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TRENDS AFFECTING THE PACKAGING INDUSTRY

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Abstract:

The authors outline the main packaging trends focused the circular economy. The six key areas are: consumerism, technology, economics, fashion & design, retail revolution and sustainability in circular economy.
Consumers today are more conscientious and self-sufficient. The Internet of Things (IoT) is revolutionising the packaging industry. Brexit and the outcome of the US election have signalled a possible de-globalization trend. There is a risk of markets becoming less international. This will impact the packaging industry.
Packaging is often inspired by fashion design. Print and packaging companies should keep ahead of the latest fashion trends. With e-commerce growing globally, packaging also quickly needs to adapt to the new ways consumers complete their shopping particularly through the internet. Sustainability is one of the main drivers in the packaging industry. All packaging stakeholders (from raw material suppliers and converters/distributors to brand owners and consumers) have started to focus increasingly on circular economy.

Keywords:
packaging, circular economy, e-commerce, sustainability, retail revolution

1. INTRODUCTION

The main packaging trends focused the circular economy. The six key areas are: consumerism, technology, economics, fashion & design, retail revolution and sustainability in circular economy.

Consumers today are more conscientious and self-sufficient. The long-term consumer engagement through packaging is an effective way of reaching these changing consumers.

The Internet of Things (IoT) is revolutionising the packaging industry. Developing intelligent packaging solutions gives manufactures and brands an opportunity to be on the cutting edge of a phenomenon is changing the world.

Brexit and the outcome of the US election have signalled a possible de-globalization trend. There is a risk of markets becoming less international. This will impact the packaging industry.

Packaging is often inspired by fashion design. Print and packaging companies should keep ahead of the latest fashion trends in order to remain competitive and become forward thinking partners to brands.

With e-commerce growing globally, packaging also quickly needs to adapt to the new ways consumers complete their shopping particularly through the internet. For online orders, the unboxing experience at home is a key. Packaging needs to deliver the right experience upon delivery.

Concerning the sustainability the print and packaging companies must educate confused consumers. Many consumers are not willing to pay for sustainable packaging but it is becoming the norm and more emphasis is being placed on the use of recyclable and compostable materials as well as the use of resins derived from renewable resources. Sustainability is one of the main drivers in the packaging industry. All packaging stakeholders (from raw material suppliers and converters/distributors to brand owners and consumers) have started to focus increasingly on circular economy.

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2. TRENDS AFFECTING THE PRINTED PACKAGING INDUSTRY

The top key trends in the printed packaging industry identified by Smithers Pira are: digital printing, innovation, e-commerce, industry 4.0 and circular economy and new packaging sustainability, as it can be seen on Figure 1 [1].
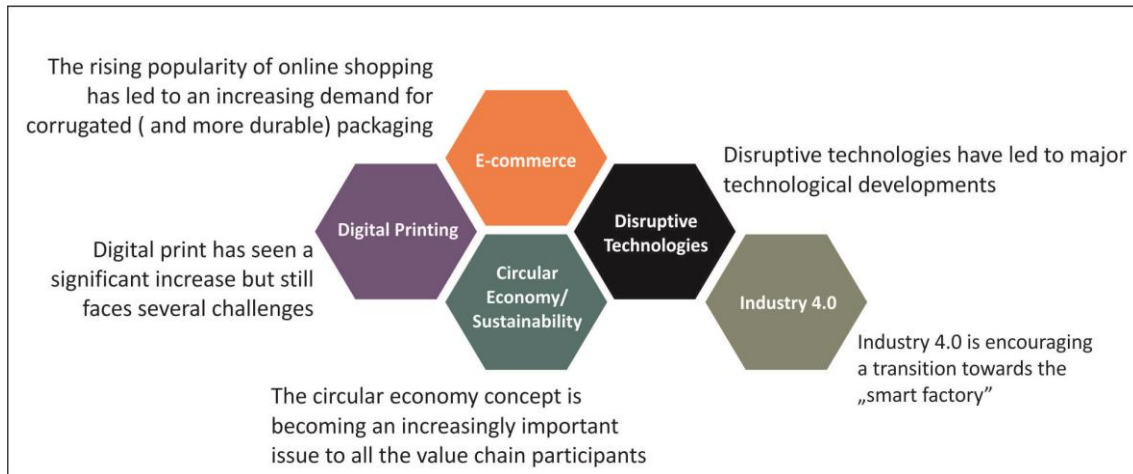

Figure 1: The major packaging trends (source: SMITHERS-PIRA)

2.1. Digital printing

Digital print has seen a significant increase in popularity over the past years. As it happened with other industries, automation and digitalisation have been main drivers behind digital print market growth [2].

Packaging converters are increasingly adopting digital printing to improve efficiencies and service levels in response to changing consumer needs. However, flexo and litho systems remain at the heart of the market, meanly because digital is currently not able support long runs. Further, digital technology providers have key challenge to overcome specifically to develop an offer with the economics for profitability, whilst not compromising on quality, productivity and format.

Despite digital printing's high potential, several issues have to be addressed. There is the cost of ink, speed and equipment; however, this is likely to come down as new technology develops. In terms of digital capabilities the process is not at a stage of satisfactory high volume printing. Colours in digital printing are not the same as in conventional printing, which may cause branding issues. The premium features are not available yet, for example metallic embellishments or textured lacquers. Some finishing such as embossing, cutting & creasing, etc. are either not available yet or difficult to deploy.

Due to these challenges, brand owners choose to use a hybrid model that combines digital printing with other analogue processes. However, as digital is forecast to grow, the industry supply chain will most likely adopt an "eco-system" thinking (which implies close communication between brand owners, manufacturers, converters and technology developers) to address customers' need s and solve current challenges.

The corrugated sector has shown a growing desire for adopting digital printing, with many developments being made to address the demands of the high volume liner and post-print markets. The

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improvements involve installations targeting litho and flexo alternatives and providing new opportunities for packaging buyers (who want to redesign the 'boring brown box').

New digital printing technologies, along with increasing e-commerce, are having a great impact on the *corrugated packaging market*. The main technology driving the increase is inkjet printing directly onto corrugated packaging. There has been a growing adoption of digital printing in corrugated applications mainly because of the flexibility of run-lengths and saving sin set-up costs, as well as the ability to personalise in relation to brands, regions, stores or individuals. Furthermore, food safety concerns have committed ink formulators, converters, print service providers and brand owners to collectively develop the best and safest solutions for digital printing, for both corrugated board and other packaging substrates.

The *flexible packaging* industry currently has a small market for digital printing. In this market, digital print packaging will continue its growth, offering many advantages to packaging converters, packaging buyers, retailers and, most importantly, to satisfy consumer demand.

Within the *carton packaging* market, digital printing is also showing signs of growth at a fast pace. The majority of cartons are produced on sheetfed litho, flexo or gravure presses, with digital presses growing in importance.

Labels are by far the major application area for digital package printing. However, this is changing as new applications for cartons, corrugated, flexible packaging, rigid plastics and metal decorating are being introduced and growing rapidly.

2.2. Innovation

The challenge in packaging is to find the balance between reducing packaging weight, preventing product loss or damage while retaining shelf/consumer appeal and functionality. Taking a life cycle view is important for evaluating this trade-off by finding the balance between material weight and size, impact and product protection, and ensuring that resources are not spent on finding ways to optimise this balance, when the materials themselves or certain product features are of a greater concern to stakeholders.

The *cradle-to-cradle* packaging design concept is being increasingly adopted by a number of brand owners and this effort is seen across the entire value chain, e.g. ink suppliers have started developing their offering with the cradle-to-cradle principle in mind.

Sustainability and circular economy principles are a major driver in the continuous down-*gauging* and *light-weighting* of materials, with technological developments enabling the same performance to be achieved with less material. The general drive in the industry to lightweight packaging for cost purposes also contributes to eco-friendliness. The increased usage of nano-materials will be crucial to this development, as nano-materials can strengthen other material to such an extent that less is needed to create robust packaging [3].

Commercialisation of high performing bio-based plastics (e.g. cellulose, fibre, resins, etc.) is an important trend. New technologies are constantly trying to improve features of bio-based plastics in packaging due to their high potential to replace oil-derived plastic packaging and to take market share from heavier formats like glass and metal.

Bio-based plastic packaging which is also biodegradable or compostable has its own set of challenges, though. The main owners are 'the last moment of truth' and the behaviour in the recycling process.

'The last moment of truth' is when the consumer needs to decide in which bin the packaging should be disposed of. A large number of packaging waste (especially biodegradable) is misplaced due to consumers' confusion.

One the other hand some bio-based and biodegradable plastics, such as PLA, continue to face opposition from the recyclers as they do not behave well in the polymer separation process.

A number of packaging producers are inventing new alternatives to plastic. Paper coatings may provide some solution to the replacement of plastic with alternative materials, and are growing market. Ecologic produces eco-friendly packaging made from 100% recycled cardboard and old newspaper,

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which is also moisture resistant. Their bottles use 60% less plastic than standard plastic lotion bottles. They are also made from recycled materials and use locally sourced seeds for the products [3].

However, there are trade-offs when it comes to alternatives such as coated paper. It could compromise food shelf life, particularly meat. This could then lead to an increase in food waste, which could constitute an even greater problem.

On the other hand, plastic packaging alternatives do not come without their downfalls. One issue with using a material such as paper as opposed to plastic is that a much higher paper weight is required in order to mimic the functionality that plastic provides. Coated paperboards have become popular in usage for items such as disposable paper cups. However, they bring a set of challenges for the recycling process in countries such as the UK where paper mills can recycle these cups, but the waste streams do not find their way to these facilities.

Smart packaging is another growing area, with a number of uses. Companies have started introducing *intelligent labels* for the consumers to ensure proper recycling and reduce food wastage at the post-purchase phase, thereby improving the end-life recycling of the packaging. With increasing technology advancements, smart labels complementing current labels are expected to drive great benefits in terms of recyclability and giving consumers correct information on the product and its packaging.

Further, smart packaging can help cut down on food waste in global supply chains, and can be used to enable doctors to keep track of their patients through connected medical packaging. It can also aid in the fight against piracy in the medical packaging area. Advanced traceability systems also strengthen the consumer's confidence in the quality and safety of a brand's products.

Some packaging companies have employed Track & Trace system, enabling producers to track each pack within the supply chain. This starts right from the raw materials, processing and filling, to quality checks, logistics and all the way to the supermarket shelf, with all of the data collected and stored in a database. Some companies use *QR codes* to enable this functionality and *consumers can scan the QR codes on their phones to access the relevant information.*

Blockchain technology enables supply chain transparency by providing an unalterable record of the origin, journey to market and authenticity certification of a product. This record can also include information directly relevant to the consumer, in the form of a scannable code on the packaging. Brands are using smart packaging to increase their emotional engagement with consumers and potential customers and boost the brand status. The *personalised pack* has the dog's name and picture, as well as the owner's name on it. The food is formulated for the dog, taking the breed, size, age, activity and various other factors into account. The company uses the information about the dog they have been given to satisfy the owner's desire to give their pet the most appropriate feed. This combination of owner, brand and dog is a very powerful engagement [5].

2.3. E-commerce

E-commerce is a major driver for growth in the packaging industry. This demand particularly comes from millennials, who tend to shop online more frequently. One driving factor behind this is the rising popularity of smartphones and tablets, which enable consumers to easily purchase items online. At the end of 2017, there were 465 million unique mobile subscriptions in Europe. This is equivalent to 85% of the European population.

Packaging has now become an even more important way for brand owners to differentiate themselves in the e-commerce value chain. Therefore, some brand owners are diverting from the traditional brown boxes into more varied packaging in order to stand out. New technological developments are facilitating this. E-commerce is also driving a demand for more durable packaging, because an item bought online will be handled several times throughout the delivery process. The popularity of online shopping could provide packaging producers with growth opportunities in the personalised packaging area. Due to its increasing importance in creating a memorable customer shopping experience, brand owners have a new opportunity to create greater engagement with their customers by adopting new print technologies [4].

E-commerce is also interlinked with trends 2.1. (digital printing) and 2.2. (innovation). The emergence of digital print affects both the internal structure of the print industry and the demand for its products. The growing adoption of digital print in packaging creates opportunities for printers, converters and brand owners. The pack can be made interactive and tailored to consumers' needs, through both technology and packaging innovations. Print equipment, consumables and substrate providers must constantly develop new technologies and innovations to satisfy consumer demand (for example, the need of personalised products can be addressed through digital print). Further, in the e-commerce sector, printing and packaging open up new opportunities for brand owners to move away from traditional packs to omni-channel packs, which have started to adopt the smart/intelligence packaging trend.

The increasing demand in online shopping is also driving the growth of the corrugated market. Another potential growth area for e-commerce is the online grocery market. Whilst this market has experienced a relatively slow growth in most Western European markets, many large supermarket chains and online retailers such as Amazon are expanding into this segment.

2.4. Industry 4.0

Industry 4.0 is the response to the ever-increasing competition posed by the low wage economies. In addition to the innovation trends described earlier, the rapid introduction of digitalisation and automation is further transforming the packaging industry.

The concept of fully automated factories and warehouses, exemplified by the Industry 4.0 initiative, is relevant to all sectors of manufacturing. For packaging is particular, the key advantage consists in the production of the right packaging for a specific product at the right time, e.g. on demand for shipping to the customer of an online retailer. Accurately matching the packaging to the product reduces waste – and costs – by avoiding bulky, heavy or unnecessary protective packaging. The technology at the core of Industry 4.0 is the Internet of Things (IoT), which enables the communication and exchange of information across computers, devices and objects. For example, a robotic warehouse crate carrier can be directed to the appropriate location, retrieve the object to be shipped, inform the stock monitoring computer and initiate the packaging generation process while on the way to the packaging station. The resulting smart packaging enables the transfer of the goods to the shipping point and their continuous tracking all the way to the customer.

The increasing adoption of digitalisation across all industry sectors has provided the foundation for IoT and Industry 4.0 by enabling continuous acquisition, instantaneous access and real-time analysis of data collected from the product design studio to the factory floor through the warehouse and shipping facilities. The detection of inefficiencies and subsequent optimisation of production processes can result in substantial saving sin cost and time while improving customer satisfaction [5].

2.5. Circular economy and the new packaging sustainability

Sustainability is one of the key drivers in the packaging industry. All packaging stakeholders (from the raw materials suppliers and converters/distributors to brand owners and consumers) have started to focus increasingly on the circular economy [6].

The idea of the circular packaging economy is to help set up a framework to tackle waste and sustainability issues. The European Commission has made this a focus point within their legislation. In December 2015, the Commission adopted an action plan for the circular economy. In this, they identified a particular problem with plastics and their life cycle. In 2017, they committed to an aim for all plastic packaging to be recyclable by 2030. Their targets are laid out in the amendment to „Directive 94/62/EC on packaging and packaging waste".

By 31 December 2025, at least 65% by weight of all packaging must be recycled. By 31 December 2025, at least 65% by weight of ail packaging must be recycled [6].

EU countries must ensure that the packaging placed in the market meets the essential requirements contained in Annex II of the Directive:

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- to limit the weight and volume of packaging to a minimum in order to meet the required level of safety, hygiene and acceptability for consumers;
- to reduce the content of hazardous substances and materials in the packaging material and its components;
- to design reusable or recoverable packaging.

This desire for an increase in recycling and shift away from plastic packaging, could lead to new opportunities for packaging producers to produce alternatives, such as cardboard. Cardboard degrades more easily than plastic packaging waste, with plastic causing environmental pollution issues.

To curb plastic waste and littering, the European Commission is proposing a new legislation on single-use plastics. The draft Directive proposes different measures for specific items made of single-use plastics, which include packaging products. For food containers, consumption reduction measures as well as extended producer responsibility measures are proposed. For beverage containers and bottles, product design requirements, extended producer responsibility as well as separate collection objectives are proposed.

The EU strategy has been implemented in order to create a new plastic economy, and to promote the reuse, repair and recycling of more sustainable materials. The goal is to boost innovation, curb plastic pollution and to help achieve the 2030 Sustainable Development Goals as set out in the Paris Climate Change Agreement. The strategy also has goals to help achieve the priority set by the European Commission for an Energy Union with a modern, low-carbon, resource and energy-efficient economy. In January 2018, the European Commission adopted a new set of measures, under the „Circular Economy Action Plan". This includes a strategy specifically aimed at plastic, under the „EU strategy for Plastics in the Circular Economy" aiming to transform the way plastics products are designed, produced used and recycled in Europe. It also aims at making all plastic packaging recyclable by 2030. There are several challenges in monitoring the progress towards achieving a circular economy. One is these is that there is no universally agreed definition of what „circularity" is, and therefore robust indicators to monitor trends are lacking. Some of the indicators that the European Commission have put forward are overall recycling rates, waste generation, contribution of recycled materials to raw materials demand, trade in recyclable raw materials, and private investments, jobs and gross value added. The Monitoring Framework tries to capture the complexity of tracking the progress of such a large system with many actors.

In December 2018, the Commission launched a „Circular Plastics Alliance" in order to increase the share of recycled plastic and to stimulate market innovation in the EU. The aim of the alliance is to strengthen the match between supply and demand of plastics and therefore create this circular economy. It is hoped this will help in tackling the problem of plastic pollution within the EU.

The end phase of this circular economy model can be the most challenging. In many markets, high quality post-consumer recycled material is hard to source, so is often sold at a premium. Greater demand for these materials will produce a larger and more attractive market, and can increase the collection and reprocessing of materials.

Additionally, the lack of en-use applications for low quality recycled plastics currently prevents them from being reused effectively.

3. Key questions of the future of printed packaging and conclusion

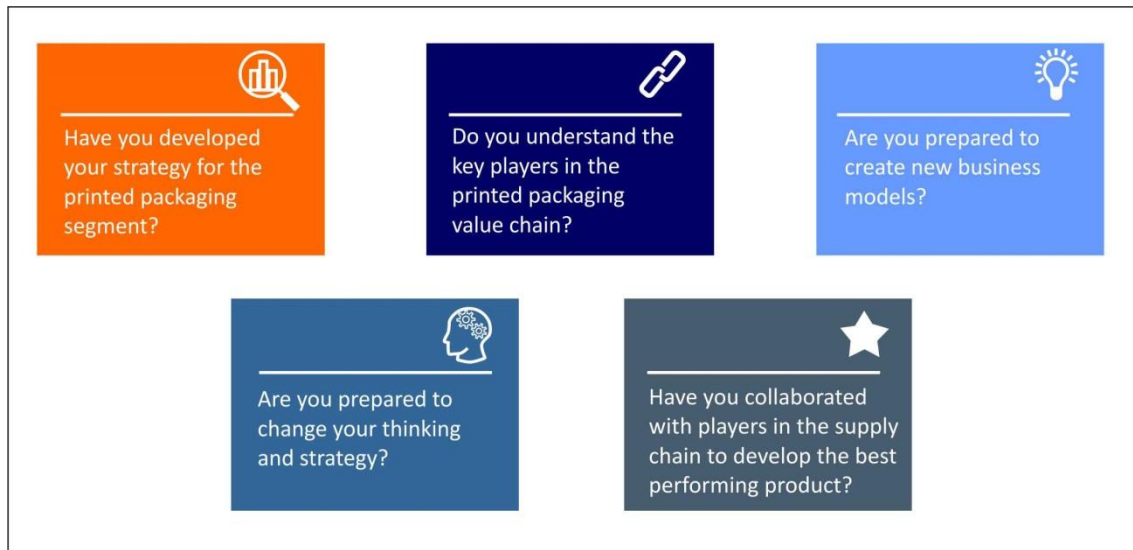The actors of the printed packaging market have to answer in future is shown on the Figure 2.

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Figure 2: The key questions for the future in printed packaging industry [2]

"Improved packaging doesn't mean less or more packaging, it means customised packaging."
(Ragaert), [7]
"There is an essential need to communicate to customers, *that the packaging is not the evil of the world*" (Krolak), [2].

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