artificial intelligence is already a reality and has been developing since the end of the 1950s. AI regulates our trains and traffic lights, protects our computers and those of the military, or suggests new friends for us on our social and professional networks. However, experts agree that we have now arrived at a tipping point and from now on, AI will develop exponentially and by 2050 will reach learning levels on a par with human beings.
Consequently, artificial intelligence, more than any other technology, is set to profoundly change our society between now and 2050. It will be embedded to such a point in our lives, our products and our habits that we will no longer notice it any more. It will have become an extension of ourselves, much like our smartphones are starting to become today.
Ultimately, it will become an integral part of us. And in so doing it will give us all 'superpowers'.
Our smartphones have already made each of us more powerful than any emperor in the past had ever been. We can communicate with anyone on Earth, order transport and food with our fingertips, and find information on virtually anything, instantaneously. In 2050, these superpowers that we all possess will have, thanks to AI, increased exponentially once again. This is a certainty
From an interview with Clément Goehrs, Synapse
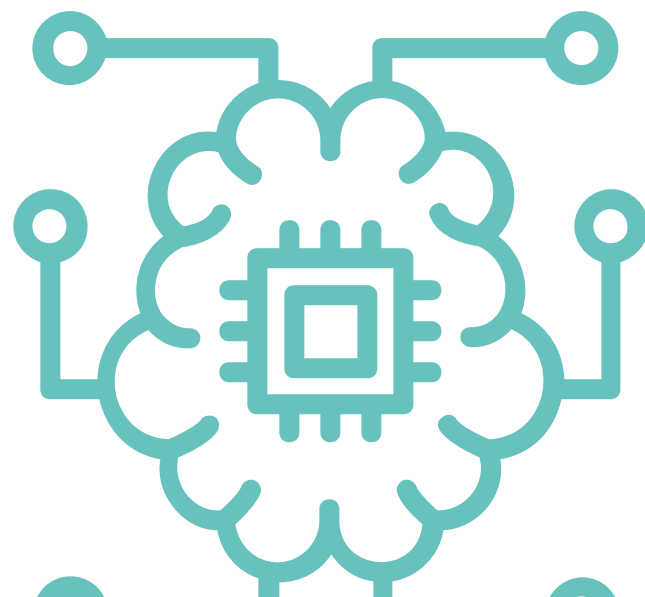
WHAT ARE THE EXPECTATIONS OF USERS WITH REGARD TO SMART PACKAGING?

DO YOU THINK THAT PACKAGING CAN BE FITTED WITH A FORM OF ARTIFICIAL INTELLIGENCE?

"Oh, absolutely… Although we are only in the early days, some examples are already in evidence and have incorporated a sort of artificial intelligence which will go much further…" In the opinions of the 22 designers surveyed, there is no room for doubt: artificial intelligence and packaging are destined to meet up. In fact, some of them say that this has already been the case for quite a while. However, we can note from their answers a certain confusion between the connected packaging of today, which is qualified (and wrongly so, in my opinion) as "smart packaging" and artificial intelligence. Asked to cite the first examples of AI experimentation, these designers mention the RFID Chip which stores information data and transmits it remotely by radiofrequency, or QR (data matrix) codes which can encrypt large quantities of data and interact with smartphones, mainly by sending the consumer to websites for marketing purposes. Similarly, they also point to digital applications which allow brands to transform product packaging into a conversational interface with their consumers by sending them to specific websites, also chiefly for brand communications purposes. These technologies do indeed call on digital tools, but their value is trivial compared to what artificial intelligence is capable of bringing to packaging to make consumers lives easier.

To get a better understanding of what artificial intelligence will contribute to the packaging of tomorrow, firstly we should clarify the notion of smart packaging as it is understood today. An item of smart packaging can be defined as a packet fitted with an external or internal component that can supply information on various aspects of the product that it holds: its producer, its traceability, its nature, its characteristics, its use, but also its sanitary condition or maturity, for example. In short, a wide array of data which cannot be fitted into the limited space offered by the packaging and which may also change during transportation, purchasing and conservation. We can thus consider that smart packaging is currently traditional packaging which offers an extension of its communication function to provide more data to various recipients who have the tools to detect them and the wish to decipher them. The most common ways of communicating these changes are for example time-temperature indicators, indicators to warn of the interruption of the chill chain, or maturity indicators. For real-time information, the most common means used are computers, tablets and smartphones and the systems to connect to them all require voluntary action by the person. This person therefore makes an active effort to obtain this information and deciphers it according to their needs. With artificial intelligence, things will change: according to the profile of the person interacting with it, the packaging itself will provide the information expected by and appropriate to the person.

Furthermore, one designer sums up the current situation: *"I think that packaging will become connected in a first phase and subsequently will become autonomous by adopting artificial intelligence."* Thanks to its intelligence, packaging will therefore enhance many of its own functions, some of which do not exist yet today.

In all events, most designers agree that artificial intelligence will substantially modify our consumption modes and our relationship with packaging.

A FEW MODIFICATIONS THAT ARTIFICIAL INTELLIGENCE WILL MAKE TO PACKAGING

AI will help packaging communicate better with consumers. *"I don't think that packaging will start talking any day soon, but there will be an increasing number of smart ways to supply accurate information about the packaging."* Consequently, several designers see packaging changing into a sort of emitter of information towards a certain number of receptors which could then pass the information on to us in the right way and customised to needs. The early signs of this trend can already be seen in applications such as Yuca with which consumers scan a food product's barcode with their smartphone to obtain its nutritional information. The application goes even further: when it detects a product which is bad for your health, it recommends an equivalent product of better quality. This way, you continue to enjoy eating while doing so healthily! This has led one designer to believe that AI will make packaging an assistant for consumers to help them eat more healthily: *"Just like a product-specific personal assistant, AI will be able to guide us in our purchasing, inform us and most of all alert and advise us according to our age, our state of health, fatigue and dietary shortages …"*

AI is perceived as being able to provide a range of benefits along the entire life-cycle of the packaged product: *"I strongly believe that artificial intelligence can apply itself along the entire supply chain of packaging: in its design, manufacture, selling, delivery, use by the consumer, recycling…"* Indeed, it appears certain today that artificial intelligence will spread to all sectors of the economy and consequently all stakeholders involved in the production and distribution of packaged goods, including the recycling of its packaging

- Some designers think that AI will develop more around the packaged product than around the packaging itself. *"I don't know whether packaging will become smart, but the tools around it will do."* This starts with the physical or virtual point of sale, with everything that contributes to presenting and promoting the product. This will include artificial intelligence to give better visibility to product ranges, communicate information better, and sell more. Finally, designers often talk about the home of the future, perceived as a smart space that manages packaged products better using connected and smart storage spaces. One designer gives their vision of the kitchen of tomorrow: *"I think that we will see more technology in people's fridges and appliances to store and use products better in the home."*

THE RISK OF FUTILITY IF SOLELY DEDICATED TO MARKETING

"It should be useful to consumers, contrary to what we observe today, where the information conveyed by so-called "smart" packaging only has a marketing purpose." This comment sums up the attitude of designers surveyed in North African countries: they fear that all of this is just another marketing ploy to increase the price of products, while they also discern real benefits for consumers. It is also a reflection of current thinking in Europe. Looking back at the survey conducted by the exhibition ALLL4PACK Paris in 2016 with research firm Obosco, we observe that a majority of consumers already considered connect packaging to be *"marketing tools without any real benefit or whose utility remains to be proven."*

PACKAGING FITTED WITH ARTIFICIAL INTELLIGENCE, FROM UTOPIA TO LOGIC

"This comes from a utopian trend, but today it has become reality." No one seems to dispute the forthcoming arrival of artificial intelligence to packaging. *"Any object, however ordinary it is, will have some sort of intelligence… Packaging, in a certain way, will not be an exception to this trend/development."* However, designers draw attention to the aptness and utility of this change which appears to be both logical and imminent. *"It is a logical development which makes sense and will lead to competitive advantage for companies. But we should also make sure that this goes together with genuine added value for consumers."* Indeed, the main objections of designers relate to the actual usefulness of smart packaging. When it was still a pipe dream, this sort of consideration could be passed over. AI was a source of reverie for some people and a source of anxiety for others. But today the threshold of reality has

been breached and the real questions are being asked: *"What real service will it provide, isn't it just a gimmick to increase the price of products? Is it ethical, is it moral?"* And several voices criticise the modern human habit of computerising everything and trying to get everything done by machines: *"As regards packaging, I think we need to get smart first, before packaging becomes smart."* At the other end of the scale, some hope that this will help to repair the human errors of the past: *"I think it's a very logical development so as to solve certain problems that apply to: packaging."* Or another point of view: *"This will help to curb the excesses of the consumer society, because artificial intelligence is more logical than people's own intelligence, who are too often influenced by their emotions, whims, ego, etc."*

WHAT COULD ARTIFICIAL INTELLIGENCE BE USED FOR IN PACKAGING?

When the 23 surveyed designers talk about what artificial intelligence could provide to packaging, they naturally draw comparisons with packaging today. They therefore look forward to the development and improvement of certain functions of packaging such as: their ability to communicate with the consumer, their aptitude to prevent risks for the user, their role as a facilitator for the product's consumption, etc. However, some designers rightly believe that the development of artificial intelligence will provide new functions to packaging which go further than what we can possibly imagine with our references of today.

Sell more

While designers acknowledged that this is the main objective pursued by all of their clients, AI is not spontaneously cited as a way to help brands sell more, except in the case of automatic reordering systems. *"Packaging could trigger a new purchase once it is empty."* Such a system would naturally help to drive sales, as a full packet would immediately replace an empty packet. In this same spirit, designers point to the Amazon Dash button, a small Wi-Fi-connected device pressed by the consumer to order a product. The system does not yet use artificial intelligence, because the consumer must remember to push the button to place their order: if they forget to do so, nothing happens. However, we can imagine that the next step would be a form of automation, without the slightest input from the consumer. Packaging would therefore be directly connected to the Wi-Fi and would be capable of detecting the right time to make out the order and send it. As pointed out by one designer: *"Artificial intelligence is not there to sell more, but, rather, to sell better. The ease and timing of the sale will give its buyer greater satisfaction which will then lead to greater brand loyalty."* This means that artificial

intelligence could become an excellent loyalty vector for brands and a growth factor in the form of successive sales as clients use their products.

Communicate better

This seems a certainty for all designers surveyed. *"The consumer would no longer be obliged to use a magnifying glass to read the text or scan a code to find out more, because the right information will come directly to them."* In addition to increasing ease of access to information, the information provided will be substantially more appropriate thanks to artificial intelligence. *"AI will help to communicate the right message at the right time to the right person."* Indeed, packaging is increasingly overloaded with illegible information, some of which is very useful and even critically important to a proportion of consumers, according to their needs, age, state of health, allergies, etc. These people have to spend time searching for this information by inspecting the packaging from all angles before finding the line of text that they are interested in. Artificial intelligence appears to be the ideal solution to make the packaging communicate more and better. It will be capable of instantly customising information according to the consumer: from the youngest to the oldest, from the most "universal" to the most specific.

If we can imagine smart packaging capable of automatically communicating towards a consumer there is no reason why it couldn't do so in the other direction: towards the brand. A very small minority of designers considers this possibility. However, this will undoubtedly exist at one point and it must also help to improve the customer relation: *"AI will offer a powerful platform to major brands who will be able to improve the conversation with their consumers."* The packaging fitted with artificial intelligence will therefore very probably be a two-way communication tool. *"Some people say that packaging is dead, but ultimately it will be more essential than ever, since it will be able to receive and transmit information."*

Improve safety

The majority of designers surveyed think that improving safety is one important aspect that artificial intelligence will be able to provide packaging. In their view, this will apply to several critical points that today's packaging has not yet perfectly resolved, such as anti-counterfeit for example. *"AI will undoubtedly help to introduce effective anti-counterfeit systems."* Incorporating artificial intelligence into packaging will make the task of forgers considerably more difficult, because in addition to copying the packaged product, they will also have to copy the intelligence. Another fundamental point cited is the absolute guarantee of quality and preservation of the contents to guarantee the safety of consumers. *"Packaging that can sound an alarm if the chill chain has been interrupted."* Generally, with regard

to safety, all expectations converge towards artificial intelligence which will protect the consumer when both buying and consuming the product. *"Not only will it allow anyone to purchase without making a mistake, but additionally it will warn us before the use-by date."* Finally, the dream of packaging fitted with an intelligent portioning system which regulates the quantity served according to the person using it, in particular for dangerous products and medicine, could also be brought to life using artificial intelligence. *"AI is more efficient and accurate than human beings, so this could help to solve the issue of measuring product servings and doses according to real needs."*

Make the product easy to use

In addition to the AI-driven quantity measurement systems mentioned above to improve safety, the designers surveyed also think that facilitation will come from the increased communication capabilities of the packaging. *"Yes, AI will help to use the product better, at least by giving more information and more advice for use, and even by visually recommending new user options."* Finally, in more forward-looking scenarios, one designer foresees packaging designed for use by robots who would be at our service, and who, consequently, would handle the packaging on our behalf.

Provide more services

Some foresight specialists and futurologists say that more than 80% of manufactured objects and products that we will use in 20 years' time have not yet been invented. Therefore, as one of the designers says: *"A lot of options and new functions will appear that we can't even conceive today. AI will soon contribute new practices and new techniques which will help people in their everyday lives."* Simply look at how smartphones have changed our lives and our behaviour ion the past two decades by giving us access to a wide range of services through applications, and you understand that with artificial intelligence, in 30 years' time there will be many more services deployed everywhere exponentially. In addition, the numerous services on offer will interconnect and interact with one another. For example, according to the packaged products that we will have in our fridges and cupboards, we will receive suggestions for menus which could evolve according to what we ate the day before, or according to our state of health, moods, and activity. In short, artificial intelligence will be capable of instantly combining a multitude of parameters with one another to suggest personalised solutions and deliver the expected benefits to us. And one designer concludes: *"I actually think that we haven't the slightest idea of all the services which will be created in the future thanks to AI."*

PACKAGING FITTED WITH ARTIFICIAL INTELLIGENCE WILL BE MORE RESPONSIBLE

According to our 23 designers, artificial intelligence will help to solve a number of problems such as food waste, ineffective packaging recycling and difficulties experienced by elderly people with packaging. This means that while packaging is criticised today for its questionable usefulness and its environmental impact, it could become more virtuous when fitted with a form of artificial intelligence.

Fight waste

Artificial intelligence is seen by most designers to be an anti-waste solution. This notion is referred to frequently in their answers, supported by examples: *"With AI, the consumer can be warned that their product is close to its use-by date and therefore the pack could suggest that they consume it immediately or give it away to a "charity" fridge rather than throwing it away several days later."* Whether stored in a refrigerator or in a cupboard, indicating its contents' approaching use-by date is the least that a smart packaging solution would be expected to do. However, to fight against waste, some designers go even further. They imagine that artificial intelligence will be able to help consumers to manage their purchasing better, or even enable them to order only the quantities they need: *"Using AI will offer excellent opportunities to all industries to meet the specific needs of consumers by providing them with on-demand formats, with fast delivery."* In this case, artificial intelligence will lead to new models of retail and new specifically adapted types of packing. All of this remains to be invented.

Protect the environment

In the opinion of the designers, artificial intelligence will solve the headache of used packaging sorting and facilitate its recycling. They seem to be very interested in this subject, judging by the number of solutions that they have dreamt up. Once again, some proposals are a result of the new communication abilities of packaging fitted with artificial intelligence. However, other, more innovative ideas go as far as making packaging autonomous in its own recycling. In all cases, the quantity and quality of recycled used packaging material is considerably improved.

Five possible contributions by artificial intelligence to packaging to protect the environment :

Make waste sorting easier

"I am this type of package, therefore I go into this bin. Even better: the pack will be so smart that it will be able to change its instructions according to the place where it will

be thrown away, since it will incorporate geo-positioning. For example, bought in Madrid but consumed in Paris, the smart packaging product will know that it is no longer in Spain but in France, where practices are different." Packaging which can indicate the right thing to do according to the place where it is would certainly help to make sorting easier, but also improve sorting quality. In the same vein, separating materials, an operation which is not automatically straightforward for novices, is also cited. "AI could expressly tell us the best way of preparing packaging for recycling according to recycling processes."

Enforce and reward sorting

"Imagine a smart dustbin which would check each item of packaging before it opens… We could even imagine a system which credits the value of materials that we throw away…" These smart sorting bins which acknowledge the action of correct disposal already exist in high consumption venues (company premises, campuses, stations, shopping malls, etc.) to sort drinks cans and bottles and cups. The smart kitchens of the future will perhaps be fitted with this type of smart bin and, in this event, would avoid wastefully disposing not only of packaging materials, but also of its contents.

Automate recycling

"With AI in sorting centres, we could imagine that once the package has been thrown away, it manages itself and automatically goes to its recycling destination." Using artificial intelligence and robots in sorting and recycling centres also seems to be an obvious choice for designers. Today, the main problem of recycling companies, particularly with plastics, is to recognise their type then separate them to recycle them: "AI should enable the packaging to indicate its makeup and steer it towards the right recycling channel."

Self manage its end-of-life

When we mention what happens to packaging after its contents have been consumed, the myth of instant disappearance, as if by magic, is always suggested. What could be more natural, because that's what happens in nature. Without any human intervention, it is capable of by degrading everything it generates, year after year. So what if smart packaging had this same ability? "By combining artificial intelligence and nanotechnologies, it may be possible at the end of the consumption cycle for the packaging to trigger its auto self-destruct process." Here, the designer evidently refers to packaging which could start and even accelerate its biodegradation process at the very moment that it is empty. Once again, artificial intelligence would have brought a dream to life: a used wrapper which disappears as if by magic!

Assist the elderly population
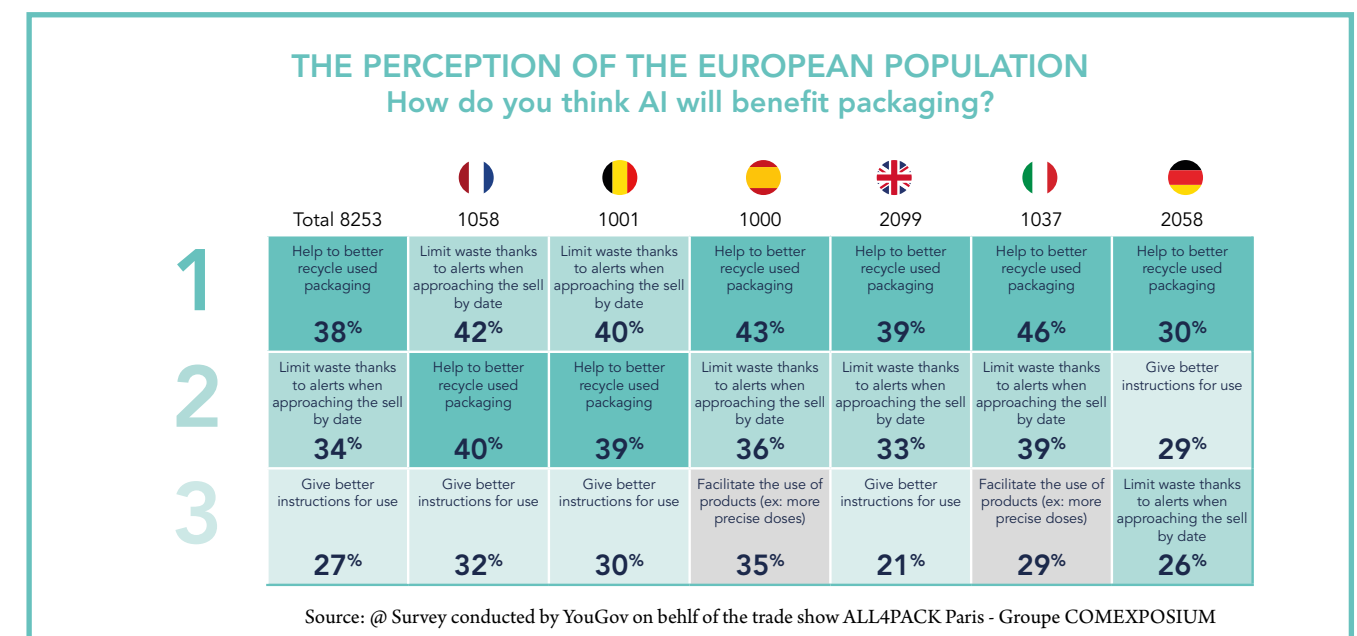
Although elderly people are genuinely considered by the designers to be the most reticent towards new technologies, artificial intelligence could make their lives considerably easier insofar as they would have nothing specific to do to benefit from it. Nevertheless, they will have to have the tools necessary to be able to dialogue naturally with their packaging. The designers surveyed thus believe that elderly people will benefit considerably from the contribution of artificial intelligence to packaging: "This type of consumer should be delighted, because they will no longer have to worry about losing their sight and/or hearing. Smart packaging will, through an interface, be adjusted to their sight. Messages will also be better targeted, tailored to their needs. If the elderly person does not understand the word, they will only have to click on the word to read and/or listen to an explanation, because they will also have the possibility to listen rather than to read…" In this area too, a revolution is already underway: "The packaging will simply sign into a system such as Amazon's Alexa to read aloud any information that is illegible because it's too small and to answer all the questions that it will be asked." We could think that a smartphone is already capable of doing approximately the same thing as this voice assistance system. Except that in a situation of use, a device installed at the heart of the home (in the kitchen or elsewhere), permanently available to the elderly person, will turn out to be very useful and the person will quickly find it difficult to do without. Because, as this designer points out: "Imagine what it will be like for people who experience difficulties to have a product that adapts its messages and its use to help them, without them having to ask…"

HAVE YOUR CLIENTS REACHED THE THRESHOLD OF ARTIFICIAL INTELLIGENCE FOR THEIR PACKAGING?

The answers of the 22 designers surveyed to this question are a mixed batch. They have clients who are already interested in connected packaging and the digital world in general, but do not yet seem to be sensitive to artificial intelligence which appears to them to be quite obscure and a distant prospect. "Our clients are very interested. But more in connected packaging than in artificial intelligence which is another thing altogether, a much broader notion." Some of their interlocutors, the most qualified on the matter bring the subject up, but this is very rarely translated into actions: "They are very curious and open to new ideas. There interested by the vision, but they remain rooted in reality." Finally, many admit that artificial intelligence is absolutely not a short or medium-term subject for their clients.

That's what progress is like. It keeps moving on unstoppably. Some anticipate it, others reject it. Some jump on the bandwagon, others wait until the train is pulling away from the platform to jump aboard at the last minute. But in all events, nothing can stop it from rolling on.

THE PERCEPTION OF THE EUROPEAN POPULATION
How do you think AI will benefit packaging?

	Total 8253	1058	1001	1000	2099	1037	2058
1	Help to better recycle used packaging **38%**	Limit waste thanks to alerts when approaching the sell by date **42%**	Limit waste thanks to alerts when approaching the sell by date **40%**	Help to better recycle used packaging **43%**	Help to better recycle used packaging **39%**	Help to better recycle used packaging **46%**	Help to better recycle used packaging **30%**
2	Limit waste thanks to alerts when approaching the sell by date **34%**	Help to better recycle used packaging **40%**	Help to better recycle used packaging **39%**	Limit waste thanks to alerts when approaching the sell by date **36%**	Limit waste thanks to alerts when approaching the sell by date **33%**	Limit waste thanks to alerts when approaching the sell by date **39%**	Give better instructions for use **29%**
3	Give better instructions for use **27%**	Give better instructions for use **32%**	Give better instructions for use **30%**	Facilitate the use of products (ex: more precise doses) **35%**	Give better instructions for use **21%**	Facilitate the use of products (ex: more precise doses) **29%**	Limit waste thanks to alerts when approaching the sell by date **26%**

Source: @ Survey conducted by YouGov on behlf of the trade show ALL4PACK Paris - Groupe COMEXPOSIUM

4 PACKAGING AND MOBILITY

Autonomous vehicles on the ground, in the air and in space, to travel and/or to deliver goods faster and further… while this still seems to be a distant prospect, it is no longer something just for science fiction films. We are currently witnessing the first experiments and tests in a range of fields. These new modes of transport will lead to new types of packaging.

DID YOU KNOW

All car manufacturers are convinced that the car of the future will be fully autonomous. In its latest report, the independent world automotive market analyst IHS Automotive confirms that autonomous vehicles will dominate the market sooner or later. In 2035, there will be 54 million vehicles fitted with this technology in circulation in the world. And in 2050, continues IHS, nearly all vehicles, whether personal or commercial, will be fully automated.

A few decades from now, we will be travelling around in autonomous vehicles. The driver will therefore become a passenger like any other. This will lead automakers to totally redesign the interior of vehicles. These will become spaces to work, enjoy leisure activities or rest … The first "concept cars" presented in international car shows have interior spaces akin to the first-class cabins of leading airlines. For example, in its autonomous car of the future, Bentley has dreamt up an interior featuring two leather Chesterfield couches arranged opposite one another, a coffee table and everything you need for a relaxing journey with a glass of champagne and exceptional food. The luxury brand also foresees providing its most wealthy passengers with a butler in the form of a hologram. Such is Bentley's vision of the autonomous car of the future. This car is so autonomous that there would no longer be need any need to be sitting in the driver's seat to take back control of automatic pilot if necessary. The vision of Mercedes-Benz, presented for the first time in 2015 at the Las Vegas CES, is undoubtedly closer to what the general public may be offered by 2050. Here too, the on-board space is completely revisited compared to a vehicle today. The front seats of the concept car can swivel 90° to face the back seats, even if the vehicle is travelling thanks to its automatic driving. The vehicle can therefore take over from the driver if (s)he so desires. The interior fittings are a high tech consumer environment, with an array of screens and devices to enable passengers to interact with each other and with the outside world. It is of course still possible to have a little snack. What should be learned from these two concepts is that **the autonomous car of the future will be a "living space",** an extension of our home and/or our workplace. We will therefore consume packaged products in them, just like we do at home and in the office… And it's not just people who will be travelling differently. According to the French commissariat for sustainable development, goods transport will also continue to develop and will be required to adapt to booming urbanisation. By 2050, more than two thirds of humanity will live in cities. To cater to this tidal wave of urbanisation, it will be essential to adopt a new vision in terms of logistics, in particular for last-mile goods transportation. These goods will be increasingly bought online and home delivered. While the Amazon Prime Air service, promising drone delivery of parcels under 2.2 kg, is undoubtedly suitable for the countryside, it is as yet hard to imagine these drones invading the skies of our cities and delivering goods to vertical housing blocks made up of several dwellings. Nevertheless, other modes of ground delivery to the home or to pick-up points will certainly appear.

For these new modes of personal and goods mobility, packaging will have to adapt: lest we forget, in addition to protecting and conserving, another of the roles of packaging is to enable goods to be moved around.
Finally, some futurologists are promising more widespread space tourism for 2050. And here, just like Magellan in the 16th century before he left for new horizons, or La Pérouse in the 18th century before going on his around the world trip, people will have to prepare and load into vessels sufficient quantities of food to survive during the time required for an interplanetary and weightless journey. Without mentioning all the goods that will have to be transported and stored in these far-off holiday resorts. The adventure of packaging is far from over!

TRANSPORT MODES IN 2050

Trucks, cars, scooters: will they all be travelling through the air tomorrow? Many laboratories and firms have already invested in magnetic disruption to get modes of transport off the ground. The major benefit of these spectacular technological breakthroughs lies in bypassing urban congestion, as city growth has made ground transportation increasingly complicated. Flying - moving around freely in the air - remains a dream to avoid being bogged down on the ground. However traditional highways still have a guaranteed future. Roads will still be the predominant means of transport for passengers and goods in 2050, says the French Transport Ministry in its foresight document.
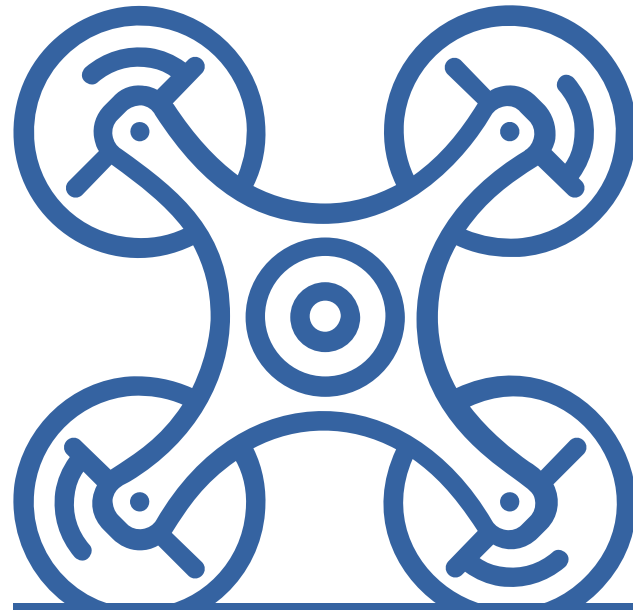
WHAT PACKAGING WILL BE SUITED TO NEW FORMS OF MOBILITY?

DO YOU THINK THAT PACKAGING TODAY IS WELL SUITED TO THE MOBILITY MODES OF THE FUTURE?

In general, the 22 designers surveyed do not think that current packaging, with a few exceptions, is particularly well suited to all forms of mobility: *"No, not really because packaging is still designed for home consumption."* They distinguish two forms of transformation that packaging will have to undertake to be able to travel better: to accompany people in their travel and to be delivered in single units, to places where people are.

As regards the functions of packaging to accompany consumers in their mobility, designers single out several weaknesses and they think that solutions will not be too hard to find: *"What new transport modes are we talking about, they already fly, drive and sail today. Over the centuries, packaging has adapted fairly well. And it will continue to transform itself if new needs appear."* However, this question often leads to a comment about the end of life of these packaging solutions which will follow us everywhere. *"On-the-go products can be easy to open, be the right size and be convenient, but there remains a major problem which is what happens to them after their consumption! Because the more mobile you are, the more recycling bins we need on our journeys. And today this is not the case."*

As regards the mobility of goods, the answer is often quite blunt: *"In terms of new logistics: no!"* Current forms of packaging for home delivery are considered by all designers to be entirely inadequate.

It is therefore clear that packaging will have to adapt to new modes of mobility. However, designers do not see this change as a revolution. It will be a natural evolution of packaging to offer the best response to the requirements of new distribution channels and delivery methods, and to an increasingly mobile consumption with one or two free hands. *"Packaging today is chiefly suited to traditional mass retail distribution modes and aimed at home consumption. The packaging of tomorrow must be able to be accessible and deliverable anywhere, then carried everywhere by the consumers to be consumed everywhere when they want in whatever conditions…"*

WHAT AREAS MAY RAISE PROBLEMS FOR USERS OF PACKAGING IN MOBILITY CONDITIONS?

The designers' answers show that consuming packaged products on the go further exacerbates all the problems relating to packaging about which consumers regularly complain. From a practical point of view, formats should be better studied and user functions such as opening and especially resealing should be improved. Another problem is the difficulty in keeping the contents chilled or reheating them if necessary. But what seems to constitute the biggest problem in the view of the designers is the difficulty in disposing of used packaging.

Shape and size
"The majority of packaging that we carry with us is large containers offered by mass retail stores, they are not practical at all." When travelling, packs and packets slide around and tip over on bends. They are too bulky to be stored in the limited space of the vehicle interior or placed on a ledge. The combined weight of container and contents may also prove to be a problem in certain conditions of use: when we have to use the package with just one hand for example.

Closing and sealing
"Leaks due to a poorly designed resealing system." This point is very often quoted as one of the major problems of on-the-go packaging. The fear of an accidental leakage appears quite frequently in the answers of the designers; possibly from personal experience…

Hot and cold
"In many cases, the contents of packaging must be consumed chilled or hot, and there is no stand-alone solution to be able to do this." This indeed is a problem which has yet to be solved. With the exception of several containers for liquids which can heat them up in the space of a few minutes, there is not yet an efficient, cost-effective and ecological solution on the market to reheat or chill a package outside the kitchen or without access to the necessary household appliances.

Waste management
"Mainly waste." Indeed, dealing with the waste packaging of products consumed on-the-go raises an essential problem: how can you make sure that they don't end up littering the environment? How can you make sure that transport vehicles do not become rolling dustbins? The designers wish to solve these problems before anything else.

WHAT DEVELOPMENTS ARE YOU STUDYING TO MAKE IT EASIER TO HANDLE PACKAGING IN AUTONOMOUS VEHICLES?

For this question, the 22 surveyed designers mainly imagine improvements to packaging that exists today. They do not point to any genuine disruptive innovation in this area.

Shape and size
"Flexible, individual portion pouches." This solution is suggested frequently with regard to packaging suited to mobility, since it would provide the consumer with the right serving while generating the least waste. In addition, flexible pouches offer the advantage of single-handed use. Indeed, even if the vehicle drives itself, it is reassuring to always have one hand free when on the move.

Closing and sealing
"After easy opening, the issue of more secure resealing should be studied." The possibility of tightly resealing the packet between two uses, with the certainty that there will be no risk of leakage, appears to be a real expectation of mobile consumers, whatever the means of transport.

Fall-proof packaging
If the packaging cannot be leakproof, one of our designers wishes at the very least that packaging is prevented from slipping or falling accidentally so as to avoid any risk of spillage in the vehicle interior. *"It would be good to have packaging that could attach to surfaces in the vehicles to prevent them from falling during mobility."* Solutions using electrostatic properties or magnetism could probably reduce the risk of accidental falls.

Hot and cold
To reheat or chill products, our designers voluntarily declare that they have no knowledge in research and development and do not dream of a miracle solution. Packaging fitted with cooling or heating systems are perceived as being too expensive and undoubtedly too difficult to recycle. Additionally, as suggested by this designer, who is also a fan of camper vans, *"There's nothing futuristic about fitting vehicles with a small fridge and a small microwave oven."*

Waste management
Several avenues are suggested by the designers to address the problem of waste packaging in vehicles. Among the simplest solutions: installing sorting bins and collection points along journey itineraries, in particular at service stations when refuelling or charging the vehicle. *"To begin with, recycling bins should be installed all over the infrastructure."* They also suggest fitting out vehicles

to manage waste better: *"We can dream of packaging compactors in this new type of vehicle."* Finally, with regard to waste and environmental protection, the dream of the *"philosopher's stone"* is often mentioned, transforming evil packaging waste into valuable resources. Consequently, *"Packaging could be a high-technology waste resource which could be used as fuel once its contents have been consumed."* Of course, if packaging is not recyclable, putting it in a tank to help us drive or fly a few kilometres further would be a good solution to get rid of it, but it would not necessarily help the particulate count…

DO YOU THINK THAT NEW PRODUCT DELIVERY METHODS WILL MODIFY THE DESIGN OF PACKAGING?

The designers' answer to this question summed up in one word: "Yes!". They believe that packaging for mass retail should be replaced by packaging specifically adapted to the tools and means used in home delivery logistics. This is for both economic and ecological reasons, but also because for consumers, it is a quite different experience in terms of contact with the product and brand relationship than is the case in conventional retail.

Standardised packaging

"There should be a modular system for optimised packaging sizes, from the pallet to the shipping box and the size of the drone trunk." For all products sold in online retail, imposing a standard for packaging based on proportional multiples of shipping box formats would be an efficient way of controlling the volume of packaging, and eradicating void space by curbing the unchecked use of fillers, which are very rarely recyclable. Furthermore, in this case it will be quite imaginable for shipping boxes to be reused for several deliveries, because the shipping packaging could be kept by the deliverer. The introduction of a deposit principle, as exists elsewhere for certain industrial packaging items, would therefore be worth considering. This would mean that more solid and more protective shipping packaging could be recovered by the deliverer.

Decorative packaging

"Packaging could be radically different to that used in traditional retail since it will no longer contribute to the act of selling." The only communication function of this new type of packaging will be to promote the brand qualitatively and inform the user in the place where the product is consumed. We can thus consider packets being decorated in a different way. These would be more like decorative objects in the image of the brand than sales tools which promote it exuberantly.

A new experience

As pointed out by a designer: *"The expansion and facilitation of home delivery could mean that we won't take our shopping home ourselves."* It is an accepted fact that online delivery methods could in future spread to traditional retail. In this event, the purchasing experience will be augmented: in the point of sale to select products, then at home when receiving and opening the logistics packaging. How can this two-step experience be qualitative and valuable for the brand? This is what prompts another designer to say: *"It is not only the packaging that must be changed but also the experience of receiving the parcel and the unpacking ritual."*

NO SPACE TRAVEL WITHOUT PACKAGING

One thing is sure for all the designers surveyed: it will be impossible to go on space vacation without taking a cargo of packaged products to survive the duration of the journey. *"One way or another, there will always be packaging. Whether we live on Earth or in space stations, will also need it to conserve, protect and carry goods."* In addition: *"Life in space will be a real life with its desires, emotions and economy… 'Space expatriates' will have requirements and they will always have to consume packaged products to fulfil them."* However, packaging will have to be slightly different to that used every day by Earthlings, because *"it's expensive to go up there."* And there are a lot of new constraints which will have to be adapted to.

Smaller and lighter

In all innovations relating to the conquest of space, size and weight are crucial factors to reduce the energy necessary for lift-off and so as not to take up too much of the confined space available in spaceships. In our space travel, we will only be able to transport packaged products that are much lighter and much less bulky than those that we have on planet Earth. However, the size of packaging is above all dependent on that of its contents. It is therefore highly probable that before designing suitable packaging, the products themselves must be miniaturised: *"Beyond packaging, it is actually the products that will be different: dehydrated or ultracompact food or in pill format."*

Even more protective

"Packaging capable of keeping its contents fresh and nourishing for long time." Indeed, as journeys will be very long it will not be possible to take short use-by-date products on board. Heat treated preserved food will therefore have to make a comeback. It remains to find a shape of packaging and a material so that the content-

container combination is lightweight and small enough to be able to take as much food on board without generating … skyrocketing costs!

Easier to consume

"Zero gravity, easy to open, easy to consume packs." In space, even more than on Earth, food and drink packaging must be easy to use because people will be consuming directly from it. This is why designers see it as being single-use and, in many cases: *"with straws".* Ironically, this accessory which is so controversial today and which many countries wish to ban would appear to be generally useful in space.
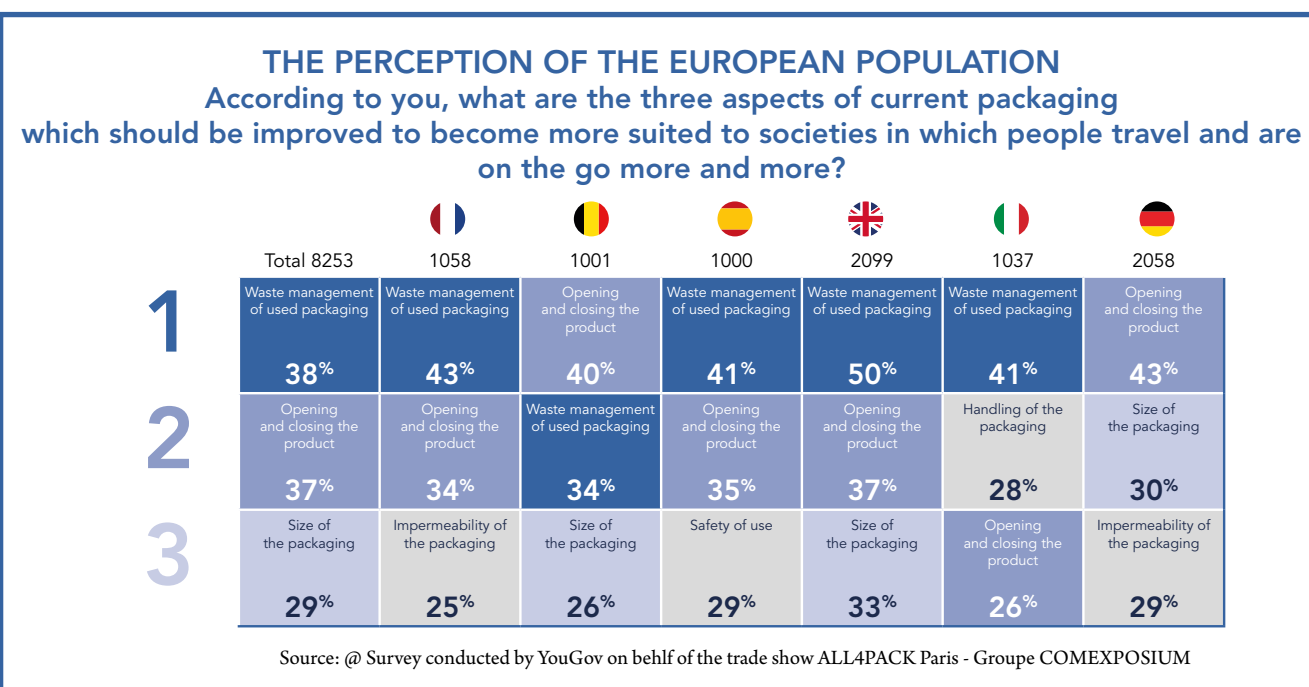
More emotional

Given the fact that food in space packaging is less appetising or sensorial, together with long periods spent eating this type of menu, one designer warns us that *"They will need packaging that allows them to dream, a highly emotional packaging that reminds them of their native planet Earth which raised them."* This is indeed a point that should not be overlooked for the well-being of space travellers, because while eating and drinking is a vital function, it is also a simple pleasure in life and it's good for morale.

The least possible waste

"We are not going to turn space into the dustbin of humanity." The problem of packaging waste is also crucial. Of course, all designers imagine the smallest possible packaging to reduce its waste, because it will have to be returned to earth to be recycled. It goes without saying that we have the same problem to solve on Earth… However, other forms of waste management could be considered: *"We should invent standalone systems to biodegrade waste."* One designer dreams of mini farms on board and/or on the colonised planets, with waste processers, a type of compost bin which could help to recreate a little bit of Earth in space.

DO YOUR CLIENTS APPEAR TO CARE ABOUT CHANGES IN MOBILITY MODES?

In general, the issue of personal and goods mobility appears to be regularly addressed by clients and designers. In this area, change in packaging appears to be more of a natural and gradual shift than a revolution. *"Yes, it is a current topic. Whether for home delivery systems or new means of travel, many brands are finding out more and even contributing new solutions."* Of course, as we might expect, all designers surveyed agree that space packaging is still a long way down the list of priorities of their clients: *"Not at the moment, although we do understand that it is just a matter of time…"*

THE PERCEPTION OF THE EUROPEAN POPULATION
According to you, what are the three aspects of current packaging which should be improved to become more suited to societies in which people travel and are on the go more and more?

	Total 8253	1058	1001	1000	2099	1037	2058
1	Waste management of used packaging **38%**	Waste management of used packaging **43%**	Opening and closing the product **40%**	Waste management of used packaging **41%**	Waste management of used packaging **50%**	Waste management of used packaging **41%**	Opening and closing the product **43%**
2	Opening and closing the product **37%**	Opening and closing the product **34%**	Waste management of used packaging **34%**	Opening and closing the product **35%**	Opening and closing the product **37%**	Handling of the packaging **28%**	Size of the packaging **30%**
3	Size of the packaging **29%**	Impermeability of the packaging **25%**	Size of the packaging **26%**	Safety of use **29%**	Size of the packaging **33%**	Opening and closing the product **26%**	Impermeability of the packaging **29%**

Source: @ Survey conducted by YouGov on behlf of the trade show ALL4PACK Paris - Groupe COMEXPOSIUM

This foresight study conducted among designers from different countries, in which packaging and recycling practices are at different stages of development and for whom uses and attitudes towards packaged products are also very different, nonetheless reveals a certain consistency to their responses.

While it is still very difficult for consumers to look into the future or towards the unknown, it is also interesting to observe that their concerns are in line with most proposals for packaging change that designers foresee for 2050.

CONCLUSION

With regard to the four changes in society selected as being likely to drive change in packaging, we can draw the following conclusions:

—— Regarding the ageing population, brands and designers will be required to work on improving information readability and introducing suitable opening and resealing systems. This will have to happen quickly because the "baby boomer" generation is already part of this population, which is likely to continue to grow further in the coming years.

—— To mitigate the consequences of the inevitable depletion of natural resources, education and goodwill are not enough: enforcement measures in place today are considered too lenient. Overpackaging and nonrecyclable packaging should be banned forthwith. To encourage people to recycle more, returned packaging should include a reward. However, in spite of all of these measures, we will not avoid the obligation to invent new types of packaging materials, mainly made from renewable resources, because certain resources currently used to make packaging will no longer be available.

—— As regards artificial intelligence, while the subject seems obscure for many people surveyed, including for certain designers, it is likely to contribute positively to packaging. Indeed, artificial intelligence should be very useful to reduce waste and help people consume better, and to make recycling of used packaging easier. This technological progress should thus lead us towards much more responsible packaging.

—— Finally, to accompany us in our mobility in autonomous vehicles, on Earth or in space, once again we will have to seriously study the convenience of packaging, chiefly with easy opening and secure resealing systems, and efficient solutions to dispose of them once they are empty. In this scenario too, there is no point in delaying any longer since the problem is already acute today.

It is clearly obvious that whatever the age of the person, wherever they may live or whatever they will be doing, it is hard to imagine life without packaging in 2050. However, the packaging of the future will care more about the environment and people because the challenges for society that lie ahead will quite simply not leave them any other choice.

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