



# Paper & Packaging Report 2023

Unpack the power of sustainable packaging

**BAIN & COMPANY** 

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## Contents

Navigating Turbulence in Paper and Packaging .....	2
Full Potential Transformation in Paper and Packaging .....	8
The Paper and Packaging Industry Faces a Biodiversity Crisis .....	14
Which Packaging Substrates Are the Most Sustainable?.....	20
How Paper and Packaging Companies Can Catch Up in Commercial Excellence .....	27
Putting Sustainability to Work in Paper and Packaging .....	32
The State of Private Equity and M&A in the Paper and Packaging Industry.....	39
Sustainable Packaging: What Consumers Want Next from the Paper and Packaging Industry .....	45
The Mill of the Future .....	56



# Navigating Turbulence in Paper and Packaging

Scenario planning can create a dynamic, future-proof strategy.

By Jason Heinrich, Ilkka Leppävuori, and Jenny Lundqvist

## At a Glance

- ▶ Successful companies embrace disruption rather than fight it by focusing on the vital few uncertainties that matter.
- ▶ Becoming future ready, more sustainable, and reaching full potential requires a dynamic strategy.
- ▶ A winning strategy is good in all scenarios rather than brilliant in one context but a failure in others.

These days, chief executives in paper and packaging face extreme uncertainty, volatility, and disruption. Covid-19 caused abnormal demand patterns across many product categories. In addition, paper and packaging companies have seen record-high volatility in input costs, spurred by surging energy and chemical costs, record-high inflation, and an enormous spike in overseas transport costs in 2021. New regulation is also scrambling categories, boosting some products while destroying others.

Despite this acute turbulence, most companies still rely on traditional approaches to strategy—such as analyzing trends, making forecasts, and committing to a set of actions that they rigidly follow—but these approaches are unfit for the high degree of instability that many companies are currently experiencing.

Companies getting it right embrace uncertainty and disruption (rather than fighting it) by focusing on the vital few uncertainties that matter. These include supply and demand fluctuations, cost volatility

in energy and raw material prices, and geopolitical risks. There are also uncertainties around the impact and timing of the green transition as well as around new technologies, including artificial intelligence, smart packaging, and e-commerce penetration.

Leading companies are engaging in strategy making as a continuous process that generates a dynamic plan. They are laying out the possible scenarios that could develop, taking key actions now, and preparing the organization to react in a timely manner via signposts or trigger points when conditions change.

## A perfect storm

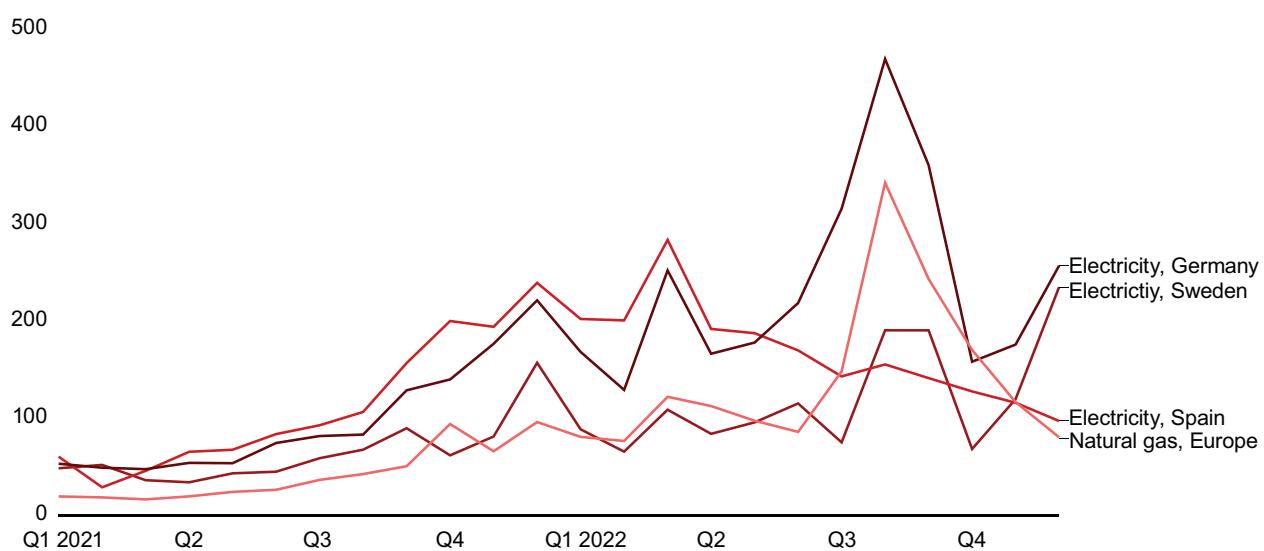
External pressures and disruptions are at an all-time high, and companies can't afford to ignore uncertainty when planning and implementing strategy.

Covid-19 caused demand to surge in certain product categories such as the panic buying of toilet paper, and plunge in others, such as the radical drop in office paper demand as copying and printing in offices suddenly disappeared while electronic contract signing took off.

As a result of the crisis in Ukraine, natural gas prices in Europe spiked from an already high €80 per megawatt-hour in January 2022 to a peak of more than €300 per megawatt-hour in August, with electricity prices following suit (see *Figure 1*).

**Figure 1:** European energy price volatility increased dramatically in 2021 and 2022

### Price in euros per megawatt-hour, quarterly



Sources: Statista; Refinitiv

Overseas transport costs more than tripled in 2021 and sustained high levels for a large part of 2022 because of the lack of sea container capacity and other supply chain disruptions. Key chemicals used in the industry have skyrocketed in cost as well—for instance, starches rose by more than 60%, and caustic soda increased by almost 200% for some customers.

Regulation is also shifting growth patterns and in practice eliminating some product categories (such as plastic straws) while creating new ones (such as molded fiber for compostable salad bowls). Bans and restrictions on single-use plastics are propelling a clear shift from plastic to paper straws and lids, and they are boosting the demand of recycled content in PET (polyethylene terephthalate) bottles.

Recent proposed EU regulation aims at reducing “avoidable packaging”—that is, reducing the demand of quick-service restaurant packaging and shifting from single-use tableware, for instance, to washable items, as already showcased in France.

Finally, record-setting rates of inflation, increasing interest rates, and the fear of a recession are additional drivers of uncertainty. Becoming future ready, more sustainable, and reaching full potential requires a dynamic plan and continuous strategy process.

## Scenario planning

Scenario planning is certainly not new, but while it used to be an academic exercise that executives performed every few years, it's now mission critical given the ever-increasing turbulence. Scenario planning begins with no-regret moves, or actions a company needs to take under any scenario. Then, it is key to identify trigger points or signposts to signal when a scenario occurs so that you can react quickly and take a new strategic direction (see *Figure 2*).

For example, a company evaluating sustainability may determine that under any scenario it will need to create more recyclable and compostable packaging going forward in light of tightening regulations and changing consumer demand. It would start by investing in R&D to develop new forms of packaging and improve resiliency. Then, the company would plan for various scenarios that factor in possibilities such as volatile energy costs, input prices, evolving regulation, and the dollar value of potential losses should each scenario play out. Finally, the company would track clearly defined signposts, and when signposts suggested one scenario becoming more likely, management could react quickly and adjust.

The company would then use these scenarios for sensitivity analysis, meaning it could pressure test strategic decisions and investments. For example, an investment into a new paper mill will have massively different economics depending on the expected growth of paper demand and the input costs. Having a feeling for the extreme upper and lower bounds can help identify the most promising investment across scenarios.

**Figure 2:** Scenario planning helps prepare for extreme outcomes

Category	Possible metrics to measure impact	Examples of extreme 2030 outcomes
End market demand	• Growth in carton board demand	0 ← → 7% p.a
	• Growth in corrugated packaging demand	1% ← → 7% annually
	• Decline in graphic paper demand	-1% ← → -10% annually
Raw material	• Average cost of softwood in euros per cubic meter	€10 ← → €100 per cubic meter
	• Global market pulp capacity additions (in tons) by 2030	5% ← → 30%
Other variable costs	• Average cost in euros per megawatt-hour for electricity	€5 ← → €500 per megawatt-hour
	• World container index (40-foot container)	\$1,000 ← → \$15,000
	• Price of carbon emission rights per ton	€10 ← → €200 per ton
Capital costs	• Interest rates	0 ← → 6%

Source: Bain & Company

## Solidify new pricing and product portfolio management

High inflationary environments make pricing a priority for companies. Some high-performing companies choose to streamline the product offering and optimize the mix to mitigate supply shocks and drive growth. These companies eliminate product families and stock-keeping units (SKUs) based on complexity analytics, migrating customers to a more profitable portfolio. They reprice high-complexity SKUs for which customers are willing to pay more, transform the cost structure of low-margin products, and exit product categories that aren't strategic fits.

It's also important to develop a strategy for passing through the fluctuating costs of raw materials. This will depend on whether your contract with suppliers is tied to market dynamics or an agreed-upon index that could be tied to global inflation or containerboard prices, for instance, or a mix of the two. Where you have negotiating power, you may need to push for higher than 100% pass-through pricing, and in other categories, you need to realize that your competitive position is such that you can't get the full pass-through price. And all this decision making needs to happen quickly in response to market circumstances.

## Build long-term customer relationships

The paper and packaging industry is known for long-term customer relationships, and one of the best examples is liquid carton packaging, where there are only a few suppliers and a few customers that are already in long-term relationships.

For many of the other grades, you have many more choices, and in turbulent times, customers often look for better value alternatives, leading to increased churn. Winning companies in these categories, however, also invest in superior customer engagement, such as deeper collaboration in demand planning, inventory management, logistics, and new product innovation.

Even packaging companies in grades with more choices for customers prioritized serving customers with long-term relationships rather than chasing the highest-margin customers when prices increased rapidly in 2022. Now in 2023, those companies are reaping the benefits in terms of maintaining their customers' share of wallet because those long-term customers have stuck with them.

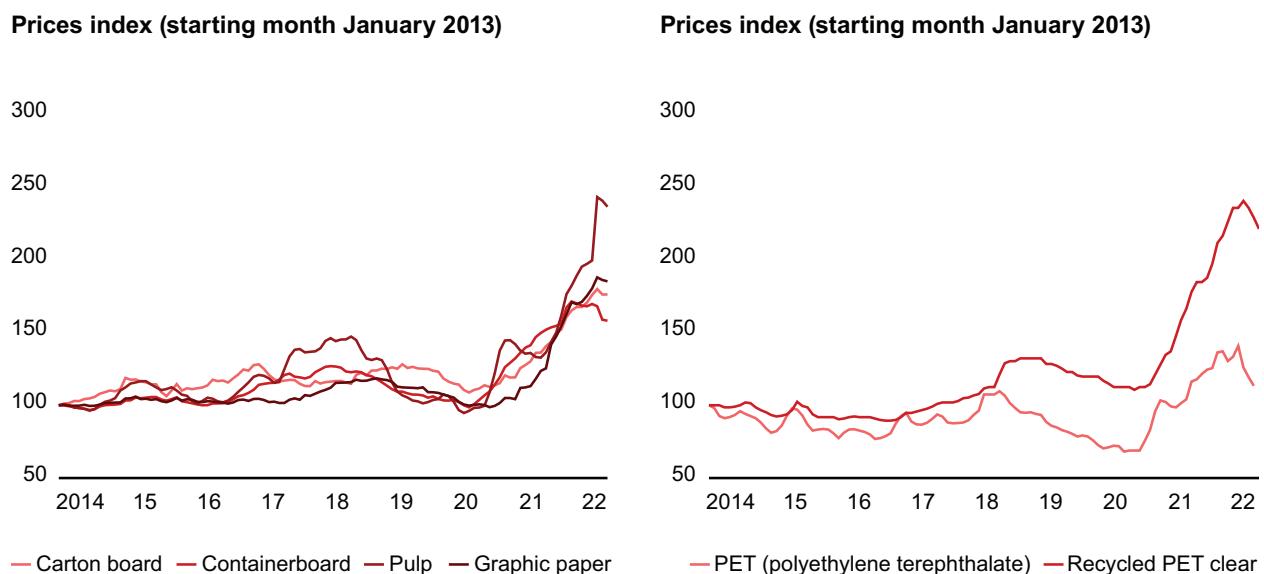
## Double down on operational resiliency and traceability

Over the past year, volatile energy prices have been the most obvious driver of uncertainty, and supply chain issues, with both input and output prices fluctuating wildly, have also played a role (see *Figure 3*). As a result, operational resiliency and traceability are more important than ever. Leading companies are investing in multiple sources of supply so that they are not dependent on one supplier per category. They are also thinking about their footprint strategy and regionalizing their supply chain more than they have done in the past, meaning that their subcontractors for a given region (e.g., North American operations) would be mostly in that region. Finally, for high-volatile categories, they are using contractual terms or hedging to ensure they are protected.

## Strategically allocate capital expenditures, R&D, and M&A funding

Downturns are a great time to gain market share. To win, you must invest selectively to outperform competitors. Use M&A to reshape the portfolio of businesses. For example, in 2008, Graphic Packaging acquired Altivity Packaging for \$1.75 billion to create one of the largest producers of folding cartons in North America. The combined company was able to realize significant cost savings and operational efficiencies, improving profitability and solidifying Graphic Packaging's position as a leading producer of folding cartons in North America.

It's also critical to continue investing in R&D, allocating capital toward the right projects while making sure they are flexible. Stora Enso, for example, is currently investing €1 billion into converting an idle paper machine into a high-volume consumer board production line. The machine will be able to produce folding box board as well as coated unbleached kraft, which can be used in a wide range of industries, including food and beverage packaging for frozen, chilled, dry, and fast food.

**Figure 3:** Output prices surged in 2022

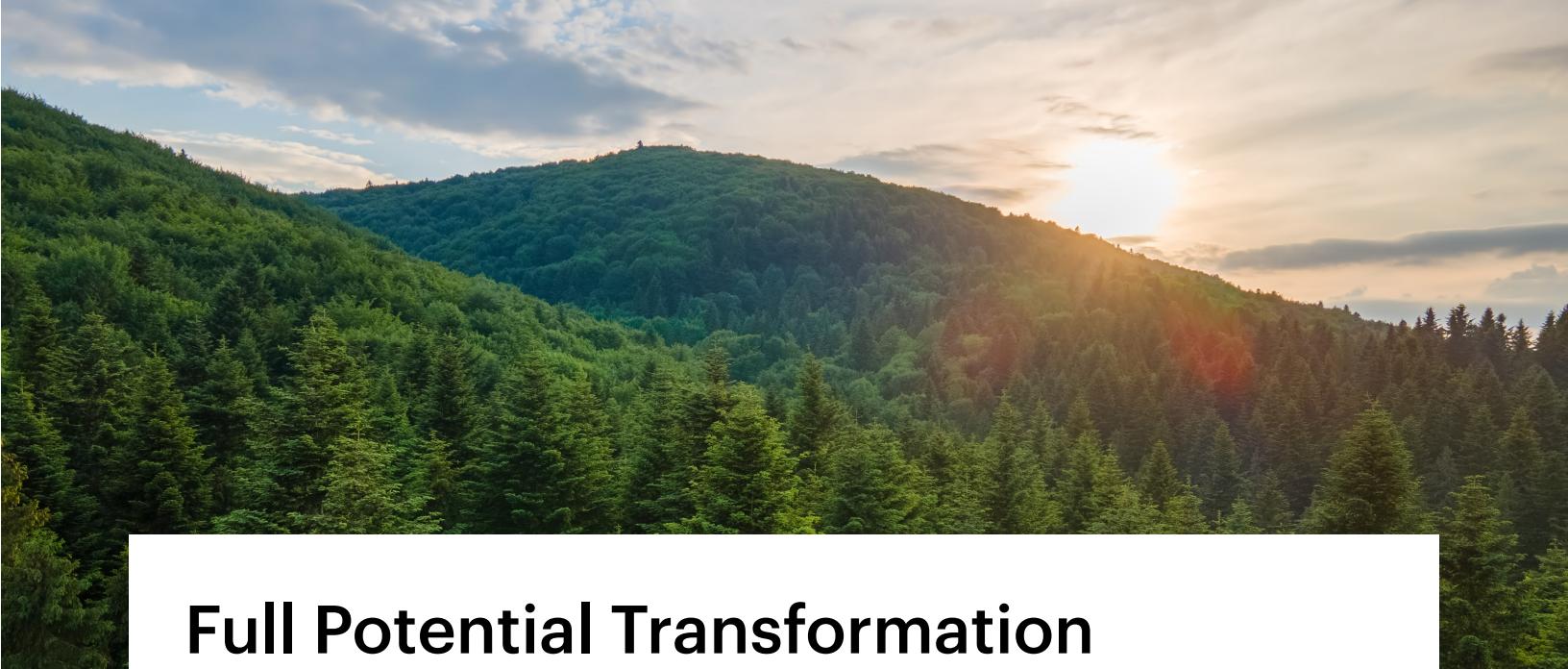
Notes: Graphic paper refers to uncoated woodfree, coated woodfree, uncoated mechanical, coated mechanical, and newsprint; pulp refers to bleached hardwood kraft pulp, bleached softwood kraft pulp, and others; containerboard refers to kraftliner, testliner, and fluting, carton board refers to white-lined chipboard, solid bleached sulfate, folding box board, coated unbleached kraft, and food service board; price movements within the subcategories were highly similar, therefore an average across the categories was taken to construct the index

Sources: RISI; Kunststoff Information Verlagsgesellschaft (KIVI)

## Reset the cost base and prioritize automation

Basic automation tools have become common in many paper and packaging companies. Modern machines can run sawmills and pulp mills with very little human oversight, and digital sales channels can automate many sales activities. Automation cuts costs (because it reduces variability) and improves safety. With improving industrial controls and closed-loop control systems, fewer employees are needed to run highly complex paper machines.

Going forward, the only certainty is uncertainty. Turbulence will most likely only increase. For this reason, winning executives are designing a strategy that is good in all scenarios rather than brilliant in one context but a failure in others.



# Full Potential Transformation in Paper and Packaging

Boosting profitability, cash flow, top-line growth, and company value.

By **Pablo Cornicelli, Manuel De Soto, Andrea Isabella, Ilkka Leppävuori, and Elena Recio**

## At a Glance

- ▶ A full potential transformation can raise a company's profitability, cash flow, top-line growth, and value to a completely different level.
- ▶ Paper and packaging companies that have achieved a full potential transformation have typically doubled their EBITDA over two to five years.
- ▶ Successful companies embrace clear purpose, full alignment, accountability, and sprint-based prioritization of actions.

How did Fedrigoni Paper more than double its adjusted sales and almost triple its EBITDA in just a few years? Established in 1888, the Italian family-run company has a long and storied history of producing specialty paper and self-adhesive labels. More recently, however, Fedrigoni lost two large international banknote customers, and market dynamics shifted. In 2018, Bain Capital acquired a 90% stake in Fedrigoni for €600 million and helped the Italian company execute a full potential transformation.

By building scale in existing markets, expanding its geographic scope, and acquiring several Italian companies with a strong European presence, Fedrigoni became one of the top players in self-adhesive labels worldwide. It also embedded sustainability into internal operations and its day-to-day business, developing circular products such as specialty paper made of 40% to 100% recycled material as well

as paper combining pulp and alternative fibers such as cotton, hemp, and linen. Finally, it also cut costs and optimized operational excellence. Thanks to these measures and others, investors achieved a five times return on investment with the new valuation of Fedrigoni at €3 billion.

For every company that has invested at the right time and achieved game-changing operational and commercial results, there have been many more that have faced declining profitability and serious balance sheet issues. Given this wide variation, CEOs and shareholders have prioritized understanding how to generate the most attractive returns and make the most out of their existing production assets.

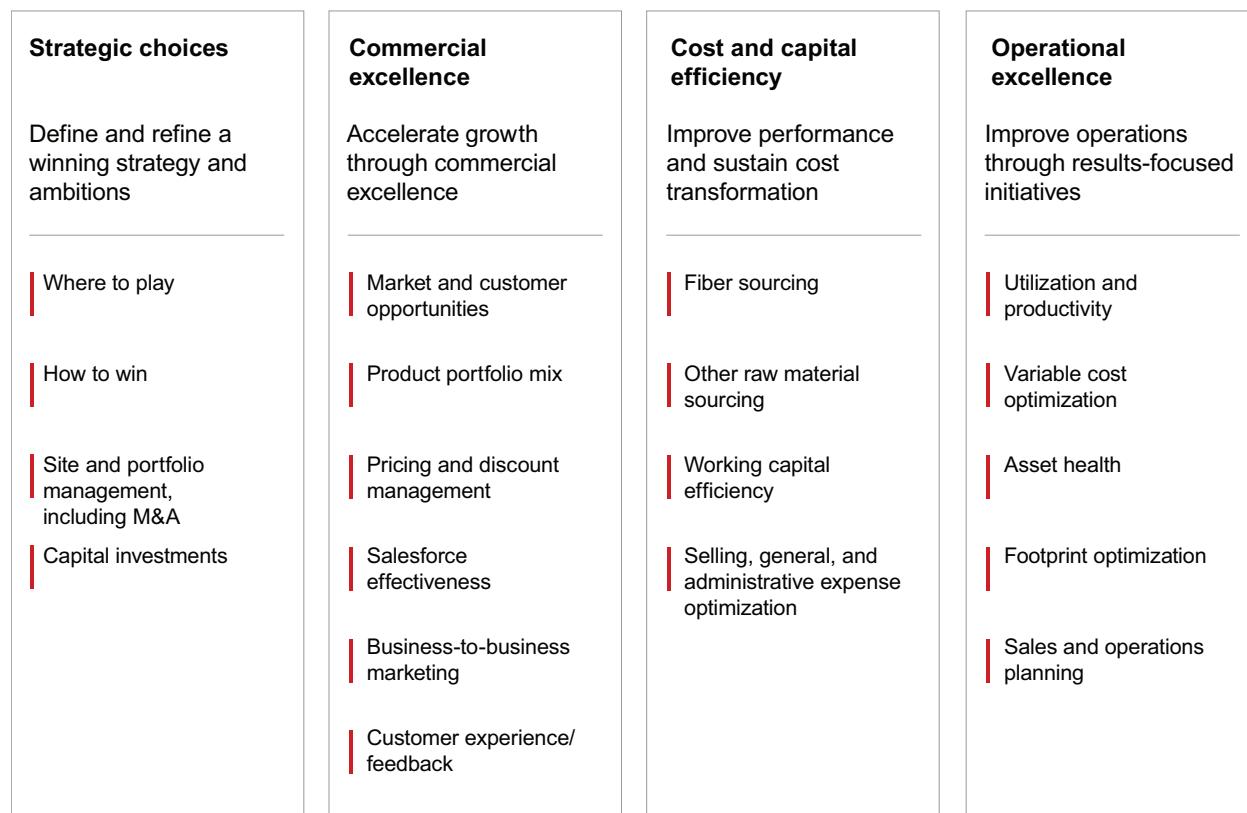
“Transformation” is used widely in the business world, and at Bain & Company, a “full potential transformation” is the cross-functional effort to alter the financial, operational, and strategic trajectory of the business. When implemented successfully, this plan can dramatically raise the company’s performance to a completely different level in terms of its profitability, cash flow, top-line growth, and value. This success often leads to an increased ability to make bold new investments in new production capacity and R&D. These days, such transformation plans also often include a concrete sustainability plan that outlines how to get toward lower (or ideally zero) carbon emissions within a given timeline, often through site energy-efficiency savings or investments in non-fossil fuel energy.

Successful companies articulate a clear purpose and value creation plan or a roadmap to achieve their full potential transformation (see *Figure 1*). They align fully across the organization and split bigger key initiatives into multiple shorter sprints. Executives meet regularly to ensure that performance is transparent, roadblocks are quickly cleared, and decisions are quickly made. Finally, they ensure that the best talent leads the transformation, and they honestly evaluate where they are missing certain skills, hiring externally to fill those gaps.

A full potential transformation usually consists of a five-year plan to significantly improve the EBITDA of the company. Everything on this broad agenda cannot be successfully executed at the same time. Instead, successful companies identify and quantify the relevant ways to create value. Three different ways that top-quartile companies Bain has worked with have employed specific value levers as part of their full potential transformation include revamping their portfolio strategy, stepping up their commercial and operational excellence, and improving their performance through cost transformation and next-generation sourcing.

**Revamping portfolio strategy:** Leading companies anticipate and react to changing market demands, and they adjust their portfolio accordingly. Early lessons can be learned from paper companies that switched some years ago from declining products such as graphic paper to producing higher-demand packaging products such as carton board or containerboard. Revamping their portfolios often involved divesting or spinning off lower-demand products, closing certain paper mills if they were too old or costly to convert, or transforming machines to produce the higher-demand products.

Today’s leaders also realize that transforming one’s portfolio means accepting that they will need to close certain plants and make new investments to convert machines into growing and attractive product grades. Finally, leaders will upgrade the commercial organization to effectively sell the new

**Figure 1:** Value creation levers that accelerate a full potential transformation**Environmental, social, and corporate governance (ESG) key enablers**

Energy and emissions	Material consumption	Water consumption and treatment	Waste and product end of life	Employee health and safety	Supplier ESG practices
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**Operating model and other key enablers**

Organizational model and alignment	People skills, culture, and talent	Agile deployment	Digital	Performance management
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products to new customers. This could entail training sales teams to sell carton board or molded fiber products to fast-moving consumer goods companies, retail chains, or quick-service restaurants, instead of selling graphic paper to publishers.

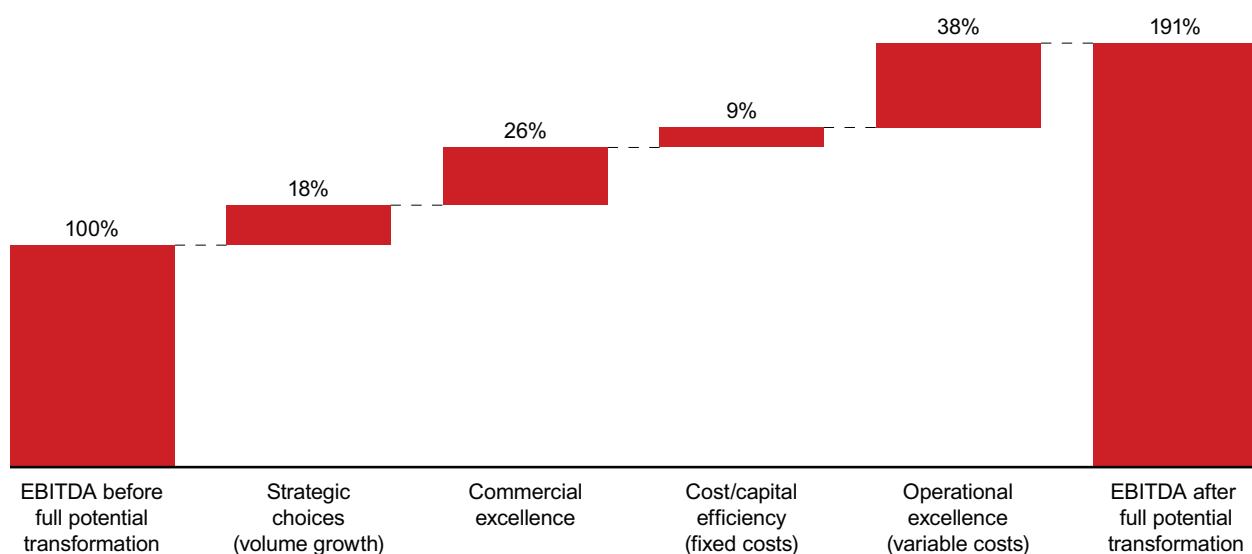
**Stepping up commercial and operational excellence:** Many full-scale transformations rely on improving commercial and operational results across dozens of production sites. One packaging producer, for example, started by setting high ambitions to improve operations vs. the baseline. It began by seeking full transparency of what good looks like on a very granular level. On the operations side, supervisors tracked how workers did on key performance indicator dashboards in every plant for every shift, how the shift changeover was managed, and many other details. They did this to establish their ambition and where certain teams and plants needed to close the gap.

The company brought in the equipment manufacturers (who also functioned as consultants) to share best practices and help the teams accomplish operational excellence. Finally, it connected those teams focused on operational excellence with the teams working on commercial excellence and sourcing excellence to ensure that operational excellence improvements were not, for instance, negatively impacting the commercial team. Sourcing was looped in early on to help find which materials, recipes, and suppliers were needed to optimize product cost.

**Improving performance through cost transformation and next-generation sourcing:** Other companies have improved their cost structure and upgraded sourcing to stay competitive and drive a multiyear transformation. For one company, this included coordinating procurement for key product categories so that every single mill did not negotiate with suppliers separately, but instead, they could take advantage of volume discounts and more strategic dialogues with select suppliers.

Analyzing the data enabled the company to determine a more efficient balance when choosing among the share of fiber to produce internally, to source from external suppliers, or to purchase on the open market. Big data analysis on varied performance across all products and sites helped manage demand and identify how it could reduce the cost of chemicals and energy within its operations—for example, through calibration of recipes and consumption in the production. As a result, this company managed to reduce costs, improve collaboration between sourcing and key business stakeholders, and upgrade the supplier management and overall sourcing strategy significantly. Sourcing teams were involved early and throughout the full transformation process so as to be more cost efficient if the team were to be sought out to alter the product recipe, and they would rethink sourcing to reduce the quantity of the most expensive ingredients, which are typically chemicals.

Past Bain project experience shows that most companies undergoing a full potential transformation use several levers in parallel, with the most successful ones (especially in the private equity setting) sequentially improving in all areas (see *Figure 2*). Operational excellence and commercial excellence were the most commonly targeted levers and showed the highest return. All in all, companies utilizing the full set of levers were able to achieve a roughly two times EBITDA uplift, truly transforming the business in the process.

**Figure 2:** Improving operational excellence created the most value in past Bain-supported transformations**Average percentage of EBITDA uplift per lever**

Source: Bain &amp; Company

## How to succeed in a full potential transformation

Successful companies begin their transformations with a diagnostic phase to establish a starting point, followed by a design phase to specify the actions and planned impact. It is in the implementation stage, however, where the winners emerge. These companies embrace a clear purpose, the principle that talent is king, full alignment and accountability, sprint-based prioritization, performance transparency, and fast decisions.

**Clear purpose:** The CEO articulates why the company needs to do things differently, what the world will look like if it succeeds, and the specific motivations for different roles within the organization. Perhaps the company is chronically less profitable than competitors or a new private equity owner is aiming for a successful exit in five years or has an ambition to achieve global leadership through M&A and consolidation. The key is that the leadership team and the broader organization feel motivated to take the journey toward that joint ambition.

**Talent is king:** Transformations are disruptive and can lead to attrition as well as new skill requirements. Leaders identify the best talent at the firm to lead the transformation, rather than simply the employees available to do so. These top performers are freed up from other tasks so that they will be the best

sponsors to ensure buy-in for the transformation. Looping in top talent before companywide communications can help them feel integrated in leading change. And diversity is reflected at every level of employment—from the factory line to the C-suite.

**Full alignment and accountability:** The top team and key profit-and-loss owners embrace the approach and its urgency. Every initiative has clear owners and sponsors, and the broader organization is informed of plans and regularly updated on progress through all-hands town hall-style meetings. A clear sponsorship spine extends through all levels to ensure buy-in and help anticipate risk early on. Employees hear about transformation directly from their managers, who can explain why the change is critical and how it will impact employees' day-to-day work.

**Sprint-based prioritization:** Broad transformations often cover countless different initiatives. To ensure progress, work is split up into multiple shorter sprints, without losing sight of long-term objectives. The most critical enablers and highest-value initiatives are front-loaded and operationalized within 4- to 10-week sprints, during which the working team is onboarded and key improvements are introduced. After the sprint is finished, leaders communicate results to all relevant stakeholders and map them against long-term ambitions.

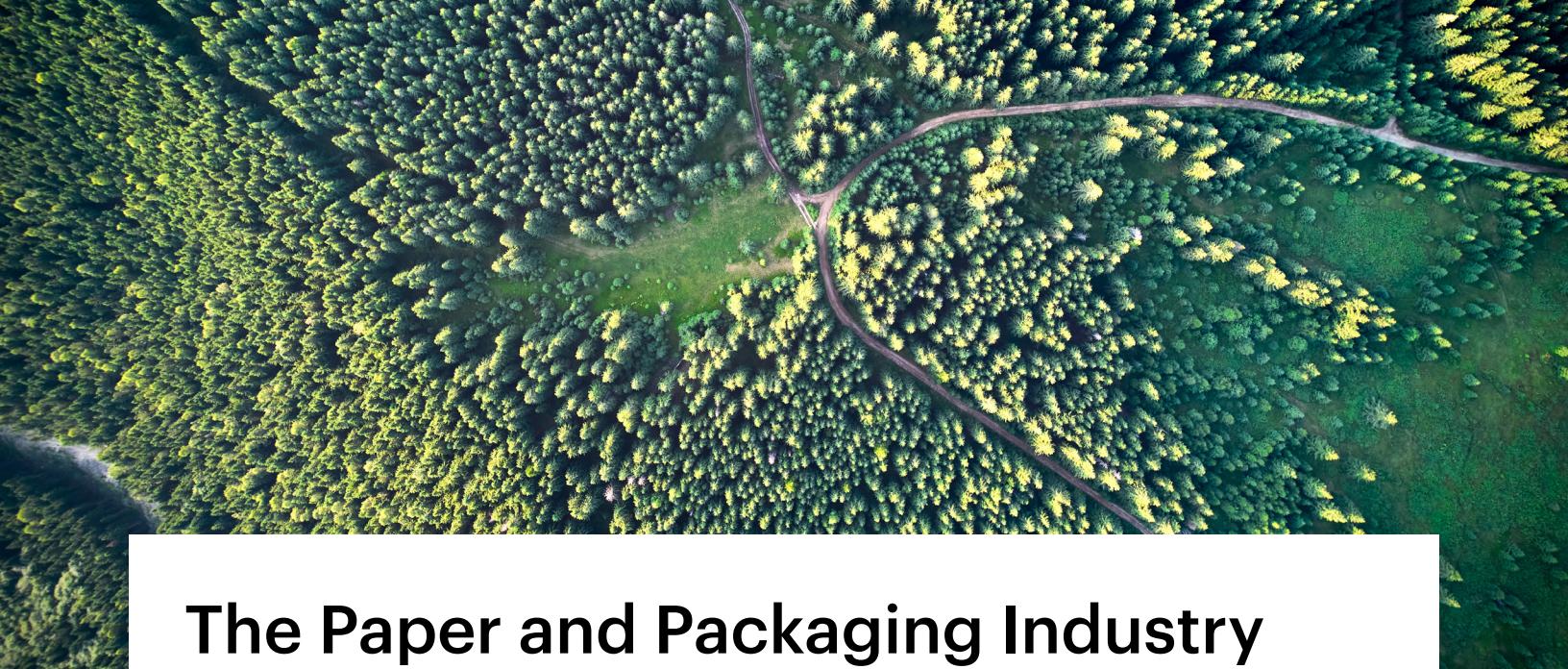
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Successful companies seek transparency on performance and a “red is good” mentality in tracking progress.

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**Performance transparency:** Dashboards showing progress in transformations too often tend to migrate toward showing green lights across, whereas the real point of tracking is to identify issues and react to those quickly. Successful companies seek transparency on performance and a “red is good” mentality in tracking progress. If waste percentages at a converting plant are not dropping, for instance, or if most price increases are leaking out, the leadership team is notified immediately.

**Fast decisions:** During well-run transformations, executives meet weekly or biweekly to address how specific roadblocks or delays in a given workstream can be mitigated. For instance, a recipe optimization effort requires a new chemical supplier in order to succeed, or the speed calculation methods across a company’s board machines need to be harmonized or the salespeople cannot charge the correct transportation costs because the data is not available on time. Quick, pragmatic decisions are made to course-correct the initiatives that are struggling, and all employees from the C-suite to the front line accept that sometimes teams make the wrong decisions and need to course-correct.



# The Paper and Packaging Industry Faces a Biodiversity Crisis

Sustainable forestry practices and recycled and reused materials deliver a competitive edge.

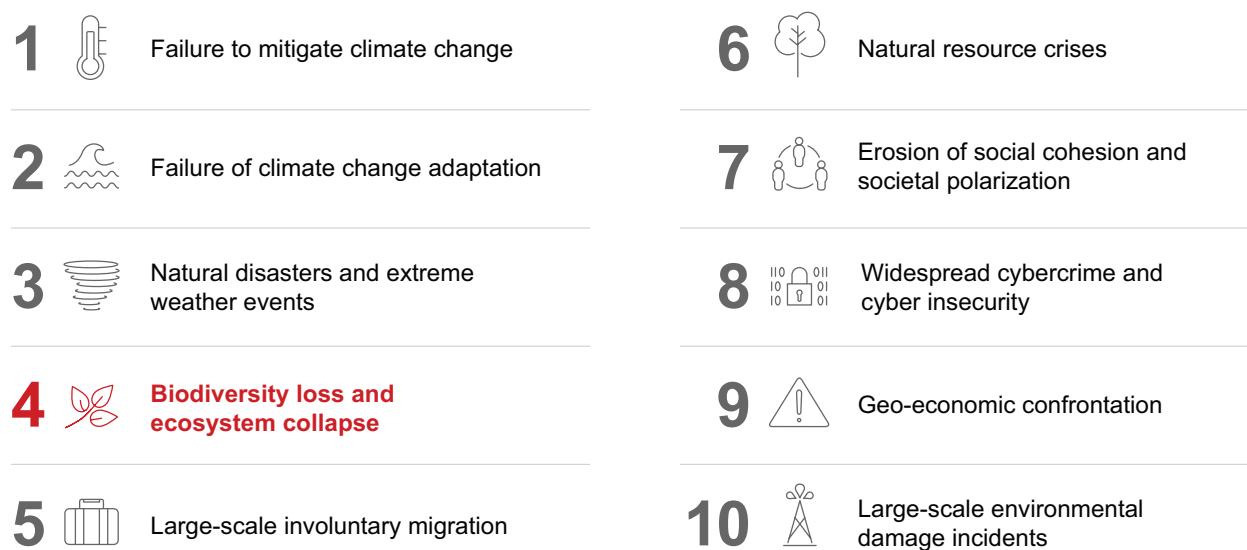
By Emma Elofsson, Erik Nordboe, and Marcos Rutigliano

## At a Glance

- ▶ Biodiversity loss could put \$44 trillion at risk—that's more than half of global GDP.
- ▶ More than a third of companies surveyed plan to act on protecting biodiversity within two years.
- ▶ Sustainable forestry practices have helped one company increase its standing timber volume and sustainable harvesting level significantly, without increasing land use.

Biodiversity loss is not only a threat to nature but also to the economy. In fact, the World Economic Forum (WEF) estimates that nature and biodiversity loss could put \$44 trillion, more than half of global GDP, at risk. And in a recent WEF survey, global risk experts rank biodiversity loss and associated environmental risks such as climate change as the most critical threats to the global economy within the next decade (see *Figure 1*).

Nature loss is unfortunately well underway. Populations of mammals, birds, amphibians, reptiles, and fish have, on average, declined by 69% since 1970. In addition, around 1 million species globally are at risk of facing extinction. Biodiversity loss and climate change are, of course, interconnected as climate change accelerates biodiversity loss. In turn, the destruction of ecosystems undermines nature's ability to regulate greenhouse gas emissions and protect against extreme weather, thus speeding up climate change and increasing vulnerability to it.

**Figure 1:** Biodiversity loss is seen as one of the most severe global risks**Global risks ranked by severity over the short and long term**

Source: World Economic Forum Global Risks Perception Survey, 2022–2023

Companies choosing to act now are poised to benefit. Leading companies are reducing their exposure to biodiversity-related risks and brand risk as well. Early movers realize that biodiversity is not just a risk to be managed but also an opportunity to gain competitive advantage. Leaders are using sustainable forestry practices and increasing the share of recycled and reused materials to appeal to customers who are increasingly concerned about reducing their biodiversity impact on the supply chain. Others are developing innovative packaging that enables them to target new markets with a lower carbon and biodiversity footprint.

## Paper and packaging perpetuate some severe issues driving biodiversity loss

Paper and packaging companies contribute heavily to biodiversity loss through unsustainable forestry management in their supply chain and specifically through their use of forestry resources as raw materials. For example, large-scale clear cutting is a particularly unsustainable forestry practice, and in Sweden, 97% of final tree felling is clear cutting and much of this is on large plots measuring greater than 10 hectares. The paper and packaging industry also impacts biodiversity with water use. Water is used to soak pulp before producing paper, and pulp, paper, and final packaging production create air, water, and soil pollution. Packaging companies not directly involved in forestry still contribute to upstream biodiversity loss through their supply chain and downstream biodiversity loss through consumer consumption.

Only a minority of paper and packaging companies are taking the issue seriously and acting on biodiversity loss today. Of a global sample of about 100 paper and packaging companies disclosing to the CDP (and therefore biased toward action), only 22% reported assessing their value chain impact on biodiversity and only 31% reported taking any action to progress on biodiversity-related commitments. On the positive side, however, about 45% of respondents are planning to begin assessing their biodiversity impact within the next two years and 35% are planning to act. Part of the challenge is that most companies have tackling climate change and reducing emissions as their highest priority, so biodiversity competes with climate when it comes to management attention and resources. So far, regulations, investor pressures, and incentives are less developed for biodiversity compared with those established for emissions, which can make it seem less urgent despite the acute need.

Most companies are following forest certification schemes such as those created by the Forest Stewardship Council and the Programme for the Endorsement of Forest Certification. These certificate programs are good, but they are not enough overall. These certificates can be used as a base, and then companies need to consider their unique conditions, tailor their approach, and do more.

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Only **31%** of companies surveyed are acting now to address biodiversity loss, but **45%** said that they plan to begin assessing their biodiversity loss within two years.

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## **Regulation is beginning to emerge, but it lags behind other areas of climate change**

New biodiversity legislation, regulations, and reporting standards are currently under development, and, when finalized, they are expected to pressure companies to do more to prevent biodiversity loss. National governments adopted the new post-2020 global biodiversity framework at the UN Convention on Biological Diversity's December 2022 COP15 event in Montreal, setting 23 biodiversity targets to be achieved by 2030. This agreement includes the overall commitment to conserve 30% of the planet's lands and oceans and to restore at least 30% of degraded land and ocean ecosystems.

In the EU, the European Green Deal includes commitments to legally protect at least 30% of the EU's land and seas by 2030 (and to strictly protect at least 10%). The US has committed to conserving at least 30% of US lands and waters by 2030, as well as establishing the America the Beautiful Challenge, a \$1 billion public-private partnership that supports ecosystem restoration projects that invest in watershed restoration, resilience, equitable access to nature, and collaborative conservation. Ultimately, goals and commitments around the world need to become regulations and legislation to help speed up responses from companies to protect biodiversity.

## Managing risk and capturing the business potential of biodiversity

Leading companies are using sustainable forestry practices to improve biodiversity and gain a competitive edge. Below are two examples of different sustainable forestry strategies in two different regions of the world.

**Europe:** In 2020, SCA developed an initiative to increase its conservation measures. It defined critical habitat categories required to retain 203 threatened species on those lands. It used this data to inform which areas should be set aside and not harvested, how to adapt harvesting methods to protect the habitats, and which other small-scale conservation methods can be used. As of December 2022, the company has set aside more than 160,000 hectares of its productive forest land for the purpose of promoting biodiversity.

In addition, the company conducts active measures to promote species survival, such as prescribed burning or creating dead wood, benefiting both local biodiversity as well as the company. These efforts reduce risks from climate change or pests, creating a more stable and resilient forest as well as higher diversity of raw materials for new product innovation. The increased focus on biodiversity is not expected to affect forest productivity negatively. In fact, SCA has managed to increase its standing timber volume and sustainable harvesting level significantly, aiming to further increase harvesting from 4.3 million m<sup>3</sup>sub (a measurement unit for form-adjusted solid log volume) in 2010 to 5.4 million m<sup>3</sup>sub in 2025.

**South America:** Brazilian paper and pulp company Suzano has committed to connecting half a million hectares of fragmented forests in Brazil by 2030. This will reconnect 1,850 fragmented pieces of land, allowing plant and animal species to extend their habitat and increase genetic variability.

## Adjusting products and supply chains

Leading paper and packaging companies are innovating products to use more sustainable raw materials and optimizing supply chains to protect biodiversity. Many companies are developing innovative packaging solutions to meet new requirements. New EU regulations on deforestation-free products, for instance, will require companies selling wood products or rubber to prove that they are deforestation-free and legal, covering the global supply chain. Measures such as these will change the market dynamics and create financial incentives to find solutions that address these areas because products that don't meet these tighter regulations will increase a company's costs through taxation and penalties. By increasing awareness and involvement in developing policies, companies are better prepared to handle upcoming regulation.

Other paper and packaging companies are looking to biodiversity leaders in other industries for strategies regarding how to manage biodiversity in their supply chain when they don't produce the raw materials themselves. For instance, in order to improve biodiversity in its wool and cotton value chain, Swedish clothing retailer H&M is working with farmers in India to safeguard wildlife corridors and buffer zones, implement regenerative practices, and support access to markets for regenerative raw materials.

## **Reducing exposure to biodiversity-related risks**

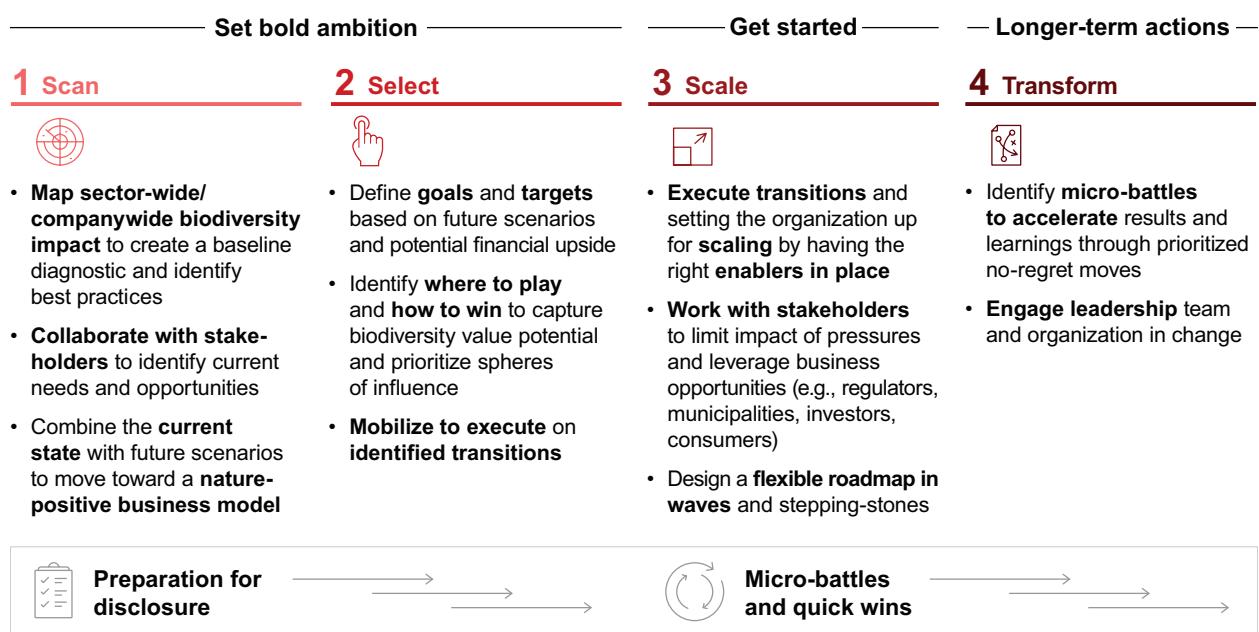
As a result of using sustainable forestry practices and sourcing from more resilient fibers, companies are reducing their biodiversity-related risks, including physical risks and reputational risks. The danger of ignoring physical risks is that forests become less resilient, which can push up input prices, contribute to raw material shortages, and reduce resilience to outbreaks. Planting nondiverse forests, increasing temperatures, and droughts contribute to biodiversity loss as they drive increases in beetle populations—such as the bark beetle, for example, which is a severe threat to coniferous forests.

## A strategic approach to safeguarding biodiversity

A structured approach can help businesses define their biodiversity strategy. This approach consists of four steps (see Figure 2).

**Scan:** Map sector-wide and companywide biodiversity impact, both directly and through the value chain, and benchmark with current efforts. It is also important to collaborate with stakeholders to identify current needs and opportunities. While it is currently challenging to measure biodiversity impact in as clear a manner as carbon dioxide, for instance, some existing tools for assessing biodi-

**Figure 2:** A strategic approach to safeguarding biodiversity



versity impact can be useful to help companies create a baseline and assess their impact. WWF's new Biodiversity Risk Filter tool, for instance, helps corporations and financial institutions assess the biodiversity risks and opportunities within their operations and value chains. In general, there is scope for a lot more collaboration along the entire value chain.

**Select:** Define goals and targets based on future scenarios and potential financial upside, identify where and how to capture biodiversity value potential, and mobilize to execute on identified transitions. Existing frameworks such as the WWF's biodiversity stewardship approach can be used to set targets and track results, map biodiversity ambitions amid broader sustainability efforts to ensure that they reinforce one another, and communicate results to all stakeholders. For example, retail chain Coop has developed and introduced a sustainability declaration that presents a product's sustainability footprint to customers. Sustainability is assessed through 10 areas, including biodiversity.

Technical development and digitalization will enable completely new and innovative solutions such as developing digital twins for forests. These digital replicas of entire forests will help model different biodiversity scenarios based on various external scenarios (such as different weather conditions) and specific measures taken by given companies. In turn, it will be possible to connect these digital twins to specific biodiversity key performance indicators.

**Scale:** Get started on executing transitions, and set the organization up for scaling by having the right enablers in place. Work with stakeholders such as regulators, investors, and consumers to limit pressures, leverage business opportunities, and design a flexible roadmap.

Making the business case for biodiversity will help scale. For instance, internal carbon pricing is set to help mitigate the impact of climate change. The same should be done for biodiversity. Leaders are aiming to develop climate- and biodiversity-positive products. And now that there are consumers and brand owners who are ready to join, these pilots could be tested in cosmetics and luxury products packaging, for instance.

**Transform:** Take longer-term action by identifying micro-battles (smaller pilot projects) to accelerate results. Completely new capabilities—that is, new competence, new structure, and new processes—will be required to make the change happen. Management needs to own and implement biodiversity rather than outsource it to sustainability specialists. Finally, the total value chain needs to join the effort and not simply outsource this piece to the next participant in the value chain.

Ultimately, executives can take a page from their overarching sustainability strategy and create bold targets, such as being biodiversity positive or nature positive by 2030, and then create a roadmap and adjust it based on continuous learning.



# Which Packaging Substrates Are the Most Sustainable?

Geography, regulations, and consumer preferences all impact substrate selection.

By Melchior Bryant, Emma Elofsson, Ilkka Leppävuori, Peter Meijer, and Moritz Vielhauer

## At a Glance

- ▶ Leading companies account for the full life cycle of substrates—from the raw materials that go into packaging design to end-of-life disposal.
- ▶ Companies configure their end-to-end sustainability strategy by product, geographic location, and associated regulations.
- ▶ Rigid paper packaging growth rates may surpass plastic packaging growth rates by 2026.

Four packaging CEOs meet at a sustainability conference, each representing a different substrate. “My products are more sustainable than yours,” starts the paper packaging CEO. “Fiber-based packaging is the only compostable substrate, and it degrades faster than other alternatives.”

The plastic packaging company CEO responds immediately, “My products are more sustainable than yours. Plastic packaging has a very low carbon footprint, and it is increasingly becoming recyclable.”

The glass packaging company CEO cannot hold back: “You talk about recyclability, but my products are *actually* recycled, without downcycling. Plus, you can reuse them, cutting down the footprint even further.”

Finally, the metal packaging company CEO chips in, too: “My products are fully recycled, without downcycling, and metal cans are much more lightweight than glass, resulting in lower carbon emissions when transported.”

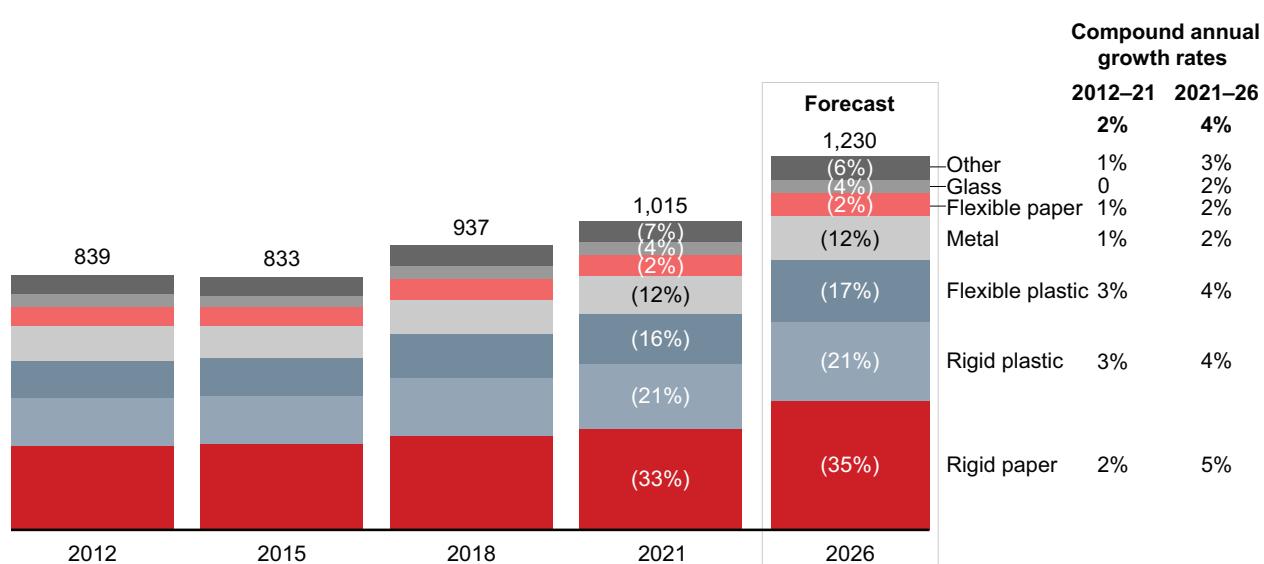
While the anecdote above is imaginary, the arguments about which products are the most sustainable are all very real. Whereas companies historically considered cost, functionality, and consumer experience as they determined which substrate to use for a given product, now sustainability is top of mind for everyone from regulators to consumers to the C-suite.

In this early moment of transformation, however, there is no clear winner (see *Figure 1*). Even though some substrates such as rigid paper may have an edge, it’s too early to tell. And across geographies, there is still not a shared understanding of what is necessarily the preferred or most sustainable type of packaging.

What is clear, however, is that packaging producers must proactively focus the discussion around substitution and provide solutions to consumer packaged goods (CPG) companies, retailers, and consumers—or they risk being unpleasantly surprised by their customers’ choices.

**Figure 1:** Growth rates of different substrates

#### Global packaging market size evolution by substrate, 2012–2026 (in billions of US dollars)



Note: Other includes other packaging and flexible foil packaging  
Sources: Smithers (2021); Bain analysis

Leading companies are assessing the environmental impact of different substrates and taking the full life cycle into account—from resource extraction and production to transportation and products’ end of life. They employ a proactive strategy that considers packaging design, collection and recycling, and the regional regulations regarding each of their products. They communicate early and clearly with regulators and their customers. They also appreciate that CPGs are striking a balance between environmental benefits and making their offerings more premium, meaning they will use what drives more rotation on the shelves and what allows them to charge more for the same product.

## **Stakeholders demand sustainability**

Executives are feeling the pressure from every angle to improve sustainability—whether that’s decreasing their carbon footprint, using more bio-based materials, or ensuring that their production is pollution free.

Regulators are pushing toward more circular products, meaning products that can be reused or that are created with a plan for how they will be recycled into something else after their first use. The EU is ahead of other regions regarding sustainability as it has introduced bans on certain substrates as well as effective recycling and reuse targets for others. For example, in November 2022, regulation was proposed in the EU to achieve climate neutrality by 2050 and to ensure that all packaging in EU markets is graded on recyclability, with greater than 70% of packaging assessed recyclable by 2030.

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In 2023, researchers found that there are more than 170 trillion pieces of plastic in the oceans, or more than 21,000 plastic pieces for each of the 8 billion residents of Earth.

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Consumers are also increasingly demanding sustainable products as greater media and non-governmental organization scrutiny is raising general awareness regarding the environmental impact of plastic packaging. In 2023, researchers found that there are more than 170 trillion pieces of plastic in the oceans, or more than 21,000 plastic pieces for each of the 8 billion residents of Earth.

While consumers are increasingly concerned, at the same time, many customers have limited willingness to pay and a poor understanding of the real environmental performance of products. For example, according to a 2022 Bain survey of nearly 4,000 US consumers, 70% of consumers believe single-use glass has a lower carbon footprint than single-use plastic, while only 12% guessed it was plastic—the correct answer.

Retailers are responding. Most consumer product companies have publicly announced sustainability commitments, though brand owners still do not have a clear view on which substrates they prefer across different applications. Many companies have focused on replacing virgin plastics and increasing recyclability and reusability for plastics in compliance with the Ellen MacArthur Foundation Global Commitment 2022 initiative. Some targets cover all packaging substrates, such as Nestlé, which aims to make 100% of its packaging recyclable or reusable by 2025. Other companies are making clear commitments about eliminating one type of substrate, typically plastics. Apple, for instance, is planning to eliminate all plastic packaging by 2025.

To meet the varied demands of their multiple stakeholders, leading companies are setting the foundation for their sustainability strategy by first analyzing the key environmental properties for each of their products throughout their life cycle, from production to transport to end-of-life disposal (see *Figure 2*).

Paper and packaging executives are asking themselves the following questions: Who are the customers and end consumers for each product in our portfolio? How will the product be used? How will it be disposed of? Which role do we play in our customers' value chain? Certain substrates may score very well on one dimension but badly on another, so which dimension is more important to us?

**Figure 2:** Substrates have different characteristics that need to be factored in when assessing the environmental properties of a specific application

	Rigid plastics	Flexible plastics	Rigid paper	Flexible paper	Metal	Glass
<b>Environmental properties</b>						
Carbon emissions (production)	■	■■■	■■	■■	■	■■
CO <sub>2</sub> e (in grams per unit, virgin production)	30–40	15–25	25–35	10–20	100–200	220–230
Carbon emissions (transport)	■	■■	■■	■■	■	■■
Circularity (recyclability, recycling rate, recycled content)	■	■■	■■	■■	■■	■■
Bio-based material	■	■	■■	■■	■■	■■
Compostability/biodegradability	■	■■	■■	■■	■■	■■
Lowest performance	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■
Best performance	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■

Sources: Smithers; Wrap (2010); Bain analysis

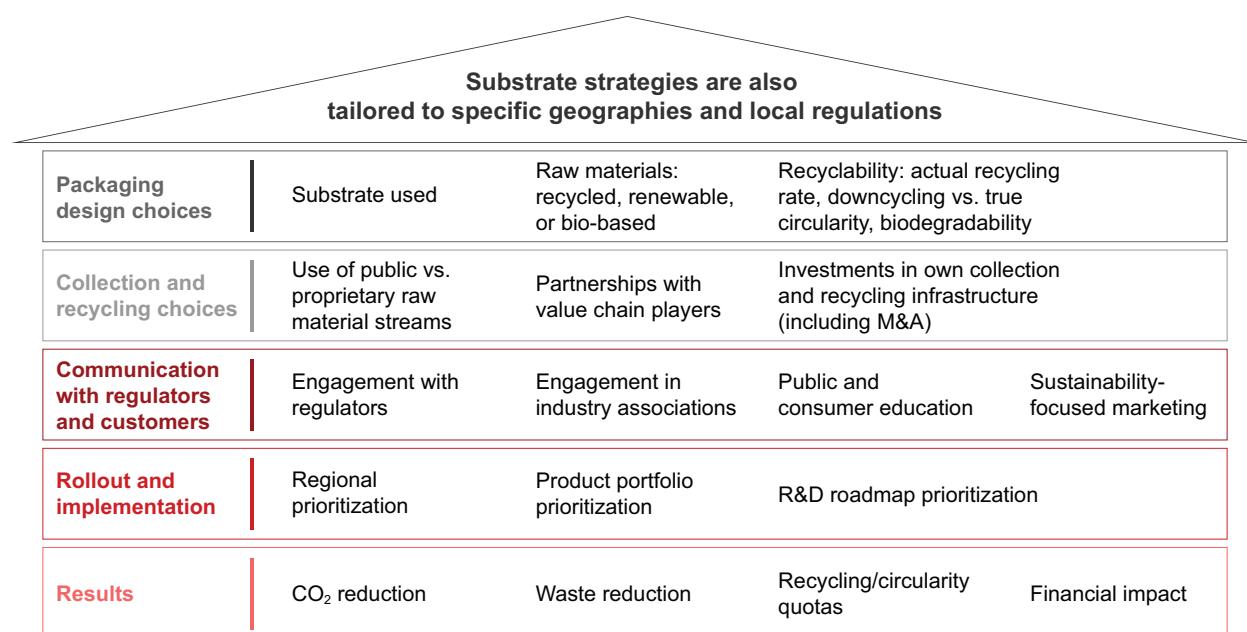
With answers to these questions, it becomes possible to identify the key environmental criteria of your customers, such as is it more urgent to act on carbon emissions or recyclability or recycled content? Retailers are increasingly stating targets for specific packaging substrates in their sustainability guidelines. For example, Walmart classifies the recyclability of different packaging substrates and formats in its internal guidelines, expecting its suppliers to change unrecyclable packaging to more recyclable versions. Unrecyclable packaging as defined by Walmart includes bags made from multiple materials, polystyrene/polyvinyl chloride bottles, or paper-based containers with metal tops or bottoms.

After identifying the key environmental criteria for customers, leaders can prioritize segments where they have the highest external pressure to act. For example, one of the larger paper manufacturers has identified substituting paper for plastic as a key priority for its end customers, so the company has started creating new products that help its customers transition to paper-based packaging.

## How to incorporate substrate substitution into your sustainability strategy

With the key environmental criteria established, and the priority segments selected, companies can design their sustainability strategy, which typically includes developing clear sustainability and substrate ambitions, starting with packaging design, considering collection and recycling, and communicating with regulators and customers (see *Figure 3*).

**Figure 3:** Consider end-to-end choices from raw materials that go into packaging design to tracking final results



**Develop clear sustainability and substrate ambitions.** Adopt an end-to-end, upstream-downstream perspective. This perspective considers every step—from where to source sustainable raw materials to how to meet market and regulatory demands as well as factoring in what customers want. Your goals should differ per region given regulations and your customers' sustainability focus in that geography. As a result, what you optimize for will vary based on region.

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An end-to-end, upstream-downstream perspective considers every step—from where to source sustainable raw materials to how to meet market and regulatory demands as well as factoring in what customers want.

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**Start with packaging design.** Leading companies design their packaging with expected substitution pressures in mind. They constantly seek to improve their own product to meet external requirements by optimizing the total environmental impact and incorporating a higher input of recycled materials.

Frozen food company Frosta, for example, introduced an innovative new packaging format made of 100% compostable paper instead of plastic. At the same time, some companies are experimenting with up to 100% plant-based plastic bottles. Finnish company Sulapac makes a biodegradable, moldable alternative to plastic that can be used for a variety of items, including cosmetics containers (such as perfume jars) and drinking straws.

Collaborating with other players in the value chain can optimize solutions. For example, a packaging converter could partner with a carton producer to create packaging with higher recycled fiber input, better recyclability, and lower environmental impact.

**Consider collection and recycling.** Up until recently, recycling has often been managed by governments or specialized organizations. Companies are increasingly recognizing that without proper recycling solutions, many substrates fall behind in the ranking of sustainability.

CPGs and retailers can leverage recycling to secure valuable raw materials, such as recycled PET (polyethylene terephthalate), especially as post-consumer recycled raw materials have recently become dear. For example, Schwarz Gruppe (the parent company of Lidl and one of Europe's largest retailers) founded PreZero in 2018 to enter the waste management and recycling business, providing access to in-demand recycled substrates.

In June 2023, a new recycling line for post-consumer beverage cartons, backed by Tetra Pak and Stora Enso, started operations in Poland. Set to serve as one of Europe's main recycling hubs, this line will triple the country's recycling capacity—and it has the potential to recycle the entire volume of beverage cartons sold in Poland, with additional volumes coming from neighboring countries such as Hungary, Slovakia, and the Czech Republic.

The facility is solely meant to handle beverage carton material separation, with the recycled fibers being used for new paper-based packaging materials. This will be complemented by other solutions to recycle polymers and aluminum into other end applications such as pellets and crates.

**Communicate with regulators and customers.** Engage with regulators and industry associations to understand which regulation is likely to influence your business going forward, how you can react early on to optimize your position, and how you can influence upcoming regulation.

**Communicate your selling points to the consumer.** While producers and converters typically have limited direct touchpoints with consumers, it's the consumer who in the end makes the purchasing decisions. Since consumers are not always great at making sustainability decisions, actively educate them and communicate the benefits you and your substrate offer to enable them to make informed decisions.

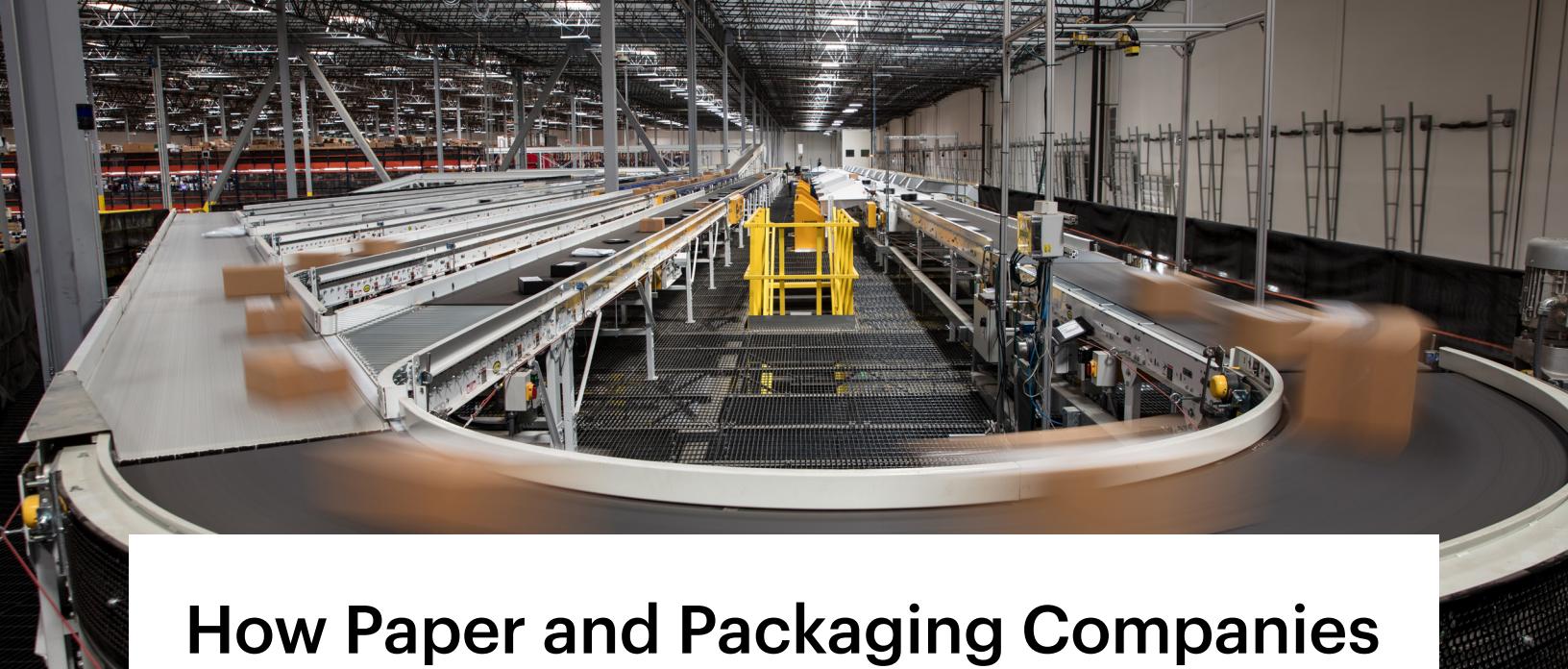
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Every company is upping their sustainability game, so whether a CEO decides to lead and take market share or follow, they will be scrutinized, and their work in this area cannot just be marketing or greenwashing.

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After rolling out and implementing one's substrate substitution plan, it is equally important to track and share results and adjust the plan accordingly. Every company is upping their sustainability game, so whether a CEO decides to lead and take market share or follow, they will be scrutinized, and their work in this area cannot just be marketing or greenwashing. For those investing in this area, extra due diligence is required as every substrate will claim to be the most sustainable. To determine the best bet, investors will need to dig deeper and determine which substrate is winning for each specific application and geography (where specific regulations play a large role).

Winning companies are approaching their substrate strategy from an end-to-end perspective, from considering the raw materials that go into the packaging design all the way to the end-of-life disposal of their substrate. This end-to-end strategy is also configured based on each one's geographic location and its associated regulations.



# How Paper and Packaging Companies Can Catch Up in Commercial Excellence

Target new growth opportunities and optimize price to turbocharge performance.

By Anders Bäck, Manuel de Soto, Pol Tarragó, and Stephanie Yee

## At a Glance

- ▶ Paper and packaging companies lag behind other industrial goods and services companies in terms of their commercial excellence.
- ▶ Commercial excellence includes the design and delivery of commercial best practices that maximize profitable revenue.
- ▶ Paper and packaging companies that prioritize commercial excellence can increase their EBITDA by 25% to 40%.

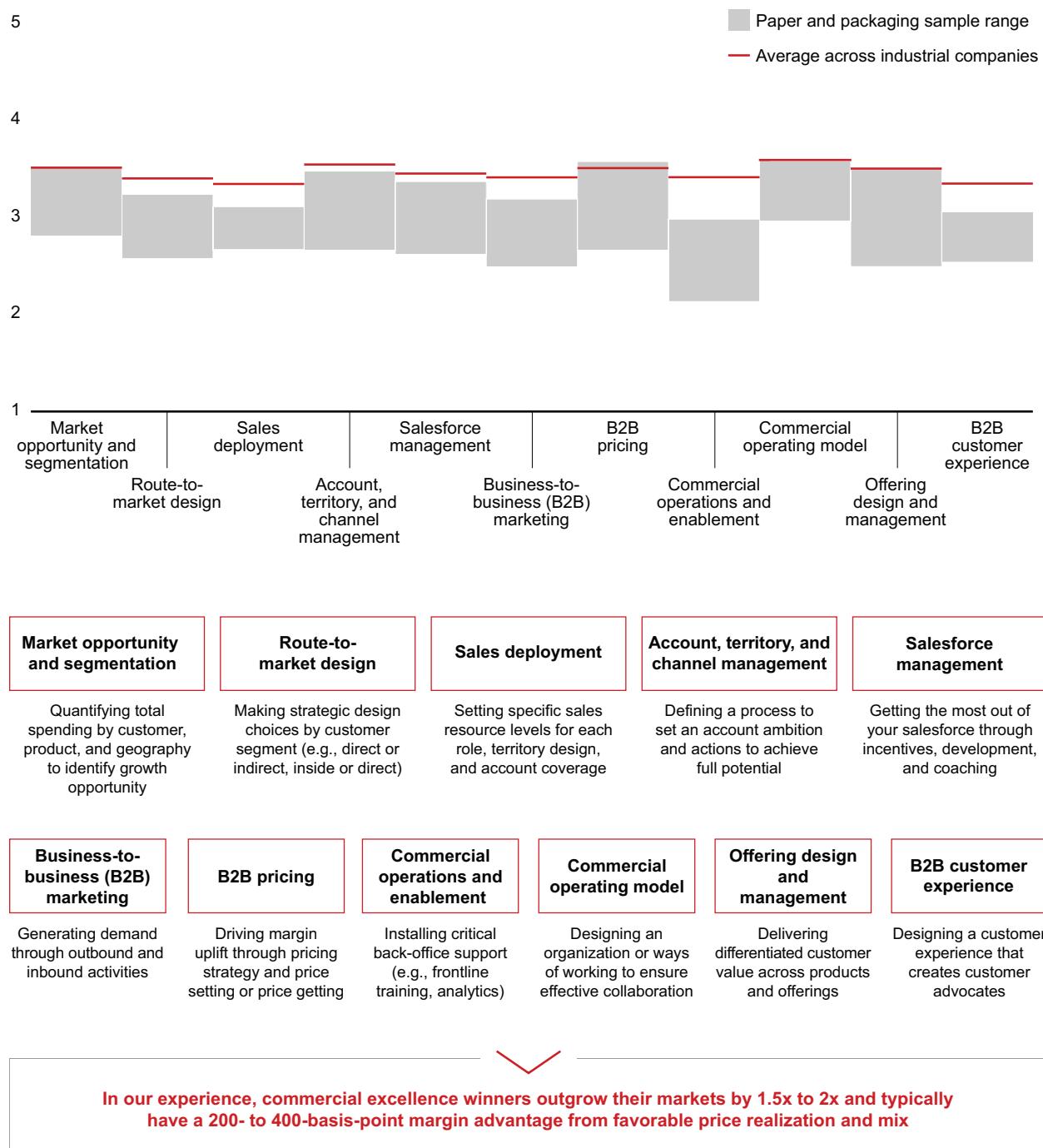
Paper and packaging companies consistently show worse performance in one critical dimension vs. comparable industrial goods and services companies: commercial excellence. By commercial excellence, we mean the design and delivery of commercial best practices that maximize profitable revenue. These could include programs to consistently improve salesforce effectiveness, the view into market opportunity and customer segmentation, route-to-market design, customer experience, commercial operations and enablement, and pricing (see *Figure 1*).

While historically many companies have focused on optimizing their production costs because of capacity constraints, leading companies now realize that deploying a tailored set of business-to-business commercial excellence best practices can present an opportunity to grow and gain a competitive edge.

**Figure 1:** Paper and packaging performs below the industry average on most commercial excellence elements

#### Bain Commercial Excellence X-Ray, average score by capability

(Scale: 1=significant gap to best practice levels; 5=operating at best practice levels)



Note: Benchmark consists of industry peer group of industrial goods and services companies  
Source: Bain Commercial Excellence X-Ray survey (results of select paper and packaging companies)

In fact, companies that prioritize commercial excellence can increase their EBITDA by 25% to 40%.

Achieving commercial excellence starts with understanding profitability with customers and products as well as where there is opportunity to grow. After gaining greater transparency on growth opportunities, forward-thinking companies have zoned in on optimizing price and discount levels, enabled by sales and operations processes. There are many elements of commercial excellence, but top firms have found that tackling these first has had the greatest impact.

## Questions leading paper and packaging companies are asking

**Do we have a robust view of customer, product, geography, and channel profitability?** Many paper and packaging companies currently lack a robust view of profitability. Sales teams know directionally which business segments are attractive, but they do not have a clear understanding of true net margins on a granular level. These margins are often obscured by complexity or lack of data.

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Transparency creates clarity into where value is created or destroyed in a company and enables a company to answer key questions such as which customers should I prioritize, which products are most profitable, and which should I deprioritize?

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Transparency by itself, however, does not solve everything. Instead, it brings clarity into where value is created or destroyed in a company and enables a company to answer key questions such as which customers should I prioritize, which products are most profitable, and which should I deprioritize?

For example, Bain worked with a leading European paper and packaging company to help it understand true profitability on a product and customer basis to inform the future portfolio it wanted to have. To do so, the company created a list of low-performing stock-keeping units in its portfolio that it deprioritized in sales and operations.

This not only created insights to support long-term portfolio strategy but also drove a list of quick wins for the organization, which included creating a list of unprofitable customers and corresponding pricing actions to take with sales teams.

**Where is the market opportunity, and how do I win?** Many paper and packaging companies do not understand how much share of wallet or business they could capture with existing customers, and they don't have a comprehensive list of new customers to go after.

Successful companies start with a granular view of customer potential and prospects by focusing on geographic regions so that the salesforce has a list of very specific growth opportunities to go after. Once the company has a clear view into growth opportunities, it can determine if it has the right value proposition to win.

When a plastic packaging company, for instance, aspired to accelerate profitable organic growth, it found that with its top 20 customers, the company had a low share of wallet and a low Net Promoter Score<sup>SM</sup>, which measures the likelihood that a customer would recommend that company to a friend or colleague.

The customers' feedback provided clear instructions on what the company needed to do to grow with existing customers. Specifically, customers wanted better service, such as better availability of popular products and shorter lead times, as well as competitive prices for high-quality products.

Based on this input, the company created action plans for each of its top 20 customers: The company identified specific volumes to pursue at the right price, articulated the value proposition more clearly (including its unique approach to service and quality), and defined specific action steps with clear owners to win new volumes.

**Do we actively manage price and discount levels?** The legacy model of a stable price list that changes once per year with discounts based on outdated data and assumptions no longer works. In the current volatile environment, with supply chain disruptions, drastic changes in input and labor costs, and other destabilizing macro factors (market and economic), companies need to invest in pricing agility so that, for instance, prices can be adjusted if input costs change.

In addition, companies often experience price and revenue leakage from overly discounting or not getting value on the services they are providing, such as not charging for rush delivery. Finally, discount levels also often vary widely across customers and are typically based on a perpetuation of historic discounts rather than strategic decisions by the company that generate returns on investment.

Winning companies manage pricing proactively, adjusting it regularly and setting prices based on the value to the customer and their willingness to pay. Price floors need to be set to cover the cost. Price ceilings should be set based on what clients are willing to pay for the products.

Top teams are starting to establish dedicated pricing teams that build and execute on key pricing capabilities to ensure that they are accurately setting prices at a regular cadence to match changing market dynamics. They also improve price realization through a disciplined approach to discount management, ensuring that they have the right people, processes, and tools in place to do this well.

Digital pricing tools, for example, can provide sales with pricing guidance. This guidance can identify target margins for sales reps to hit and define a price floor below which no sales should be made. Plotting customers by realized price and size can help identify where a company may be discounting too heavily.

To tackle underperforming customers, developing a targeted approach based on customer size and profitability is key. This approach could include increasing prices, decreasing the cost to serve, or changing the product mix—all of which aim to increase profitability.

**Do we have a robust sales and operations planning process?** As a final step, after identifying their most profitable customers and products, leading companies ensure that their sales and operations planning (S&OP) process prioritizes selling and producing those products for those customers, and they allot their capacity accordingly.

An efficient and robust S&OP process will not only save costs on logistics and improve operational efficiency through production cycle optimization and capacity balance, but it also will help manage working capital through optimized inventory levels and lead to higher customer profitability through an optimized customer mix.

At a minimum, companies need good data quality; standard S&OP reporting, including stock levels, sales, and production volumes; clearly highlighted shortfalls; and regularly scheduled and structured S&OP meetings.

Those companies that differentiate themselves often leverage additional tools. For example, a large paper and packaging company used its recently introduced pricing tools to generate insights for its S&OP discussions, calculating whether increased price levels in currently unserved markets would enable profitably selling spot quantities to these markets, forecasting expected future price levels given expected raw materials price changes, or helping to fill unsold machine capacity at a positive gross margin during times of reduced demand.

Commercial excellence and pricing provide a huge opportunity to companies to increase their EBITDA. Gaining visibility into true profitability and market opportunity is key to deploying commercial muscle toward segments and customers with the most attractive growth. Finally, tools that allow for agile pricing and a robust S&OP process are critical for capturing value.

The roadmap alone, however, is not enough. Developing a culture of commercial excellence that fosters the right set of behaviors through coaching and supported by tools and processes will help embed the gains for the long run.



# Putting Sustainability to Work in Paper and Packaging

Reduce energy costs and spur organic growth.

By Mattia Bernardi, Jenny Davis-Peccoud, Torsten Lichtenau, and Oliver Straehle

## At a Glance

- ▶ The World Bank predicts that, without drastic actions, global waste will increase by 70% through 2050.
- ▶ A sound sustainability strategy can reduce material use and energy costs and spur organic growth.
- ▶ Sustainability can contribute 4 to 6 percentage points to EBITDA through cost savings and revenue growth.

The pressure on paper and packaging executives to become more environmentally friendly has never been higher. The industry generates a significant amount of carbon emissions because producing paper and packaging is energy intensive and requires high amounts of raw materials and water. At the same time, paper is a core input for a huge range of products, packaging protects goods during transport and sale, and it increases the shelf life of perishable products.

While, historically, executives have viewed sustainability initiatives as an extra expense to shoulder, leading companies realize that a decarbonization and sustainability agenda can, in fact, create economic value. Specifically, a sound sustainability strategy can reduce energy costs and increase access to recycled or renewable raw materials at a competitive cost. It can also help spur organic growth and price realization, not to mention the fact that many leaders and employees think that it's simply the right thing to do.

In sum, leading companies realize that this pressure to address emissions, raw materials, biodiversity, and waste impacts also presents an opportunity. Sustainability has already become a license to operate and critical to create value along several dimensions. Successful companies follow a clear playbook that includes setting a sustainability ambition, creating value through cost savings and commercial growth, and embedding sustainability in the organization for continuous improvement.

## **Under scrutiny for sustainability**

The paper and packaging industry is broadly exposed to sustainability issues for several reasons. Producing paper, glass, and metal uses a very large amount of energy. In addition, the production of many substrates, such as plastic and aluminum, generates large amounts of greenhouse gases and some toxic emissions. Finally, much of the plastic, metal, glass, and paper packaging that gets created and sold to retailers ultimately ends up as litter from consumers on land and in the sea.

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The Organisation for Economic Co-operation and Development estimates that around 80 million tons of plastic waste are mismanaged per year.

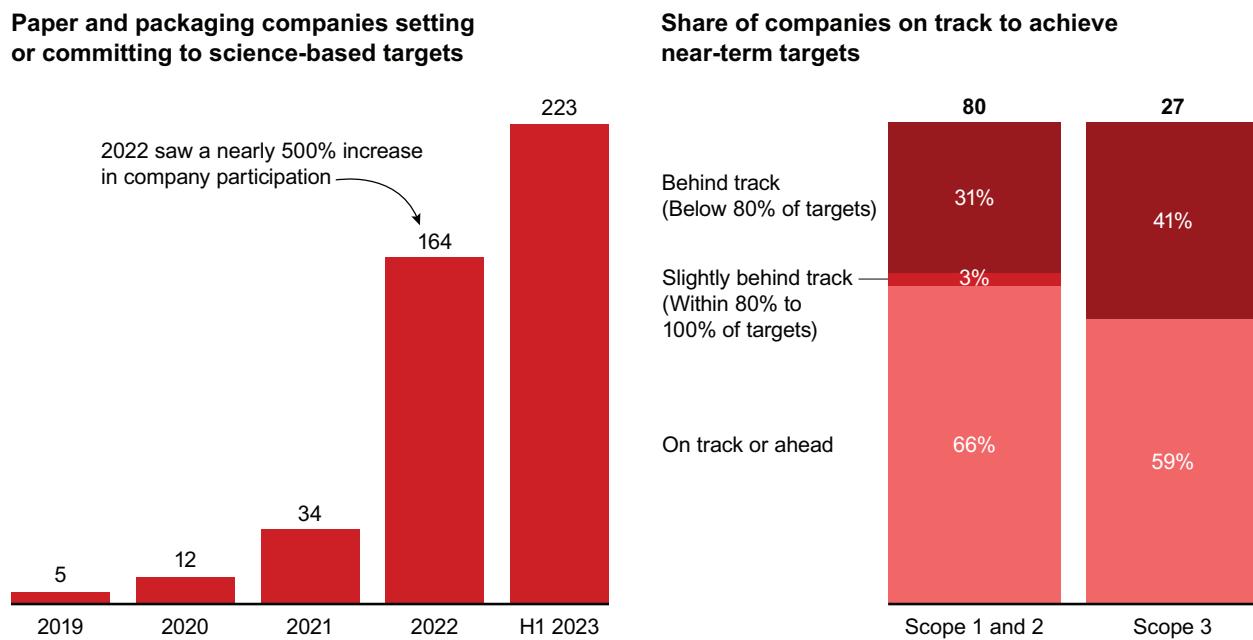
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Packaging converters are typically less energy intensive but nonetheless produce waste that can ultimately be mismanaged. Plastic waste is continuously increasing and ending up in the environment. In fact, the Organisation for Economic Co-operation and Development estimates that around 80 million tons of plastic waste are mismanaged per year.

Paper and packaging companies have started to address sustainability, but most can do much more. While the number of companies in the industry that have verified or committed to science-based targets has rapidly increased from 5 companies in 2019 to 164 in 2022, more than 30% of those companies have missed their near-term Scope 1 and Scope 2 targets—and even more are missing their Scope 3 targets (see *Figure 1*).

## **Pressure from all sides**

In light of overflowing landfills and oceans littered with plastic waste, companies are under growing scrutiny by consumers to develop more sustainable packaging solutions. Without taking drastic actions, the World Bank predicts that global waste will increase by 70% through 2050. In Europe, 71% of consumers claim they want to buy sustainable products. In the US, 71% of consumers claim they want to buy products with as little packaging as possible.

**Figure 1:** Paper and packaging companies' sustainability targets and early results

Note: Share of companies on track to achieve near-term targets data includes only absolute targets and targets expiring in 2030 or before  
 Sources: SBTi; CDP

Both consumer packaged goods companies (CPGs) and retailers are pushing the paper and packaging industry to innovate and create sustainable solutions and decarbonize. Upstream Scope 3 emissions typically account for a large share of CPGs' carbon footprint, with packaging a significant contributor.

Regulation to reduce total packaging volume and improve recycling is also increasing across the world, notably, with push in the EU. For example, the current proposal under review of the EU Packaging and Packaging Waste Regulation requires 20% of take-away beverage containers to be reusable packaging by 2030 and 80% by 2040. It also sets targets for recycled content and bans certain single-use plastics—and these are in addition to existing national regulations.

In the US, certain state laws are setting the pace, such as California's SB 54: Plastic Pollution Prevention and Packaging Producer Responsibility Act, which requires a 25% reduction in the use of single-use plastics and that all single-use plastic packaging be recyclable or compostable by 2032. The multitude of local, state, country, and regional laws can make it difficult for global companies to navigate the full set of rules. In addition, the number of regulations keeps increasing, and how regulation will ultimately play out across different substrates remains largely unknown.

The Paris Agreement and corresponding laws and regulations regarding emissions also impact the industry. Large pulp and paper mills are obliged to participate in the EU's Emissions Trading System, and rising carbon prices will incentivize producers to reduce their emissions. Further carbon taxes and more stringent regulations are expected globally.

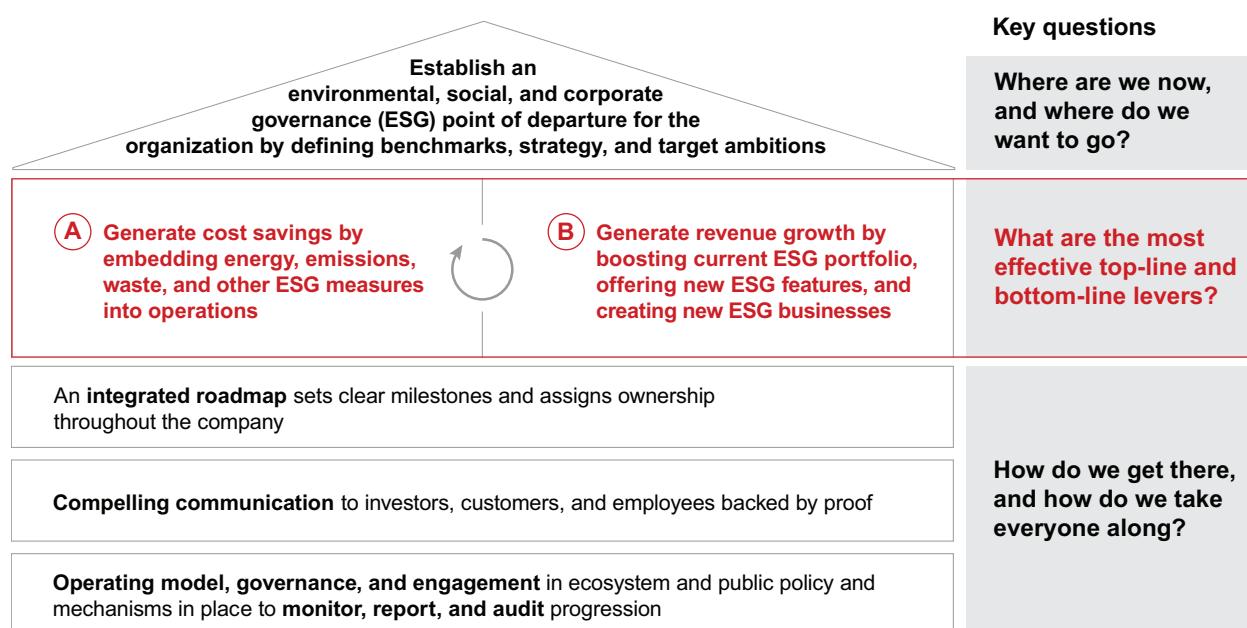
## The sustainability playbook

After a thorough environmental evaluation, many companies realize that sustainability can be both a method for them to create value as well as a way for them to distinguish themselves from industry competitors (see *Figure 2*).

**Set the ambition.** As a first step, leading companies set an ambition that requires a deep understanding of their company's current sustainability performance vs. the competition based on benchmarking. They also consider current and expected regulations and infrastructure, such as the availability of environmentally friendly raw materials, clean energy, and recycling services.

For example, one packaging company Bain worked with set the plan to reduce its Scope 1 and 2 emissions by more than 1 million tons by 2030, surpassing its own 1.5°C science-based targets by a significant margin. After articulating this ambition, the company identified a long list of potential decarbonization levers and quantified the carbon savings potential and cost for each lever.

**Figure 2:** A holistic approach to sustainability can create cost savings and revenue growth



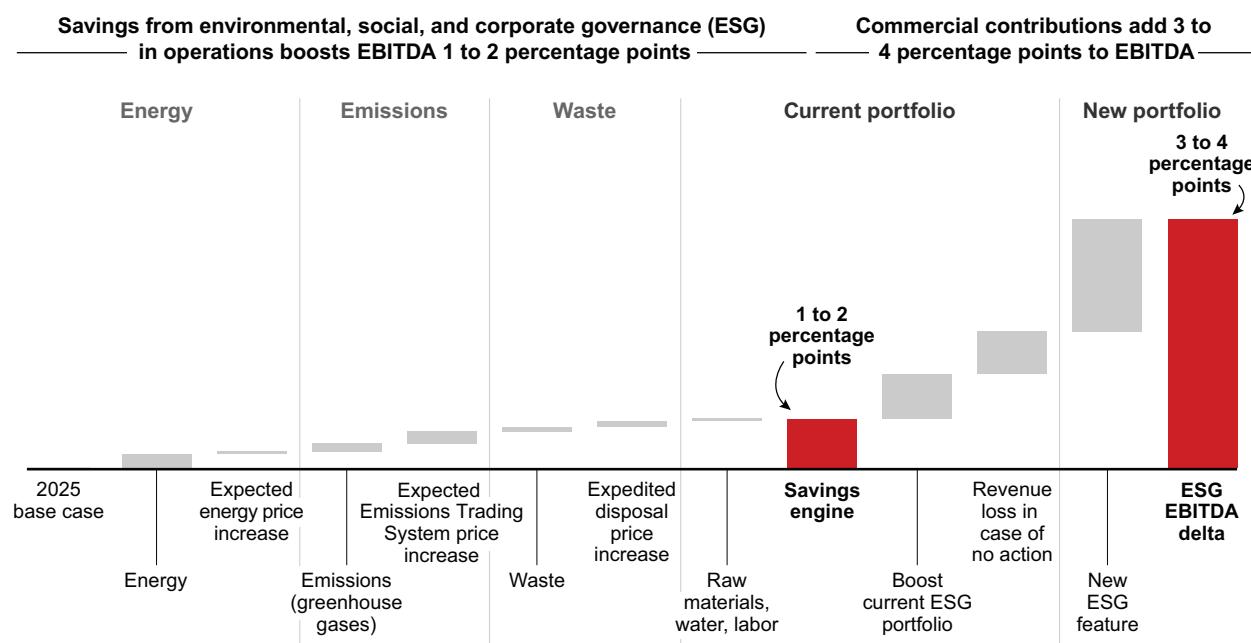
**Create value through cost savings and revenue growth.** There are generally two ways to create value through sustainability. They include cost savings and commercial or top-line growth. Leading paper and packaging companies are able to achieve a 4- to 6-percentage-point EBITDA increase through their effective use of cost savings and commercial levers (see *Figure 3*).

- **Cost savings:** One paper company tackling cost savings started with short-term moves that included changing its heat source from coal to gas, optimizing steam consumption, and energy recovery. The company also adjusted its recipe and process, reducing the functional surface of its paper, and screened pulp more efficiently.

Then, the company moved to mid-term projects that required longer lead times and larger investments. The company also investigated biomass investments and black liquor gasification to provide some of the electricity and steam needs of pulp plants.

Finally, the company tackled long-term projects, which typically require either substantial organizational adjustments, high investments, or technological developments. These projects could include electrifying machines, switching from natural gas to hydrogen, or carbon capture and storage.

**Figure 3:** Sustainability can contribute 4 to 6 percentage points to EBITDA



Note: Based on Bain client experience  
Source: Bain & Company

Through a reduction of energy, emissions, waste, raw materials, and water usage, the client was able to achieve a 1- to 2-percentage-point EBITDA improvement. With higher energy prices and the rising cost of emissions certificates, savings are expected to increase even more.

Many players will start long-term projects with pilots to test new technologies or strategies on a small scale. For example, Smurfit Kappa is the first paper and packaging company to test a hydrogen fuel-powered mill. The pilot mill is in France and is funded by European sustainability incentives. UPM, by contrast, is the first player to launch a conversion of its gas boiler to electricity in an effort to move toward zero emissions. Companies such as these put pilots on their sustainability roadmaps and scale once they have achieved success.

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There are countless options for providing more sustainable products to customers—such as developing low-carbon, fully recyclable, compostable, or biodegradable solutions; using recycled or upcycled inputs; or marketing environmentally friendly production, such as “chlorine-free” or “made with renewable energy.”

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- **Commercial or top-line growth:** Another way companies create value is by offering packaging solutions that help customers achieve their sustainability targets. There are countless options for providing more sustainable products to customers—such as developing low-carbon, fully recyclable, compostable, or biodegradable solutions; using recycled or upcycled inputs; or marketing environmentally friendly production, such as “chlorine-free” or “made with renewable energy.”

To create top-line growth, one paper and packaging company started by scouting key environmental, social, and corporate governance (ESG) trends within its end markets. Plastic-to-paper substitution and low-carbon packaging were deemed as most relevant. The company then reviewed its existing product portfolio and identified which products could help customers in these areas. The company next collected products, such as plastic-free shopping bags for luxury brands and thermoformed cellulose packaging, into a new catalog, developed marketing tools and trainings to support the sales network, and approached their customers with tailored solutions.

To develop long-term product options, the company set up a new innovation process to prioritize ESG initiatives, partnered with experts and universities, and developed prototypes of innovative low-carbon products such as paper-based single-serve portion packs for liquid products.

These initiatives helped the company grow revenue by boosting its current portfolio and developing new products, and they helped it avoid revenue loss from inaction. In total, these initiatives led to a 3- to 4-percentage-point EBITDA increase.

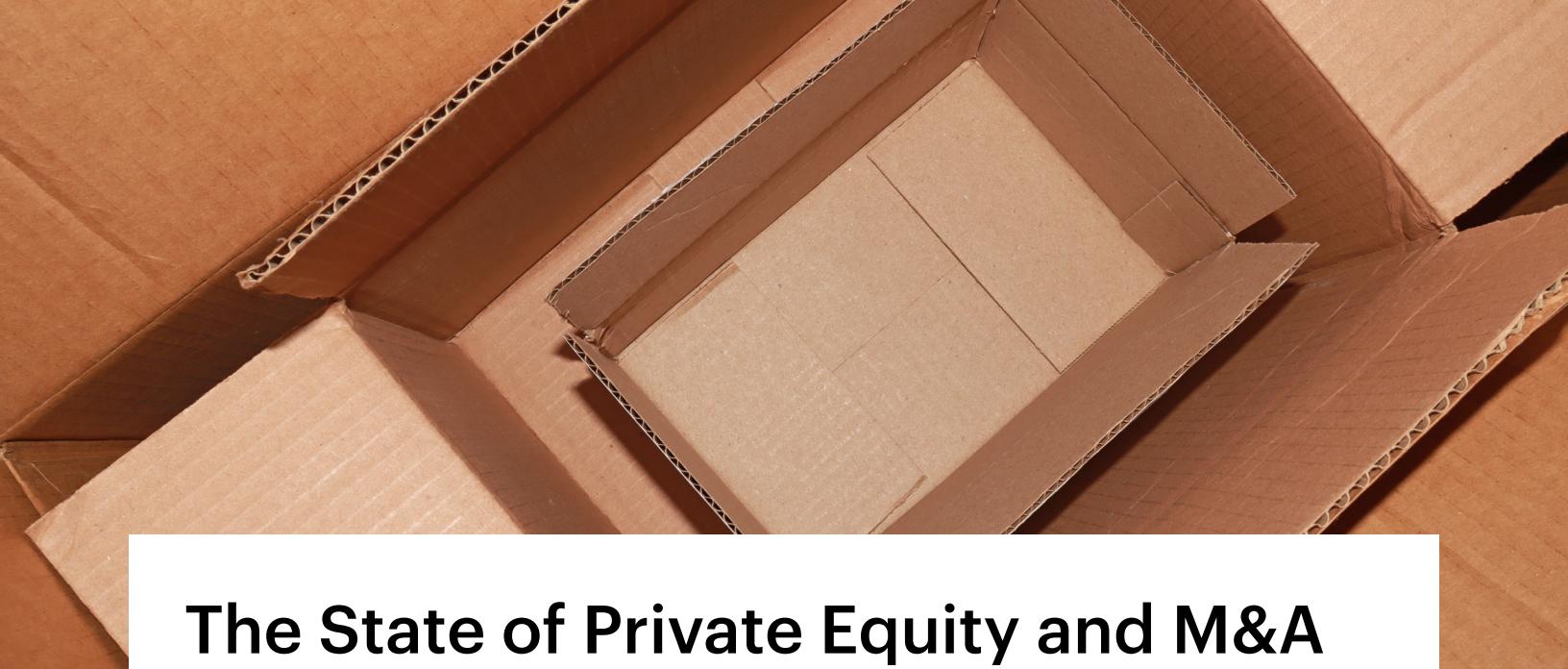
Sometimes companies will launch entirely new businesses to create value. Papermaker UPM has started to leverage the large amount of biomass in its value chain for different applications beyond using pulp for paper production. Specifically, it has invested in a biorefinery in Leuna, Germany, that transforms biomass such as solid wood into a range of biochemicals. Once operational by the end of 2023, the refinery will be able to produce 220,000 tons of sugars, lignin, and residue streams for bioenergy and biofuels that can be used instead of fossil fuels by UPM and others. Molecular bioproducts are one of UPM's three strategic areas for growth going forward.

## **Embed sustainability**

As a final step, leading companies embed sustainability value creation in the organization to make sure achieved improvements stick and the organization develops continuous improvement from within. To do so, they set up the right structure and governance to deliver on the ambition and link strategy to clear roles and responsibilities. They also integrate sustainability in business processes, decision mechanisms, and tools across functions and processes.

Paper and packaging company Ahlstrom, for instance, has embedded sustainability in its mission statement so that now it seeks to innovate products that purify and protect the environment, which has required a full redesign of the company's innovation pipeline.

Focusing on building a sustainability-oriented culture and mindset to embed change throughout the organization is key. Practically, this can mean appointing a head of sustainability on the executive team and a sustainability leader in every division. This helps everyone in the organization link short- and long-term incentive systems to sustainability targets. Finally, it is important to ensure that sustainability is led by line executives, those responsible for delivering the business performance day-to-day, so that all employees will focus on what it takes to combine sustainability outcomes with profitability and growth.



# The State of Private Equity and M&A in the Paper and Packaging Industry

Resilient end markets and a repeatable value creation playbook fuel strong M&A activity.

By Florian Mueller, Sambit Patra, and David Waller

## At a Glance

- ▶ The paper and packaging sector has seen more than 2,000 M&A transactions since 2007.
- ▶ Revenue growth, margin expansion, and free cash flow generation will increasingly create value.
- ▶ The repeatable playbook includes a leading cost position, M&A opportunities, and a profitable portfolio mix combined with a loyal customer base.

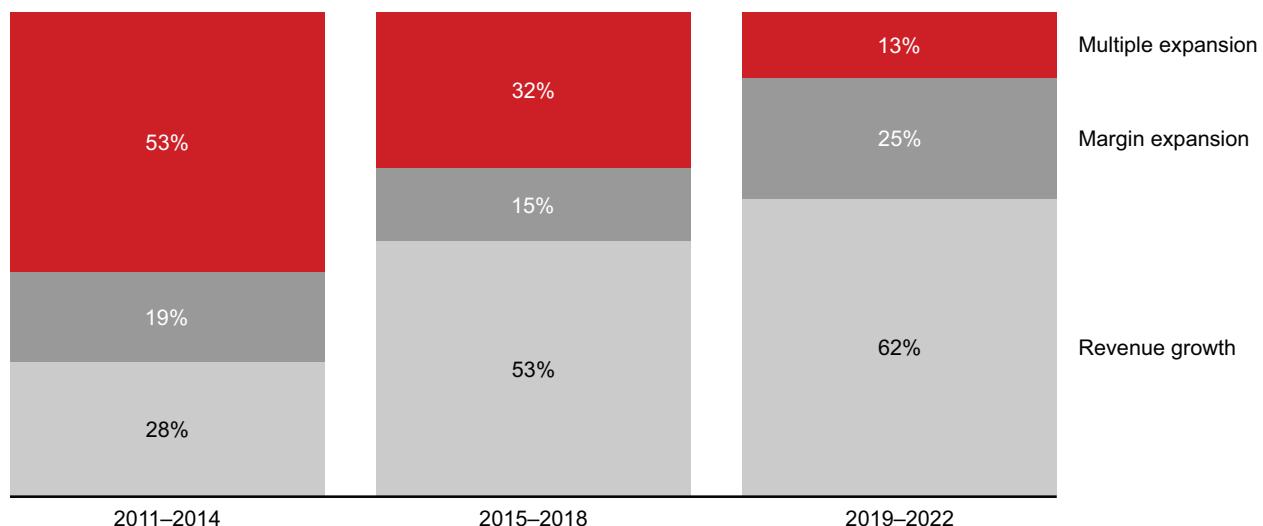
The paper and packaging sector has had two times more M&A deals relative to its size than the broader manufacturing industry over the past decade. This flurry of M&A activity comes both from strategic paper and packaging investors who are filling gaps in their portfolios as well as external private equity (PE) players that are creating standalone value with new acquisitions.

Historically, significant value created by paper and packaging industry PE investments has been through multiple expansion—that is, companies selling off companies at a much higher multiple than they purchased them—driven by an overall booming valuation market (see *Figure 1*).

We are now, however, amid a transformational shift in which multiple expansion can no longer be taken for granted. Going forward, value will increasingly be created through the fundamentals of revenue growth and especially margin expansion, as well as free cash flow generation.

**Figure 1:** The fundamentals of revenue growth and margin expansion will increasingly generate value

#### Sources of value creation in packaging deals



Notes: Median value creation index for packaging sector deals 2010–2022, including buyout and growth deals, fully and partially realized deals, all sizes, all regions; all figures calculated in USD  
Source: DealEdge

Given this trend, leading companies are using an investor lens to examine themselves from the outside both in terms of value creation but also in regard to M&A opportunities. This perspective helps companies understand potential attractiveness for full or partial take-private opportunities as well as any potential exposure to unwanted approaches. Further, taking a PE growth investor lens on their business can help companies unlock full potential regardless of any third-party investor activity.

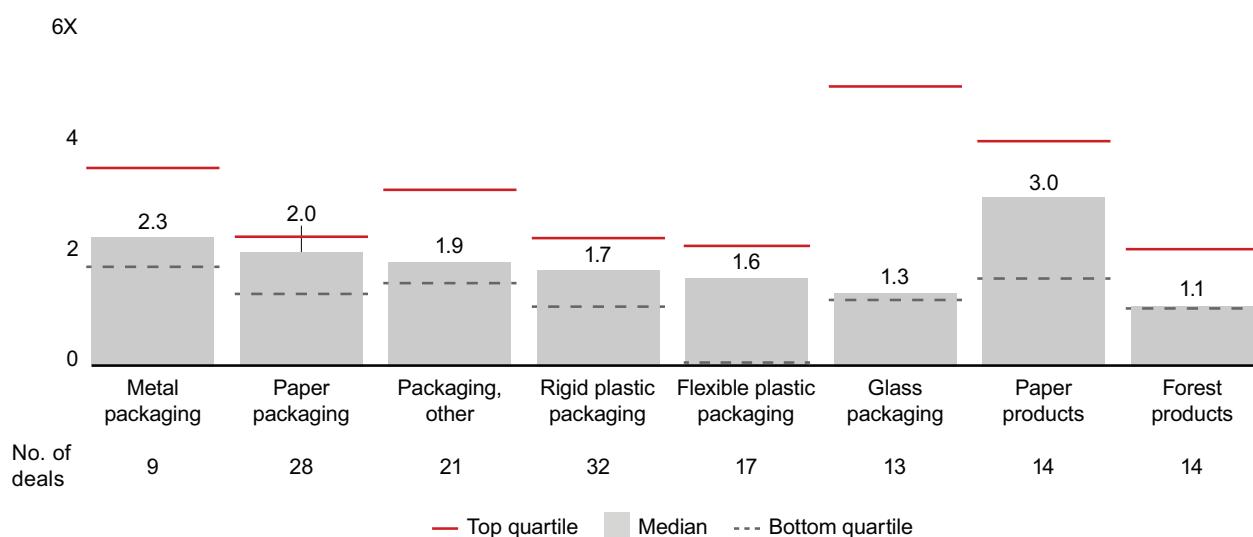
#### Resilient end markets and high M&A activity

The paper and packaging sector has seen more than 2,000 transactions since 2007. And of those, 84 were greater than \$1 billion and 11 greater than \$5 billion. The multiple on invested capital has historically been highest in the US, approximately 2.2 times that in Europe and 1.5 times that in Asia-Pacific over the past 10 years. By substrate, paper-related deals have been the most profitable vs. plastic and glass (see *Figure 2*).

The flurry of M&A activity has been enabled by important end markets such as packaged food, home care, and pharma, which have been resilient in down cycles and have even shown consistent positive growth rates through the global financial crisis of 2008–2009 and 2020’s Covid-19 pandemic-related crash. This resilience has in turn spurred more M&A activity and private equity interest. While end-

**Figure 2:** Median packaging, paper products, and forestry deal multiples on invested capital by subindustry

**Median packaging, paper products, and forestry deal multiples on invested capital by subindustry, 2010–2022 (in US dollars)**



Note: Median packaging, paper products, and forestry deal multiples on invested capital by subindustry includes fully and partially realized buyout and growth deals of all sizes and in all regions  
Source: DealEdge

market resilience will remain a key attraction to invest in packaging going forward, it also requires investors to become much more activist to create value through margin expansion and revenue growth (as multiple expansion is no longer a given).

## Margin expansion

Historically, this lever has had the least impact, but it will become increasingly more important going forward. First, a culture of continuous improvement is required to offset headwinds such as inflation, and then it is possible to expand margins. Key elements in top-line margin expansion include value-based pricing (including pass-through pricing), innovation, and optimizing the product mix. Leading companies will also achieve bottom-line excellence in areas such as procurement and operations by using the right assets for the right products and reducing the downtime of machines.

## Revenue growth

Significant value will also be created through revenue growth, especially through M&A as companies buy and build—namely, buying smaller companies, improving their performance, and gaining market share. Among the capabilities that leaders are looking to acquire are sustainability and consumer

packaged goods innovation, which would allow them to differentiate from competitors and gain share in markets that are otherwise moving slowly.

The packaging market is still very fragmented across many regions, offering plentiful M&A opportunities going forward. Small to midsized players create room to consolidate and achieve leading scale positions in major markets or attractive niches. The maturity level of the M&A market is different by substrate. Metal and glass, for instance, are reasonably consolidated, whereas plastic is midway in industry consolidation. Paper packaging, such as folding cartons, perhaps offers the biggest opportunity as it is still relatively unconsolidated.

Strategic investors inside paper and packaging are pursuing different types of M&A strategies depending on their goals. Those looking to increase revenue and market share in existing business or enter new geographies are seeking pure play scale deals.

Scope deals will also only continue to grow in importance as companies use acquisitions to enter new businesses or build up a new technology capability. Faerch acquired Paccor in 2022, for example, allowing the company to enter the dairy packaging market and leverage its joint innovation and recycling technologies for circular food packaging. Companies such as Mayr-Melnhof, a producer of carton board and folding cartons, also do scope deals to integrate down the value chain. Mayr-Melnhof acquired Essentra's packaging business in 2022 to bolster its position in resilient downstream markets such as pharma secondary packaging.

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Since many scale deals come with an element of scope, few targets are pure plays. While hybrid deals add complexity in the first instance, they also provide an opportunity to enter attractive adjacent areas.

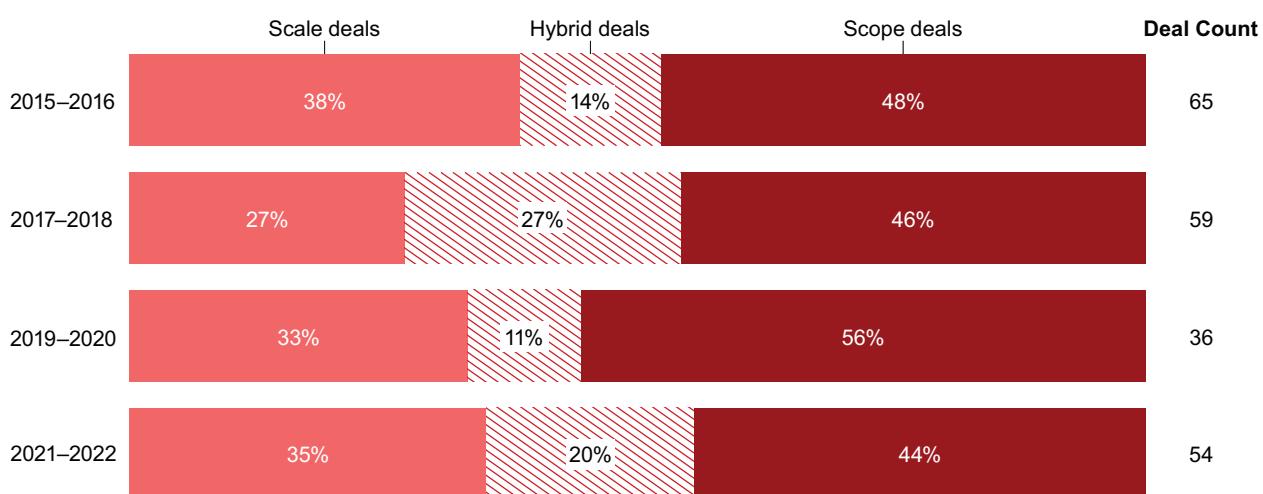
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These days hybrid deals that combine scale and scope are also gaining popularity (see *Figure 3*). Since many scale deals come with an element of scope, few targets are pure plays. While hybrid deals add complexity in the first instance, they also provide an opportunity to enter attractive adjacent areas. Graham Packaging, historically focused on beverage containers, acquired Liquid Container, which was heavily focused on food packaging, to get access to new customer relationships and technologies.

Going forward, scale deals will remain relevant because of ongoing consolidation and the opportunity to fill gaps in geographies, and scope deals will continue to be important because of adjacent opportunities, allowing companies to explore new products.

**Figure 3:** Scope deals experienced a peak before the Covid-19 pandemic; since then, scale deals (pure or hybrid) appear to be regaining share

#### Strategic deals with greater than \$100 million in deal value



Notes: Analysis includes deals from strategic investors (i.e., excluding financial investors such as private equity funds) and deals with greater than \$100 million in deal value; deals classified by rationale using a proprietary classification framework, as per stated strategic rationale at the time of deal announcement; deal value based on announcement year; scale deals include deals made to increase market share or to improve financial strength; scope deals include growth scope and capability scope deals

Sources: Dealogic; Bain analysis

## Lessons learned

Deal success depends first and foremost on the standalone attractiveness of the target, understanding what to integrate vs. leaving as is and how to create a repeatable playbook of value creation.

Three elements in this repeatable playbook that have consistently generated value for top quartile companies include the following (see *Figure 4*):

- **A leading cost position for organic share gain:** For example, global packaging and paper company Mondi has an active M&A and integration agenda. After the company made key acquisitions in Eastern Europe to expand its footprint in emerging countries, it was able to reap the operational synergies relatively quickly.
- **A profitable portfolio mix combined with a loyal customer base for organic growth:** For instance, Fedrigoni further diversifies its portfolio of luxury high-end packaging, where competition is limited and importance of the packaging quality, consistency, and availability is high to the brand and customer. Price is relatively lower in importance, and it is adding further adjacencies such as molded pulp products for luxury applications.

**Figure 4:** A successful M&A deal includes one or more of the following

- |  |  |
|--|--|
| <b>① Growth megatrend</b>              | <ul style="list-style-type: none"> <li>Sustainability and plastics substitution</li> <li>E-commerce packaging</li> </ul>   |
| <b>② Low-cost leadership</b>           | <ul style="list-style-type: none"> <li>Integrated board producers with modern assets and access to low-cost fiber</li> <li>Innovative use of low-cost recycled input materials</li> </ul>          |
| <b>③ Unique solutions/technology</b>   | <ul style="list-style-type: none"> <li>Patent-protected designs and solutions</li> <li>Digitally enabled smart packaging solutions</li> </ul>  |
| <b>④ Attractive industry structure</b> | <ul style="list-style-type: none"> <li>Consolidated segments (e.g., liquid carton, cigarette packaging, metal cans for food packaging)</li> </ul>  |
| <b>⑤ Profitable mix</b>                | <ul style="list-style-type: none"> <li>Specialty packaging (e.g., pharma, luxury)</li> </ul>   |
| <b>⑥ M&amp;A</b>                       | <ul style="list-style-type: none"> <li>Successful rollups demonstrated in many converting segments, some segments still fragmented (e.g., flexible packaging, corrugated, carton board)</li> </ul> |
| <b>⑦ Market leadership</b>             | <ul style="list-style-type: none"> <li>Building regional niche leadership (e.g., beauty packaging, food flexibles) organically or through M&amp;A</li> </ul>                                       |
| <b>⑧ Last one standing</b>             | <ul style="list-style-type: none"> <li>Invest in flat/declining markets with limited competition to strengthen own position and harvest position as peers exit</li> </ul>                          |

Source: Bain & Company

- M&A opportunities such as rollups and other capabilities in the industry:** For example, Smurfit Kappa and DS Smith both play in a very regional industry of corrugated packaging. Consequently, over the past years they have added plants to densify their networks.

Companies in the top quartile are matching their M&A value creation strategy with their talent strategy, ensuring they have the right executives pulling the appropriate levers in this playbook. These executives have already developed muscles to take down costs (beyond eliminating headcount) as well as find the right deals—whether those are market rollups by larger players or technology-led deals in environmental, social, and corporate governance to acquire new technologies or move into recycling/circularity.

Going forward, the M&A market in paper and packaging will remain attractive and active, driven in large part by resilient end markets as well as the repeatable playbook with which many companies continue to find success.



# Sustainable Packaging: What Consumers Want Next from the Paper and Packaging Industry

Balancing opportunities and trade-offs to reimagine packaging for sustainability.

By Daniela Carbinato, Magali Deryckere, and Yoni Shiran

## At a Glance

- ▶ Fast-moving consumer goods companies have transformed packaging to achieve circularity targets and reduce greenhouse gas (GHG) emissions.
- ▶ Leading consumer goods companies focus on best practices, legislation, infrastructure, consumers and retailers, and technology.
- ▶ This approach helped one global beauty company pinpoint ways to use 20% less packaging and consequently reduce GHG emissions by more than 40% by 2030.

*This chapter expands upon the existing Bain Brief “A Roadmap for Sustainable Packaging in Consumer Goods” (published September 2022).*

The environmental challenge of packaging waste has exploded, with governments, regulators, consumers, shareholders, employees, and society at large putting immense pressure on brands to address the unintended consequences of their current linear packaging system. Going forward, we expect to see a further acceleration of pressure on packaged goods companies. In parallel, reuse and

refill may be legally mandated (as we are starting to see in France and other markets). Standardized packaging may also become the norm, and certain polymers, additives, and pigments may be banned.

In this context, many fast-moving consumer goods companies are reimagining packaging to achieve circularity targets while reducing greenhouse gas (GHG) emissions. But they face some big hurdles. Even when they invest in innovations for recyclable packaging, for example, companies often find themselves at the mercy of inadequate recycling and waste management systems in the markets where they make and sell goods. In addition to dealing with broad variations in infrastructure and legislation in different countries, companies must plot their packaging roadmap amid the uncertain path of technology advances in everything from materials to recycling as well as unpredictable consumer acceptance of different solutions, especially new business models. And success requires thoughtful coordination and cooperation with multiple stakeholders across the system, including suppliers, retailers, industry groups, and governments.

With these and other obstacles in front of them, companies are stymied by how to make progress in their sustainability journeys.

But sustainability is a huge deal and only getting bigger. Today, 45% of the world's emissions come from making products and consuming them, and the top 10 sources of plastic litter by consumers are all in the consumer products industry. The stakes keep rising as consumer goods companies target growth in the developing markets that represent the lion's share of unmanaged waste. In developed markets, it is critical for consumer goods companies to use more recycled content and to adhere to their sustainability targets.

Given the critical role they can play, most large consumer goods companies have made big commitments to packaging innovation and other means of reducing emissions, falling into different categories based on their ambition (see *Figure 1*). But major sustainability transformations are difficult to achieve. According to our research, only 7% of companies succeed—half the rate of other transformations. Another disappointing finding: 80% of companies that started less than a year ago report that their sustainability programs are not on track.

Consumer goods companies that make the biggest strides toward packaging circularity will invest to understand the trajectory of five fundamentals at play:

- benchmarks and best practices;
- legislation;
- infrastructure;
- consumers and retailers; and
- technology.

**Figure 1:** When setting targets for reducing packaging waste, consumer goods companies fall into four categories

	Active	Proactive	Leading	Distinctive
Packaging waste ambition	<ul style="list-style-type: none"> <li>• Make packaging <b>100% recyclable</b></li> <li>• <b>Not an Ellen MacArthur Foundation Global Commitment signatory</b></li> </ul>	<ul style="list-style-type: none"> <li>• Make packaging <b>100% recyclable</b></li> <li>• <b>Low ambition to use recycled material</b> in packaging</li> <li>• <b>Potential Ellen MacArthur Foundation Global Commitment signatory</b></li> </ul>	<ul style="list-style-type: none"> <li>• Make packaging <b>100% recyclable</b></li> <li>• Goal to use <b>25% recycled plastic</b> in packaging</li> <li>• <b>Ellen MacArthur Foundation Global Commitment signatory</b></li> </ul>	<ul style="list-style-type: none"> <li>• Make packaging <b>100% recyclable</b></li> <li>• Goal to use <b>35% recycled plastic</b> in packaging</li> <li>• <b>Ellen MacArthur Foundation Global Commitment signatory</b></li> <li>• Have a <b>circularity target</b></li> <li>• Target on <b>downstream recycling</b></li> </ul>
Consumer packaged goods (top 35)	6	13	9	4

Packaging is responsible for up to 40% of scope 3 greenhouse gas (GHG) emissions, making it a critical lever for GHG emissions targets in the industry

Notes: Relative positioning of companies is directional; the Ellen MacArthur Foundation's Global Commitment unites organizations behind a common vision of a circular economy for plastics; "consumer packaged goods (top 35)" includes the top 10 companies in the beauty and personal care market as well as the top 25 companies in the food and beverage market; the total number of companies does not add up to 35 because 3 of the top 25 food and beverage companies have no target

Sources: Company annual reports; company sustainability reports; analyst reports; Bain analysis

We refer to them collectively as BLICT (see *Figure 2*). That analysis helps companies prioritize the appropriate levers to pull so that they can achieve their packaging circularity goals, choosing among the four R's, including reduce, reuse, replace, and recycle.

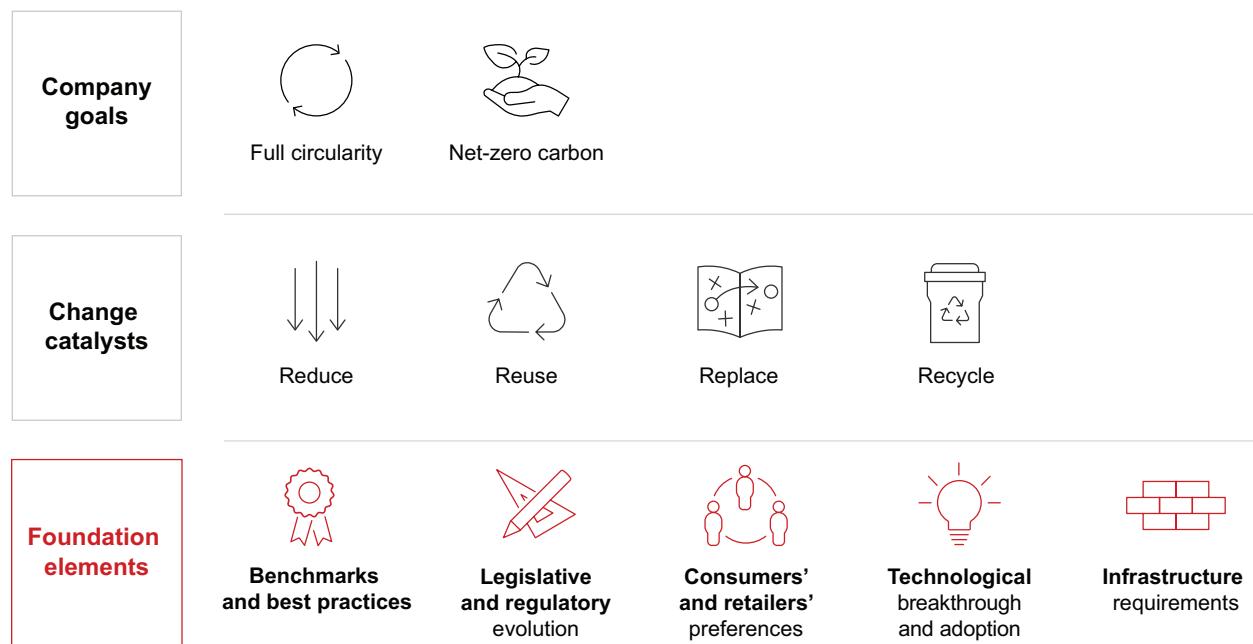
Mapping trends in the BLICT fundamentals also enables companies to clearly see the trade-offs they will need to make as well as the best way to mobilize stakeholders to deliver on the plan.

This approach set the stage for a global beauty company to establish priorities and identify what to expect from each of the four R's across all its markets. The company ultimately pinpointed ways of reducing packaging GHG emissions by more than 40% in 2030 vs. its 2020 emissions by using 20% less packaging material, delivering products in which half of the plastic ingredients are recycled, and by making 100% of all packaging ingredients either reusable, recyclable, or compostable.

Companies hoping to pursue similarly bold goals need to ask basic questions for each element of BLICT to understand their starting point as well as the potential impact on the industry.

**How do you compare vs. competitor benchmarks?** Consumer goods companies across subindustries have set ambitious packaging sustainability targets. The specific targets as well as the actions behind them, however, can differ significantly. Benchmarking vs. competitors can help companies identify

**Figure 2:** Creating sustainable packaging solutions requires building a view into the future in five key areas



Source: Bain analysis

where they outperform and where they must improve along their packaging portfolio. This could entail the types of packaging, number of packaging types, and current sustainability of packaging that they offer. The same applies to their sustainability targets. These could include specific substrate targets, such as striving to reach 100% sustainable materials (e.g., recycled or bio-based) by a certain deadline as well as establishing innovation channels through partnerships and innovative packaging materials or formats. It is similarly important to understand how and what competitors are communicating around packaging choices and targets.

**How is legislation evolving?** Waste legislation can happen in the form of bans (e.g., single-use plastics); mandatory targets (e.g., recycling rate, minimum required post-consumer recycled content); taxes and fees (e.g., extended producer responsibility, EPR, fees paid by the polluter); and standards and compliance (e.g., deposit return scheme, labeling). Although these mechanisms are similar globally, countries are in widely different stages of waste legislation evolution. In general, the EU is furthest along, with the revision of the EU Packaging and Packaging Waste Directive adding additional requirements, bans, and definitions. But a few pioneering US states are starting to implement a robust agenda, significantly increasing recycling rates through EPR mechanisms by material and select deposit return schemes, for example.

Consider the situation in three key markets for consumer goods. The UK's favorable environment and ambitious targets should help many companies achieve their goals. For example, companies can avoid the circa £210-per-ton plastic tax if their packaging has 30% or more post-consumer recycled content; it's a move that is spurring the recycled content market. On the other hand, Brazil's legislation and infrastructure challenges are likely to persist, and cross-industry mobilization may be needed to help local companies achieve circularity goals.

In the US, different conditions across different states can require the industry to take the lead in nationwide strategies. For example, California's SB 54: Plastic Pollution Prevention and Packaging Producer Responsibility Act established a broad EPR program. It requires all single-use plastic packaging and food service ware to be recyclable or compostable by 2032, a 25% reduction in plastic packaging, and a 65% recycling rate of single-use plastic, all by 2032. Given California's outsized relevance for the overall US economy and the preference of consumer packaged goods companies to sell uniform products across all states, this bill could have effects across the nation.

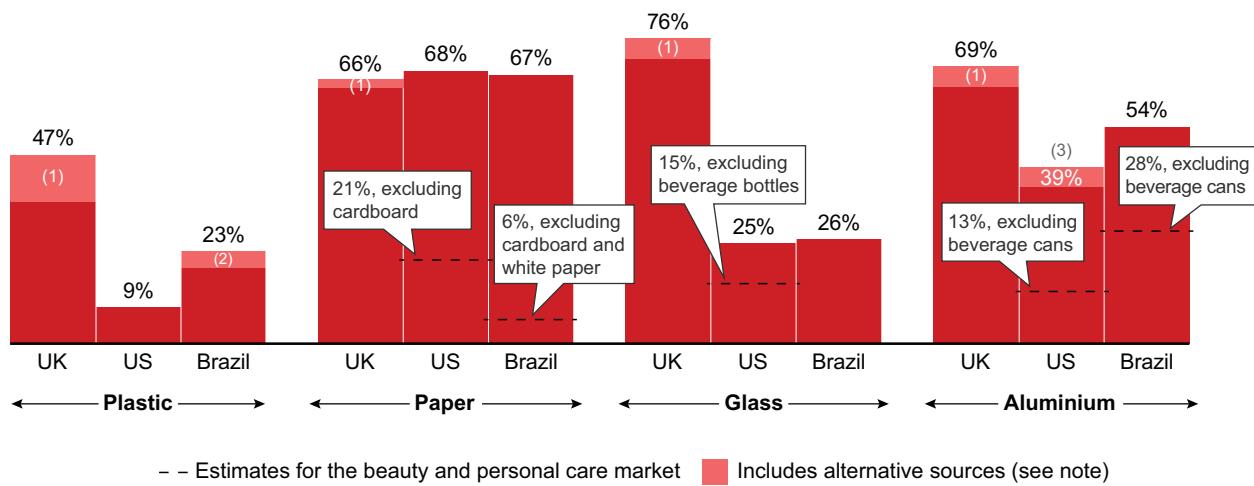
Nongovernmental regulation can also play a role. For example, the Science Based Target Initiative (SBTi) defines the 1.5°C pathway as an absolute emissions reduction target of at least 42% by 2030 vs. 2020 levels. Consumer goods companies committing to a 1.5°C target will need to achieve this ambitious path in part by limiting the carbon footprint of their packaging.

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The waste management infrastructure for packaged goods spans manufacturing, post-consumption discarding, collecting/sorting, and recycling/disposing.

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**What are the infrastructure requirements?** Having identified the legislative environment in their major markets, companies need to look at infrastructure. The waste management infrastructure for packaged goods spans manufacturing, post-consumption discarding, collecting/sorting, and recycling/disposing. Infrastructure, as well as recycling rates, varies by material and by country (see *Figure 3*). For example, the UK and EU have achieved high rates of formal collection, sorting, and recycling for most important materials. By contrast, Brazil has low rates of formal collection and sorting. While the US has high rates of formal collection, its recycling rate is low, even for important materials such as polyethylene/polyethylene terephthalate (PET) plastics (typically present in bottles). While the UK and US waste management systems are consolidated into large companies, recycling in Brazil is made possible by several small and mostly informal participants. A deep understanding of how the waste management system deals with discarded packaging materials is key to informing product innovation and generating a positive impact.

**Figure 3:** Recycling rates vary greatly across countries**Recycling rate by material and country, 2020 (percentage of generated waste)**

Notes: Rates consider all generated municipal waste (do not consider industrial waste); rates for UK only consider packaging waste; (1) difference between UK *packaging* reported rates and derived calculation to estimated UK *total* recycling rate (lower); (2) difference from rates published by Veolia; (3) difference from rates published by The Aluminum Association

Sources: UK Government Statistical Service; US Environmental Protection Agency; MaxiQuim; ANAP; Abividro; ABAL; The Aluminum Association; Veolia; The Wilson Institute; expert interviews; Bain analysis

**How is consumer behavior changing, and how are retailers responding?** Consumer goods companies need to clearly understand the role that consumers and retailers play in accepting and leading changes. Consumers are increasingly aware of sustainability challenges and say they are more willing to act. Climate change, air pollution, and waste are the top-of-mind sustainability concerns globally, and avoiding excessive packaging is the action that consumers are most willing to take. Nearly a quarter of US consumers can be classified as “conscious consumers,” meaning that they are actively concerned about climate change and environmental sustainability is a key purchasing criterion for them. On the other hand, the US has 32% of “conscious nonconsumers,” meaning that they express concern about climate change and have several environmentally friendly lifestyle habits but do not buy eco-friendly-branded products.

There are, however, important issues that prevent consumer behavioral change. Although awareness is increasing, many consumers still are confused about sustainability—that is, what makes a product sustainable and what to do. Consumers aren’t fully confident in their ability to change their behavior or make an impact and are not always correct when choosing what they believe is the most sustainable solution. For instance, when presented with single-use plastic vs. single-use glass packaging, 75% of respondents did not know or chose glass as the product with the lower carbon footprint, when in fact it is plastic.

There's also the convenience factor; adopting more sustainable practices requires greater effort from consumers. Retailers can make it easier for customers to identify sustainable products on the shelf through labeling, for example, and make sustainable products available when consumers are deciding which product to buy for each category (vs. separated/dedicated session, for example).

Finally, while consumers say they would pay a premium for sustainable products and brands, some perceive them as being too expensive. Even of those consumers who say they are willing to pay extra for sustainable products, roughly half will only pay a minimal amount—sustainable solutions are often still much more expensive than the premium price consumers are willing to pay.

There still is a gap between consumers' expectations and available sustainable options. In general, for consumer goods companies to deliver on circularity targets, more consumers will need to make trade-offs by trying new packaging presentations or sensory experiences—everything from concentrated solutions in cleaning, for example, to powders and solid bars in toiletries. They'll also need to participate in waste sorting and reverse logistics programs, where retailers can have a critical role to play and allow for real circularity.

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When asked to rank elements of sustainability they consider when purchasing products, shoppers ranked sustainable packaging as the second most important element, ahead of the product contributing to animal welfare, being organic, and having a low carbon footprint.

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Importantly, however, packaging can play a key role in positioning your brand as sustainable. Consumers place a lot of emphasis on packaging, with the plastics problem being vigorously publicly debated. When asked to rank elements of sustainability they consider when purchasing products, shoppers ranked sustainable packaging as the second most important element, ahead of the product contributing to animal welfare, being organic, and having a low carbon footprint.

Meanwhile, although the retailers that sell consumer products are at different stages of maturity, their overall level of environmental, social, and corporate governance (ESG) engagement is increasing. Our study across 40 global retailers found that nearly three-quarters of them included a sustainability pillar in their corporate strategy. They are setting science-based targets for reducing their emissions or becoming Ellen MacArthur Foundation Global Commitment signatories for circularity. Retailers are also putting significant pressure on brands to use recyclable packaging or packaging with recycled content. British supermarket chain Tesco, for instance, said it will no longer carry brands that use excessive or nonrecyclable plastic packaging. The immediate implication for the consumer products industry is that retailers will change what they find acceptable in packaging ingredients and will redefine shelf space allocation.

**What are the technology breakthroughs?** Technological innovations are being developed to minimize waste generation and to improve decarbonization and the management of unavoidable waste; GHG-capturing technologies are also in the works. Since 2018, private equity and venture capital firms invested more than \$6 billion in recycling facilities and bio-based packaging alone. Recycling and substitution with recycled glass, metal, and paper are the solutions with the highest probability of scaling by 2030. To achieve their 2030 targets, companies shouldn't count on chemical recycling or industrial composting, given that both technologies won't be available on a large scale by the end of this decade. On the other hand, mechanical recycling will get more effective and still should be the dominant technology by 2030. Recent significant price increases in recycled substrates such as recycled PET, however, have caused companies to revisit their short-term targets and look for alternative solutions. If prices remain high, this could be an enabler for new technologies breaking through and becoming economically competitive.

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Since 2018, private equity and venture capital firms invested more than \$6 billion in recycling facilities and bio-based packaging alone.

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## Planning for different scenarios

While packaged goods companies want to take meaningful action, the economic, environmental, and social implications of different solutions are often uncertain, and the industry still needs guidance regarding what actions to prioritize in diverse geographies/applications as well as how to find synergies among various solutions.

Based on this BLICT assessment, three plausible scenarios emerge for what consumer goods sustainable packaging could look like in 2030 across the US, UK/EU, and Brazil markets:

- a *substitute economy* in which advances in consumer behavior will lead to a shift toward alternative materials and new product presentation (in this scenario, companies should not rely too heavily on recycling);
- a *circularity breakthrough* brought on by advances mainly in legislation, infrastructure, and technology, leading to recycling industry development; and
- a *green shift* in which advances in all five BLICT elements reduce material demand and reshape the value chain to a circular flow.

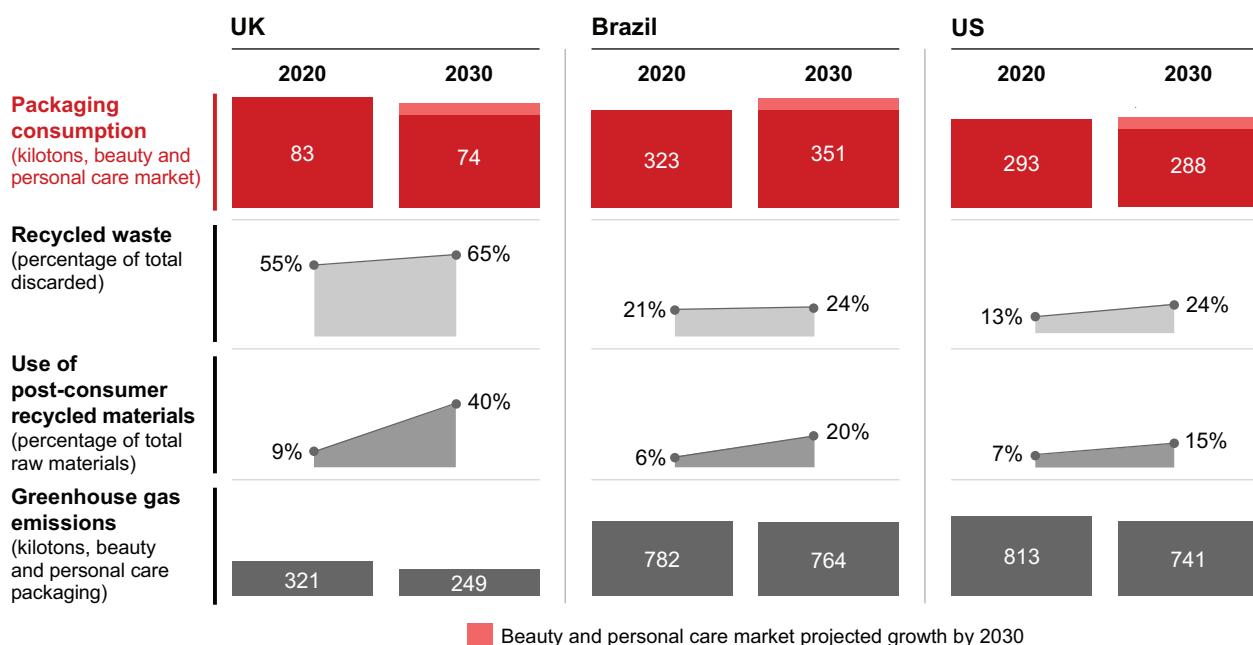
Each market's situation and unique BLICT trends will determine its most likely scenario. For example, in the UK, a strong push for recycling in the coming years, combined with incentives and a build-out of infrastructure capacity, likely will advance the market toward a green shift. By comparison, Brazil could

move toward a substitute economy based on likely poor waste management infrastructure and an unclear 2030 legislation outlook. There, most relevant changes will be mostly driven by consumer behavior and retailers' practices. In this context, companies' product innovation will be critical to promote circularity.

The situation in the US likely will be more complex. Pioneering states with a robust infrastructure and legislative agenda can advance toward a green shift; in other states, a possible shift to a substitute economy will depend in large part on changes in consumer behavior encouraged by nationwide companies. Understanding these potential scenarios helps companies decide on the right circularity agenda and how to engage other stakeholders.

When a global beauty and personal care company went through this process, it was able to clearly determine the impact of different actions by evaluating the weight of materials produced, the potential to be truly recycled, reused, or composted, and the GHG emissions per ton produced (see Figure 4). Because those factors don't always move in the same direction, the company needed an integrated view, and it acknowledged that some trade-offs would be required. It considered the feasibility of different initiatives given specific constraints. For example, the company could make great strides with innovation in refill packaging and concentrated product formulations, both of which involve minor technological challenges but major consumer behavioral shift requirements. Designing for recycling would be harder from a technology perspective.

**Figure 4:** One global beauty and personal care company determined it could make significant sustainability gains, even with market growth



Sources: Euromonitor; Bain analysis; "Breaking the Plastic Wave," a study led by Systemiq (<https://www.systemiq.earth/breakingtheplasticwave/>); governmental agencies; literature review; expert interviews

The company decided that it could achieve greater impact in the short term by reducing material weight and by reducing or eliminating some plastic. Using compostable materials and biopolymers and developing on-premise refill or returnable options would take longer because of technological and waste infrastructure challenges, but those initiatives could transform the industry in the medium term. Meanwhile, working on alliances and coalitions to contribute to the development of infrastructure and technology, encourage consumer behavioral change, and support waste legislation would require coordination outside the organization, but doing so could help advance the sustainability agenda both within and beyond the company.

Armed with these insights, the beauty company created a clear roadmap for a more than 40% reduction in GHG emissions through packaging changes. The quantitative approach helped the company identify the key moves to make.

To achieve its goal, the company also needed to mobilize the organization and promote leadership alignment around priorities.

## **Circular packaging transformation: A top management collective agenda**

What could this look like at a large consumer goods company? Sustainable packaging transformation is a complex agenda. As with any other strategic transformation, top management engagement is critical to set the priorities, allocate resources, promote behavioral change, and engage all stakeholders in the journey. More precisely, each top management leader will play a critical role to drive this change.

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The CEO could make public comments and mobilize the organization while also committing company resources to ESG initiatives. The chief marketing and sales officer could focus on overcoming consumer barriers, generating desire for sustainable products, and commercializing more sustainable offerings together with retailers. Category managers could be tasked with translating product innovation projects that align consumer needs with the company's sustainability goals.

The chief procurement officer should go after sourcing the new materials and ingredients needed, and the chief supply chain officer should revisit the supply chain and make the adjustments required to adopt new packaging materials and formulas.

Meanwhile, the chief sustainability officer could support all areas based on a quantitative approach with an integrated view and a clear roadmap. The R&D head could allocate the appropriate resources, respecting mandatory moves while also betting on future (and more disruptive) solutions. Teams could focus on developing a reverse logistics program as well as supplier engagement on product innovation, and they could create alliances within the industry, forging relationships with key stakeholders.

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The best companies will identify options to shift toward favorable packaging materials, and they will gain control of after-use packaging materials and the supply of recycled materials through vertical integration or strategic collaborations with the full waste value chain.

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Forward-looking companies that build the capabilities and flexibility to navigate the complex packaging challenge are likely to emerge as winners. Success means starting early and taking some calculated risks. The best companies will identify options to shift toward favorable packaging materials, and they will gain control of after-use packaging materials and the supply of recycled materials through vertical integration or strategic collaborations with the full waste value chain. First movers can commit to volumes of recycled materials early on and ensure the availability of increasingly in-demand (and potentially increasingly expensive) raw materials. Brands that fully embrace circular economy principles can connect with their consumers in new ways and create new value pools around different sensory experiences (better design, better materials) and better delivery models.

Consumer goods executives see the opportunity to transform packaging as a way of advancing toward their circularity targets while reducing emissions. They acknowledge that there's much on the line and much ground to cover quickly. Yet, as they plot their path amid an aggressive timetable and obstacles that seem daunting, those that take a systematic approach will make the biggest leaps toward their sustainable future.



# The Mill of the Future

Paper and packaging mills become more adaptable, optimized, sustainable, and data driven.

By Mattia Bernardi, Andrea Isabella, and Jared Lapin

## At a Glance

- ▶ The mill of the future is integrated and flexible, sustainable and technology driven.
- ▶ Talent management will be essential, and 65% of job searchers already view inclusion as very important in new roles.
- ▶ Best-in-class mills that achieve true operational excellence can raise EBITDA by a 7-percentage-point margin or more.

The paper and packaging industry is changing rapidly amid unprecedented turbulence within the sector. As a result, chief executives are dramatically rethinking their operational models and their global footprints. The market mix is changing as traditional commodity markets such as newspapers are shrinking and specialty papers such as high-barrier papers that protect food from moisture and oxygen are growing. Global competition is intensifying, and technology is disrupting all parts of the supply chain. Economy-wide raw material shortages and volatility are further complicating market dynamics.

Agile companies are reacting now to exploit new markets and products. They are shifting from a mill-centric to a customer-centric approach, which requires greater flexibility and structural changes

to the company. Business-wise, players are engaging in M&A and consolidation. Process-wise, they are capitalizing on the increasing availability of data and sensors that are providing new opportunities to optimize production.

While the manufacturing mission in the paper and packaging industry has historically centered on maximizing throughput and being highly efficient in a standalone mill-by-mill approach, this approach will no longer suffice. Leading companies are taking steps now to create interconnected mills of the future.

The mill of the future is integrated and flexible, sustainable and technology driven. It enables maximum productivity through high uptime and high asset health, effectively leveraging its full capacity. It is adaptable and optimizes for different objectives—whether a company's mission is to lower costs (producing the right quality with the lowest possible cost), minimize carbon emissions, or optimize customer service. Finally, mills of the future attract top talent for current and evolving needs.

## **Integrated and flexible**

The mill of the future is part of an *integrated* network of plants with an optimized footprint, meaning products are made at those plants with the lowest production cost and that are nearest to customers to minimize logistics costs while ensuring quick delivery times and factoring in regional market demand, including expected demand growth.

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Mills of the future balance cost efficiency and customer demands and service levels through next-generation sales and operations planning.

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In addition to being integrated, the mill of the future is highly *flexible*. This allows companies to optimize performance of the overall footprint of their plants as well as to react to changing conditions such as increasing energy prices, market downturns, or plant closures. Mills of the future balance cost efficiency and customer demands and service levels through next-generation sales and operations planning.

With an integrated network of plants and factories, executives can optimize for multiple scenarios and identify opportunities to improve, such as reallocating volume, upgrading assets, and optimizing portfolios and capacity. If they want to optimize for carbon emissions and reach carbon neutrality, for instance, they can move production to plants where energy sources are sustainable.

Footprint optimization also helps when there are drastically different energy prices in one region vs. another, as happened in Europe vs. the US in 2022. Conflicts and natural disasters such as the earthquake in Turkey can also interrupt the supply chain. Leaders can quickly pinpoint impacted plants and move production to other plants that are the most cost-effective and efficient.

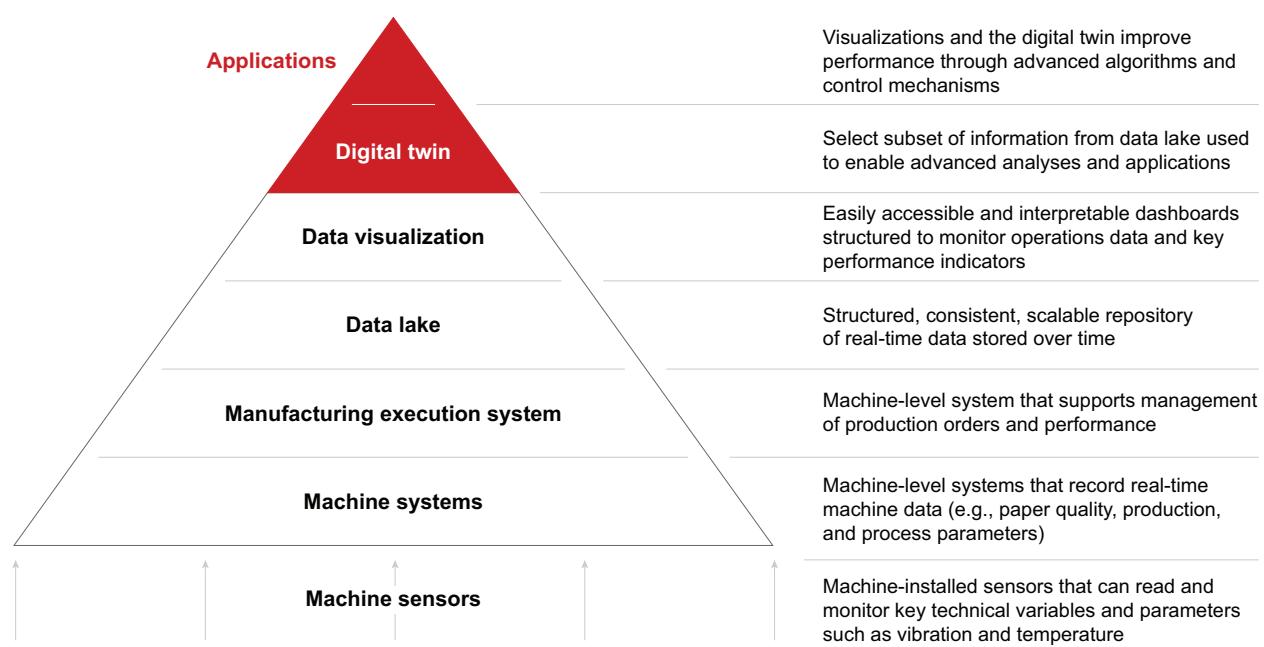
## Sustainable

The mill of the future is fully sustainable. Energy sourcing, production, and consumption are optimized for net zero, requiring both very high-energy efficiency through the full deployment of operational levers and a massively increased use of renewable energy. No or little waste is sent to landfills, and there is full recycling of water usage. In addition, the full life cycle of the manufacturer's products is designed for sustainability and zero impact. The mill follows high safety standards, with a zero-accident mindset.

## Technology enabled and data driven

Employees use technology and data to make better decisions and innovate faster. The digital mill is made possible by a full technology stack (see *Figure 1*).

**Figure 1:** Digital applications and the digital twin are at the top of a broader technology stack



Source: Bain & Company

A key technology in the technology stack is the digital twin, which is a digital copy of a company's mills and network. The digital twin enables improved analytics and decision making by optimizing process parameters (such as the quality of paper, strength of paper, and weight of paper) and performance parameters (such as the speed of the machine and consumption of raw materials).

The digital twin has many specific applications in individual mills that can help improve performance across utilization and productivity, cost optimization and asset health. For example, digital twins can be used to make machines more efficient, producing better-quality products with fewer resources. Digital versions of machines allow operators to test different configurations of the machine and find the optimal setup without the need to physically test many configurations, therefore making optimization quicker, less costly, and more effective.

## Talent magnet

While the workforce of many paper and packaging companies used to be characterized by highly experienced blue-collar employees with long tenures within their organizations, employers are now seeing higher turnover of younger employees who rotate jobs more frequently. As a result, instead of having decades of knowledge, employees now only have a year or two's worth of knowledge. In addition, the various new technologies require entirely new skills that existing employees don't necessarily have. This means leaders need to redesign how knowledge is transferred and retained.

Executives have different tools to centralize expertise, such as video training and augmented reality, which can be offered to employees in their local mills. Secondly, they can redesign the operating model to centralize employee competence and some of the mill activities. There will be an increased need for high-profile skills to remotely drive mills, such as the ability to remotely operate control rooms and monitor maintenance. The increased need for remote skills will also open up new labor pools of employees that don't need to live near the mills they operate.

Finally, future mills will have a well-thought-out diversity, equity, and inclusion strategy that provides a welcoming environment for all employees. This helps the company attract a diverse group of talent, which is relevant as 65% of job searchers view inclusion as very important when considering a new role, according to a recent Bain survey—the same study found that employees who feel fully included are six times more likely to stay within the organization.

## Highly productive, exhibiting world-class performance

The mill of the future guarantees maximum productivity through high uptime and high asset health, which is achieved with the right maintenance strategy, operations, organization, and processes.

The largest drivers of downtime are known, the maintenance strategy for each piece of equipment is based on the likelihood and consequence of failure, and action plans are defined and followed through on for each asset based on their risk level.

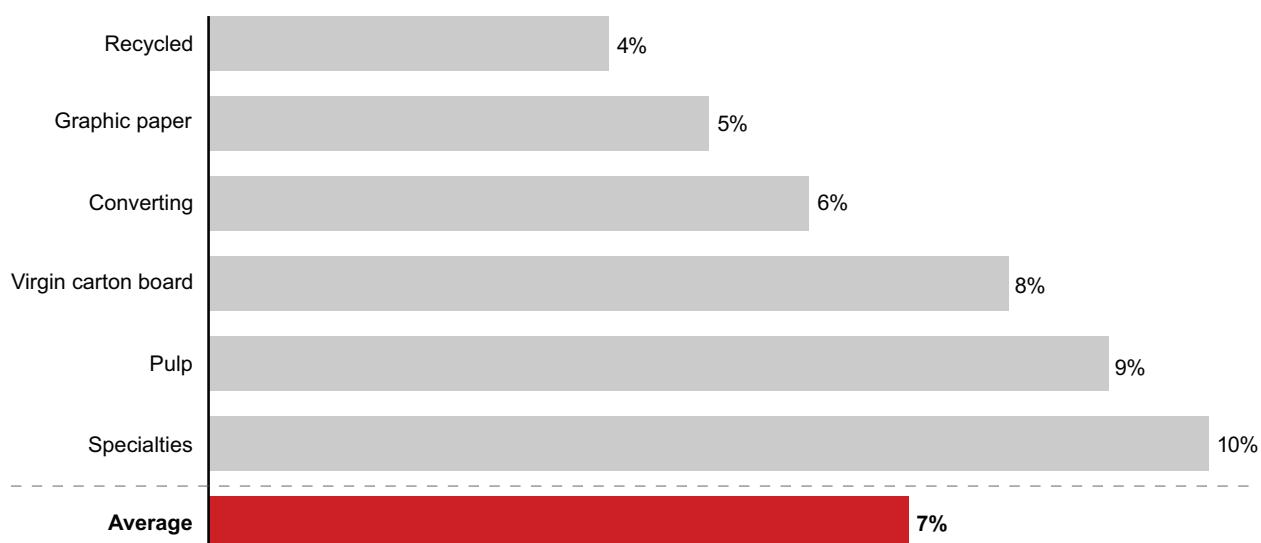
Downtime is minimized through predictive maintenance, supported by machine learning. Maintenance is embedded within the organization, with dedicated roles and responsibilities and intelligent leveraging of external maintenance support. Productivity is boosted by improving utilization, overall equipment effectiveness, and de-bottlenecking.

Cost is minimized by reducing material consumption, realigning recipes to customer needs and specifications, maximizing energy efficiency, reducing waste, mitigating quality costs, and optimizing the distribution network. Performance is regularly monitored.

Finally, world-class mills are highly adaptable so that they can be optimized and tailored to each company's specific goals. When done right, achieving true operational excellence can lead to great value generation. Bain has supported many paper and packaging companies in a broad cost savings program across more than 70 plants, resulting in an average 7-percentage-point EBITDA increase (see *Figure 2*).

**Figure 2:** World-class mills are highly adaptable and optimize operational excellence, with the potential to increase value by a 7-percentage-point EBITDA margin

#### Average EBITDA margin uplift in percentage points



Note: Based on the average results obtained by Bain clients on more than 100 actual projects  
Source: Bain & Company

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