

# Pulp, paper, and packaging in the next decade: Transformational change

Basic Materials | Paper & Forest Products May 2017



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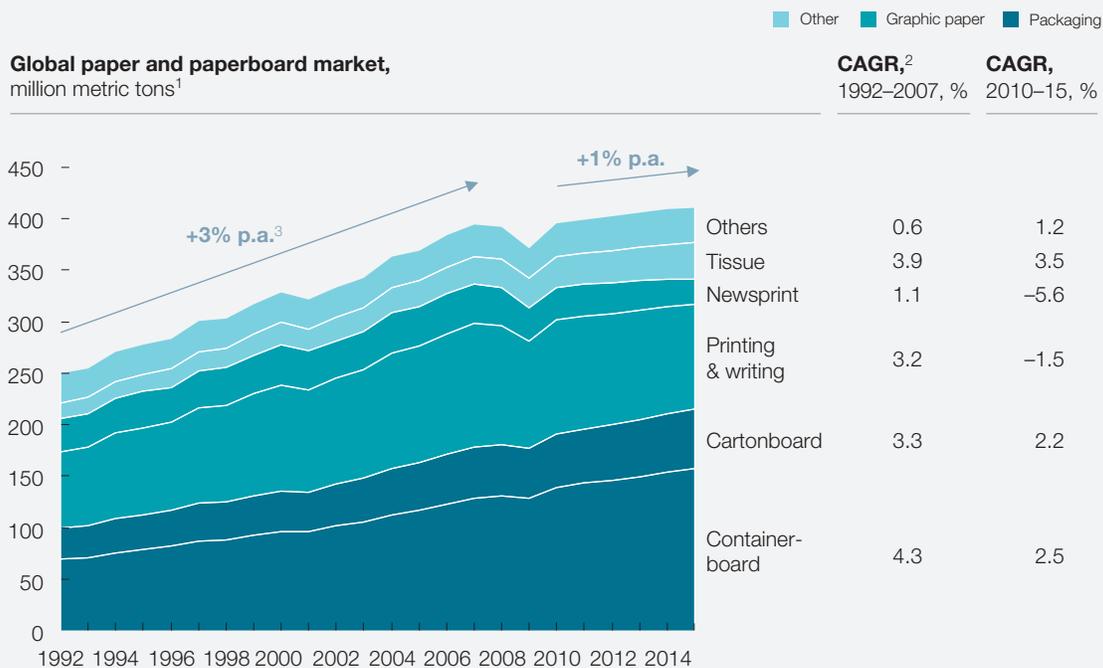
If you thought the paper industry was going to disappear, think again. Graphic papers are being squeezed, but the industry overall has major changes in store and exciting prospects for new growth.

From what you read in the press and hear on the street, you might be excused for believing the paper and forest-products industry<sup>1</sup> is disappearing fast in the wake of digitization. The year 2015 saw worldwide demand for graphic paper decline for the first time ever, and the fall in demand for these products in Europe and North America over the past five years has been more pronounced than even the most pessimistic forecasts.

But the paper and forest-products industry as a whole is growing, albeit at a slower pace than before, as other products are filling the gap left by the shrinking graphic-paper<sup>2</sup> market (Exhibit 1). Packaging is growing all over the world, along with tissue papers, and pulp for hygiene products. Although a relatively small market as yet, pulp for textile applications is growing. And a broad search for new applications and uses for wood and its components is taking

Exhibit 1

## The global paper and paperboard industry continues to grow despite decline in the graphic-paper segment.



<sup>1</sup> Metric tons: 1 metric ton = 2,205 pounds.

<sup>2</sup> Compound annual growth rate.

<sup>3</sup> Per annum.

Source: RISI

place in numerous labs and development centers. The paper and forest-products industry is not disappearing—far from it. But it is changing, morphing, and developing. We would argue that the industry is going through the most substantial transformation it has seen in many decades.

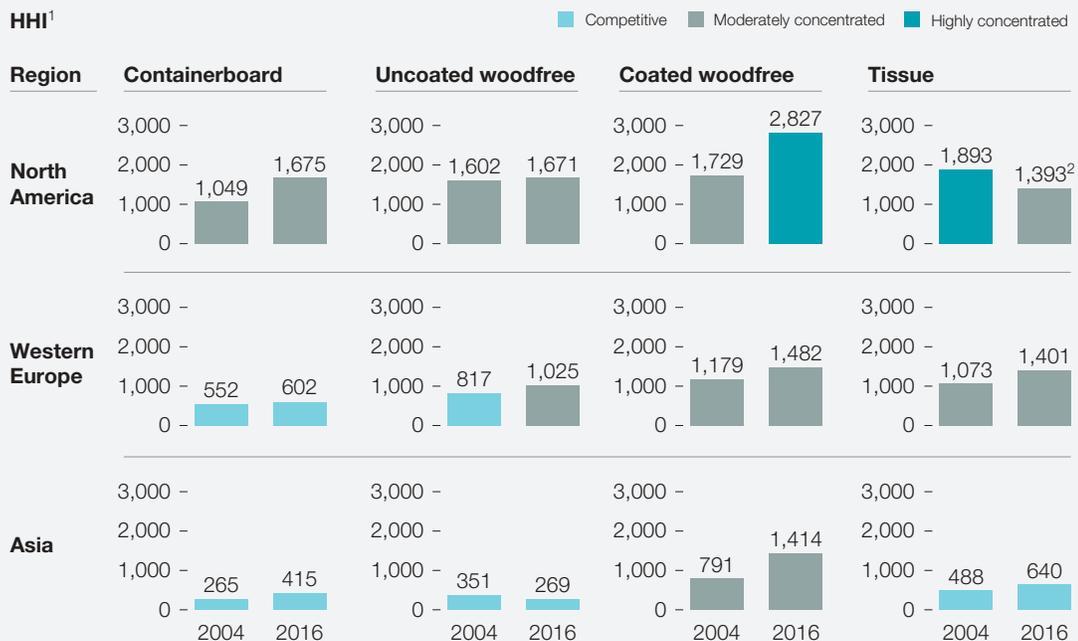
In this article, we outline the changes we see happening across the industry, and we identify the challenges CEOs and their leadership teams will need to manage over the next decade.

### Changing industry structure

The structure of the industry landscape is changing. The changes are not dramatic individually, but the accumulation of changes over the long term has now reached a point where they are making a difference.

Consolidation has been a major factor in many segments of the industry. The big have become bigger in their chosen areas of focus. At the aggregate level, the world’s largest paper and forest-products companies have not grown much, if at all, and several of them have reduced in size. What they have done is focus their efforts on fewer segments. As a result, concentration levels in specific segments have generally, if not universally, increased (Exhibit 2). In some segments, such as North American containerboard and coated fine paper, ownership concentration, as defined by traditional approaches to drawing segment boundaries, may be reaching levels where it would be difficult for companies to find further acquisition opportunities that could be approved by competition authorities.

**Exhibit 2 Consolidation has resulted in increasing segment concentration.**



<sup>1</sup> Herfindahl-Hirschman Index,  $\sum(\text{market share})^2$ , HHI <1,000 competitive, 1,000–1,800 moderately concentrated, >1,800 highly concentrated.

<sup>2</sup> At the next level of granularity, consumer tissue and away-from-home tissue are highly concentrated segments (HHI ~2,500).

Source: Brian McClay & Associates; McKinsey analysis

A grouping of companies has emerged that is not identical to but partly overlaps with the group of largest companies, and it is drawn from various geographies and market segments. Companies in this group have positioned themselves for further growth through high margins and low debt (Exhibit 3). Our analysis suggests the financial resources available to some members of this group for strategic capital expenditure (capex) could be five to ten times greater than other top players in the industry. This potentially represents a powerful force for change in the industry, and over the next few years it will be interesting to see how these companies choose to spend their resources. Some of these companies, with large war

chests and sizable annual cash flow deployable for strategic capex, might even face a challenge to find opportunities on a scale that matches these resources.

Where there are leaders, there are also laggards. We believe the pronounced differences in performance among companies across the industry continues to pique the interest of investors and private-equity players in an industry that is already undergoing substantial restructuring and M&A.

### Changing market segments

Whether companies are well positioned for further growth or still needing to earn the right to grow,

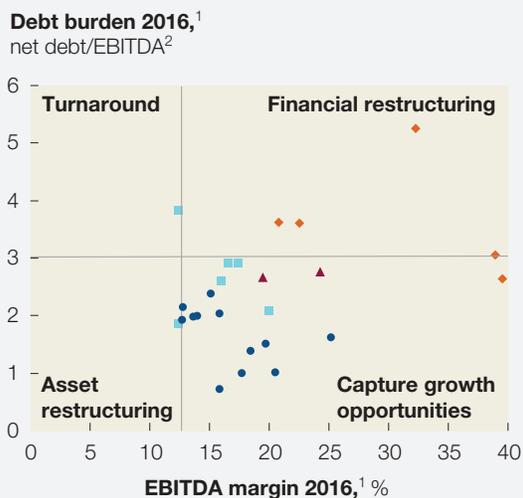
Exhibit 3

## A group of companies has positioned itself through structural actions for further growth.

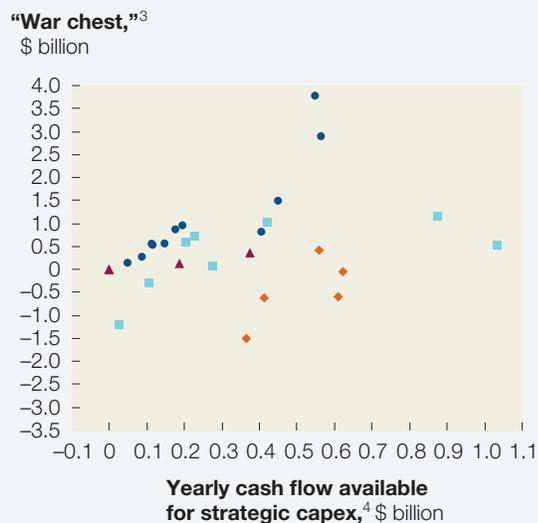
Region where the company is based

- Europe
- ◆ Latin America
- North America
- ▲ Asia

### Performance and financial strength, estimate



### Growth potential, estimate



<sup>1</sup> Based on full year 2016 or latest available interim report, excluding nonrecurring items.

<sup>2</sup> Earnings before interest, taxes, depreciation, and amortization.

<sup>3</sup> Indicates further debt potentially to be used in expansion assuming net debt/EBITDA may not exceed 3.

<sup>4</sup> EBITDA less maintenance capital expenditures (assumed 4% of sales), less assumed change in assumed working capital, tax, dividends, and financial costs.

Source: Company reports; McKinsey analysis

they can expect demand to grow for paper and board products over the next decade. The graphic-paper market will continue to face declining demand worldwide, and our research has yet to find credible arguments for a specific floor for future demand. But this decline should be balanced by the increase in demand for packaging—industrial as well as consumer—and tissue products. All in all, demand for fiber-based products is set to increase globally, with some segments growing faster than others (Exhibit 4). The one hazy spot in demand might be concerns over how fast it will grow in China. Expectations of growth from only a few years ago have proven a bit too optimistic, not only in graphic papers but also in tissue papers and packaging. Given China’s weight in the global paper and board market, even relatively modest slowdowns can have significant impact.

How these demand trends will translate into industry profitability will of course be heavily influenced by the industry’s supply actions. Supply

movements are notoriously difficult to forecast more than a few years out, but we believe the following observations are relevant to this discussion:

- **Graphic papers**, particularly newsprint and coated papers but also uncoated papers, will continue to face a severe decline in demand and significant pressure to restructure production capacity. We are likely to see continuing machine conversions into packaging and specialty papers, as well as more innovative structural moves that include innovations in distribution and the supply chain. Such structural changes are already having an impact, and the profitability of graphic-paper companies is currently reemerging from several years in the doldrums. The turbulence in graphic papers has meanwhile spilled over to packaging and tissue segments, with capacity increases in segments that don’t really need it.
- **Consumer packaging and tissue** will be driven largely by demographic shifts and consumer

**Exhibit 4 Growth prospects vary significantly among segments and regions.**

Market demand		<span style="color: green;">■</span> CAGR <sup>1</sup> >2% <span style="color: orange;">■</span> CAGR 0–2% <span style="color: red;">■</span> CAGR <0%						
2016–21	Major product groups	Japan	Western Europe	North America	China	Other Asia	Eastern Europe	Latin America
<b>Tissue</b>	Tissue							
<b>Graphic papers</b>	Mechanical							
	Newsprint							
	Woodfree							
<b>Packaging papers</b>	Kraft paper and specialty							
	Cartonboard							
	Containerboard							
<b>Hardwood pulp</b>	Market BHKP <sup>2</sup>							
<b>Softwood pulp</b>	Market BSKP <sup>3</sup>							

<sup>1</sup> Compound annual growth rate.  
<sup>2</sup> Bleached hardwood Kraft pulp.  
<sup>3</sup> Bleached softwood Kraft pulp.

trends such as the demand for convenience and sustainability. It will grow roughly on par with GDP. We expect innovation to be a critical success factor, but we are uncertain how far packaging players can drive innovation by themselves. Clearly they can take the lead on materials development, but they may need to follow the lead of retailers and consumer-goods companies in areas such as formats, use, and technology. At the same time, the sudden inflow of capacity from the graphic-paper segment will need to be managed.

- **Industrial packaging** will also see opportunities for innovation and a certain amount of value-creating disruption, for example, in online shopping, last-mile delivery, product safety, and counterfeiting measures. But demand growth is still likely to be somewhat below GDP.
- **Hardwood fiber** is likely to face some challenging times near term, despite healthy demand growth. Recent and ongoing expansions are creating an oversupply that is likely to exert downward pressure on prices for a few years. Until the industry as a whole learns to adopt a more long-term view on demand cycles and capacity expansions, this cyclical performance is likely to continue.
- **Softwood fiber** could be looking forward to some prosperous years. In the medium term, requirements for stronger, lighter-weight packaging and the need to balance out the deteriorating quality of recycled fiber could increase demand. Although demand-growth rates are lower than for hardwood, so are the industry's capacity additions, and this should help profitability. Challenges in expanding softwood-forest supply are constraining new supply, as well as the fact that much of the industry's softwood-production assets are aging and need complete renewal or substantial upgrades. But the scale of the investments

required is a potential roadblock to them being made, which could further contribute to scarcity. The lingering question is whether such supply-side challenges can trigger an accelerated development of hardwood applications as a substitute, rendering softwood fibers partly obsolete.

### Challenges for the next decade

In such an environment, what are the key challenges senior executives will need to address? What are the key battles they will have to fight? The paper and forest-products industry is often labeled a “traditional” industry. Yet given the confluence of technological changes, demographic changes, and resource concerns that we anticipate over the next decade, we believe the industry will have to embrace change that is, in character, as well as pace, vastly different from what we have seen before—and anything but traditional. This will pose significant challenges for CEOs regarding how they manage their companies.

We argue that there are three broad themes that paper and forest-products CEOs will have to address through 2020 and beyond:

- managing short-to-medium-term “grade turbulence”
- finding the next level of cost optimization
- finding value-creating growth roles for forest products in a fundamentally changing business landscape

### Managing short-to-medium-term ‘grade turbulence’

The past couple of years have seen increased instability in some forest-products segments. The negative impact of digital communications on graphic paper has led many companies to steer away from the segment and into higher-growth areas, either through conversion of machines or through redirection of investment funds. This is leading to

a higher level of uncertainty and overcapacity in, for example, packaging grades. The instability has also been exacerbated by the capacity additions that primarily Asian producers have made in spite of the slowing demand growth in that region.

An increased interest in swing capacity that can move production between grades has added to the uncertainty in certain grades. A case in point is virgin-fiber cartonboard. Several producers in Europe have converted machines away from graphic paper and into this segment, creating further oversupply in Europe, and leading producers to redouble their efforts to sell to export markets. This is happening just as increasing capacity in Asia, and particularly in China, looks set to displace imports that have traditionally come into the region, mainly from Europe and North America. Some of the new Asian capacity could even find its way into export markets.

This development is likely to persist for several years until markets again find more of an equilibrium, and it poses challenging questions for companies. What, if any, safe havens exist for my products? How do I protect home-market volumes? How do I protect my export volumes? What is the appropriate pricing strategy to use in the different regions?

For CEOs looking to move into a new market segment, it will be equally important to make the right assessment of which segments to enter as they shift their footing. Where will I be the most competitive? How will my entry change market dynamics, and will this matter to me?

#### [Finding the next level of cost optimization](#)

Even though we see new ways of creating value in the forest-products industry, low cost is, and will remain, a critical factor for high financial performance. One of the characteristics shared by companies with high margins and high returns is that they have access to low-cost raw materials, primarily fiber. This will continue to be a high-priority area, albeit with some twists compared with today.

In recycled fiber, availability and quality—and therefore cost—will be increasingly challenged. Fresh fiber is facing other cost issues. It is unclear whether plantation land in the southern hemisphere (primarily for short-fiber wood) will continue to be available at current low prices. And as companies go to more remote areas to acquire inexpensive land, such as in Brazil, their infrastructure and logistics costs increase. Will higher productivity and yield allow the global industry to add ever more low-cost capacity, or are we going to see a gradual increase in raw-material costs? For long-fiber products, the difficulties involved to expand long-fiber pulp capacity will make such assets very valuable over the next several years. But at what point will development of the material properties of short-fiber pulps make them rival more expensive long-fiber pulps in a number of major applications?

Operating costs for paper and board production are another area where companies need to get a tighter grip. Despite the fact that this area receives continual focus from management, our experience suggests there is still significant potential for cost reduction by using conventional approaches to work smarter and reduce waste in the production chain. This is particularly the case in areas that are less the focus of management attention, such as converting.

Many companies need to go beyond the conventional approaches to a next level of cost optimization—and many are ready to take this step. Most, if not all, paper and forest-products companies have completed large fixed-cost reduction programs. But there are often broader systemic issues that companies still need to address to be able to build sustainable operating models. In addition, in some segments many companies fail to reduce fixed costs as quickly as capacity disappears. By radically rethinking the operating model, companies can significantly shift their fixed-cost structure. By doing so, they can set a very different

starting point with respect to flexibility and agility for when market volumes go through their normal cyclical swings.

The paper and forest-products industry has much to gain from embracing digital manufacturing: according to our estimates, this could reduce the total cost base of a producer by as much as 15 percent. New applications, such as forestry monitoring using drones or remote mill automation, present tremendous opportunities for increased efficiency and cost reductions. This is also the case in areas where big data can be applied, for instance, to solve variability and throughput-related issues in

each step of the integrated production flow (Exhibit 5). The industry is well placed to join the digital revolution, as paper and pulp producers typically start from a strong position in regard to collected or collectable data.

At the customer-facing end, the opportunity for innovation is huge and has the potential to transform existing industries and create new ones, especially in packaging segments. Digital developments will also help disrupt previous B2B2C value chains, paving the way for direct B2C relationships between paper-product makers and end consumers, for example, in tissue products.

## Exhibit 5 Embracing the digital revolution will lead to cost-improvement opportunities.

### Example use cases in the paper and forest-products industry

	Raw-material supply (forestry and harvesting)	Pulp production	Paper and board production		Cost-reduction on total cost base, estimate, %		OEE <sup>2</sup> improvement, estimate, p.p. <sup>3</sup>
			Paper machine	Converting line	Existing technologies	Existing and future technologies	
<b>AI<sup>1</sup> and analytics</b>	Fiber yield, chemical consumption, and energy				<b>~4.5</b>	<b>~7.0</b>	
	Predictive maintenance				<b>~2.0</b>	<b>~2.5</b>	<b>~2.0</b>
	Throughput debottlenecking and quality						<b>~3.0</b>
<b>Automation</b>	Logistics automation				<b>~0.5</b>	<b>~1.0</b>	
	Process automation					<b>~0.5</b>	
	Remote process control					<b>~1.5</b>	
	Remote process inspection				<b>~1.0</b>	<b>~1.0</b>	
<b>Mobile</b>	Digital field-force apps				<b>~1.0</b>	<b>~1.0</b>	
	Digital business-support functions				<b>~0.5</b>	<b>~0.5</b>	
	Digital performance management						
<b>Total opportunity<sup>4</sup></b>					<b>~10%</b>	<b>~15%</b>	<b>~5 p.p.</b>

<sup>1</sup> Artificial intelligence.

<sup>2</sup> Overall equipment effectiveness.

<sup>3</sup> Percentage points.

<sup>4</sup> Not including purchasing, marketing and sales.

Source: McKinsey analysis

The digital world is unfamiliar territory to most paper-industry CEOs. To avoid too much doodling with small uncoordinated efforts, it is necessary to undertake a thought-through program, preferably guided by digitally experienced people either on the top management team or board.

#### *Finding value-creating growth roles for forest products*

For any paper-company CEO who looks out ten years, the really different challenges will not be around cost containment. Global trends are moving the industry into a new landscape, where the challenges and opportunities for finding value-creating growth roles for forest products are changing radically. For example, the industry's historic linear value chains are giving way to more collaborative structures with players in and outside the industry. We believe examples will include new producer and distributor collaborations; pulp players collaborating more innovatively with nonintegrated players; paper and packaging companies collaborating more intensively with retailers, consumer-goods companies, and technological experts; and new products such as biorefinery products requiring novel go-to-market partnerships. Here are some interesting examples of how these and other trends could play out.

*Staying relevant (and increasing relevancy) in a fast-changing packaging world.* The packaging market is multifaceted and continuously morphing. Digital developments influence it both by stimulating demand for packaging used in e-commerce and by enabling the integration into packaging of sensors and other technology. E-commerce has highlighted new packaging topics such as improved product safety, the unboxing experience, counterfeiting measures, and optimizing for last-mile delivery. At the same time, the industry has to deal with increasing pressures around cost, resource conservancy, and sustainability, while plastic packaging continues to grow at a faster pace than fiber-based packaging.

The opportunity to develop a differentiated and distinct customer value proposition in this landscape has never been greater. Packaging CEOs will have to address a number of choices and trade-offs as they seek the appropriate strategic posture. Should you be a pure upstream player or a packaging-solutions provider? Should you focus on fiber-based packaging only or on providing multi-substrate solutions? Should you be at the forefront of technology integration and application development in packaging or focus on materials development?

To stay relevant, many companies in packaging are trying to move closer to the brand owner or end user. Only a few companies are positioned to successfully make this move, however, and even they should be cautious. We are already seeing brand owners and leading customers challenging the benefits of packaging companies coming with consumer-facing ideas, such as complete packaging concepts. Some of these players would prefer packaging companies to focus instead on core competencies, such as materials development, or interfaces with other substrates, such as plastics.

*Finding the right path in next-generation bio-products.* Wood is a biomaterial with exciting properties, from the log on down to the fibers, micro- and nano-fibers, and sugar molecules. A healthy niche industry making bioproducts has existed for many years alongside large-volume pulp, paper, and board products. We are in the midst of an explosion of research activity to develop new bio-products, ranging from applications for nanofibers to lignin-based carbon fiber. New processes are being designed to extract hemicellulose as feedstock for sugars and chemical production while still keeping the cellulose parts of the wood chip for pulp products.

We believe wood-based products will find new ways to enlarge their footprint in a more sustainable global economy. But the challenges are legion, particularly for finding cost-effective production methods that can withstand competition not

only from oil-based materials but also from other biomaterials. Finding the right balance between developing the “new” and safeguarding the “old” will be a crucial undertaking for executives running companies with access to fresh fiber.

*Finding growth in adjacent areas.* Over the past decade or two we have seen the larger forest-products companies performing a focus adjustment. Most companies have moved from being fairly broad conglomerates present in various forest-products segments to focusing on a few core businesses. To find value-creating growth in the next two decades, we expect companies to start broadening their corporate portfolio again, but broadening it around the core businesses they have been working on, so as to create differentiated customer value propositions. Finding value-creating adjacencies to the core business will be a challenging exercise in creativity and business acumen for executive teams.

Finding new value-creating growth for forest products will also put the spotlight on a number of functional executive topics. We believe the following will be most important:

- **Innovation:** The forest-products industry has not been known for a fast-paced innovation agenda. By and large it hasn't been necessary, as markets and demand characteristics have changed relatively slowly. In the future, however, innovation in products, processes, organizational set-up, and business models will be imperative. For many companies, getting efficient innovation practices and the organization up to speed will be an important challenge.

- **Talent management:** The different skills required over the next 10 to 15 years will put particular onus on the talent pool of forest-products companies. Installing an executive team that is able to understand new demands across customer businesses, digital, bioproducts that cater to completely different value chains, and cross-industry collaboration will be a major task for CEOs and boards.
- **Commercial excellence:** Paper and forest-products companies will need to transform their commercial interface to stay relevant, particularly in packaging and downstream paper. They will need to put in place a more professionalized and skilled organization that focuses on value creation, instead of focusing primarily on sales volumes.



We believe the paper and forest-products industry is moving into an interesting decade, one that will see nothing less than a transformation of large parts of the industry. There will be many barriers to overcome and metaphorical cliffs to fall off. But the companies that are able to navigate through successfully can look forward to an industry that has a new sense of purpose and an increasingly vital role to play. ■

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<sup>1</sup> This article primarily focuses on the parts of the forest-products industry that are related to the production of pulp, paper, packaging, and bioproducts; it does not cover timber.  
<sup>2</sup> The graphic paper segment includes newsprint, printing, and writing papers.

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