LAUFRICHTUNG

THE PACKAGING MAGAZINE

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PACKAGING DESIGN
How to impress buyers

ENVIRONMENT
What makes packaging sustainable

TRENDS
Where packaging is heading

PRO CARTON

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Editorial

Dear Readers,

Welcome to the second issue of the magazine LAUFRICHTUNG! The Fachverband Faltschachtel-Industrie and Pro Carton welcome you once again into the multifaceted world of packaging. Twelve interviews feature experts who look at the topic from very different perspectives, inspiring people from paper and folding carton production, food production, waste management, design and science.

What struck me most was that the topic of packaging is very dynamic, there is movement everywhere. My interviewees impressed me very much in this respect:

Jürgen Dornheim is driving the development of sustainable packaging solutions at Procter & Gamble, Katja Binder is engaged in Ritter Sport, Dagmar Glatz at dm - all three are making sure that packaging on supermarket shelves becomes more environmentally friendly month by month. Michael Deronja is also working on sustainable and innovative concepts for the packaging manufacturer Karl Knauer, Ilkka Harju at the Finnish cartonboard producer Metsä Board and Florian Müller, who invented paper bottles with the Danish start-up Paboco.

The packaging of tomorrow is already taking shape today in the development laboratories of all these companies. The other interview partners also provide exciting insights: Katharina Müller from the dual system Interseroh+ explains how packaging can be made more recyclable. Scientist Rene Eckhart explains why folding cartonboard can be recycled 25 times. Christian Köhler, CEO of the Markenverband, talks about regulation and the importance of packaging for brands. Ruediger Goetz, the creative head of the Peter Schmidt Group agency, talks about current design trends. Retail expert Frank Rehme looks at the current and future functions of packaging. And Klaus Hecker, head of the OE-A association, illustrates the future potential of printed electronics.

Of course, we cannot cover the topics exhaustively in these interviews. Rather, they are intended to arouse curiosity about the many facets of a world about which one usually hears little in the daily media – wrongly so! That is perhaps the most important insight I have drawn from the discussions: Packaging is much more fundamental to our lives than we think. It not only ensures that goods can be transported and stored safely, it also influences the way we perceive brands and products and make our purchasing decisions. And above all: it is an essential factor on the way to a more sustainable future.

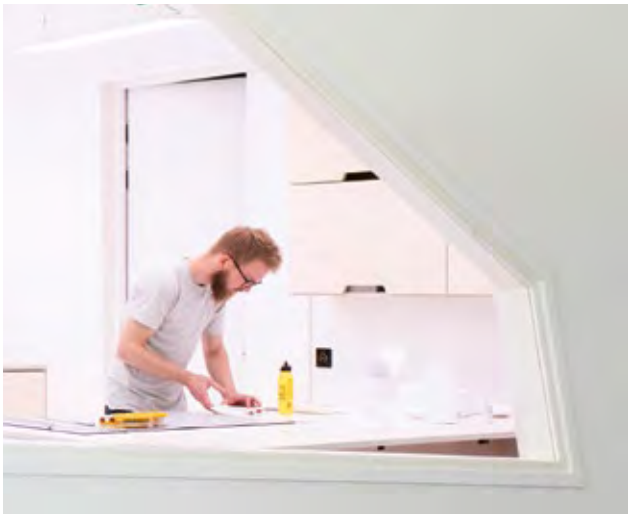
I wish you an enjoyable and inspiring read!

Klaus Janke
Freelance journalist

For reasons of readability, the generic masculine form is used for personal nouns and pronouns. However, this does not imply any discrimination against other genders. For the sake of linguistic simplification, the masculine form is to be understood as gender-neutral and includes all gender identities equally in the respective context.

Cover image: Peter Schmidt Group | Paper background: jessicahyde, Adobe Stock

Content



Images: Procter & Gamble | Karl Knauer KG | Carlsberg | Metsä Board

16 QUESTIONS FOR RUEDIGER GOETZ

“People go through the supermarket **with their eyes open**”

How do you design contemporary packaging? What role do sustainability, brand history and childlike schemes play? Ruediger Goetz, Managing Director of Peter Schmidt Group, explains the most important trends in packaging design.

Mr Goetz, you are constantly designing new packaging for major brands. Where do you get the inspiration for new ideas?

The sources are numerous. It is important to follow international and national award shows where you can see what is “state of the art” as well as many examples of what is to come - you learn a lot when you exchange ideas with other experts as an award judge. You can also look at interesting creations from all over the world on the internet. I recommend that creative people go through the supermarket with their eyes open - many retailers have a large range of goods and try out a lot of ideas. And last but not least, I find a lot of inspiration in areas where I didn‘t even think of looking for them, in art, for example, or interior design. Ideas often spring up from sources that are not obvious.

Images: Peter Schmidt Group

16 QUESTIONS FOR RUEDIGER GOETZ

What role does packaging play for the Peter Schmidt Group?

We deal with corporate branding, i.e. brand management and brand strategies, as well as consumer branding and especially packaging design. Today‘s customers increasingly want all of this from a single source. Packaging design was at the heart of the Peter Schmidt Group - the agency more or less invented premium packaging in Germany 50 years ago. At that time, no one could have imagined that international perfumes by Jil Sander or Baldessarini could be sold in flasks that are produced in Germany.

How strong is the demand? Does packaging become more important in the marketing mix of companies?

Packaging has always been important and will remain so. We have never seen a “drop” in business. The variety of products in the supermarket is increasing, and digitalisation is opening up new possibilities.

What are you currently working on?

We have just relaunched Powerbar. We won the pitch with a redesign idea for the entire brand, not just the packaging. We developed the look further, citing the brand origins while providing more flexibility to appeal to new target groups. As we all know, Powerbar founded a whole segment, it has become the epitome of sports bars. We also won a tender for Delta, the market leader for coffee in Portugal. Portugal is a coffee nation. Delta now wants to internationalise, and we are redesigning the entire portfolio. In the past few months, we have also redesigned the entire Vitalis range for Dr. Oetker. We are also working on various projects for Nivea and concepts for Steiff.

Which trends are currently determining packaging design?

It sounds vague but the biggest trend is variety. Each variety - from elaborate to minimalist, from telling a story to hard-selling - is currently possible to achieve and in demand. In the high-end sector, packaging is often designed more elaborately, delivering an attractive unboxing experience. Or packaging is designed so that it can be reused, i.e. it offers an additional benefit. What is clear is that in many projects, customers are asking more about how the packaging affects the perception of the brand. Could I perhaps have an advantage if I forget tactical measures and instead opt for a simple, rigid form? It is clear to everyone that you need the packaging to create a special bond with the consumer, especially when many experiences today are purely digital. A redesign is sometimes so attention-grabbing that it itself becomes the advertising campaign. All you need to do is show the new packaging.

> “Ideas often spring up from sources that are not obvious.”

Packaging design can probably be more simple and concise in order to make an impact in the online shop which is viewed in miniature.

Redesign for Vitalis: more modern look, more food appeal and quick orientation on the shelf

Looking at the brand heritage: The Peter Schmidt Group has also developed a new look for Powerbar

Correct. The online need for digital images leads to less detail being necessary. However, if you simplify too much, at some point everything looks the same.

It is said that consumers are more in need of harmony in times of crisis, which is also reflected in design. Has the Corona pandemic caused a boom in designs that are playful and almost childlike?

This trend - I would call it infantilism - has been around for a long time, nothing to do with Corona. A brand like Innocent has implemented this new innocence consistently, almost inventing a new market. There is a need for meaningful simplification, the childlike scheme also works on the shelf. The aesthetic of naivety is very appealing, but it can only be applied to certain products. With technology, for example, it's difficult as you'll never put children's pictures on high-precision products. The only manufacturer that has very successfully combined a certain naivety with technical minimalism is Apple.

Images: Peter Schmidt Group

16 QUESTIONS FOR RUEDIGER GOETZ

Juchheim box:
Unboxing is also an experience

Is heritage also a big trend? Many companies play with their history as well in packaging design.

Definitely. You could do a whole interview on this topic alone. We've never had a corporate branding concept that didn't refer to the brand's past in some way. Even if you don't take up this trend, you have to know why not and to do that, you have to know the heritage. You are not credible as a brand consultant if you are not also a bit of an archaeologist. I would advise every designer to take a very close look at heritage as it is very exciting to see what has made a company what it is today.

> "Packaging has always been important and will remain so."

Brands like Rotbäckchen and Ahoj still swear by their packaging concepts from the 1950s. Is that advisable?

It may be successful for these brands but you have to be careful to appear contemporary alongside nostalgic references. For a long time, there was a trend towards glorifying the past. This has strongly influenced the wine industry, for example. But those who want to stand out today tend to design modern labels. So, history is an option where you have to look very carefully at the framework conditions in the category.

One should basically try to differentiate oneself from the category through packaging design?

Yes, if you have a customer who is really entrepreneurial, then disrupting the category is a smart way to go - for example, by using completely new colours. In my opinion, Weihenstephan has provided a very good example: In the otherwise white-dominated milk shelf, the brand has used the colour blue and therefore stands out in the crowd. However, such concepts have a hard time getting through market research because it is not easy to demonstrate the attention-grabbing effect. Not every marketing department is able to take the lead here. Therefore, it is our task as an agency to encourage those responsible to disrupt their category.

How strongly do your clients want you to deliver sustainable packaging designs?

In the briefings, this aspect is less pronounced than I would like to see as a father and as a global citizen. Let's face it: when we walk through the supermarket today, sustainable packaging doesn't exactly jump out at us. Where plastic can be replaced with more sustainable materials, this is often already happening. But the real sustainability gains that are relevant for companies are less in the packaging than in the production of the products. When we look more closely at the contribution of packaging, we have to consider its entire impact. A luxury perfume bottle may not seem particularly environmentally friendly at first glance, but it can reinforce a general value attitude in the consumer: don't buy a lot, but buy high-quality items, which in turn means less packaging waste.

Image: Peter Schmidt Group

Can the demand to make packaging more sustainable put the brakes on creative design ideas?

Yes, if you actually use it very sparingly and reduce packaging to its logistical and protective functions. But if you want to tell stories and offer an inspiring unboxing experience, you need corresponding design options. In practice, ecological materials are already so sophisticated that a lot is possible here. Creativity usually reaches its limits when it comes to calculating the cost.

Are cost discussions with your customers the order of the day?

Yes. Designers are always very ambitious, and they have to be. In most categories, however, there are certain criteria that have already been taken into account in the creation stage. In the case of perfumes, the packaging may have a comparatively high share of the costs because it is a stronger part of the product experience. In other categories, costs have to be calculated more sparingly.

The Peter Schmidt Group also implements many international projects. How much does the perception of packaging differ in various countries?

There are many specific rules. The Japanese market, for example, functions quite differently aesthetically to the German market. But you can use these differences to your advantage. One of our clients is Juchheim, a Japanese company that sells European confectionery culture in Japan. Here, a disruption in aesthetics is consciously accepted and successfully contributes to an increase in attention and differentiation.

> “The biggest trend is variety.”

Do aesthetic codes tend to converge? Can companies scale up internationally and design their packaging identically?

Many large companies are now realising that fragmented house-of-brand concepts are too expensive. So they are increasingly investing in a few, large brands that are as similar as possible, also in terms of their packaging. At the other end of the scale, there is a strong trend towards specialised niche products from small suppliers, some of whom only sell via social media. They deliberately focus on regional and local codes, so there is also the opposite trend.

Another look into the future: Are you also looking at new technologies, for example smart packaging?

Of course. As an agency, we are always challenged to try out new things, even if they don‘t yet have any commercial significance. In smart packaging, for example, augmented reality is a topic: How can I create additional content and experiences around my packaging? But we always have to slow down a little because the demand is very low and manageable. How many people have you seen in the supermarket who actually scan the QR codes on the packaging or on the shelves?

Ruediger Goetz
Managing Director
Peter Schmidt Group

Ruediger Goetz has been Managing Director of the Peter Schmidt Group, currently Germany's top-selling brand and design agency, since 2020. He was previously Managing Director Creation for KW43 Branddesign in Düsseldorf, an agency of the Grey Group, for over 15 years. Goetz is considered one of the most renowned designers in Germany. His claim: communicatively convincing, not only formally aesthetic design. Goetz is a professor at the Academy for Fashion & Design (AMD) at the Rhine-Main University of Applied Sciences as well as a member of the Art Directors Club (ADC) and the German Designer Club (DDC). He is also active as a juror in creative competitions, including being the German representative on the Cannes Lions 2017 design jury.

Image: Peter Schmidt Group

“We are on **the right track”**

Paper instead of plastic: Ritter Sport switches packaging to more sustainable materials. **Katja Binder, Head of Packaging Development, reports on the experiences to date.**

Ms Binder, the Ritter Sport Minis are now only available in paper bags instead of plastic bags. How has the market reacted to this?

The feedback has been very positive, both from retailers and customers. We have followed the changeover very intensely on social media, so that we have had constant feedback from our community. The feedback shows us that we are on the right track with the switch from plastic to paper. This is also a general trend in Germany and throughout Europe.

What were the biggest technical challenges during the changeover?

We had a very high learning curve when it came to the production process. This was due to the fact that we needed to design a completely new system for the production of the bags. We were able to produce a very convincing result with a beautiful design. If there was a pain point, it was in the print quality, especially with the colours looking very different on paper than on plastic. This is particularly noticeable with dark colours, which do not appear so comparable on paper. You have a more uneven surface. Half-tones are also a challenge, as they can quickly lead to colour breaks. Such effects have to be taken into account in the design of the bags.

> “If there was a pain point, it was in the print quality.”

What about tensile strength and stability?

That was certainly a challenge at the beginning. That‘s why we had to work with our packaging manufacturer on a number of things. The individual minis weigh only 16 grams, but they do have sharp corners and edges. If the minis fall into the bag from a great height during the filling process, there can be problems. Paper breakage is also an issue and the bag naturally looks more “used” after a short time. But there was no negative feedback on this.

Katja Binder
Head of Packaging Development
Alfred Ritter

Katja Binder has been head of packaging development for Alfred Ritter in Waldenbuch since 2012. In this role, she leads a team of eight packaging experts and is responsible for the conception, optimisation and implementation of new solutions. Within this framework, she also defines and implements Alfred Ritter's sustainability strategy for the packaging sector. Binder previously worked from 2004 to 2007 at Treofan in Neunkirchen/Saar in technical service and then at Nestlé PTC in Singen as a packaging expert in an international context.

The prototype: The community's interest was overwhelming

A paper bag is also easier to open, right?

JYes, of course. We have retained the familiar zig-zag top edge, which makes it easier to tear open a plastic bag, but actually you don't need it anymore with the paper solution.

But the bag is not made entirely of paper, it has an inner coating made of plastic. Is that necessary?

Yes. The plastic film provides stability, and also makes the bag heat-sealable - otherwise it would not be possible to seal it in the production process. But we don't see a problem here because the bags still have excellent recyclability. That was a crucial point from the beginning. We didn't want to be able to say that the bag was only made of paper. What does that mean exactly? How pure does paper have to be to be called paper? Is paper still paper if it is coated?

> "We didn't want to be able to say that the bag was only made of paper."

Were you able to make the change-over cost-neutral? Or has the packaging become more expensive?

You can't make a before-and-after comparison here. Firstly, as I said, we produced the paper bag on a new machine. Secondly, the bag now has a completely different shape, so we have not only changed the material, but the entire design.

Optimised: **“Schoko & Gras” was tested in Austria**

You also took the risk of making changes to primary packaging. Among other things there have already been limited editions of the “Schoko & Gras” and “Don Schoko” in paper packaging. What experience have you had so far with this?

Our community is also very interested in this. We presented the first prototype in January 2020. The edition was 500 units, and we had 25,000 pre-orders for it. A large part of the prototype was still adapted by hand. It became clear that we would have to change the print image - the differences in colour also exist with the tablet packaging. The way the packaging opened was not optimal at first. We definitely wanted to keep our distinctive crease pack, but at the same time the paper needed to be easy to tear open in other places.

What happened next?

We then implemented the experience gained from “Schoko & Gras”, which was available in Austria, from the end of 2020. In 2021, we tested the “Don Schoko” in paper packaging on the German market. In this way, we have been able to gradually improve the packaging rather than wait for the one perfect solution. In orders of magnitude of 35,000 or 70,000 bars, production was already running through our standardised process and was still very manageable.

Unlike with secondary packaging, there is direct contact between chocolate and paper. Is that particularly difficult?

The challenge lies in the diversity of our product range: there is no one paper suitable for all varieties. An individual solution has to be found for each

one. Sharp-edged crunchy flakes can easily pierce a wrapper; rum sultana is more moist and contains alcohol; nougat, marzipan and coconut have a high fat content. So the issue is very complex.

You have also incorporated a functional plastic coating in the primary packaging.

Yes, for the reasons already mentioned for the secondary solution. In addition, there are further barrier properties for direct food contact. But here, too, we have a very good, tested and certified process for recyclability.

Is it conceivable in the foreseeable future that a variety will be permanently delivered in paper packaging?

I certainly hope so!

Actually, you wanted to produce all packaging from renewable raw materials by 2025. Will that work?

We have this goal in mind and are pursuing it, but we won't be able to achieve it 100 per cent by 2025. That's why we have updated our planning so that from 2025 onwards, we will change over step by step. However, we have to take the international framework conditions into account as well. We can already see in secondary packaging that we have markets in Asia that do not view paper as positively as we do in Europe. Therefore, we will do the right thing for the respective market on a case-by-case basis.

How flexible will you be in pricing? For example, are consumers willing to pay a surcharge for more sustainable packaging?

We asked this question in our market research, and there were definitely positive answers. But I am not sure about studies of this kind: in a survey situation, consumers tend to give answers that they believe are desired. When they are standing in front of the shelves in the supermarket, things look very different.

Positive response: **the minis are no longer available in plastic bags but in paper bags**

In addition to the changeover from plastic to paper, you are also looking to improve the recyclability of your plastic packaging. How far are you at with this?

For us, more sustainable packaging is based on three factors: recyclability, reduction of material and the use of renewable raw materials, where it makes sense. But the be all and end all is recyclability. Our plastic packaging is now excellently recyclable. In the past, we had one or two bags that were not ideally designed, for example with a zipper closure, but that has been changed. There is still potential for optimisation, for example in the area of printing.

So basically you have nothing against plastic?

Not at all, we have never been plastic-bashing. Plastic is a good material that, when used correctly, undoubtedly has its place. But paper is becoming more interesting for us because it is a renewable raw material and because we can take advantage of established recycling processes with it. The situation is different with plastic: There are many markets where there are no efficient recycling processes in place. The material simply doesn‘t end up where it should. That‘s why we decided to expand our range.

> “From 2025 onwards, we will change over step by step.”

On the subject of material reduction: Ritter Sport Minis generate quite a lot of waste. The small bars are individually packaged, plus the bag itself. Should such a thing be offered at all?

First and foremost, we follow the wishes of the consumer, who really likes the variety mixes. Of course, you can‘t put the minis in the bag without packaging because that would look very unappetising. Additionally, the Corona pandemic has demonstrated that we should not oppose additional protection of products. As far as the mini format is concerned, we were a pioneer in downsizing sizes in the 1980s at a time when upscaling was more in vogue. From a nutritional point of view, the advantages are obvious: if the individual portions are smaller, people generally eat less.

FACTS & FIGURES ALFRED RITTER

TURNOVER 2021	EMPLOYEES	MARKET PRESENCE
505 million euros	1,750	over 100 countries

Image: Alfred Ritter GmbH & Co. KG

“We must now **stay on the ball”**

How can a consumer goods giant like Procter & Gamble make packaging more sustainable? **Jürgen Dornheim, Director of Corporate Packaging Innovation & Sustainability, provides answers.**

Mr. Dornheim, Procter & Gamble set itself ambitious targets in 2018 to avoid packaging waste. By 2030, all packaging should be recyclable or reusable. How far have you come with this? Will you reach the target?

We have set out on the path and are making good progress. At the same time, we know that there is still a lot of work ahead of us. The figures motivate us to continue on the path we have chosen and already 73 per cent of the global product portfolio is recyclable. In Germany, the rate is already more than 93 per cent.

Big step forward: the entire range of Gillette and Venus system razors has been switched from plastic blister packaging to FSC-certified cartonboard packaging

By 2030, you also want to halve the share of new fossil plastics. Where do you stand on this issue?

We are working on three focal points in research and development: Packaging savings, use of recyclable materials and packaging innovations. For example, we have changed the large containers of Ariel and Lenor All-in-One PODs from heavy plastic packaging to a recyclable mono-material bag. This saves 75 per cent of plastic per wash load compared to the previous packaging. And consumers can use a refill system for their daily hair care at home because in the hair care category, the increase in the use of recycled materials also continues. Herbal Essences and Pantene proV are already using 100 per cent PCR in their bottles across the entire portfolio. From this summer, Head & Shoulders will also follow suit, switching from 40 per cent PCR to 100 per cent PCR in its bottles. And the Lenor brand has also converted its entire fabric softener and laundry fragrance range to 100 per cent PCR in its bottles.

What is the focus of the innovations?

Innovations have the ambition to do something fundamentally different. For example, with the knowledge that we posess today, there is a return to fibre-based packaging and with this, many things are possible that were previously thought to be impossible. For example, the entire range of Gillette and Venus System razors has been completely converted from plastic blister packaging to FSC-certified cartonboard packaging which means that around 550 tonnes of plastic can be avoided in Europe in the space of one year, even the inner shell consists of 95 per cent recycled fibres. This means that this packaging is plastic-free, with the same contents. For the Always brand, we were able to

Image: Procter & Gamble

Good for the cycle:
75 per cent of Lenor's primary packaging is recyclable

change the film packaging of the Cotton Protection pads to paper packaging, running on the existing production lines. This packaging is also plastic-free and paper-recyclable – we received both the German Packaging Award and the World-star Award for this innovation. All these measures are helping us to get closer to our goals little by little, step by step. Now we have to stay on the ball. As a packaging developer, we can particularly prove our innovative strength now, in times of ecological challenges.

What are the most important levers for P&G to make packaging more recyclable?

We focus on recyclable design and full recyclability. For plastics, this means first and foremost switching to mono-materials. For detergent bottles this is relatively easy, but for toothpaste tubes, for example, it has taken some development work to create recyclable tubes with full product protection, marketable design and in the required volume size range that a large company like P&G needs. Even the refill bags that were initially developed to save packaging have all been converted to mono-material. In the plastics

> "We have set out on the path and are making good progress."

Always is now offered in a recyclable paper pack

Jürgen Dornheim
Director Corporate Packaging
Innovation & Sustainability
Procter & Gamble

Jürgen Dornheim has held various roles in Research & Development, Engineering and Product Supply over the past 25 years, always with responsibility for corporate projects that had to overcome regional and global challenges. For eight years, he managed the global packaging development of the Oral-B (oral hygiene) and Braun (electrical appliances) brands. Since 2012, he has served as a sustainability and innovation expert for all P&G brands. This includes the development of packaging concepts of the future, the evaluation of innovative materials and the analysis of all impacts on the ecological footprint.

Images: Procter & Gamble

sector, we only use common plastics in packaging and do not use PVC at all. In the case of fibre-based paper or cartonboard packaging, we make sure that the packaging not only looks like paper, but can actually be recycled in the waste paper stream without any problems. This includes, among other things, the right choice of glue or a conscious choice of printing inks.

“As a packaging developer, we can prove our innovative strength especially now in times of ecological challenges.”

What is the status of the “Holy Grail 2.0 project? Together with other companies and organisations you want to introduce a digital watermark that will help with waste sorting.

The background to this is the existing problem of the shortage of recycled material. There is simply not enough recyclable material available that could be used for packaging with hygiene requirements. The “Holy Grail 2.0” project can help here. Better sorting results in higher quality and greater quantities. In a semi-industrial test in Copenhagen, the prototype of the recognition sorting unit for digital watermarks was successfully endorsed. The results show that digital watermarking technology can achieve smarter and more accurate sorting of packaging waste on a large scale, enabling new recycling streams, such as the development of separate food and other new PCR streams that do not currently exist. The consistently high results for all categories of plastic packaging material tested, with an average detection rate of 99 per cent, a rejection rate of 95 per cent and a purity rate of 95 per cent, demonstrate the impressive performance of this first prototype. The recognition sorting unit is now ready for pilot testing on an industrial scale, which is scheduled to begin later this year. More than 100 P&G products such as Fairy, Lenor, Pampers and blend-a-med have already participated in the semi-industrial test.

Refill made easy: Shampoo by Herbal Essences

P&G promotes the circular economy in various projects. How big is the willingness of other market participants to cooperate in such projects?

Very big, because the fundamental questions of our time exceed the abilities of individual companies, and we will only be able to answer them by forming partnerships. We are witnessing a productive rethinking in all areas of the value chain. Circular economy concerns us all and can only work on a widespread basis. The “Holy Grail 2.0” initiative already has more than 180 members and is growing steadily. The Cospatox (Cosmetics Packaging Toxicology) initiative aims to define high-quality recyclable materials and has 24 committed and highly competent members who are contributing their best experts worldwide.

What has the Alliance to End Plastic Waste” (AEPW) achieved so far?

This is a partnership that promotes local structures in critical regions in Asia and Africa. A lot has already happened here. We know that plastic waste is a serious problem in our environment, especially when it enters our rivers and oceans. It is a complex global challenge that requires a comprehensive, collaborative approach across the entire lifecycle of plastics. Our brands, our suppliers and our partners are working on a range of sustainable solutions and driving the circular economy so that plastic is treated as a resource to be collected, recycled and reused.

How do you rate the success of the Packaging Act of 2019?

The law that replaced the old Packaging Ordinance was important and right. Free-riding in packaging licensing was successfully combatted - the Central Packaging Register Agency (ZSVR), established in the course of the Act, was essential to that. The catalogue of packaging subject to participation has contributed a great deal to clarity. The performance of the ZSVR is characterised by competence, expertise and commitment; at the same time, communication in all areas is crystal clear and very inviting. The good work of the Central Packaging Register Agency is of great benefit to the circular economy of packaging.

The framework conditions for the circular economy vary in different countries. Is that a big challenge for P&G?

Yes, it is. As a European established producer, P&G is sometimes faced with the challenge of having to market the same product differently in various EU countries - a problem that we actually considered to be a thing of the past. There are different standards for recyclability, there is different case law on what counts as recycled material and what does not and our lawyers can tell you a thing or two about the sometimes contradictory rules for claims on packaging. Don‘t get me wrong: my point is not to moan about how difficult everything is. However, it is clear that only consistent regulations will ultimately enable scaling, and therefore progress, across the board. Fragmented regulations are sand in the gears of a functioning European circular economy.

What can be achieved in the recycling processes for the different types of material in order to recover more material?

Basically, all recycling processes must continue to be improved. This means that the various processes of the individual steps of recycling must be optimised or newly developed in order to produce large quantities of high-quality recyclable materials, which is what is lacking today. This requires standards, which is what the Cospatox consortium

Image: Procter & Gamble

Another measure to reduce plastic: Ariel is now also available in recyclable cartonboard packaging

The Head&Shoulders solid hair shampoo comes in FSC-certified and recyclable cartonboard packaging

is working on. After all, product categories such as detergents or cleaning agents do not necessarily have to use food-grade recyclable materials. Recyclables are currently in high demand worldwide, so standards are an important tool to counteract the shortage of them. And it is important to clearly mark packaging with the correct waste bin detail so that the end consumer, the most important sorting authority, disposes of the packaging waste in the correct bin.

In which areas are high-grade recyclable materials sufficiently available?

The market for high-quality recyclable materials of any plastic material is in high demand, since most large manufacturers are now replacing new plastics with recyclables. That is why there is a shortage in all areas.

Let‘s talk about your product portfolio. With Design-4-Recycling, you ensure that packaging is made more recyclable. Can you give us some examples?

Recyclable paper packaging for Always, Pampers, Gillette, Venus and Ariel, new cartonboard packaging for Gillette and Venus razors and the conversion of PODs family packaging to lighter and recyclable pouches. Since summer 2022, the small containers of PODs are available in a fully recyclable cartonboard box, which completely replaces the former plastic packaging.

> “We see here a productive rethinking in all areas of the value chain.”

Which P&G products can already be purchased in reusable packaging?

In the last year, hair care brands: Head & Shoulders, Pantene PRO-V and Herbal Essences launched their “Refill the Good” shampoo refill system, consisting of a durable aluminium bottle and a recyclable refill pouch. This saves about 300 million shampoo bottles in Europe.

Does P&G possibly also thinking of changing existing products to a different shape or consistency so that they can be packaged in a different material?

Our researchers are working on many exciting options. In summer 2022, Head & Shoulders will launch a solid hair shampoo. It will come in FSC-certified and recyclable cartonboard packaging. This can save up to two bottles of shampoo, depending on the type of hair wash. More new projects are being planned and will come later in 2022.

Where possible, you replace plastic in your products with paper-based materials. Can you give some recent examples?

As mentioned earlier, we have switched the Gillette and Venus System razors from plastic blister packaging to FSC-certified cartonboard packaging with an inner tray made from fully recyclable pulp with 95 per cent recycled paper. We are introducing a solid shampoo in FSC-certified cartonboard packaging at Head & Shoulders, and Always Cotton Protection pads made of recyclable paper are now replacing PE film. Without giving too much away, there's more to come from summer onwards. The possibilities are far from exhausted.

“The possibilities are far from exhausted.”

What are the biggest challenges in switching to paper-based material?

Paper-based material must meet the German minimum standard and be considered paper that can be disposed of in the waste paper bin and recycled in standard paper mills. Our consumers have learned this which is the reason why recycling rates for waste paper are so high. When we think about paper packaging for liquid applications, the challenges are of course the barriers that need to be in place. It is necessary to develop and produce new innovative materials that follow the German minimum standard, meaning they are recyclable and can be disposed of easily in the waste paper bin.

FACTS & FIGURES PROCTER & GAMBLE

HEADQUARTERS	TURNOVER 2021	EMPLOYEES
Cincinnati, USA	76.12 billion US dollars	99,000

Images: Procter & Gamble

Multi pack: Instead of shrink wrap, a sturdy cartonboard box holds the bottles in place

“Less **is more”**

Packaging manufacturer Karl Knauer helps its customers design and implement sustainable and smart solutions. Managing Director Michael Deronja on the most important trends.

Mr Deronja, your company advertises itself as being “impressively different” – a big promise. How do you keep that promise?

Karl Knauer, now in its third generation, is one of the larger family-owned companies among folding carton manufacturers. With two manufacturing plants, we are positioned midway between large, international players and specialised niche suppliers. We offer our customers the implementation or optimisation of existing packaging solutions and also completely new projects. In addition, we develop and build packaging machines that are specifically tailored to our customers‘ requirements. With this rather unique positioning, we feel we are well prepared for the future.

> “Many customers are looking for paper-based alternatives to existing plastic packaging.”

How do you proceed with new projects?

Our so-called “Innovation Engine 7.0” ensures that seven aspects are considered: material, form, function, finishing, process, value and interactivity. So we look at packaging holistically and ask which solutions are optimal for each area. Karl Knauer does not run a classic design agency, but we can advise our customers on design, as we have many years of experience in this area.

How are customers‘ wishes currently changing? What trends are emerging?

Of course, the topic of sustainability plays a big role, I‘m not telling you anything new. More environmentally friendly materials are in demand, not only wood but also grass fibres or silphie-paper. Many customers are looking for paper-based alternatives to replace existing plastic packaging; PET, for example, is being replaced by cartonboard packaging. The increase in recycled content is also relevant. In addition, the volume of material is being reduced through intelligent packaging designs.

Does the drive usually come from the customer? Or do you proactively suggest new solutions?

Both. In the beverage sector, for example, we have a lot of customers who wrap PET bottles with shrink films for carrying, or cans with tight-fitting shrink sleeves made of plastic. Here we have independently developed successful solutions made of cartonboard that deliver the same function. To be honest, it has to be said that most companies are only just beginning to deal with sustainability. Therefore, a lot of consulting is still necessary. This is all the

Image: Karl Knauer KG

Complex manufacturing process: toothbrush packaging made of cartonboard

more important because technical development is progressing very quickly – the goal is far from being reached here. Our task is to know the possibilities and make them usable for our clients.

What role do cost discussions play in this?

Very few conversions are cost-neutral – you can't gloss over that. A plastic product is usually cheaper than a cartonboard box. Sustainability can therefore be up to a factor of 3 times more expensive. The question is always to what extent the costs can be passed on to the end customer. It depends on the product segment.

So do you see customers deciding against a change for cost reasons?

Yes. Many things remain in the drawer until a later date. The implementation of many ideas will take another two to three years while consumer acceptance changes.

> "Most companies are only just beginning to deal with sustainability."

Let's talk about design. Which trends do you pick up on?

Here, too, the demand for sustainability is making itself felt: Packaging is becoming simpler, people are limiting themselves to the essentials – less is more. Colourful glitter packaging, which was very popular five years ago, is clearly on the way out. Tactile is becoming more important and natural-looking surfaces are in demand. Many customers are currently seeking advice on this: should tactile 3D lacquers be used? Or is it better to use materials that create this effect?

Is it true to say that design can suffer if you use less material or more environmentally friendly material?

It always depends on what the packaging is supposed to say. A high-quality product must be packaged appropriately, certain finishes may be necessary.

So there are product groups that are virtually immune to the sustainability trend.

I wouldn't say immune. But it is more difficult to convert some packaging, even in cosmetics there are some interesting approaches, but development of these is not yet widespread. Something is also changing with drugstore products, our packaging development for Dr. Best toothbrushes would have been unthinkable a few years ago.

"For the implementation of many ideas, it will take another two to three years."

Endless possibilities: **Illuminated OLED solutions for Coca-Cola and Bombay Sapphire Dry Gin**

FACTS & FIGURES KARL KNAUER GROUP

ESTABLISHED	EMPLOYEES	PRODUCTION AREA
1938	800	38,000 m²

Images: Karl Knauer KG

13 QUESTIONS FOR MICHAEL DERONJA

You have developed a solution with a plastic-free viewing window made entirely of cartonboard. Dr. Best's oscillating toothbrush head is presented behind an innovative viewing window made of sustainable cellulose fibres. What was the biggest challenge?

The entire process was very complex, from the partnering of the different components to the machine processability on the toothbrush packing machine. But we succeeded and the packaging can now be completely disposed of in the paper bin.

> "Packaging will be able to communicate actively via printed electronics in the future."

Viewing windows are always an obstacle when striving for completely paper-based packaging. You need transparency, but at the same time the product has to be protected. Is it not possible to educate consumers to do without this in the future?

It's hard to say. My personal opinion is that it won't work without a window. Customers simply want to see certain products before they buy them.

Karl Knauer is very innovative when it comes to smart packaging. You have already won prizes for illuminated packaging for Coca-Cola and Bombay Sapphire Dry Gin, among others. Are these prestige projects? Or is there really a market for them?

Luminous packaging can provide an interesting attention-grabbing effect, but it is not relevant for the mass market - for the foreseeable future. Nevertheless, our aim is to demonstrate the possibilities through such projects. Smart packaging has many facets. Think of interactive solutions. I am convinced that packaging will be able to communicate actively via printed electronics in the future. There are currently many ideas on the market, and we are in serious discussions with many customers.

How do you see the future prospects for folding carton manufacturers? Do you feel a tailwind from the sustainability trend?

Currently there are big problems with material availability. Fortunately, Karl Knauer has long-standing relationships with suppliers, so we have been able to fulfil all customer orders so far. But we are struggling with material prices that are going through the roof. In general, however, the folding carton industry is a growth market. Ecological requirements will ensure that more environmentally friendly materials will play an even greater role and that the share of recycled cartonboard will increase. If we get a grip on the supply chain, I expect very positive developments.

Michael Deronja
Managing Director
Karl Knauer KG

Michael Deronja has been Managing Director at packaging manufacturer Karl Knauer in Biberach, Baden, since February 2021. The graduate engineer and marketing expert previously worked for 15 years in the management of medium-sized, internationally active companies. After studying plastics technology at the University of Cooperative Education in Mosbach, he worked in a plastic film finishing company from 1995. From 2007, he managed international business units in an American factory automation company. In 2016, he became Managing director for three plants in Germany and Italy at a company in the field of plastics processing and the manufacture of hot runner systems. In 2000, he completed a part-time degree in “Marketing” at the Bavarian Academy for Advertising and Marketing in Munich. In his free time, Deronja is a passionate sailor and motorcyclist.

Image: Karl Knauer KG

“You can take **bold steps”**

“Thinking ahead for packaging” – with this claim, the drugstore retailer dm wants to make a contribution to sustainability. How this looks in practice is explained by dm packaging expert Dagmar Glatz.

Ms Glatz, dm has set itself very ambitious goals to make its packaging more environmentally friendly by 2025 with 90 per cent of the packaging to then be recyclable. The amount of plastic used is to be reduced by 45 per cent (compared to 2018). And in non-food plastic packaging, the recycling rate should be 50 per cent. What is the biggest lever on the way to increased sustainability?

The best thing you can do is to avoid packaging if product protection allows it. We have already been able to save a lot since 2018, both in terms of plastic and paper. We have not replaced plastic with paper, but have reduced the use of materials in both areas equally. Although we have already achieved a lot here, we still see further potential. For example, plastic bottles can be made even thinner and cardboard packaging can be reduced in the header area.

Nevertheless: reducing packaging by almost half in seven years – is that really achievable?

There is still a lot of room for improvement because only a few years ago we simply did not exploit the technical possibilities. For example, we didn‘t dare to make the bottles radically thinner. We didn‘t know whether our customers would go along with the changed look and feel. But now we see that these brave steps can be taken and that they are accepted. For example, you can make bottle caps flatter and tubes thinner.

> “Circular packaging can offer strong leverage.”

However, packaging is also a marketing tool. If you reduce it, the impact of the products could suffer.

Packaging has many functions, marketing is one of them. Reduced packaging or packaging with a different design can be a challenge. This can be demonstrated by the familiar blister packaging, for example for toothbrushes. You can see the colour of the brush and the shape of the bristles through the plastic, which can be very helpful for the customer. But this form of packaging is not sufficiently recyclable, according to the German minimum standard, so we have to change something. In this case, the market is now moving towards cardboard packaging without windows but with different colour printing so that the customer can still make a choice. Another example is babies dummies, which customers also want to see. Here, too, we have to find new solutions.

When you reduce packaging, you have less space available to put information on about the product. Is that a problem?

We face this challenge with PET bottles, which we use in the laundry and cleaning segment, and also with packaging for cosmetics. With some dimension combinations, the label only takes up a certain proportion of the packaging surface so the packaging is still considered recyclable. However, for WPR products in particular, we have a lot of mandatory texts that we have to print in a certain size.

Material can also be saved through reusable packaging. What do you think about this?

Among other advances, we have installed refill stations in some dm stores since 2020. Basically, the possibilities are quite varied, ranging from WPR products all the way to food. The possible number of stations depends on conditions such as the store size, location and refill numbers. If we decide to include the stations permanently in the dm stores, it is possible to integrate them on shelving within the standard units. So far, customer feedback has been consistently positive, which is why we are currently testing various different products. We are currently in the process of evaluating the refill stations from an overall ecological point of view so that we can determine whether they are actually more sustainable than, for example, recycled bottles or refill bags.

16 QUESTIONS FOR DAGMAR GLATZ

How important is the topic of circular economy?

Circular packaging can offer strong leverage. Packaging should consist of as much recycled material as possible and must also itself be recyclable.

Does the use of recycled materials still lead to visual issues in products, such as cloudy colours?

For the first time in 2011, we launched a bottle for alverde Naturkosmetik the body of which was made from recycled materials. If you look back over time, you can see that the bottle colour has become more and more grey, but inconsistently so. To start with, we covered the grey with a label to conceal this. But now the label has become transparent because we have aligned the design with the colour grey – so we more or less accept the colour. There were hardly any customer enquiries regarding this. In 2021, we switched all Balea bottles to recycled material. You don't see the grey there because there is a full-body sleeve that covers the bottle. You can only see the grey on the bottom. So there are different ways to integrate or hide the grey colour through the design.

How well are recycled materials available on the market?

There are different reports about this from the industry. We have never run out of materials. 2021 was a very dynamic year in the virgin sector, but not in the recycled sector. Virgin is dependent on the commodity sector, the oil price and geopolitical issues. With recycled materials, the risk of failure is lower: if you have found a reliable recycler, things are usually very stable. But here there is also clearly more work to be done. There needs to be more invested in mechanical recycling. Where there is a will, there is a way.

Balea bottle bodies are now made entirely from recycled materials

Will energy and raw material shortages in the wake of the Ukraine war lead to an even stronger switch to recycled materials?

Yes. For dm, it is not only an ecologically important issue, but also is part of our strategic purchasing. We have to minimise risks.

What materials can you use to make your packaging more recyclable?

This is clearly regulated in the German minimum standard. In the plastics sector, polyolefins are very recyclable, such as polyethylene and polypropylene. But PET, which is classified as recyclable, is also a relevant plastic for us. The cardboard boxes for our headers and folding boxes are classified as

Dagmar Glatz
Packaging Expert
dm-drogerie markt

Dagmar Glatz is a packaging expert with a broad background ranging from material and packaging production to circular packaging design. She is involved in various initiatives for the development of sustainable packaging. After graduating in plastics engineering from the University of Leoben, she worked for more than eight years in process engineering and later in research and development at a mechanical engineering company for cable extrusion. This was followed by leading positions in the pharmaceutical and automotive industries. In mid-2019, she moved to dm-drogerie markt.

very recyclable because we use uncoated carton-board. Fortunately, we have hardly any other barrier coatings or barrier-coated folding boxes, which are common in the food sector – just Tetra-Paks. We are currently looking at how we can replace non-water-soluble adhesives.

How broadly do you define sustainability in your products? Do you assess the entire life cycle?

At the moment there are still too few tools and automated data on this. But together with the Technical University of Berlin we have developed the Pro Climate product range, consisting initially of 14 articles from the basic range that really everyone needs. We optimised the complete life cycle assessment for the entire product, not just the packaging. We have learned a lot from this project so far. It is clear that the packaging does not play such a big role – the leverage is much bigger with the product and its production. But we now also have a good orientation guide for choosing packaging. Most of the time it is clear what the best choice is but for 5 to 10 per cent the connections are not so clear.

> “There is still a lot of room for improvement.”

How would you describe your work? Do all products regularly come up for resubmission?

The entire eco-balance was optimised for the Pro Climate product range

We regularly exchange information with our partners, for example on recyclability. In addition, our 100+ product managers are constantly working on the issues and trying to implement optimisations with the manufacturers. If everyone does their bit, a lot can improve.

Do you also put pressure on your partner companies?

We are in constant dialogue with our partners and learn together on a number of subjects – currently very much on recyclability. We have packaging goals that we can only achieve together, so a basic knowledge of the topics is invaluable. We notice a great willingness – everyone wants to do their part to make packaging more sustainable.

What about the costs? Is sustainable packaging automatically more expensive?

It will definitely not be cheaper, because we have to invest in the circular economy. Until now, we had a linear economy where a lot went into thermal recycling. Now we need new technologies, but those are affordable. The price at alverde and Balea has hardly changed, if at all, due to the switch to recycled materials, which means that prices have remained stable throughout.

Are there further optimisation possibilities in packaging that you have not implemented because it would be too expensive?

It can be debatable as to which point you switch to recyclable packaging for a product. If it means that you need a completely new line or have to convert a line, the investment has to be carefully considered. An investment would be made easier if there was an EU-wide standard for the recyclability of packaging, as that would bring more security. We currently only have the German minimum standard, which was created for dual systems but this standard changes every year. Often, packaging details are defined as no longer recyclable - from one day to the next. This hits us hard when the German specifications are suddenly changed and no longer correspond to the practice of recyclers in other countries.

> “Our customers expect us to use our resources in a sustainable way.”

We haven‘t even talked about the end customers yet. To what extent do consumers perceive improvements in packaging? To what extent do they appreciate the efforts?

People go to dm for the products, not for the packaging - that has to be made clear. Our customers expect us to use our resources in a sustainable way, which is also part of our self-image. We try to show our customers our commitment to sustainable packaging and to a functioning circular economy.

FACTS & FIGURES DM-DROGERIE MARKT GERMANY

FOUNDED IN	EMPLOYEES	TURNOVER 2020/2021
1973	42,000	9.04 billion Euro

Image: dm-drogerie markt GmbH + Co. KG

Unboxing: not only the product, but also the packaging counts

“Do not **underestimate** the unpacking”

Packaging will take on many new functions in saturated markets, believes retail expert Frank Rehme. New innovative technologies will also become interesting.

Mr Rehme, will packaging still look exactly the same in 20 years as it does today?

No. In the future, packaging will take on far more communication tasks than it does today. The original functions - making products transportable and protecting them - will only play a secondary role. Instead, the focus will be much more on making people want to buy a product. The necessary incentives must be conveyed via the packaging.

But isn‘t that already the case today?

Yes, but the trend will intensify because we have increasingly saturated markets. This will lead to a further significant change in consumer behaviour. And retailers will take on a new role: they will no longer act as suppliers, because we have long been oversupplied, so it will be more important for them to send other signals. For example, if you pack in eco-paper, you give shoppers the feeling that you are doing something good for the environment. It‘s always about messages and stories. This is true even for the unpackaged shops: even if you remove packaging, you are telling a story about packaging.

Can sustainable messages clash with other messages? We have become accustomed to certain codes that convey quality and value. Do you block those, if you package ecologically and economically?

It depends on which message should dominate. You must not overestimate packaging: It underlines the message of the product. When it comes to sustainability, appropriate packaging is indispensable. But a fine perfume no longer seems fine to us if it is not packaged in a fine way.

> “Packaging will take on far more communication tasks than it does today.”

What role will be played in the future by interactive technologies such as QR Codes or augmented reality? Will they improve the shopping experience?

Packaging is a certain size, based on the product within. If you want to communicate more than fits on it, you need other possibilities. That‘s why these technologies are becoming more important. Take the example of Tierwohl TV (Animal Welfare TV): it shows you at the meat counter via livestream what the barn is like where the animal comes from. In this way, the trade can build up trust in its products. But

Image: ronstik, AdobeStock

since it is not possible to hang a screen everywhere, NFC, QR codes or other technologies will be increasingly used in the future to deliver content. Another factor is that you will have to be even more active in the future to convince people to buy a product.

> “Retailers will take on a new role: they will no longer act as suppliers.”

The e-commerce boom could also have an influence on packaging design. When I order products online, I can‘t hold them in my hand before I buy, but only see them as small pictures on the web. This changes the design requirements.

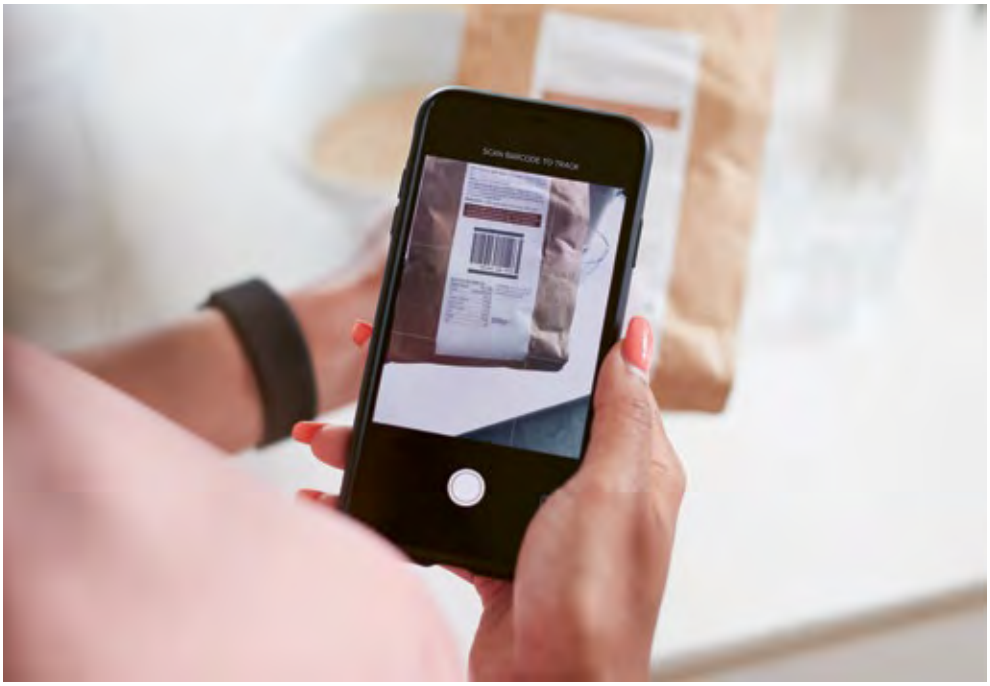
I have already had many discussions about this topic with university research professors. It makes sense to ask from the perspective of neuromarketing: when does a product promise come true? In a bricks-and-mortar shop, I can see the product for myself in person, and I don‘t really care how the packaging is designed. But when I order a product online, the “magic moment” of unpacking comes after delivery - and it can be very fascinating or disappointing. Think of the amazing success of unboxing videos on the internet that simply show people unpacking a product. Or ask an iPhone owner if he threw away the smartphone packaging. I guarantee he didn‘t, because it was a sacred moment for him to remove the device from its high-quality box. In this respect, the e-commerce trend places increased demands on packaging: do not underestimate the unpacking!

> “A fine perfume no longer seems fine to us if it is not packaged in a fine way.”

Is e-commerce also accelerating the trend towards dynamic packaging? Will packaging be used more flexibly in the future?

I sincerely hope so, especially in e-commerce. We are still carting far too much air around because packaging is not tailored to the contents. The decisive factor will be how retailers handle ‚the last mile‘. Deliveries still go directly to the end customer and parcel services are dependent on standardised formats in packaging because of the limitations of loading areas. But if in the future we have small logistics hubs in cities from which the products are brought to households on cargo bikes, then new possibilities will open up. We will have a chance to implement dynamic solutions.

Unpackaged shops: even if you leave out packaging, you are telling a story about packaging.



Added value: codes for scanning can provide additional information

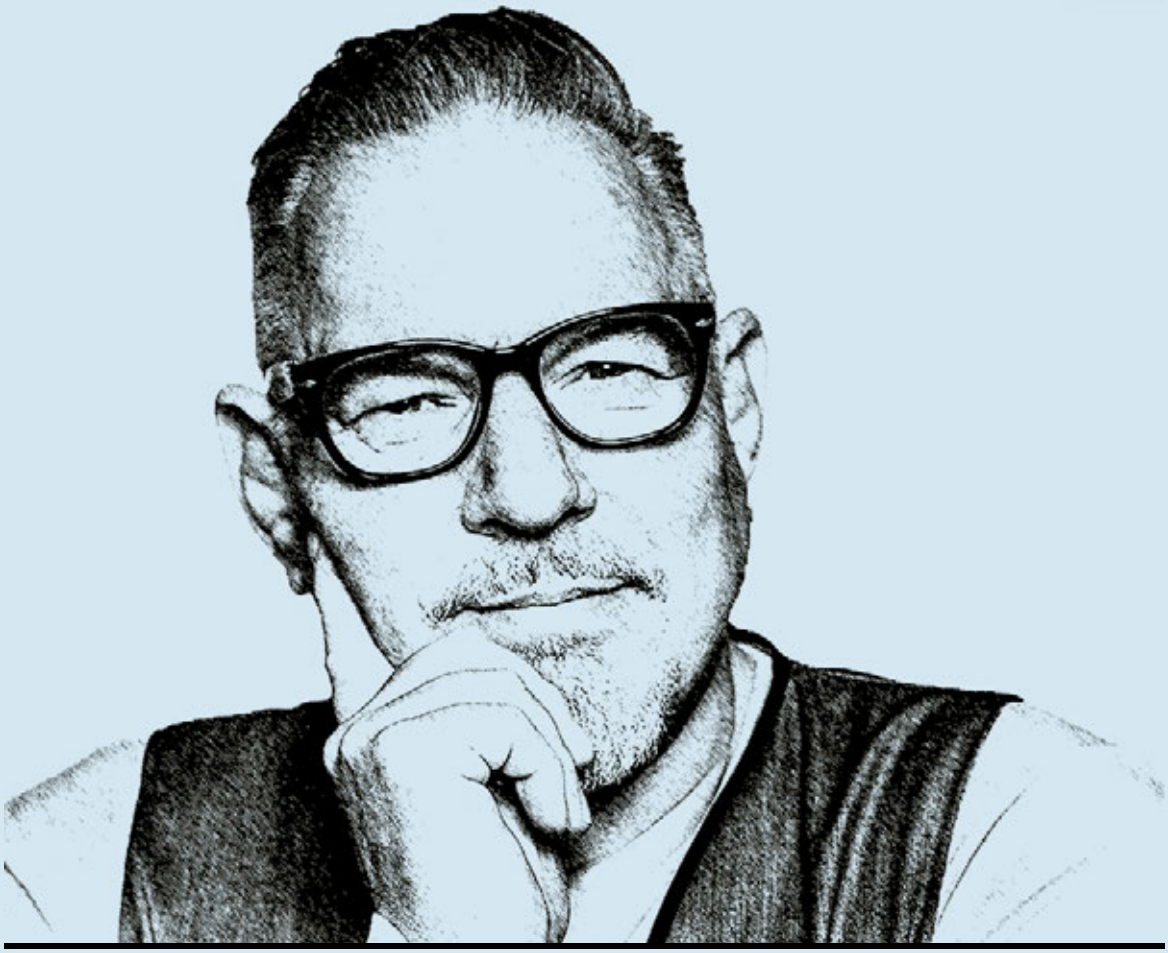
Images: Monkey Business, AdobeStock | AzmanJaka, iStockphoto

“We are still carting far too much air around.”

Digital printing also makes individualisation and personalisation possible. Is that promising?

Brands like Coca-Cola and Nutella have already taken the first steps in this direction by printing different proper names on their packaging. But of course these were only different series. You only get to real personalisation when you can take individual preferences into account - that would be the box with the buyer‘s full name and favourite colour. You could also cross-sell by using the packaging to promote products that match the one being bought. Personalisation would also finally add value to the packaging because the packaging industry‘s biggest problem is still that its products are seen as rubbish. This is why batch size 1 is always a fascinating idea - but in practice too expensive for the vast majority of products.

E-bike of a parcel service provider: New logistics channels can promote dynamic packaging



Frank Rehme
Managing Director
gmvteam

Frank Rehme is a distinguished thought leader in the field of innovation and shaping the future of retail. The managing director of the Düsseldorf-based consultancy gmvteam is an entrepreneur, strategy consultant, speaker and management consultant. He is also co-founder of the information service www.zukunftdeseinkaufens.de for innovations in stationary trade and Managing Director of the Mittelstand 4.0 - Competence Centre for Trade. Rehme describes himself as an innovator, entrepreneur and maker of tomorrow.

Images: Uwe, AdobeStock | Frank Rehme

“With Paper Bottles, you stand out”

Paboco‘s third generation: plastic only serves as a barrier

The Danish start-up Paboco (Paper Bottle Company) produces paper-based bottles for Carlsberg, Coca-Cola and other companies. Chief Technology Officer Florian Müller explains the strategy.

Mr Müller, how did Paboco come to be founded?

Paboco's predecessor was the Danish research company EcoXpac, which was involved in EU-wide and national projects. EcoXpac built up valuable knowledge about fibre materials and manufactured products through those projects. Having gained this knowledge, a technology was developed whereby paper-based hollow objects, for example bottles or containers, could be produced in one piece. The packaging materials company BillerudKorsnäs in Sweden, which specialises in fibres and paper, became aware of this and worked with EcoXpac in a limited way. But it quickly became clear that the project could only achieve market relevance if it could produce on a larger scale. So the globally active plastic packaging manufacturer ALPLA was brought on board and a joint venture was formed.

> "Paboco can be agile and, more importantly, independent within certain guidelines."

ALPLA specialises in plastics, BillerudKorsnäs specialises in paper and corrugated board.

Exactly, "Paper meets Plastic". The two are not competitors, but can benefit from each other's expertise. So in 2019 they founded the joint venture Paboco. The goal: to further develop EcoXpac's technology and make paper-based bottles suitable for mass production.

Why was a venture startup founded for this purpose? The two companies could have simply started a joint project.

A venture start-up offers a better framework in the early phases of a research project. If you still have to change direction frequently, it is advantageous to be able to make decisions as quickly as possible. This works better outside of corporate structures. Paboco can be agile and, more importantly, independent within certain guidelines. We now have about 30 employees. In addition, we receive personnel support from the shareholder companies when specific expertise is required. This structure will enable us to continuously move closer to our vision of "A Paper Bottle in Every Hand".

What are Paboco's most important milestones to date?

The first was the C40 World Mayers Summit in Copenhagen in 2019. At this international event, Carlsberg and Paboco presented to the public for the first time, a Paper Bottle filled with beer - we were very proud of that. The next important step was the founding of the so-called Pioneer Community with our business partners The Absolut Company,

Image: Paboco

13 QUESTIONS FOR FLORIAN MÜLLER

Paboco's first generation: major brand owners follow suit

Carlsberg, Coca-Cola, L'Oréal and, since last year, Procter & Gamble. They all already use our products and share their experiences in their communities - which causes no problems, as they are not competitors in their respective markets. The third important milestone was the launch of our first fully automated production line in 2021. This means we can now produce paper-based bottles around the clock.

But they are not made entirely of paper, are they?

No, but the paper content is getting greater and greater. Our "Generation 1", which is already produced fully automatically, still has a very thin plastic film on the inside and a relatively large amount of plastic is used in the neck area. The ratio of paper fibre to plastic is about 60:40, but we are already working on "Generation 3", which has a much better ratio of about 85:15. Here, the plastic no longer takes on any mechanical tasks, but merely serves as a barrier. We are working with other partners on the production of fibre-based closures in order to eventually be able to offer a complete paper product.

> "We want to see how far we can go with it."

Bottles made of paper - that sounds very bold at first. What are the the biggest challenges?

It is already a complex task to produce a prototype at all. But it is even more demanding to scale the idea up to a usable market size. You won't get far in the packaging industry with 200,000 bottles; it only gets exciting from about 10 million. It's not easy to get a grip on that, especially on the cost side. On top of that, of course, there are currently the procurement problems with raw materials for production, and also for the manufacture of additional machines.

Florian Müller

Chief Technology Officer

Paboco

Florian Müller studied plastics technology at the University of Leoben in Austria from 2005 to 2010. He then worked there as a research assistant and did his doctorate in the field of injection moulding. In 2014, he moved to the globally active Austrian packaging manufacturer ALPLA Group. Here, he was initially Project Manager and Global Key Account Manager, then Team Leader Innovation from 2016. Since 2019, he has been Chief Technology Officer at Paboco (Paper Bottle Company), a joint venture between ALPLA Group (Austria) and Billerud-Korsnäs (Sweden).

Images: Paboco

13 QUESTIONS FOR FLORIAN MÜLLER

Is it a special challenge to make the bottles easily recyclable, but sufficiently stable at the same time?

In order to be recyclable, the guidelines known in the paper recycling industry must be adhered to so as not to burden their value chain. This contradicts the requirements imposed by the products that are to be packaged - which are mainly based on water or oil. Likewise, where the product is used places additional demands on the packaging - think about beauty care products that are used in the "wet" bathroom environment. With our Paper Bottle production technology, we achieve a strong fibre compression, meaning that we get a very dense and therefore water-repellent surface - which also gives us a very stable bottle. We apply the barrier layer to the inside and we leave the outside untreated: We separate barrier capability from stability, so to speak, and can thus reduce non-fibre content. Fortunately, in order to find the right balance between durability and recyclability, we can draw on the vast knowledge of our corporate companies.

How high is the recycling rate of Paper Bottles?

That varies from country to country because the recycling structures are very different. Almost 100 per cent of our fibres can be recycled. How high the rate is for the entire bottle depends on what happens to the "reject", i.e. the remaining plastic content: Is it also recycled or sent to a downcycling process? There are strong international tendencies to also use the "reject" for positive value creation. The paper industry in particular has recognised that it can gain a larger share of the packaging market if it deals more with the "reject" aspect.

How does the German consumer dispose of the Paper Bottles? Do they go into waste paper?

It is our vision that the Paper Bottle will be disposed directly in with the waste paper. For this to happen, however, it must consist of 95 per cent fibre. At the moment, that is not possible, and also not possible due to the use of existing closure options. However, we are working hard, together with our customers, to reduce the non-fibre content and to develop closures made of fibre or paper. Currently, the Paper Bottle counts as a composite. The exact recyclability is currently being tested in several EU countries.

What motivates Carlsberg, Coca-Cola and the other companies of the Pioneer Community to use Paper Bottles?

Of course, only each partner can answer this question for themselves. But what can be seen in general is that many FMCG companies have committed themselves to certain sustainability gosals. In addition to reducing CO_2 emissions, the reduction of new plastic also plays a major part. Recycling can achieve a lot, but it will probably not be enough for their sustainability goals. Therefore, alternatives are being looked at. And this is where fibres come into play: they are a renewable raw material with a potentially negative CO_2 balance, which is industrialised and also has a very good established recycling system. Our Paper Bottles are therefore an interesting plastic alternative. We want to see how far we can go with it. And the Pioneer partners are helping us to do this.

How does it look in terms of costs? Are paper bottles more expensive than glass or plastic?

It‘s hard to compare. The plastic industry thrives on the “economy of scale”: Plastic packaging would have a different price if it weren‘t for the enormous production volumes behind it. Because we lack this scale, our price situation is different. But that will change when we have the necessary machines, quantities and sufficient capacity utilisation. If you make a comparison with conventional packaging, you also have to see the aesthetic added value that the Paper Bottles offer. This allows brand manufacturers to differentiate themselves from the competition and signal their ability to innovate. Paper Bottles make you stand out!

But aren‘t the visual design options limited?

There are competitors whose systems only allow certain shapes. Our solution offers the possibility of producing so-called “iconic bottle shapes”, i.e. individual bottle shapes, thus continuing the proven design language of the brand manufacturers.

> “It is already a complex task to produce a prototype at all.”

Where do you go from here? What is next on your agenda?

Now that the production line for “Generation 1” is up and running, we are building the necessary machines to bring “Generation 3” to market in larger quantities - production is scheduled to start this year. In addition, we are constantly optimising our processes. We have to continually improve the performance of our machines. And we are looking at the lifecycle of our products to make them even more sustainable. We are now no longer in the research phase but in the operational phase and are facing competition from plastic, glass and metal packaging.

FACTS & FIGURES PABOCO

FOUNDATION	HEAD OFFICE	EMPLOYEES
2019	Copenhagen	30

“More robust than you think”

Folding cartonboard can be recycled at least 25 times. This is what Dr. Rene Eckhart, a scientist at the Graz University of Technology, has discovered. With this information, he disproves many myths surrounding cellulose fibre.

Mr. Eckhart, last year you designed and directed a highly regarded study on recyclability of folding cartonboard. How did that come about?

There was already a similar study on corrugated board carried out in 2018, which was published in the publication Wochenblatt für Papierfabrikation. It was conducted by TU Darmstadt, with which TU Graz has a strategic partnership. The conclusion was that corrugated board can be recycled up to 25 times. The Pro Carton association then asked whether we could conduct a similar study on the recyclability of folding cartonboard. We agreed and designed a corresponding set-up. Of course, we were interested in the topic because there are still many myths surrounding it.

They say that cellulose fibres can only be recycled six to seven times times without the material losing its integrity.

Indeed. These figures come from studies of materials such as newsprint, among others. But here you often have to deal with insufficient material retention on the screen of a laboratory scale, you lose material with each new cycle. Therefore, at some point in these studies you reach a limit because there is not enough material left for the next cycle. We managed to eliminate this in the laboratory by using a more robust setup. But there were also earlier studies on fibre material that showed up to twelve cycles were possible.

“We kept the cycle as closed as possible.”

How did you then proceed?

We received a folding cartonboard sample from a manufacturer that was made up of different layers. It already consisted mostly of recycled material, only 18 per cent was virgin fibre. We then used it to produce new lab sheets over and over again for 25 cycles. What was important for our setup was that the pattern had a high “ash content”, as we call it. This is pigments and other additives that are used to achieve certain effects on the paper. This ash content cannot be retained well in the sheet-forming process, so it is particularly easy to lose material. In order to avoid this, we washed out the ash to a level of about 5 per cent beforehand and thus reduced the paper to the fibre content.

Recycled cellulose fibres: **The material is not the limiting factor**

Does this mean that the study is not oriented towards real production processes?

No, because the focus of the study is on the fibres. On the other hand, it would be a problem if the ash were to be successively reduced over the cycles. This is because the additives disrupt the binding of the ash, and when they are gradually washed out, the material gains stability. However, this should not distort the results of our study. We kept the cycle as closed as possible. This allowed us to limit the material loss to about 1 per cent per cycle. Less than that is not possible, you inevitably lose fine material in particular.

Nevertheless, after 25 cycles almost a quarter of the carton has “disappeared”. Can you really talk about “25 times recyclable”?

We are not saying that a single carton can be recycled that many times. But the fibres that are still there can actually be used that many times.

Image: Marco, Adobe Stock

9 QUESTIONS FOR RENE ECKHART

> “The fibres can still bind and form a sheet after 25 cycles.”

But the willingness seems to be there. What was left of the carton after the 25 runs? Did it still have the same quality, for example in terms of strength and stiffness?

Yes. The fibres can still bind and form a sheet after 25 cycles. The strength even increased to begin with. This is due to the fact that mechanical energy is applied when the board is defibred, resulting in a very fine material. It practically peeled off the fibres. This material has the property of creating a more binding surface in the sheet. In paper production, this effect is often achieved deliberately. In the long run, however, this also makes the material more difficult to drain.

Did this result surprise you?

Absolutely. We had expected it, but not to this extent.

If it went so well, why did you end the study after 25 cycles?

The study objective was set at 25 cycles - we had to prove this. But we could have actually carried on. The remaining fibre would have been sufficient. The quality did not decrease in the course of the cycles, but it stagnated. However, I would like to emphasise again that we were in laboratory conditions so the results cannot be transferred 1:1 to an industrial environment.

> “But we could have actually continued.”

What can we learn from the study?

In the recycling of folding cartonboard, it is not the material but the recycling process that is the limiting factor, especially in collection, cleaning and reprocessing. So if there is no increase in recycling, it is not due to the potential of the fibres. However, it must be emphasised that in Europe, we have a collection rate of around 80 per cent which means that a considerable loss of fibre is already inherent in the recycling programme. This must be reviewed if the product cycle is to be kept constant. For this reason alone, the fibres will never be able to complete their 25 rounds. Also, fresh fibres have to be used for many products because they offer greater strength, especially at the beginning of the cycle. Other factors make them indispensable, for example, you can‘t produce bright white paper without virgin fibres. But our study shows that if we can increase the capture rate of fibres and keep more and more material within the process, we dont have to worry about fibre material deteriorating longer term. The fibre materials are more robust than one might think.

Dr. Rene Eckhart
Senior Scientist
Graz University of Technology

Rene Eckhart has a PhD in process engineering with a focus on paper and pulp technology. He has been working at the Institute for Biobased Products and Paper Technology at TU Graz since 2002. As a Senior Scientist he is active in teaching and especially applied research with a focus on pulp and fibre characterisation.

Christian Köhler
Managing Director
Markenverband

Since January 2010, Christian Köhler has been the Managing Director of the Markenverband, which representsthe interests of brand companies from many sectors - from automotive, finance, food and luxury goods to telecommunications, luxury and lifestyle - both in Berlin and in Brussels. The association has around 400 members and thus represents the brand industry with its turnover of almost 1.1 trillion euros and around 5.2 million jobs. Köhler previously held various managing director and board positions in the European food industry and trade, including responsibility for the coffee business of Tchibo, the European artisan bakery business of CSM Bakery and the German business of Kraft Foods. Before that, he worked for Mars in various functions in the pet food and foodstuffs sector. Köhler is an industrial engineer by training from the Technical University of Berlin and holds a Master of Science degree in Marketing Communications from Roosevelt University, Chicago.

“Packaging is part **of the product”**

How important is packaging for brand owners? What is the impact of e-commerce? What are the regulatory requirements? Answers from Christian Köhler, Managing Director of Markenverband.

Mr Köhler, your association represents the interests of German brand manufacturers. How important is the topic of packaging to your member companies?

The importance of packaging has always been very high and it will remain so. Packaging not only has protective and transport functions, but also makes a substantial contribution to selling the product within. Brand Owners can delight their customers with attractive packaging. For many customers, the packaging is the first contact they will have with the brand - the significance of communication on packaging is therefore high.

Is packaging becoming even more important because products are becoming increasingly similar? Do brands have to differentiate themselves from the competition through their packaging?

I don‘t see this connection. One can‘t separate the performance of the product from the performance of the packaging. If, for example, paper handkerchiefs are offered in a resealable package, that is an essential contribution to the value of the product. The packaging is not just a covering, it is part of the product.

> “For many customers, the packaging is the first contact they will have with the brand.”

How do you think the success of e-commerce will affect this? Will packaging be designed differently in the long run if the customer views it mainly just as a small image on the Internet?

Yes, you have to ensure you clearly represent the brand across every environment, both online and offline. But there are already online shops that work with 3D images - the customer can see all facets of the packaging in detail. In some cases you can

Image: Thomas Rafalzyk

also provide additional information online that opens up when the cursor hovers over the image. But e-commerce brings with it another requirement: one must ensure the marketability of the product on the internet, which may involve additional declaration obligations, among other things. Product information on the internet must not differ from the information on the packaging - so the online shop operator must pay close attention to this. On the shelf, on the other hand, this is not a problem: here the consumer only receives the information that directly relates to the product they are holding in their hand. This sounds trivial, but in practice it is often quite a challenge.

But an important difference is also that the haptics (tactile responses) are missing on the internet.

That‘s right. For example, during my time at a pet food company, I oversaw the launch of a super premium brand. The packaging was made of aluminium and felt very pleasant. This was not least due to its high heat conductivity - the tray looked classy, but never felt cool. Of course, you can‘t communicate this over the internet. But in e-commerce this takes place post purchase, when the customer opens the package and inspects the goods. This so-called unboxing experience should not be underestimated.

How does the sustainability trend change the perception of packaging? Does a conflict arise in the mind of the consumer between the attraction of an elaborate design versus the desire for environmentally friendly, reduced quantity packaging?

Actually, a lot is happening here right now. Companies are trying to save material, for example by working with thinner walls. They are also increasingly using recycled materials. This can limit the spectrum of design possibilities for them. But that does not mean that packaging can no longer be designed attractively. It is the task of packaging developers and designers to find appealing solutions.

„One can‘t separate the performance of the product from the performance of the packaging.“

Let‘s talk about regulatory requirements for packaging design. One particularly drastic measure was the introduction of shock photos on cigarette packets. Do you fear that there may be more of these measures to come?

In politics, one should never rule anything out. We know that the EU Commission is currently carrying out an evaluation to examine the effect of shock pictures. On the other hand, it is currently being suggested that we should not prescribe a uniform design for cigarette packs, as the Australians and the French have done. This is a big threat - and from my point of view completely wrong.

Unacceptable simplification? The Nutriscore is not only met with approval

Why?

Apart from legal concerns, it must be emphasised that in the end such measures achieve nothing. Consumers usually choose the cigarette product irrespective of brand - they want to smoke, and the brand doesn't matter to them at first. Only when they have decided on the product group of cigarettes does the brand differentiation begin. Prescribing uniform packs does not prevent people buying. You merely prohibit the brands from differentiating themselves from each other. This also applies to tobacco advertising, as many studies have shown. There are many factors that influence the basic consumer decision - do I smoke or not? I don't want to say that advertising has nothing to do with it at all. But other aspects such as the social environment, upbringing and lack of education about the consequences of smoking play a much bigger, more influential role.

Since 2020, the Nutriscore, which is now used by around 300 companies, has also been designed to influence consumer behavior. The traffic light coalition wants to develop it further throughout the EU, and its mandatory introduction is also being discussed. What do you think of this?

Some of our member companies were pioneers with Nutriscore, others are not so convinced. My own experience in the consumer goods industry has shown me that it is a very ambivalent topic. One potential problem lies in the simplification, which does not do justice to many foods. Thus, the Nutriscore can send misleading signals. After all, many foods are only to be advised against if they are consumed in far too high quantities. To exaggerate: If they were

Image: Romain TALON, Adobe Stock

fundamentally harmful, they would be banned. But it may be that for some consumers this simple system is still better than none at all. Retailers want it, and that puts quite a bit of pressure on manufacturers. But I think more of the opportunities that digitization brings. For example, in the future it will become more natural to offer additional information about products via QR codes.

> “In politics, one should never rule anything out.”

Information on single-use plastic has been mandatory on packaging since 2021. Can this help consumers pay more attention to avoiding plastic waste?

All brand manufacturers are aware of the problem and support the circular economy. However, it is questionable whether such a labelling obligation really influences consumer behaviour. If you buy a disposable coffee cup in a coffee shop, will it change anything if the cup is labelled as such? It would be more useful if there was Europe-wide labelling for the packaging materials that are used. This would give consumers clear instructions on how to dispose of them properly, which in turn would make it easier to collect recyclable materials.

Too much air in the bag? The reasons can be manifold

> “It is questionable whether such a labelling obligation really influences consumer behaviour.”

What about a traffic light system for sustainable and less sustainable packaging materials? A for the cartonboard box, E for the plastic cup.

At first glance, that sounds like a good idea, but it‘s not. Against the background of what has been said before, such a simplification would be even more problematic in this area than the food traffic light system has been.

Consumer protectionists continue to be concerned about so-called deceptive packaging. Many packages are still oversized. Shouldn‘t we prescribe fixed ratios for packaging quantity and content?

Here, too, the devil is in the detail. Yes: the trend towards smaller households means that we have smaller portion sizes that require proportionally more packaging than larger portions. But that can‘t be changed. You also have to look at the processing chain. For example, there are detergent packages that are full to the brim when they leave the production hall. During transport, however, there are jolting effects that compress the detergent meaning that a few centimetres are empty at the top. This is the criticised “air” that is supposedly unnecessary. It must be said that the manufacturers have already done a lot here, so that regulation is not necessary. And the few black sheep react as late as possible only when they are publicly attacked by consumer organisations.

FACTS & FIGURES MARKENVERBAND

HEADQUARTERS	ESTABLISHED	MEMBERS
Berlin	1903	400

Image: ANASTASIA, Adobe Stock

“Mono is always better”

How can packaging be made more recyclable? The Interseroh+ specialist Katharina Müller explains what is possible and which mistakes companies should avoid.

Ms Müller, Interseroh+, as one of the dual systems, organises the collection, sorting and recycling of used sales packaging nationwide. Companies can have their packaging certified as recyclable by you. How does this work?

Customers from industry and commerce usually approach us and are interested in an analysis. In an initial discussion, we find out more about the packaging and make a contract offer. If the customer agrees, they send us samples for analysis. This takes about four to five weeks. We draw up a report on the recyclability of the packaging and the customer receives a certificate based on this. This gives them the right to advertise with the recyclability certificate for two years.

Why only for two years?

Because our assessment method is regularly updated. This is because the minimum standard of the Stiftung Zentrale Stelle Verpackungsregister (ZSVR) changes annually. Since 2019, this standard has regulated how recyclability is to be determined in accordance with the Packaging Act. We therefore check all packaging after two years to see whether there is a need for action.

“Labels can be reduced in size with little effort.”

Do you also give companies tips on how they can make their packaging more recyclable?

Of course. We point out optimisation opportunities as part of the reporting, especially from a holistic view of the life of a package after use that valuable tips can be gained, which the vast majority of customers are happy to implement. We also support them in this.

Katharina Müller

Packaging Recyclability Consultant

Interseroh+

Katharina Müller completed a Master's degree in Agricultural and Food Economics at the Rheinische Friedrich-Wilhelms-University in Bonn before joining Interseroh Dienstleistungs GmbH in Cologne as a corporate trainee in 2019. Since January 2020, she has been a consultant for recyclability of packaging in the Made for Recycling business unit. Interseroh Dienstleistungs GmbH, provider of a dual system, changed its name to Interseroh+ as of January 2022. At the same time, the parent company was reorganised under the name Interzero. In addition to the dual system Interseroh+, the service provider Interzero Circular Solutions (ICS), which specialises in the circular economy, and the recycler Interzero Plastics Recycling (IPR) will be combined under the new umbrella.

> “For many manufacturers the customer has the last word.”

Can you give examples: Which improvements are simple, which are more complex?

Labels can be reduced in size with little effort. The near-infrared scanner can then identify the packaging more easily in the recycling process. More cost-intensive is a change of material, for example from a PET tray to a recyclable PP tray.

Does it also happen that companies make improvements which are actually counterproductive?

Yes, recycled PET, i.e. rPET, is often used for PET trays. PET from the bottle stream, i.e. from a well-functioning closed-loop system, is used for this. But if rPET is used for trays, the cycle comes to an end because PET trays are currently mainly thermally recycled. We are therefore very critical of rPET trays because they take material away from the PET cycle. More and more companies are also replacing plastic packaging with paper composites. This often results in paper packaging with a plastic layer that is difficult to recycle. With composites, it is very time-consuming to separate the different materials from each other and there are high losses of separable, non-recyclable materials. Products made of only one material, whether paper or plastic, are highly recommended. Mono is always better.

Why are paper composites so popular?

Because the consumer considers them more sustainable than plastic. And for many manufacturers, the customer has the last word. But sometimes the companies themselves don‘t know enough about the composites. They are often at great pains to make the right decision.

> “No optimisation proposal has ever been rejected for aesthetic reasons.”

Do you only deal with recyclability in your analyses? Or do you look at the entire ecological footprint of a package?

We only carry out analyses ourselves to assess recyclability. However, we cooperate with Sphera, who have developed the GaBi Packaging Calculator. With the help of this online tool, complete lifecycle analyses can be created.

Do you also take into account in the analysis how easy it is for the consumer to dispose of packaging in the best possible way? In some cases it is necessary to separate plastic from paper components.

Absolutely. Unfortunately, one cannot assume that the consumer will separate the individual components from each other. If, for example, the packaging has a perforation for separation, this is only a theoretical separation. It is different if the components separate themselves in the recycling process.

When companies don‘t want to accept your suggestions for improvement: Is it usually because of the costs? Or do they not want to change the design of the packaging?

Attractive design and recyclability are not mutually exclusive – no optimisation proposal has ever been rejected for aesthetic reasons. But it can be true that the label size cannot be reduced because certain information has to fit on it.

Laboratory analysis of packaging: The exact procedures of the dual systems can differ

Image: RHJ, iStockphoto

Do companies usually accept your decisions on recyclability?

Let‘s put it this way: If we come to the conclusion “not recyclable”, we can be sure that a meeting will be scheduled afterwards. The companies usually do not doubt the result, but they want to understand the reasons. Complete rejection is unusual.

If you are not satisfied with the result of the Interseroh+ audit, can it be worthwhile to go to another provider?

Theoretically, the minimum standard should lead to the same results with every provider. In reality, however, there may be differences because each provider carries out the analysis slightly differently. The Interseroh+ evaluation catalogue is comparatively strict. We do not only evaluate according to the specifications that the companies give us, but also analyse the packaging in our own laboratory and find out the material composition of a package ourselves. Some suppliers do not do this because they do not have a laboratory. In this case, the evaluation is carried out solely on the basis of the material specifications sent to us.

Which companies are particularly committed when it comes to recyclability?

These are often start-ups that consciously position themselves sustainably with their products. But food manufacturers are also very active. Here, the direct fight for the end consumer is stronger than in other sectors. They are also under pressure from the retail chains. Drugstore chains are also very active.

“The Interseroh+ evaluation catalogue is comparatively strict.”

And who is not doing their homework at all?

Especially in the pharmaceutical sector, very little is being done. Here, the consumer is usually not involved in the decision-making process. They buy their medicine at the pharmacy and the packaging plays less of a role in the purchase decision. There are also luxury brands, for example in the cosmetics sector, that do not like to deal with recycling.

One can also make a big contribution to sustainability by reducing or avoiding packaging. How big is the potential in this respect?

There is still a lot to be done. For example, in the food sector, with confectionery or cosmetics, far too much packaging is often used because the products have to look very appealing. Packaging that is not used in the first place is still the best.

> “Especially in the pharmaceutical sector, very little is being done.”

An important component of the circular economy is the use of recycled materials. What is the current availability situation? Is the supply sufficient?

There has been a clear shift in thinking here recently: Recyclable materials are becoming more and more attractive. Our parent company Interzero also produces recyclables and sells its own products. At the moment, demand is greater than supply, we can hardly keep up with production – this is a new situation for us.

Another look into the future: What framework conditions still need to change for the recycling cycle to work even better?

Paragraph 21 of the Packaging Act stipulates that systems should create incentives involving participation fees to create more recyclable packaging. This does not work in practice. The legislator needs to tighten up the Packaging Act. In addition, the recycling infrastructure in many countries still needs to be significantly improved - Germany is in a very good position in this respect. Only if there is a functioning recycling infrastructure in a country can recyclable packaging be kept in the cycle.

Orientation for consumers: the Seal from Interseroh+

FACTS & FIGURES INTERZERO

HEADQUARTERS	PRESENCE	EMPLOYEES
Cologne	10 European countries	Around 2,000

Image montage: F16-ISO100, Adobe Stock | Interseroh+

“Labels become **a Dialogue medium”**

What can printed electronics do for packaging? Dr Klaus Hecker, Managing Director of the international OE-A working group in the VDMA, on the prospects.

Mr Hecker, electronics can be printed by using conductive plastics or inks. These make it possible to produce extremely thin and flexible electronic components, such as sensors, flexible displays or smart labels. Is this a relevant topic for the packaging industry?

Of course. RFID and NFC tags can be easily integrated as labels in packaging or printed directly onto packaging. These enable, for example, the traceability of goods throughout the entire logistics chain. Since you have a reader in every mobile phone today, the necessary infrastructure for reading the information is for sure available everywhere. This opens up many possible applications in the packaging sector, some of which are already being realised.

Can you give some examples?

Smart labels, based on printed electronics, can provide information about disruption during transport, about interruptions to the cold chain or when an expiry date has been exceeded. Large packaging manufacturers are very interested in temperature labels because they can optimise logistics and prevent the waste of perishable goods. It is also a great way to control and optimise inventory, which can reduce transport costs. But it is not only about logistics.

Brand owners can offer their customers certificates of authenticity or additional information that can be accessed via a mobile phone. The electronic labels therefore become a dialogue medium. Additionally, interesting effects can be achieved, for example, through luminous packaging. The much-discussed Internet of Things will provide an additional boost for smart labelling in the future.

> “Large packaging manufacturers are very interested in temperature labels.”

Smart labels can also ensure that packaging can be tracked over its entire life cycle, right?

Yes, but if a package is to send information continuously, you need a battery or a solar cell as well as an interface to mobile communications. All this can also be printed or combined with printed electronic elements. However, the electronic component will then be somewhat larger, about the size of a postcard. But there are already logistics companies working on that.

For which industries can packaging with printed electronics be interesting? A carton of milk should remain cheap despite inflation, so no smart labels are worthwhile.

Of course, the systems have to be profitable. In the pharmaceutical industry, for example, there are many possibilities. Sometimes the necessary information for package inserts on medicines changes. And in order to make those changes, new package inserts have to be printed and packaged. An electronic label could be used to make changes in real time at any time - but this is not yet legally possible. There are applications that have already been implemented. Faubel, for example, a specialist in product labelling, has developed a smart label for investigational medicinal products together with E-Ink, a provider of electronic ink technology. This makes it possible to update the expiry dates of the preparations without having to apply new labels.

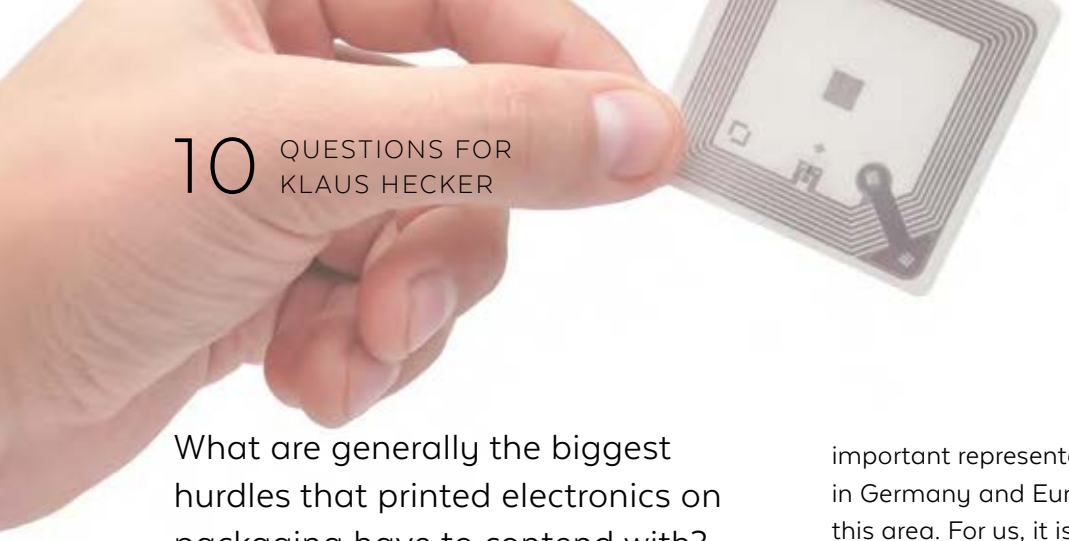
For which packaging materials are printed electronics most suitable?

Almost anything works, because you don‘t print the substrate directly onto the packaging. You usually work with smart labels that are glued on. This also ensures that the labels can be easily removed, which is important for recycling.

But direct print on packaging is technically possible.

Yes, even on paper. But there are a number of challenges. If you print directly, this step would have to be integrated into the complex manufacturing process of a package, which would be very costly, so it is a question of whether it is worth it. What‘s more, electronic ink is sensitive and the layers are ultra-thin so you need very smooth surfaces. A single paper fibre sticking out can impair the conductivity. It‘s quite possible that things will be different in the future, but for the next few years, we‘ll stick with the label solution.

Image: titanium-desire, iStockphoto



10 QUESTIONS FOR KLAUS HECKER

What are generally the biggest hurdles that printed electronics on packaging have to contend with?

As everywhere, cost is a big, if not the biggest, issue. The manufacturing process with electronic sensors, antennas, chips and batteries is quite complex. Very often this is not economically viable That's why you usually see solutions in the market where electronics have not been factored into the costing of the individual product. The packaging manufacturer Karl Knauer, for example, attracted a lot of attention with luminous packaging for Bombay Sapphire Dry Gin and Coca-Cola. However, the quantities were rather small for the packaging industry, but as a PR and marketing exercise it was very successful. Another point that should not be underestimated is that if printed electronics are really to become established on a large scale, packaging manufacturers will also need to become electronics manufacturers – and that is revolutionary. That change requires completely new competencies along the entire supply chain. Just one example: functional ink reacts very differently to environmental influences than conventional ink does and you have to be able to deal with that.

You are at the head of the OE-A, which stands for Organic and Printed Electronics Association. What are the most important tasks of the association?

We are an international industry association with over 220 members worldwide. A broad spectrum of industry is represented, from material manufacturers to machine builders and integrators to scientific institutions. The OE-A is part of the VDMA, the largest network organisation and an important representative of mechanical engineering in Germany and Europe, but we are not limited to this area. For us, it is important to network all players in the organic and printed electronic industrys, to organise meetings, to be present at trade fairs and to make the topic publicly visible. We regularly inform our members about new trends, including a roadmap that is published every three years, and we offer them access to specific databases. We also represent the interests of the sector in Brussels.

> “Like everywhere else costs are a big, if not the biggest issue.”

Do you also do market research?

No, that would be too complex on an international level and given our range of applications. But we do conduct a semi-annual business climate survey among our members. This shows how future potential is developing.

And what is the current situation?

Despite the pandemic, we had a record year in terms of sales in 2021, although many projects were put on hold due to Corona. At the moment, of course, we are concerned about the consequences of the Ukraine war and the associated supply bottlenecks. The chip shortage especially is a big problem. But the members are very positive about the future.

Dr. Klaus Hecker
Managing Director
OE-A (Organic and Printed Electronics Association)

Klaus Hecker is Managing Director of the working group OE-A (Organic and Printed Electronics Association) within the VDMA. The OE-A is the leading international industry association for organic and printed electronics with over 220 member companies and institutes worldwide. Hecker has been with the VDMA since 2003, initially as project manager for the planning of a pilot line for the development and production of OLED displays. Before that, from 1998 to 2002, he managed projects in the field of flat panel displays and microtechnology at the Institute for Microtechnology Mainz (IMM). He studied physics at the University of Cologne and completed his doctorate there in the field of experimental solid-state physics on electrical transport in nanostructured metallic and superconducting systems.

“We bring experts together **at one table**”

Work in the Excellence Centre: interdisciplinary exchange is a priority

Finnish paperboard manufacturer Metsä Board has set up an Excellence Centre to drive innovation. Ilkka Harju, Packaging Services Director EMEA, explains what happens there.

Mr. Harju, what encouraged Metsä Board to open the Excellence Centre?

Customers are increasingly demanding sustainable, but also more efficient packaging solutions. Therefore, we need more innovation. The Excellence Centre was established to accelerate the development of new material and packaging solutions. At the same time, it will provide a platform for collaboration with our customers and technology partners – co-creation is a very important component.

The Excellence Centre is located in the small town of Äänekoski in central Finland, where Metsä Group has its largest production site. Did you want the closest possible connection to the manufacturing process?

Yes. We operate the largest wood processing plant in the northern hemisphere here. Besides pulp, the mill produces large quantities of bioproducts such as tall oil, turpentine, product gas, sulphuric acid and biogas, as well as green energy. So we chose the immediate vicinity of production for the Centre - wood fibre, our most important material, is basically at home here.

How big is the Excellence Centre?

The centre has about 1500 square metres and includes research and development facilities, a state-of-the-art laboratory, a customer feedback centre and a packaging design studio. There is also a virtual shop and a computer-aided engineering (CAE) tool to analyse the impact of packaging via simulations. In total, the Centre employs around 20 permanent staff. For certain workshops, we call in other experts from the company on a temporary basis.

> “Co-creation is a very important component.”

In what direction are you researching? Where is the journey going?

A particularly important topic is plastic reduction: How can we reduce the amount of plastic? How can plastic packaging be completely replaced by paper-based solutions? We also see ourselves as a pioneer in the field of lightweight paperboards. We are constantly looking for design solutions that are lighter but offer the same performance.

From which industries are the customers you are doing joint research with in Äänekoski?

Our customers are packaging manufacturers, mainly for the food industry. Beyond that, the spectrum is very broad, ranging from health products to consumer electronics.

Images: Metsä Board

12 QUESTIONS TO ILKKA HARJU

Attractive architecture: the centre should also inspire customers

> “So we chose the immediate vicinity of production for the Centre.”

Does the impulse usually come from your customers? Or do you approach them with new ideas?

It goes both ways. Depending on the customer‘s needs, we offer different types of workshops. It can be about optimising existing packaging, designing new packaging or even thinking about completely new technologies for innovative solutions of the future. – for example paper bottles. In doing so, it is increasingly important for us to bring together expertise from different areas. That‘s why we work with packaging manufacturers, but also with technology partners or scientists. We bring experts together at one table.

What are the most interesting products that have been developed in the Excellence Centre so far?

There are quite a few that have already gone into regular production. For example, we have developed a new bakery box with the Finnish bakery manufacturer Viipurilainen Kotileipomo, which saves a quarter of material compared to the previous model. The lightweight solution does not require plastic coatings and is therefore completely recyclable. In addition, 34 per cent less CO_2 is emitted during production. Another example is a very light but stable and, above all, easily recyclable packaging for Chopin Organic Rye Vodka. All layers are made of

Curiosity as a principle: many ideas have already emerged in Äänekoski (right)

Fundamental work: the state-of-the-art laboratory provides valuable services (below)

the lightweight white Kraftliner MetsäBoard Natural WKL Bright. Despite its light weight, the completely white litho-laminated packaging has a robust structure with closure flaps that requires no adhesive.

To what extent do you also take the perspective of the end users into account in the projects?

It plays a big role. That's why we are currently conducting a new study on the question of how consumers see sustainable packaging. For example, there is an intensive discussion about whether and to what extent the colour brown makes packaging look more environmentally friendly. We also offer a very white paperboard, which makes almost no difference in terms of material. The study should help us to better understand packaging-related consumer behaviour. We are also working with market research institutes on this.

> “We see ourselves as a pioneer in the field of lightweight paperboards.”

Do you assume that consumers will increasingly demand sustainable packaging?

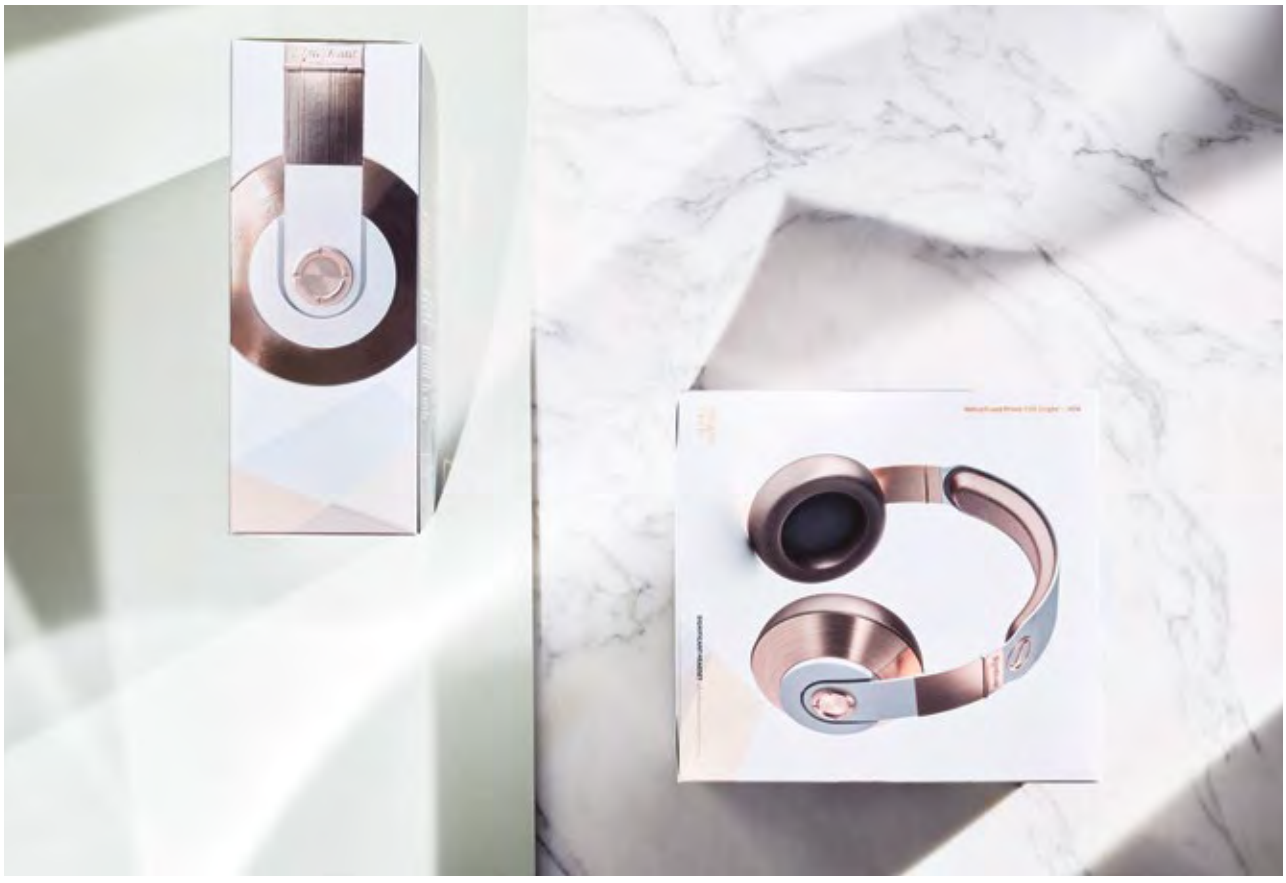
Yes, we have been noticing this trend throughout Europe for years. There is a lot of discussion about plastic waste and its harmful effects on the environment. This naturally makes fibre-based solutions more interesting. By the way, we also register other

Images: Metsä Board

12 QUESTIONS TO ILKKA HARJU

Congenial: sustainable packaging for sustainable cosmetics

Headphone box: Metsä Board sees itself as a pioneer in lightweight board



Ilkka Harju

Packaging Services Director EMEA

Metsä Board

Ikka Harju heads Metsä Board's packaging design team in EMEA and APAC. Previously, he worked in product development and design for various companies in the packaging industry. Harju is renowned for pushing design boundaries by working collaboratively with other designers and technology experts. He constantly advocates the role of responsible design, technology and renewable raw materials as a tool for a healthier environment. In 2017 he received a Worldstar Award for his jewellery packaging design.

Images: Metsä Board

arguments in favour of paperboard that have nothing to do with ecological responsibility. For example, many consumers find that plastic packaging is much more difficult to open than cartons.

How do you see the commitment of retailers and manufacturers so far? Are they doing enough for more environmentally friendly packaging solutions and circular economy?

Five years ago I might have said no. But in the meantime a lot is happening, especially in retail. Retailers have understood that they can and must be a major driver.

What contribution can politics make? Do we need more regulation at EU level?

As far as the recyclability of paperboard is concerned: there are countries where things are looking very good, while in others there is still a lot of catching up to do.

> “Retailers have understood that they can and must be a major driver.”

In which direction will you develop the Centre further? What are the next steps?

We are working on new tools with which we can virtually design and test new packaging solutions – simulations without physical samples, that is one of the most important topics. We are also optimising our hybrid co-working models so that we can exchange ideas with our customers on site and online. We also want to build a large technology library that collects international knowledge about packaging solutions – as open source, freely accessible to all.

Ready for a tour inside the Excellence Centre? Simply scan the code and off you go.

FACTS & FIGURES METSÄ BOARD

HEADQUARTERS	TURNOVER 2021	EMPLOYEES
Espoo, Finnland	2,1 Mrd. Euro	2400

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