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KEY DRIVERS OF THE FUTURE EUROPEAN PRINTED PACKAGING MARKET

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Abstract

Europe's packaging sector is transforming—driven by innovation, regulation, and collaboration. The sector continues to grow while undergoing significant change, responding to increasingly complex expectations from regulators, brand owners, and consumers alike. Drawing on recent conference presentations, journal articles and market reports, the authors present detailed the key drivers of the packaging market: sustainability and regulation, the growth of e-commerce, changing consumer attitudes and lifestyles, digitalisation and innovation, advances of printing technology and packaging format innovation.

Keywords: *printed packaging, sustainability, digital printing, consumer attitudes in packaging, packaging innovation*

Introduction

Europe remains a key region for print products globally. Despite this only moderate growth is expected in the overall value of print in Europe to 2029. Packaging is expected to grow alongside more high-value printed products.

The printed packaging industry in Europe is broad and diverse, encompassing a wide range of materials and applications from corrugated boxes and cartons to flexible and rigid plastics, metals, and labels. With an estimated market value of €114.6 billion and a growth rate of 1.9% CAGR, the sector remains a critical component of the European economy, even as demographic trends – such as a projected population decline in Europe - begin to temper long-term regional growth. In 2024, printed corrugated and solid fibre packaging accounted the highest market share in total European printing output, both in terms of value and volume, and this segment is forecast to retain its top position in 2029. On a global scale corrugated and solid fibre packaging also accounts for the largest market share in value, with this trend continuing into 2029.

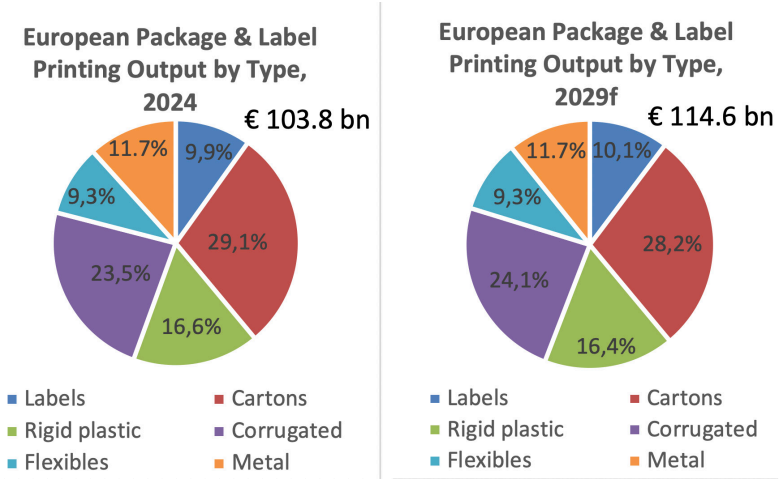
Printed packaging accounts for some 75% of all European packaging but significant differences exist between the packaging segments (Table 1).

Table 1. Europe: Printed vs Unprinted packaging output, 2024 (share by value)

	Packaging segments	Printed	Unprinted
1	Consumer flexible packaging	65.0 %	35,0 %
2	Corrugated packaging	87,5 %	12,5 %
3	Cartons	82,0 %	8.0 %
4	Industrial / Other flexible packaging	85,0 %	15,0 %

Estimates considered for all countries in Europe. (Source: Smithers)

Printed packaging (including labels) is expected to reach €114.6 billion in 2029, growing at a CAGR of 1.9% between 2024-2029 (Figure 1). During the same period, label printing output in Europe is forecast to increase at a CAGR of 2.6% reaching €11.6 billion in 2029. In this area, Western Europe growing at a slower pace than Eastern Europe.



Notes: Countries considered include the EU27 + UK, Norway, and Switzerland. Other packaging includes rigid plastic packaging and metal packaging; flexible packaging comprises plastic film, paper and aluminium foil substrates. Source: Smithers,2025

Fig. 1. European package printing output by type, 2024 &2029 (% share by value, constant 2023 price & € exchange rate basis)

The relative proportions of traditional key packaging printing technologies will not change significantly in the future. However, digital printing technology is developing rapidly and may play a decisive role in the production of smaller series (Table 2).

Table 2. European package printing output by key printing technology, 2024 & 2029f (€ billion, constant 2023 prices & exchange rates)

	Package printing technology	Printing output		Compound annual growth rate (CAGR)
		2024	2029f	
1	Offset lithography	€ 16.7 bn	€ 17.5 bn	0.9 %
2	Rotogravure	€ 8.0 bn	€ 8.5 bn	1.2 %
3	Flexography	€ 44.0 bn	€ 47.2 bn	1.4 %
4	Digital	€ 2.7 bn	€ 5.2 bn	13.9 %

Source: Smithers,2025

European printed packaging key trends and drivers

Based on recent market analyses and publications – when writing this paper – we consider the following six key factors and drivers to be decisive for the development of the European printed packaging market over the next five years.

- Retail changes driving supply chain (growth of e-commerce)
- Sustainability and regulation
- Economic uncertainty
- Consumers attitudes and lifestyles
- Digitalization and innovation
- Advances in print technology

1. Retail changes driving supply chain (growth of e-commerce)

The rise of e-commerce has had a major effect on the retail supply chain and is also a key driver for printed packaging. E-commerce saw major growth in popularity during the Covid-19 pandemic, and although there has been some later adjustment particularly in 2022 with growth rates falling to a more normal level, e-commerce remains a large and growing part of the overall retail business. Global growth is forecast to be 15.3% CAGR between 2017 and 2027, with Asia significantly above this and both North America and Europe a little way behind the global average. The largest e-commerce segments are fashion, electronics and furniture while health and

pharmaceuticals is showing strong growth above the global average. These trends are illustrated on the Figure 2.

The rise of e-commerce is having an ongoing and very positive effect on the volume of packaging materials needed including printed packaging. Transit packaging is widely used to protect goods during transport, and this has driven growth of corrugated and other paper-based packaging materials, much of which is printed. There is also significant growth in the use of void fill and shrink wrap although these materials are largely unprinted.

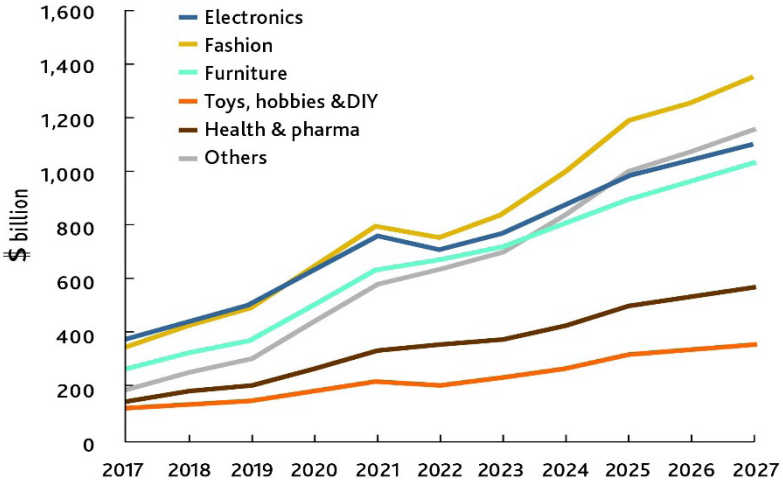


Fig. 2. Global B2C e-commerce growth 2017–2027

2. Sustainability and regulation

The issue of sustainability has been growing in recent years and is now one of the highest-priority concerns of many brands. All the leading consumer brands have well-publicised sustainability policies, and the reduction in packaging waste together with its safe and efficient recycling form a major part of their sustainability goals.

In addition to sustainability initiatives driven by many of the leading brands, government regulation is increasingly focused on improving sustainability, and several regions are introducing legislation that will further reinforce the drive to more sustainable packaging.

2.1. Circular Packaging

The main objective of the circular economy is to keep valuable resources in use and to use them over as many life cycles as possible. This implies a gradual decoupling of economic activity from the consumption of finite (fossil) resources and the diversion of waste out of the system. The transition to a circular economy is not just about adjusting reduce the negative impacts of a linear economy. Rather, it is a fundamental change that builds long-term resilience, creates business and economic opportunities, and delivers both environmental and social benefits (Munroe, 2023).

The Circular Economy Action Plan requires EU countries to ensure that packaging placed on the market complies with the essential requirements of Annex II of the Packaging and Packaging Waste Directive.

2.2. EU Legislations influencing the label & packaging markets

European strategy for plastics in the circular economy

The Plastics Strategy is part of the EU's transition to a more 'circular' economy. Its aim is to improve "the way plastics are currently produced, used and disposed of", as the status quo fails to reap the economic benefits of a more circular approach and is damaging the environment. The strategy calls for all plastic packaging on the EU market to be reusable or recyclable in a cost-effective way by 2030.

The Single-Use Plastics Directive (SUP Directive)

In February 2021, the European Parliament called on the Commission to consider further measures, such as amending the Single-Use Plastics Directive to ensure that single-use plastics are replaced by reusable products wherever possible. The Commission was also called on to develop standards for reusable packaging and the replacement of single-use packaging.

Labelling requirements

Labels and packaging are increasingly subject to legislation, requiring more information and, in some sectors, coding to reduce the possibility of counterfeiting. The legislation extends beyond the pharmaceutical industry to consumer goods. Unique codes and tracking and tracing using a simple phone camera app for authentication are being offered as a method of authentication and as a logistical tool for distribution. Many high-value products can be authenticated, although for high-volume, low-value products, some brands are concerned about potential litigation over counterfeit products.

3. Economic Uncertainly

The world has suffered from a series of global events that have led to major economic shocks, disrupting trade and creating significant inflation-

ary difficulties. The first of these was the Covid-19 pandemic in 2020, but the war in Ukraine that started with Russia's invasion in February 2022 and is still ongoing at the time of writing caused an additional series of problems for world economies. This has been followed by the difficulties in the Middle East that have further disrupted global supply routes and stifled economic recovery.

World events had a direct effect on the printed packaging business. Concern over supply chain fragility that increased during the early days of the Covid-19 pandemic led many brands, copackers and converters to hold higher stocks of raw materials as well as semi-finished and finished packaging, and this led to a significant stock build throughout the supply chain for most packaging types. However, the ongoing global uncertainty compounded by soft consumer demand in 2023 led to widescale de-stocking and a return to more normal inventory levels. This led to a short-term decline in printed packaging volumes with the global value falling by 8.2% and volume by 2.8% in 2023 relative to the previous year. This is a one-off effect, and volumes are forecast to return to more normal growth levels for the last five years of the review period.

Significant uncertainty remains about the economic impact of ongoing world events including the war in Ukraine, global inflation, energy transition and geopolitical tension, and the connected nature of these factors makes forecasting a challenge. The IMF is forecasting global GDP growth of 3.2% in 2024 followed by 3.3% in 2025, with Western economies a little behind this average and emerging markets somewhat ahead. The global economy is still adjusting to the aftershocks of the Covid-19 pandemic, and the war in Ukraine plus increasing tension in the Middle East have added layers of complexity.

The uncertain economic outlook has a clear influence on the market for printed packaging as volumes are closely linked to consumer confidence and economic well-being. However, the printed packaging market is very robust, with much of the volume linked to essential items such as food and beverages, and although packaging for more discretionary items is more exposed, any further economic shocks are unlikely to have a dramatic effect on this sector.

4. Consumers attitudes and lifestyles

Consumers have a negative perception of single-use plastic packaging, which has encouraged the development of alternative materials and packaging. A good example of this is the food sector, where brand owners and retail chains are constantly experimenting with substitutes for single-use plastic

packaging, such as compostable bags, paper bags and cellulose nets. It is expected that the recent trend of replacing single-use plastic packaging with reusable renewable materials will continue (Oliver et all, 2022).

4.1. Consumers are driving the demand for recyclable and compostable packaging

Partly as a response to the media's portrayal of the harmful effects of plastic on the environment, consumers are becoming more aware and passionate about the impact of packaging on the environment. Consumer advocacy is driving action by brand owners and national governments. Many European countries have banned single-use plastic products such as plastic straws, bags, coffee cups and other non-recyclable products. There is also a growing interest in reusable products and efforts are being made to increase recycling in waste collection. European consumers are looking for packaging made from renewable and recyclable materials with recovered or recycled content wherever possible. The need for education on the need and opportunities for sustainability has also been highlighted.

4.2. Consumers do not like oversized packaging

Consumers are becoming increasingly concerned about the use of oversized packaging for home delivery, forcing brand owners and retailers to respond to this demand with improvements.

Consumers expect printed packaging to take this into account. Sustainable printed packaging can go a long way to adding value to the unboxing experience for the consumer.

4.3. Consumers are changing, and they are driving the packaging agenda

Consumers have greater environmental knowledge, and packaging is now a key purchasing differentiator. Convenience is key- consumers are increasingly "Cash rich, time poor" – a trend that is having a huge impact on food packaging. Accelerating urbanization is also generating significant changes in the world of packaging products, supply and recycling systems (Figure 3). Urbanisation related to changes in lifestyles with larger numbers of smaller and single parent households. Urbanisation increases demand for printed packaging.

Growing middle class with higher disposable incomes will be a big driver for packaging over the coming decade.

More than 50% of the world's population now **live in urban areas** — increasingly in highly-dense cities.

Urban areas typically have **higher waste collection rates**, & better recycling infrastructure which drives opportunities for "recycle ready" packaging.

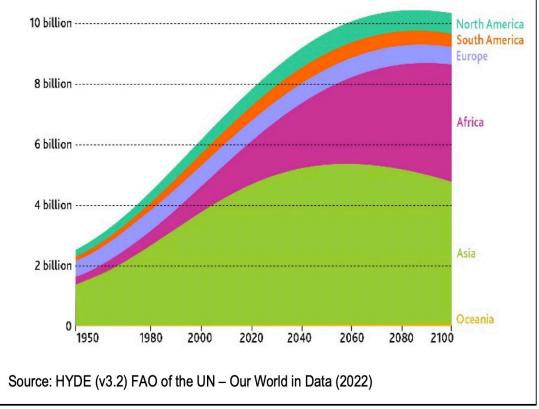


Fig. 3. Effects of accelerating urbanization

5. Digitalization and innovation

One of the most significant impacts of traceable packaging on the global market is blockchain technology, which is likely to continue to evolve in the future.

5.1. Leveraging blockchain technology for traceable packaging

Blockchain technology can be described as a distributed and immutable ledger that records transactions, tracks assets, and provides greater transparency across the supply chain. With blockchain technology, data is stored in time-stamped, tamper-proof, interconnected blocks. When combined with other technologies, such as near field communication (NFC) or internet-enabled devices, blockchain technology allows consumers to access the entire history of a product, which has significant benefits in areas such as anti-counterfeiting and record keeping (Gegeckienė at all, 2022).

Supporters of blockchain technology believe that it offers significant benefits to companies and organizations seeking traceability, anti-counterfeiting, and brand authentication solutions. This solution improves record keeping and, as a result, the efficiency of the supply chain and inventory management. As more and more people have internet-enabled mobile devices such as smartphones, consumers have become much better at quickly and conveniently checking the authenticity of goods or the traceability of the supply chain using QR codes and similar technologies. For consumer

goods such as food, blockchain technology can be a useful tool in combating contamination and threats to consumer safety, while also offering innovation and intellectual property (IP) benefits by making it clearer what information has been produced, when, and by whom.

5.2. Development of smart packaging

There are many recent examples of the use of smart packaging to enhance the value of products.

Accenture has recently partnered with a European luxury brand to create a virtual retail store that consumers can enter by scanning or activating a product's smart packaging. Within the metaverse, consumers can interact with the digital equivalent of the product – information generated during consumer interactions can be recorded and used, for example, in sales and manufacturing.

Pharmaceutical developments in smart packaging include new time-temperature technologies that increase safety and extend the shelf life of certain products, such as vaccines. In May 2022, Essentra Packaging and Advanced Material Development (AMD) announced that they would collaborate on the development of next-generation solutions to improve patient safety in the industry.

During 2021, US and Chinese authorities announced that they would develop advanced food traceability systems to improve food safety through the introduction of smart packaging solutions.

The introduction of smart packaging with tracking capabilities can often improve the competitiveness of companies operating in the logistics sector by providing them with information that helps reduce waste and costs and improve productivity.

Laava is a leading Australian company in the smart packaging market, specializing in product authentication technology. Its portfolio includes Smart Fingerprints, which uses patented optical technology to place unique, randomly generated images on labels and other packaging and is being promoted as an alternative to QR codes. Smart Fingerprints technology has been used on more than two million products and has been introduced in both the food and beverage industries in recent years (‘t Hart, 2023).

5.3. Innovation in packaging formats

There are many noteworthy examples, but the most significant developments at the beginning of the decade were as follows (Lippitsch, 2023)

- Paper postal packages for e-commerce
- Paper bottles in the beverage and household goods sector

- Dry molded cellulose for the food service and pharmaceutical industries

6. Advances in print technology

Print technology is advancing, with digitisation of workflows, increased automation of equipment and the introduction of artificial intelligence driving improvements and opening new opportunities for printed packaging.

6.1. Increased operational efficiency

AI influences the optimisation and efficiency of packaging processes, offering streamlined production throughout the supply chain from sourcing to delivery. In addition, AI is employed through learning algorithms to optimise inventory management, reviewing historical sales data to predict future demand and adjust production volumes accordingly. AI is being increasingly used to drive predictive maintenance requirements of printing, conversion and packaging equipment, optimising production schedules to take predicted downtime for maintenance into account. Computer vision and machine learning are being incorporated into machines with cameras and sensors learning to spot imperfections and defects within set quality assurance parameters.

6.2. AI in packaging design

AI is also widely used for packaging and print design. In design, generative AI is used to create a range of images based on a client's brief, doing so quickly and accurately. There are several image generators available to designers including Open AI Dal-e-2, Midjourney and Stable Diffusion. Software from these companies uses input text to create images, doing so rapidly and accurately. Generative AI is also a feature of professional design software such as Adobe Photoshop which now incorporates Firefly. This is a text-to-image tool and is designed to allow easy manipulation of photographic and other images based on text inputs rather than creating them from scratch.

6.3. Digital printing

Although printing is perceived to be going through difficult times, it is in fact a highly competitive and dynamic business, especially in the packaging sector. There are huge expectations for the development of digital printing, both inkjet and electrophotography. Digital printing is increasingly used to print labels, corrugated, cartons, flexible, rigid, plastic, metal and glass packaging. In 2020, as the global Covid pandemic disrupted all aspects of

human life, digital packaging volumes soared as suppliers were able to respond quickly to changing demands.

Digital printing allows for greater flexibility, helping packaging manufacturers and converters to meet the increasingly tight schedules of their customers. The ability to print variable content enables brands to create new, innovative solutions, delivering higher levels of engagement and new customer experiences that increase brand effectiveness and value (Heidelberger Druckmachinen AG, 2022).

6.4. Market drivers for adoption of digital print for packaging

Among the factors driving the growth of digital printing, the trend towards lower print runs (batch sizes) plays a major role. Differences in set-up costs when producing shorter runs can contribute significantly to variations in cost per print between printing processes. On the other hand, for large print runs, these set-up costs are significantly reduced and the costs of consumables used – ink, coating and other consumables – dominate.

The 'Amazon' effect – The need and expectation for same-day and next-day delivery is widespread, but not typical in the labelling and packaging sector. It is expected that by 2027, many converters will offer on-demand printing and finishing services (Figure 3). This technology will be exploited not only by craft brands, but also by large companies that will be able to move to smaller and more frequent orders with changes to meet consumer demand. Environmental benefits will come from less set-up waste, printing accurate quantities on demand and eliminating minimum order quantities (Guga - Strătilă, 2023).

Fig. 4. Personalized packaging (Hallam, 2023; Smith, 2025)

7. Staying ahead of the trends

The packaging market is changing rapidly. Its shareholders must be aware that their key tasks for successful operation are to monitor market changes and trends, keep up to date with the constantly changing regulatory environment, and assess the specific impacts on their own businesses. In our summary, we have highlighted the key processes that we consider important in the current period and for the coming years, based on our own experience and market information, drawing on the market reports and publications referred to in our article. Due to the limited length of our article, we were unable to cover all factors. Accordingly, our analysis should be interpreted as our own subjective assessment.

In compiling this paper, we considered the following market analyses: IMARC, 2023; Mordor Intelligence, 2023, Smithers Research 2023 and 2025.

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