

Operations Practice

Value creation in European building materials—where do the opportunities lie?

Six factors will determine whether Europe's building-materials players can grow at the same rate as the construction industry they supply.

by Raffaele Carpi, Peter Claus, Imke Mattik, and Patrick Schulze



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While the construction industry's importance and dynamics are well known, the accompanying building-materials industry generally gets less attention—despite generating global revenue estimated at \$2–3 trillion in 2015. It's this sector that manufactures essential building components, both external—outside wall segments, roofs, insulation, glass—and internal, such as HVAC systems, windows and doors, and inside walls. Specialty chemicals, used in paints and building compounds such as concrete, also fall within its ambit.

There has been strong growth in construction activity in most European markets: Since 2009, construction's compound annual growth rates (CAGR) has averaged 7 percent in Germany, 2 percent in France, and 6 percent in the UK, largely fed by historically low interest rates. It's therefore striking that profitability in building materials has lagged behind. We estimate that 60 percent of companies in the industry are roughly value neutral, and 20 percent generate economic losses. The remaining 20 percent, however, are experiencing success.

How are they creating value? Through a focus on operational performance.

Market trends and implications

Improving operational performance to boost profitability requires an understanding of market trends and their implications. Six major industrial movements are affecting construction-materials players, adding to the dynamics and complexity of the market:

1. **More multifamily houses.** There is a clear trend in most European markets towards multifamily houses. These require fewer materials per unit, as well as changes in the type of building materials used—such as stronger growth in flat-roof components than in tiles.
2. **Strong regional preferences for building materials.** There are strong regional preferences for building-material types in European markets,

making it difficult for companies to grow through innovation or new-product development.

3. **Increasing consolidation in the market.** The high number of M&A deals during the last decade has resulted in a consolidation of the market, as well as an increase in the size and complexity of many players.
4. **Tighter environmental regulations.** In addition to increasing energy costs, complexity increases because of the regulation of carbon-emissions trading. There is also pressure to integrate circular-economy thinking into building-materials production to compensate for waste generated through construction and demolition.
5. **Limited workforce and construction productivity.** A shortage of labor with the right capabilities has limited construction productivity to the same levels as 50 years ago, exacerbating challenges in meeting demand and driving a broader trend towards prefabrication. Moreover, although prefabrication can significantly increase construction productivity, it also increases complexity in building-material plants.
6. **Digital disruptions across the value chain.** New digital tools include using building information modeling (BIM) to interact with planners and decision makers, improving planning efficiency and reducing lead times and failures. Digital customer platforms also allow suppliers to increase direct sales, reducing the importance of merchants. Automation and analytics tools are also helping optimize throughput, energy cost, and quality, with a focus on thermal processes in building-materials plants.

These cost-, consolidation-, and demand-related trends are behind the urgent need for operations improvements toward greater profitability. Our experience shows that a holistic operations-improvement programs by building-materials companies can raise EBITDA more than 3 percentage points.

A capital-market perspective on building materials

The overall construction-materials industry has generated higher cumulative returns than the MSCI world index globally, as expressed in total return to shareholders (TRS) (Exhibit 1). Overall, the sector has recovered from the financial crisis and has shown an annual TRS growth rate since 2013 similar to the pre-crisis rate of approximately 12 percent. Nevertheless, the construction sector's TRS growth rate is behind that of similar industries such as chemicals.

The building-materials industry's return on invested capital (ROIC) performance has also rebounded over the last eight years after steep decline in 2009, with both capital efficiency and margins returning or exceeding pre-2009 levels. In many industries, TRS performance as a measure of overall performance is closely linked to ROIC and generation of economic profit. However, in the construction materials industry this link is weak:

value creation is spotty, with ROIC levels roughly equal to the cost of capital at around 9 to 10 percent.

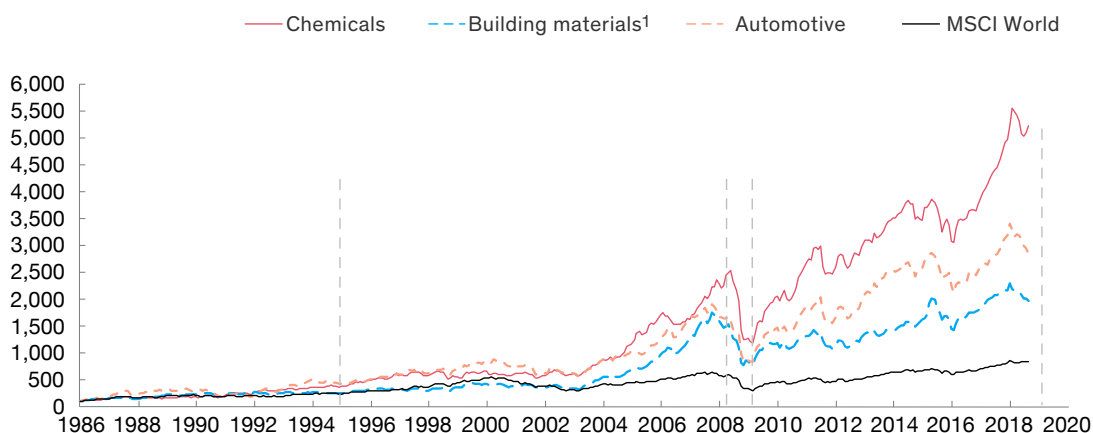
Since 2013, both winners and losers in the construction-materials market have reported similar gains and losses—in our sample of 144 companies, the average economic profit is close to zero. The effects of this weak value creation can be seen by looking at the very steep concentration of economic profit (Exhibit 2). The highest-performing construction-materials companies (the top quintile) capture almost the full economic profit of the industry, whereas the next 60 percent of companies (quintiles 2 to 4) create returns just above or below zero. Comparing the 2008-12 and 2013-17 periods further shows that only selected companies shifted their relative economic profit-generation quintiles, with 87 percent of the companies in quintiles 2 to 4 staying in their quintile. Most movements were only to adjacent quintiles, and only about 35 percent of bottom-quintile companies in 2008-12 improved their position by 2013-17.

Exhibit 1

The building-materials market outperformed MSCI but lags adjacent industries.

Cumulative total return to shareholders (TRS)

100 = situation on 02-Jan-1986



¹ Construction-materials index consisting of 135 construction-materials companies across the globe

Source: Capital IQ

Exhibit 2

Top-quintile performers earn nearly all of the building-materials industry's economic profit.

N=105;

average economic profit (\$ million) 2013-17

Cluster	Quintile	Revenues Billions	NOPLAT ¹		Turns ² Times	Economic Profit \$Billions	Share of sub segments						
			Margins Percent				HVAC	Interior	Insu- lation	Exterior wall/roof	Windows /doors	Glass	Multi- players
"Winners"	Q1A	42	11.4%	2.5		1.9	40%	7%	60%	15%	36%	0%	24%
	Q1B	12	8.0%	2.5									
"Value neutral"	Q2	11	9.1%	2.5		0.2	20%	27%	20%	8%	27%	0%	18%
	Q3	51	5.7%	2.1	Total EP 0	0	20%	20%	20%	31%	9%	8%	29%
	Q4	10	4.5%	1.4	-0.2		13%	33%	0%	31%	9%	17%	12%
"Value destroyers"	Q5	103	3.5%	1.2	-2.6		7%	13%	0%	15%	18%	75%	18%
							Σ100%	Σ100%	Σ100%	Σ100%	Σ100%	Σ100%	Σ100%

¹ Net operating profit less adjusted taxes

² Defined as revenue/invested capital, excluding goodwill

Source: McKinsey Corporate Performance Analysis Tool

While other industries also see much of their profit concentrated among a small number of players, the building-materials industry is an extreme example: 90 percent of its economic profit is generated by just 20 percent of companies.

By and large, industry subsegment was not a strong predictor of a company's performance. The two exceptions were glass, whose players are concentrated at the low end, and insulation, where no companies performed below the third quintile. In the other five subsegments, a significant share of the players were successful value creators, value neutral, and value destroyers.

These findings suggest both that the potential for profitability improvement is high, and the need is urgent. The industry must identify the drivers of

strong performance at both the subsegment level and across the industry as a whole.

Business model

Let's look in more detail at the market trends identified above, and their implications for the sector participants' business models.

More multifamily homes mean fewer building materials per unit

Europe shows widely varying rates of construction. Low mortgage interest rates have kept residential construction steady in many places, and fueled rises in important markets such as Germany, France, and Poland. But other countries, including Italy and Spain, are still recovering despite the low interest rates: in these markets, new residential

construction has been shrinking by 4 to 10 percent per year.

Even where residential-construction activity is on the rise, an increasing share is on multifamily homes. These usually require less building material per unit than single-family houses, and in some cases use different material types as well, reflecting changes such as flat roofs rather than pitched roofs. This trend has led to slower growth for some material types, and to decline for others such as roof tiles.

We find that the profitability of building-material players across Europe differs mainly due to different price levels and market sizes. Our analysis shows three main drivers for market attractiveness: the market's size, its future growth, and its intrinsic profitability due to factors such as market prices, energy cost, raw-material cost, and labor cost.

As a result, it becomes important for companies in the sector to position themselves carefully. Location becomes particularly crucial for most subsegments, where organizations should strive to balance proximity to raw materials with proximity to large cities to keep transport costs low. Moreover, in some markets, the leading position of one or two major players may inhibit new players from entering—further limiting growth opportunities for outsiders.

Strong and stable regional preferences for building-material types in European markets limits innovation

There are clear regional preferences for the types of building material used, and a general aversion among customers to risk trying new materials results in little variation in the selection of building materials within regions.

In Germany and Belgium, for instance, the primary construction material for walls is clay blocks, a material barely used in the Netherlands or the UK—where calcium silica and concrete are the most commonly used materials. This market preference makes it extremely difficult for construction-materials companies to balance regional demand variations with exports. The stability of choice is also driven by producers' current plant networks:

for items such as wall bricks, transport costs for distances of more than 300 km often make orders unprofitable. These constraints further restrict growth opportunities, with little possibility of growing through new product types or exports.

Market consolidation leads to larger, more complex companies

The sector's high level of M&A deals over the last decade have furthered consolidation of the building-materials market (Exhibit 3). Historically, many companies in the sector started as family-run businesses, but now are being acquired by global companies. This trend began in cement, where strong market consolidation has already happened and turned the market into a truly global business. Many other subsegments are following this trend, including insulation materials, brick manufacturing, fiber-gypsum production, and others.

Consequently, many players have increased both in size and complexity—factors making an excellent operations strategy even more critical in capturing potential synergy effects from newly acquired assets.

Tighter environmental regulations and shifts in energy sources raise costs and reduce gypsum supply

The fourth trend is the regulation of carbon-emissions trading, which increases pressure on materials companies to reduce energy consumption. The typical cost of energy for a building-materials company ranges between 15 and 20 percent of the total cost of goods sold (COGS), and therefore represents a major cost component on the balance sheet.

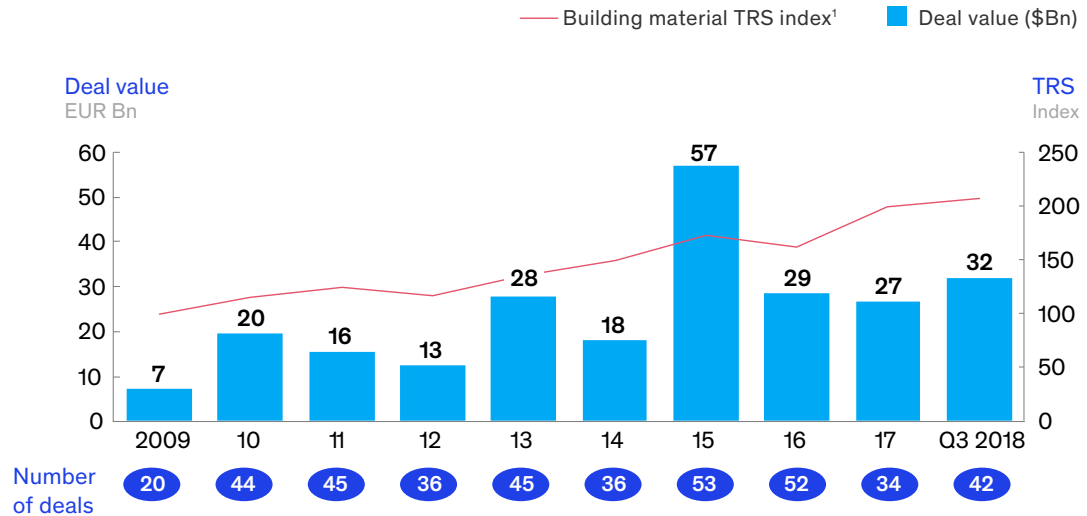
Recycling building materials is becoming more important as well, as construction and demolition generate significant waste. There are two main consequences for the producers of materials: 1) the need to develop products that can be recycled after demolition; and 2) the use of recycled materials as the starting point for new products.

Another supply-side factor weighing on costs is the transition from coal to renewable energy. A large

Exhibit 3

M&A activity and potential for industry consolidation have grown along with the industry's recovery.

Cumulative total return to shareholders (TRS) for building-materials industry, and transactions trend



¹ Datastream-defined index consisting of 189 building material companies across all regions

Source: Dealogic

percentage of today's production of gypsum—a major input to construction materials—is by flue-gas desulfurization in coal plants. As energy generation shifts away from coal, the supply of gypsum is expected to decrease. This may lead to a shortage of gypsum in the short term, and increasing prices in the long term, as the amount of gypsum gained through natural exploitation increases.

Construction-workforce shortages restrict growth in several countries

Globally, the construction industry is just about as productive today as it was 50 years ago, despite productivity advances across many other sectors. In many countries, investments in infrastructure are expected to grow, but workforce shortages are making it difficult to meet the demands for new construction. For example, the current construction workforce in the UK is estimated to be short some

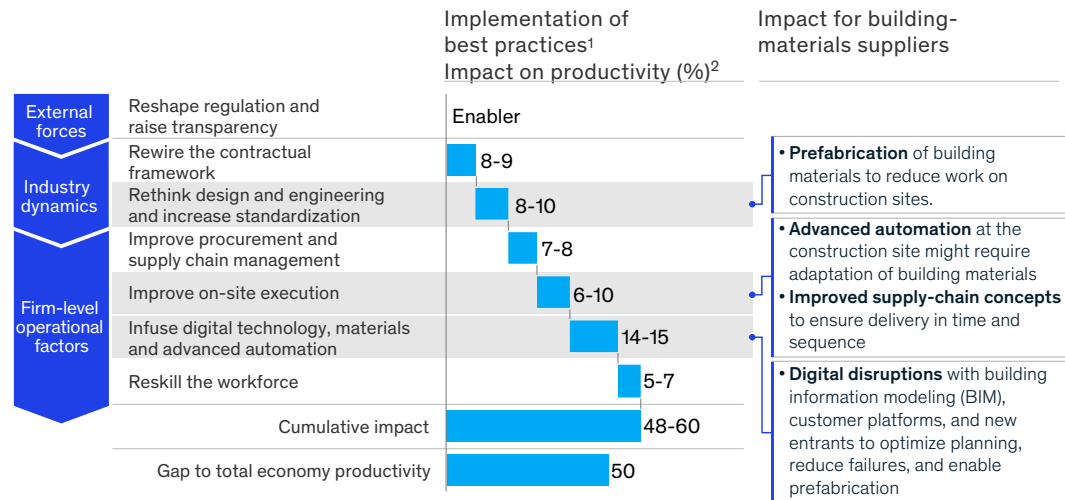
200,000 workers, with few options for rapidly closing the gap. Shallow labor pools will limit the number of projects that can be executed, and the resulting demand for construction materials, constraining growth for construction-materials companies.

To significantly increase productivity within the construction sector, the McKinsey Global Institute has conducted research to identify levers spanning external regulation, industry dynamics, and firm-level operations (Exhibit 4). Three levers are particularly relevant in building materials:

1. **Prefabrication.** New designs enabling easier construction (such as incorporating larger elements), along with pre-fabrication and standardized offerings, can reduce manual workload at building sites. This evolution

Exhibit 4

Seven levers can help boost construction productivity, with three pertaining to building materials.



¹The impact numbers have been scaled down from a best-case project number to reflect current levels of adoption and applicability across projects, based on respondents to the McKinsey Global Institute (MGI) Construction Productivity Survey who responded "agree" or "strongly agree" to the questions around implementation of the solutions

²Range reflects expected difference in impact between emerging and developed markets

Source: McKinsey Global Institute analysis

could lead to higher customization of building products at the factory, with attendant increases in workload and customer or decision-maker interactions at building-materials production locations. Some construction players are already building lower-complexity houses, using prefabricated materials and heavy reliance on offsite construction to significantly reduce building costs.

2. *Advanced automation on construction sites.*

More automation solutions are now available at construction sites to improve on-site execution, potentially leading to design changes in building-materials products. Brick-laying robots, for example, may need redesigned bricks in order to generate their full potential.

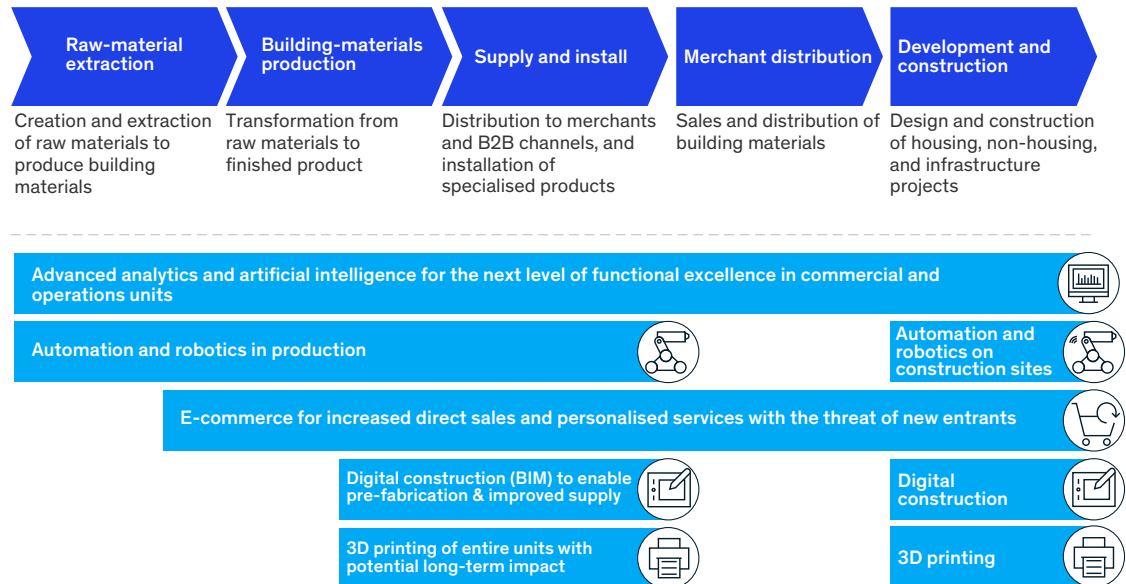
3. *Digital technology.* Further innovations will likely continue to improve today's on-site planning, with building-information modeling (BIM) tools that link building-materials characteristics into a single, integrated solution for better planning and easier plan or product changes. Digital technology is an important enabler of earlier and more intense interaction between building-materials suppliers and decision makers.

Digital disruptions across the value chain

Like most sectors, the building-material industry is facing digital disruptions across the full value chain (Exhibit 5). And, as in other process industries, there is a high potential to significantly increase functional excellence across all operations, commercial, and general and administrative units. Advanced

Exhibit 5

Digital disruptions are affecting every link in the building-materials value chain.



Source: Expert interviews, team analysis

analytics, digital tools, and advanced automation technologies can together help increase margins, reduce costs, and improve customer satisfaction with better service and quality.

The building information modeling (BIM) systems mentioned above are a specific digital disruptor for this sector. By creating a shared knowledge network and communication tool for all stakeholders involved in a construction project, BIM has the potential to enable prefabrication, more standardized products, and easier changes, without common construction-site mistakes.

There is also the long-term prospect for buildings, or major components, to be 3D printed. But although example projects exist, industry experts see its widespread use potential as low, and mostly confined to non-residential buildings.

Operational improvement strategies to boost performance

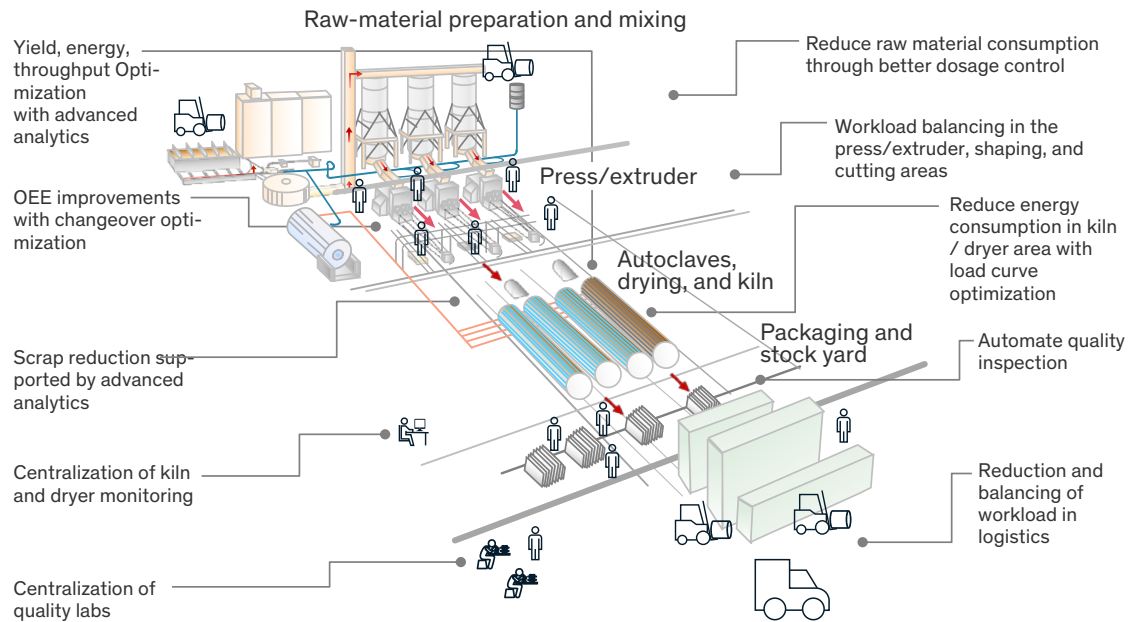
While the larger goal is to increase overall productivity across the entire construction sector, our experience shows that individual construction-materials companies can significantly improve their profitability and create sustainable value by setting up their own operations-improvement programs.

A typical cost structure shows that labor, raw materials, and energy are the most important COGS categories, with their relative importance varying depending on the exact production process. Accordingly, there are several performance-improvement and cost-optimizing levers that can be implemented along the value chain, including (Exhibit 6):

Exhibit 6

Along the value chain, several changes can improve operations and optimize cost.

Example of typical levers along the value chain



Yield, energy, and throughput optimization.

This lever focuses on thermal processes in the autoclave, dryer, or kiln, and can result in either higher throughput at current energy costs, or reduced energy costs while maintaining current volumes. When modeling production and sensor data, optimization models for the heating curves can be generated that adjust the thermal parameters depending on production speed, product requirements, and raw-material recipe. This, in some cases, also requires an adaptation of the production sequence.

Workload balancing and use of digital alarm systems.

Since the many physical spaces within a building-materials plant require high levels of process observation, automated alarm systems can help balance workloads and reduce wasteful

observation tasks. Over time, this approach could eventually enable flexible operators to move between stations on packaging lines, presses, and cutting, under a control room/flexible operator setup common in other process industries.

Automation of material handling and quality control.

As material handling in many building-materials plants is still manual, autonomous guided vehicles (AGVs), automated palletizing, and automated sorting can have a large impact. In addition, visual quality inspection can be automated with the current generation of automated visual-inspection tools.

Plant and distribution-center optimization.

Many building-materials companies have large plant and distribution-center networks—but not all are

in the right micromarkets. Analyzing each plant's contribution margin shows the underperformers. This information could then be further evaluated—through a macroeconomic outlook of the relevant region, for example—in order to determine whether production shifts are warranted.

Cross-network product- and order-allocation optimization. This usually requires that customers order in regional or centralized service centers that guide them to the best plant. Ideally the optimization would include the additional cost of a short-notice changeover and, if cheaper, would direct the customer to the second-best-located plant.

Route optimization. Routes (and potentially milk runs) could be adjusted in order to optimize the fill level of the trucks and, thus, the transport costs.

A final optimization lever that is highly effective across network and plant optimization is the

reduction of the product portfolio. Some companies can achieve SKU reductions of 30 to 50 percent while also stabilizing production at lower cost, simplifying product allocation, and minimizing stock-outs for customers.

While the decade following the global financial crisis has brought a modest level of growth back to Europe's building-materials industry, multiple trends related to cost, consolidation, and market demand have limited profitability to a small number of players. Several levers can help reignite construction and increase overall productivity over the long term. But building-materials companies seeking an immediate improvement in their individual performance in an industry under pressure will need to focus on resource-related operational improvements.

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