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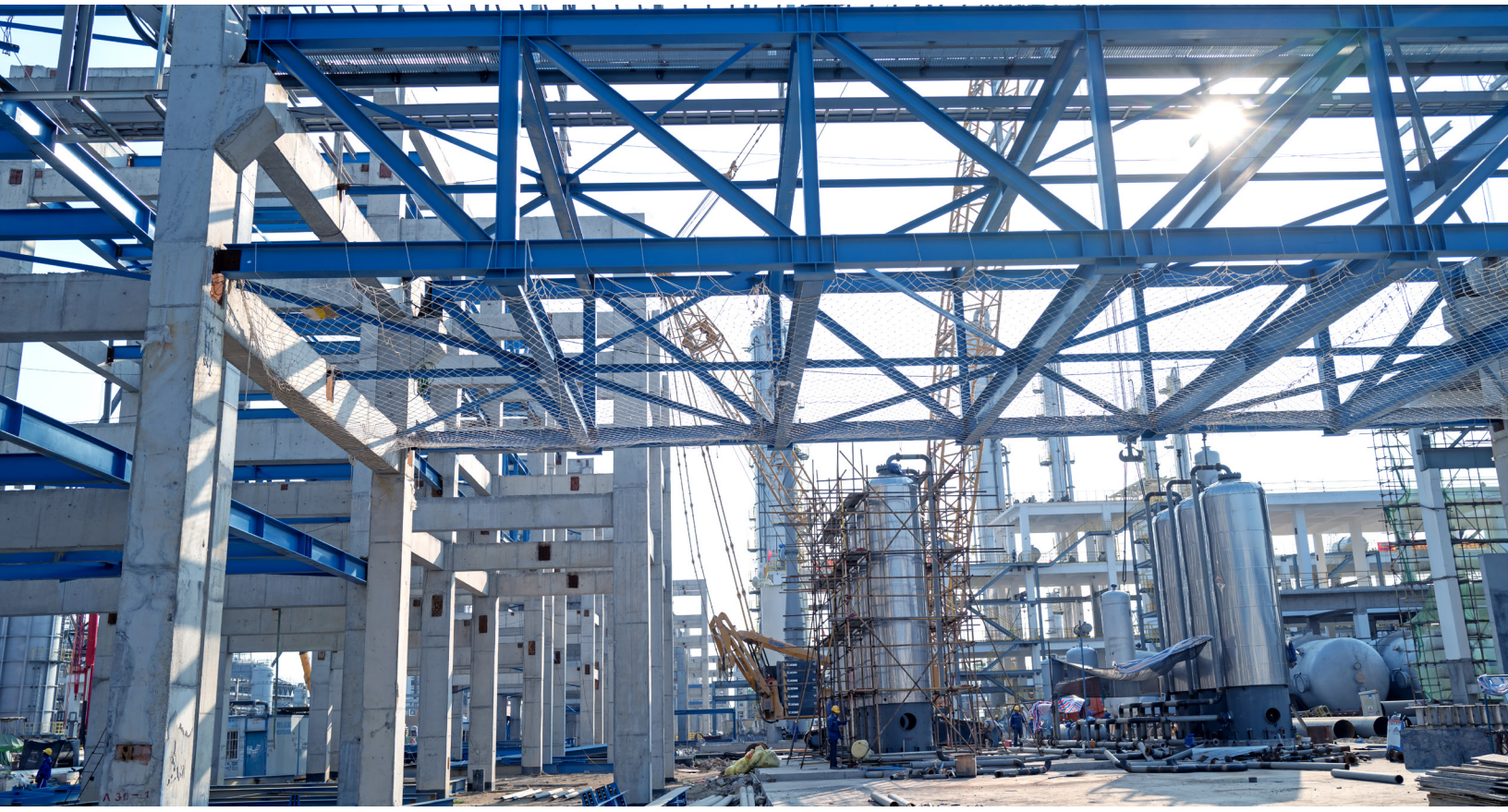
Operations Practice

Delivering on construction productivity is no longer optional

Why the construction industry must climb out of its productivity rut—and why it hasn't yet.

by Jan Mischke, Kevin Stokvis, and Koen Vermeltfoort with Birgit Biemans



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When it comes to creating a more sustainable future, the construction industry has a great role to play. On top of fulfilling critical economic and societal needs for offices, housing, hospitals, and infrastructure, the industry can help meet net-zero goals by 2050 by developing and executing the needed projects, including renewables, low-carbon activities, infrastructure, building insulation, and more.

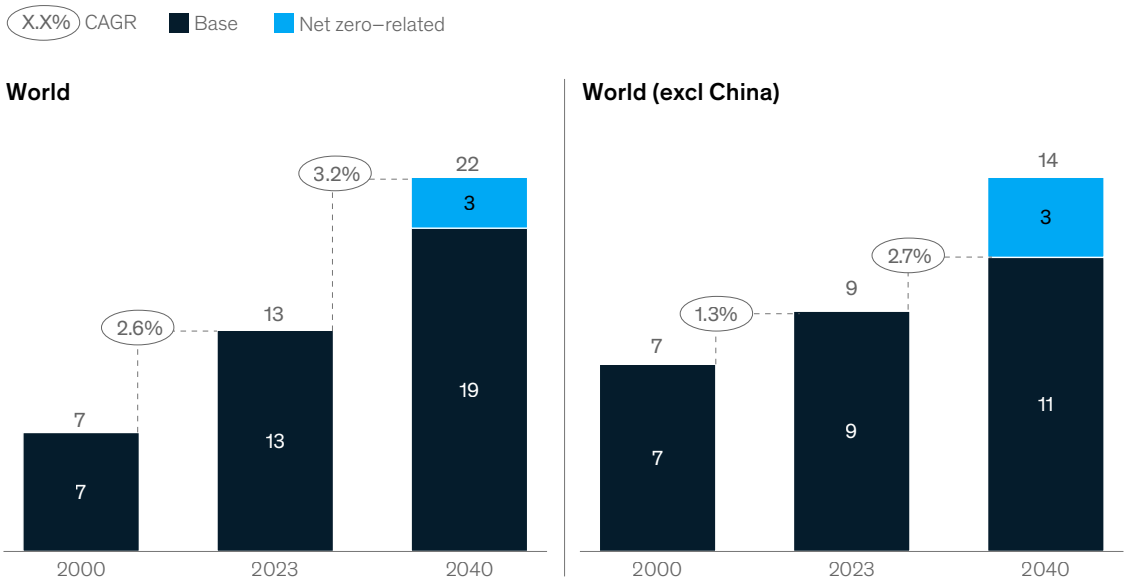
The construction industry could thus be on the brink of remarkable expansion: in constant prices, global construction spending is projected to escalate from $13 trillion in 2023 to a striking $22 trillion in 2040, which would require a CAGR of 3.2 percent.[1] While this is no faster than the rapid China-driven expansion of the past two decades, outside of China, the industry will need to double its growth rate (from 1.3 percent to 2.7 percent CAGR) to deliver on the projections for 2040 (Exhibit 1).

The demand is clear, but how the construction industry will meet it, is not. The industry is lacking sufficient capable workers, and economic labor productivity (the economic value added per hour worked) has stagnated for decades globally despite technological advancements and improvements by individual firms. Any shortfall in output would cause significant bottlenecks in country-level economic, social, and environmental ambitions and is hampering countries' abilities to address critical needs of a growing population or meet societal goals, such as affordable housing and net-zero targets.

Exhibit 1

Construction is already one of the largest industries, but its growth rate (excluding China) would need to double to meet 2040 demand.

Annual construction spend, $ trillion (real 2019),[1] 2000–23 and 2023–40



Note: Figures may not sum to totals, because of rounding.
[1]Base spending is calculated based on IHS Markit estimates. Net-zero-related spending is calculated based on McKinsey Global Institute forecasts, which assume that all net-zero capital expenditures in power, buildings, fossil fuels, and industry are directed to construction (but not to machinery or other physical assets).
Source: McKinsey analysis based on data from IHS Markit and McKinsey Global Institute

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[1] IHS Markit data in real 2019 US dollar with projected net zero–related construction calculated using McKinsey Global Institute net-zero estimates, assuming all net-zero capital expenditures in power, buildings, fossil fuels, and industry directed to construction (and not to machinery and other physical assets). Two-thirds of capital expenditures was redirected and included in IHS projections, and one-third was new capital expenditures that was added on top of current projections.

Building on the 2017 McKinsey report on construction productivity,[2] this article aims to highlight the increasing urgency to bridge the gap between the construction industry's lagging productivity and its role. As the first in a series of articles, this piece will focus on historic trends of productivity in construction, the reasons why recent efforts to improve productivity have not been effective, and the broader implications this trend has. Later articles will cover several approaches for the industry to improve productivity in more detail.

A shortfall in construction output looms without faster productivity growth

The construction industry[3] remains one of the world's largest industries. In 2023, $13 trillion worth of gross annual output was devoted to construction projects globally, constituting 7 percent of global gross output. By 2040, the industry could grow by around 70 percent, but engineers and constructors in many parts of the world are struggling to deliver even today's project pipeline. They're already faced with tight labor markets for critical roles, such as engineers, craft workers, and project managers, and there is no evidence that the near-term labor market will be able to keep up with demand.

An increase in productivity is hence needed to allow the industry to deliver projects with the same or fewer people per project. It would also create the financial space within construction companies to increase wages and invest in better tools and practices.

Historically, construction productivity has flatlined

The story of lagging construction productivity is an old one (see sidebar "Aggregating construction productivity"). Apart from selected economies, the issue has been perennial around the world for the past two decades. Despite individual companies' efforts, at the aggregate level, construction productivity improved by only 10 percent (0.4 percent annually) between 2000 and 2022, compared to a 50 percent (2 percent annually) productivity improvement of the total economy and 90 percent (3 percent annually) productivity improvement for the manufacturing sector for the same period. From 2020 to 2022, productivity in the global construction industry has even declined by 8 percent (Exhibit 2).

Aggregating construction productivity

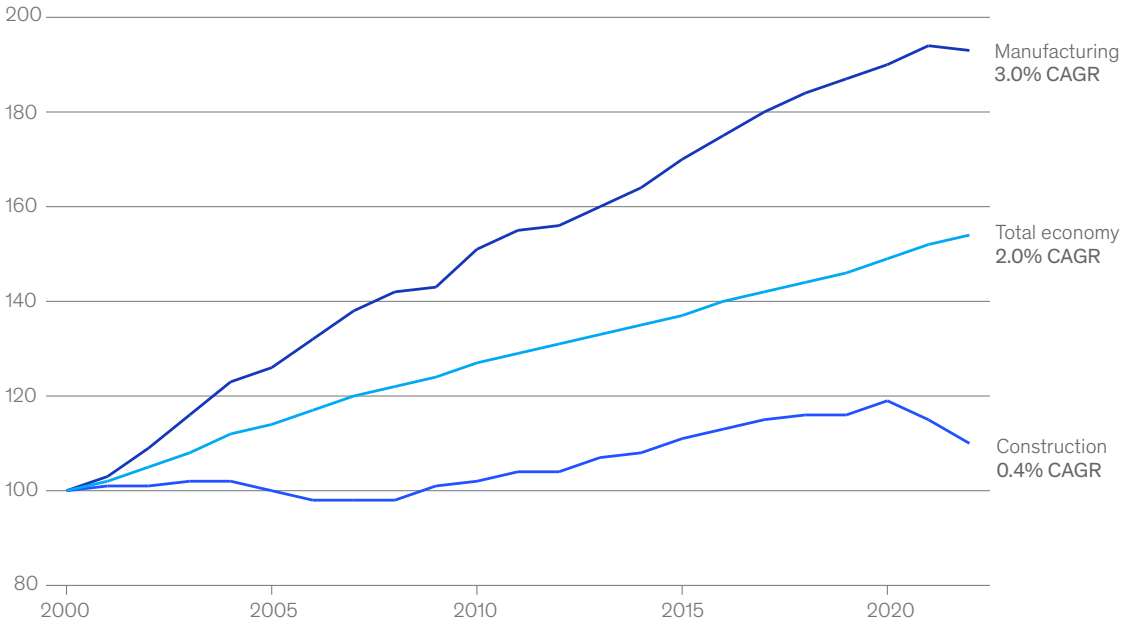
The focus of this article is on economic labor productivity, which is defined as the value added (VA)—gross output or revenues minus purchased materials and supplies—per hour of work, adjusted for increases in construction and input prices. The findings in this article are based on economic labor productivity data for 42 countries across the globe. Together, these countries represent about 90 percent of construction's global VA. The average rate of productivity growth for each country was aggregated to the global level by multiplying it with that country's share of the total construction VA. Sources used include the International Labour Organization, IHS Markit and S&P Global, the OECD, the United Nations, and national statistical agencies, such as the National Bureau of Statistics of China and the US Bureau of Labor Statistics.

[2] *Reinventing construction through a productivity revolution*, McKinsey, February 27, 2017.
[3] For the purposes of this article, the definition of the construction industry aligns with IHS Markit's and the International Standard Industrial Classification of All Economic Activities (ISIC)'s description and includes engineering and construction sectors.

Exhibit 2

Labor productivity in construction continues to lag behind productivity in manufacturing and the total economy.

Real gross value added per hour worked (global),[1] 2000–22 (index: 2000 = 100)



[1]Includes 42 countries with sufficient data availability; they account for >90% of 2022 construction value added.
Source: McKinsey analysis based on sources from IHS Markit, the International Labour Organization, OECD, the UN, and local statistical offices

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Whatever productivity growth there was in construction in the past decade mostly came from developing economies that have adopted foundational productivity practices, such as upskilling the workforce. Conversely, in the world's most advanced economies, namely the United States and Europe, there has been virtually no progress. For example, between 2000 and 2021, construction productivity CAGR in China was 4 percent, whereas the global average was only 1 percent (Exhibit 3) and the United States had negative growth of 2 percent per annum.[4]

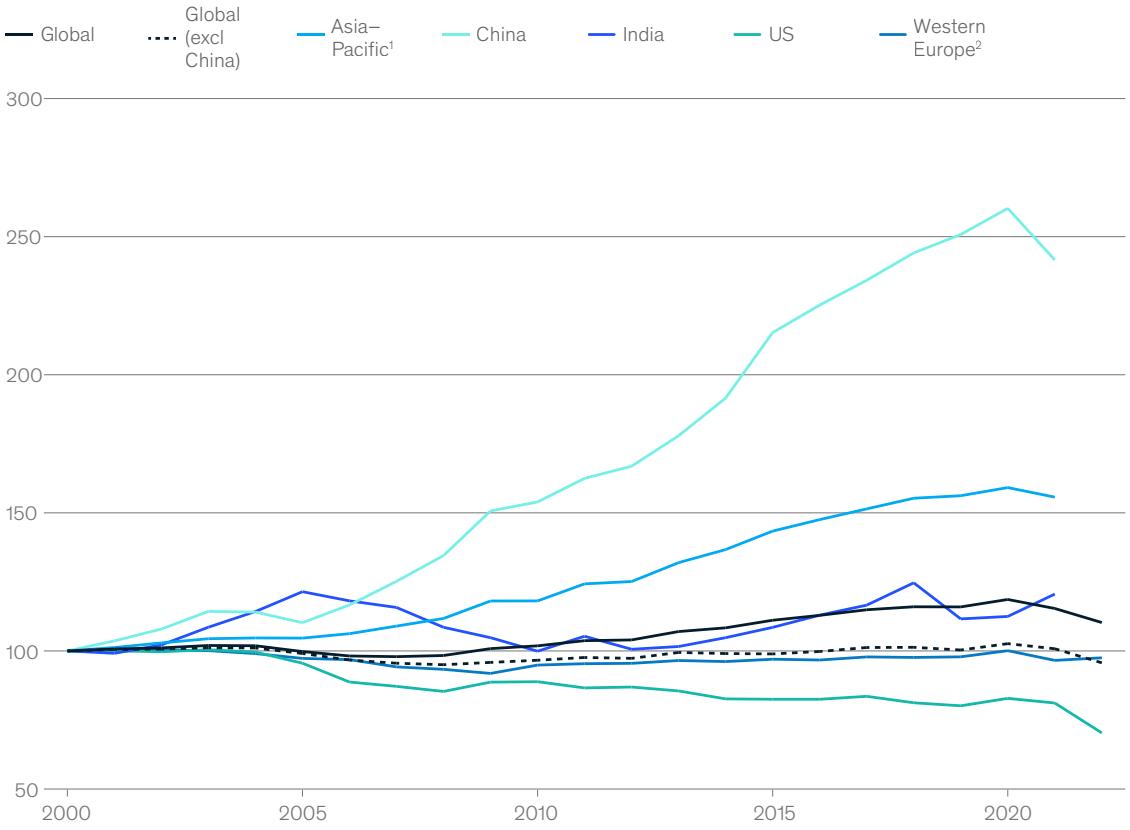
Related to low productivity growth, construction became 1 to 3 percent more expensive[5] each year globally on top of general inflation. Between 2015 and 2023, the cost of construction rose 36 percent in Europe,[6] and construction prices (nonresidential) in the United States rose 52 percent, reaching double-digit growth rates in 2022.[7]

[4] McKinsey analysis based on sources from the International Labour Organization, the OECD, IHS Markit, and local statistical offices.
[5] McKinsey analysis based on IHS Markit, global economic data, and comparative industry service data.
[6] "Construction producer price and construction cost indices overview," Eurostat, July 2023.
[7] "Producer price index by commodity: Construction (partial): New nonresidential building construction," US Bureau of Labor Statistics, 2023.

Exhibit 3

Global construction productivity was boosted by China's improvement but is showing signs of slowing down.

Real gross value added per hour worked in construction sector, 2000–22 (index: 2000 = 100)



[1]Australia, China, India, Indonesia, and Japan used as proxies.
[2]Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, and the UK.
Source: McKinsey analysis based on sources from IHS Markit, the International Labour Organization, OECD, the UN, and local statistical offices

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Amid shrinking workforces in advanced economies, labor cannot compensate for low productivity growth

The obvious way to grow construction output amid stagnant productivity would be to hire more people, but the current labor market has pushed that option off the table in many economies and has added to concerns of escalating construction costs.

As of 2020, the construction industry employed roughly 8 percent of the global workforce.[8] In the United States, the average number of vacancies in construction almost doubled between 2017 and 2023, increasing from 200,000 to 380,000 across the industry.[9]

In addition to shortages in the workforce, retirement, shorter job cycles, and competition for

[8] "ILO Monitor: COVID-19 and the world of work, second edition," International Labour Organization, April 7, 2020.
[9] Job Openings and Labor Turnover Survey, US Bureau of Labor Statistics, 2023.

talent have caused a decline in the construction workforce's skill and experience levels. The World Economic Forum reported that building and related trades were among the most highly experienced positions to experience job shortages across the European Union.[10] The construction workforce's demographics are also skewed toward older age brackets, suggesting an erosion of the construction workforce's expertise as that demographic retires.

In the United States alone, 41 percent of the construction workforce from before 2020 is expected to retire by 2031.[11] In the United Kingdom, the sector is expected to lose about a quarter of its workforce within the next 15 years because of retirement.[12]

Looking to 2040, the outlook is hardly encouraging. Across advanced economies—and in China—overall workforce projections are near zero or negative because of aging (Exhibit 4).[13] And while several economies have shown that it is possible to grow the construction share of the total workforce, this is much harder to do without significant international immigration (such as in Australia) or internal migration from farms to cities (such as in China and India).

Labor shortages and productivity challenges may result in a shortfall in construction output of up to $40 trillion

At the current trajectory of stagnant productivity and slow or negative projected workforce growth, construction output might fall short of demand by $40 trillion cumulatively by 2040 (see sidebar "How the construction industry might evolve").[14]

How the construction industry might evolve

Besides the historic trends and future demand, two hypothetical scenarios have been developed that illustrate how the construction industry might evolve depending on its workforce size and productivity growth:

— *The current trajectory.* The current trajectory was calculated by looking at the ten countries with the biggest construction gross output and projecting how much they could improve based on the average productivity growth of the past 20 years and the expectation that projected workforce growth would remain in line with the medium national projections by the World Bank. The gap between the projected need and what could be delivered was then scaled to the whole industry.

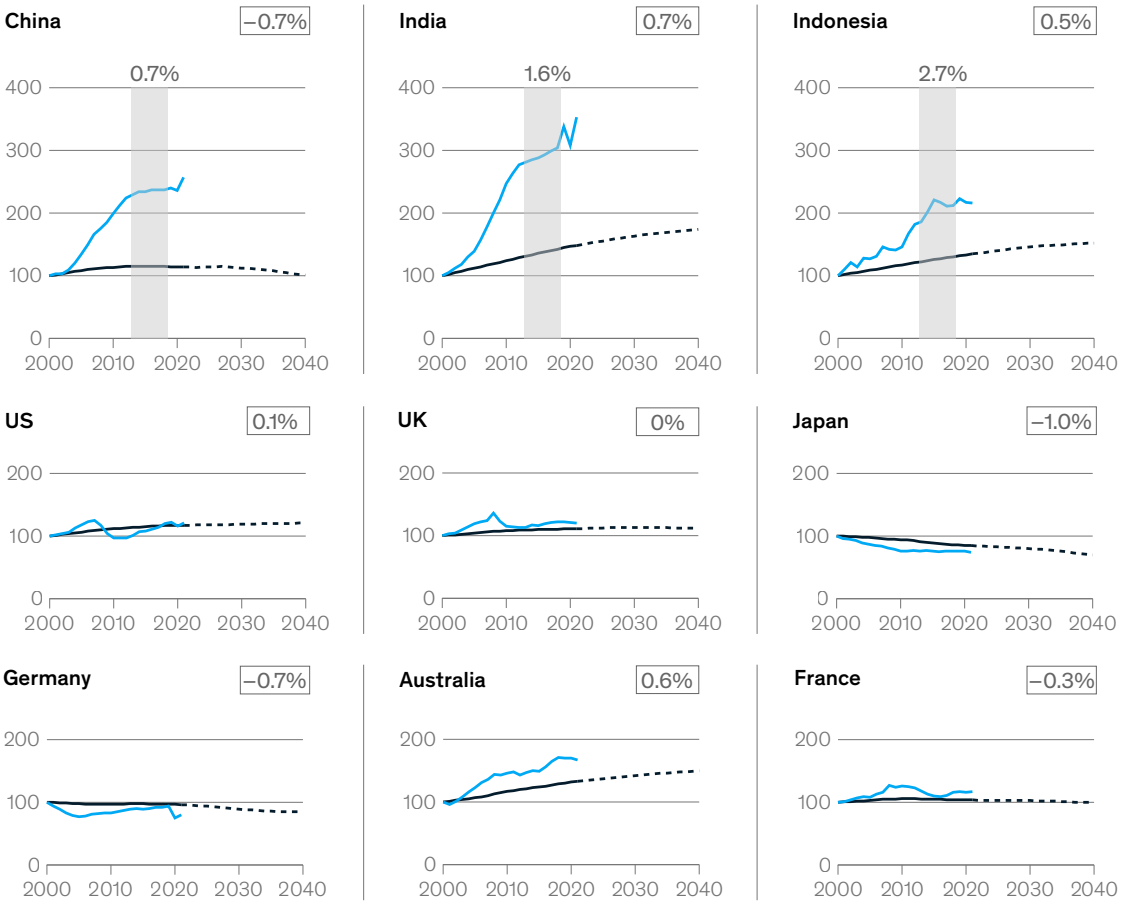
— *The optimistic trajectory.* This scenario assumes productivity growth of an additional 1 percent on top of the trend of the past 20 years and that the workforce grows with the highest population projections (or pre-COVID-19 construction workforce growth if that rate is higher). This scenario implies that China will not have a shortfall in construction supply.

[10] *Future of jobs report 2023*, World Economic Forum, April 30, 2023.
[11] *The next normal in construction*, McKinsey, June 4, 2020.
[12] "Diversity and inclusion," Construction Industry Council, accessed May 21, 2024.
[13] "Population estimates and projections," World Bank, 2022; population aged 15 to 64 used as proxy for workforce.
[14] McKinsey analysis based on data from the International Labour Organization, the OECD, IHS Markit, the United Nations, and local statistical offices (such as the National Bureau of Statistics of China and the US Bureau of Labor Statistics).

Exhibit 4

In advanced economies and in China, workforce growth projections are near zero or negative.

Labor workforce (aged 15–64) growth,[1] 2000–40 (index: 2000 = 100)



[1]Workforce projection based on UN 80% upper-bound scenario, ages 15–64.
[2]Assumption that construction workforce follows same trend as total workforce projection.
Source: "Population estimates and projections," World Bank, 2022 (population aged 15–64 used as proxy for workforce); McKinsey analysis based on sources from IHS Markit, the International Labour Organization, OECD, the UN, and local statistical offices

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In a more optimistic scenario, assuming countries can increase the average productivity by 1 percent annually on top of the trend of the past 20 years, and that the workforce grows in line with a high case scenario,[15] the cumulative required spending on construction can be met, showing that if construction productivity can be improved, future demands can be met, which reinforces the necessity for countries to start promptly (Exhibit 5).

Because of the construction industry's foundational and enabling role for other sectors, capacity limits in the industry would have far-reaching ripple effects. The net-zero transition may be delayed, growth ambitions may be deferred, and countries may struggle to meet the infrastructure and housing needs for their populations.

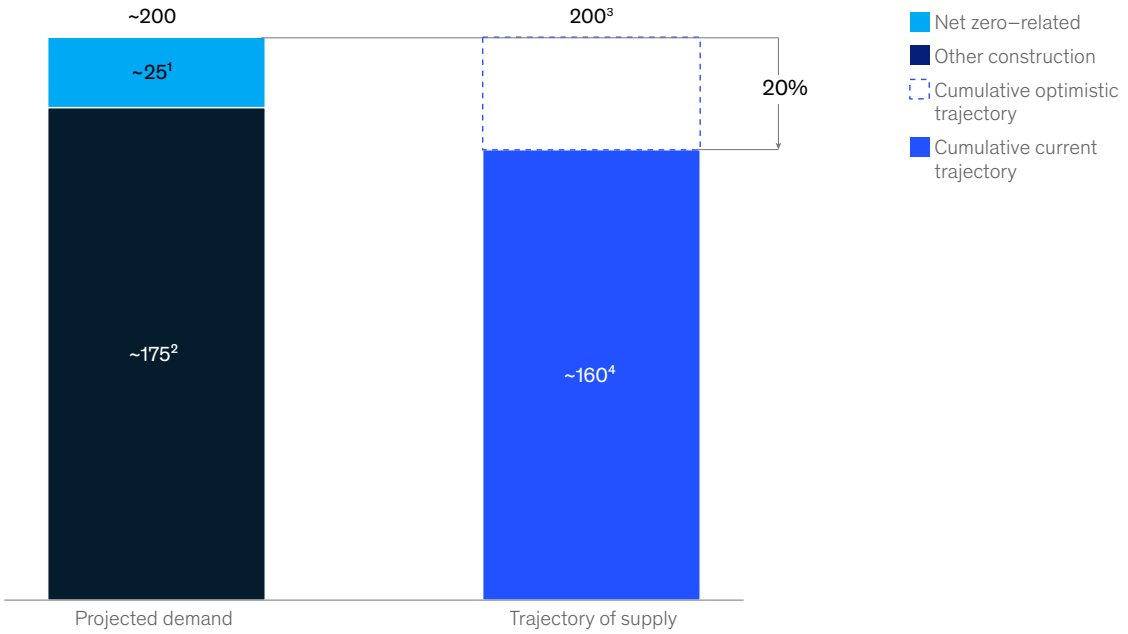
Several examples of these challenges are already present today and may severely worsen. The rate of housing production is well below needs in many economies. Public infrastructure provisions are being threatened by the difficulty of delivering complex projects on time and on budget. The build-out of the semiconductor industry is reliant on addressing the shortages in construction, but

[15] McKinsey analysis based on World Population Prospects 2022 data, United Nations, July 2022 and Employee Assistance Program employment data.

Exhibit 5

On the current trajectory, construction output might fall short of demand by $40 trillion by 2040.

Cumulative construction spend, 2023–40, $ trillion (real 2019, excluding China)



Note: Figures may not sum to total, because of rounding.
[1]McKinsey Global Institute net-zero estimates, assuming 25% of net-zero capital expenditures directed to construction (but not to machinery and other physical assets).
[2]Base spending is calculated based on IHS Markit estimates.
[3]Optimistic projection based on UN high-variant workforce projections and countries with relatively higher construction force growth and upper-quartile global productivity (excl China).
[4]Projections assuming current output indexed to workforce trends and unchanging productivity; workforce trends based on World Bank projections for population aged 15–64.
Source: McKinsey analysis based on sources from IHS Markit, the International Labour Organization, OECD, the UN, and local statistical offices

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many projects have struggled to find the right talent. In the United States, in an example cited by Bloomberg, a $40 billion chip factory in Arizona was due to be operational in late 2024 but has been postponed until 2025 because of a skilled-labor shortage.

Various industry efforts have not led to measurable industry-wide productivity improvements

While the sentiment in the sector suggests significant efforts have been made to improve productivity, the results don't show for it. Many construction CEOs are perplexed by this data: they feel that because they have launched multiple initiatives and see improvements in their own companies, the industry overall must also see progress.

The 2017 McKinsey report on construction productivity captures the causes behind the low productivity,[16] many of which remain true. For example, in construction design, inefficiencies arise from a lack of standardization and significant friction between design and construction. These issues are compounded by the industry's tendency to offer bespoke solutions, which hinders the adoption of modular components and has resulted in slow industrialization in the sector since 2000.

This section spells out seven specific issues holding back measurable productivity gains that are front and center in discussions with executives.

Technology uptake has been slow and is mainly focused on control rather than productivity

The construction industry's uptake of technology has been slow over the past several decades. Historically, construction companies spent an average of less than 1 percent of revenues on IT, less than a third of what is common, for example, in automotive and aerospace.[17]

Since 2020, the interest in technology in the architecture, engineering, and construction (AEC) industry has grown compared to the previous three years. According to McKinsey analysis, between 2020 and 2022, venture capital and private equity funds invested $50 billion in AEC technologies globally—85 percent more than the three previous years, with the median deal size doubling since 2017.[18] But this increased technology investment has not yet led to an uptick in productivity.

When considering nine widely discussed technological innovations in construction, the more established ones largely focus on increasing control or other priorities, such as design, safety, and usage of new materials, and less on direct workforce productivity (Exhibit 6). The two technologies adopted at scale mainly digitalize the current processes (such as digital document management and building information modeling) or report and monitor data (through tracking sensors, for instance). While they are meant to materially improve productivity by, for example, improving engineering and planning or reducing rework, they are typically not yet deployed in a way that would fundamentally transform ways of working for the majority of workers.

[16] *Reinventing construction*, February 27, 2017.
[17] Rajat Agarwal, Shankar Chandrasekaran, and Mukund Sridhar, "Imagining construction's digital future," McKinsey, June 24, 2016.
[18] Jose Luis Blanco, David Rockhill, Aditya Sanghvi, and Alberto Torres, "From start-up to scale-up: Accelerating growth in construction technology," McKinsey, May 3, 2023.

Exhibit 6

Most construction players have not yet adopted at-scale productivity innovations, many of which offer increased control.

Mature innovations in the construction sector, nonexhaustive

	Type of impact (example use cases)	
	Productivity improvement (cost or time decrease)	**Increased control of process and risk[1]**
Widely adopted		— **Digital document and contract management** (paperless workflows; digital permitting; job hazard analysis)
Frequently adopted	— **Prefabrication and modular** (centralized product libraries for modular designs; off-site product-based offering)	— **5D building information modeling[2]** (rapid design concept evaluation; building of performance simulation; real-time project control; change order evaluation)
Selectively adopted	— **3D printing** (planned structures visualization; rapid prototype creation; on-location creation of parts) — **AI** (generative design and scheduling; predictive maintenance; route optimization; resource management; automated safety and quality control)	— **Internet of Things** (smart cameras for safety compliance control; sensors for real-time equipment location and productivity tracking)
Sporadically adopted		— **Automation or robotics** (worker aids or exoskeletons; automation of labor-intensive activities; autonomous transport) — **Supply chain marketplaces** (B2B marketplaces for labor, materials, and equipment) — **Augmented or virtual reality** (augmented reality–guided quality assessment or operation; gamified apps-based training)

[1]Includes control, monitoring, measurement, modeling, and safety assurance.
[2]BIM is widely used in major firms for the design and construction phases; "true" end-to-end usage is still not applied broadly.
Source: Jose Luis Blanco, David Rockhill, Aditya Sanghvi, and Alberto Torres, "From start-up to scale-up: Accelerating growth in construction technology," McKinsey, May 3, 2023; "Rise of the platform era: The next chapter in construction technology," McKinsey, October 30, 2020; McKinsey analysis

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The focus on control and risk is understandable. When reviewing financial results per project, executives often lament the effect the few negative projects had on their overall performance. These negative projects often trigger improvement efforts focused on better controls, governance, and risk management, which are undoubtedly important. But too often, the upside from systematic productivity improvements across the entire portfolio, including the majority of profitable projects, is missed.

In turn, direct workforce productivity–focused technologies, such as prefabrication and supply chain marketplaces (which should make buying and selling materials easier by reducing efforts to request for quotes), are not yet delivering on their promise at scale. Many are still at the beginning of the learning curve or are lacking scale or implementation requirements. These innovations hold significant potential, but cutting corners in their implementation—for instance, if the team implementing the technology has limited frontline change-management experience—adds to the scaling and adoption challenge.

The industry struggles to scale improvements from one project to the entire portfolio

Project professionals that manage to propel improvement efforts in their projects often struggle to scale their efforts across the entire project portfolio. Every project has a different scope, context, team, and culture, which can be empowering for teams, but it can also result in distinctive ways of working and a resistance to adapt to changes or learnings coming from outside the project.

Timing may also impede efforts to scale improvements. The ideal time to install improvements and new working methods is in the early days of the project. However, the tender phase has a limited budget, and the effort might be wasted if the bid is lost. Moreover, because of the industry focus on lean timelines, companies typically start as soon as possible with a smaller team that focuses on technical aspects, procurement, and project deliveries rather than on improvement initiatives.

Finally, projects have little incentive to act as the pilot for the benefit of future projects. Typically, project outcomes are strictly managed with tight budgets, which discourages team leaders from piloting improvements that could dip into these resources.

Though difficult, portfolio-wide change is necessary to improve productivity and provide incentives for investments in tools that would enhance performance management. The low degree of standardization and industrialization among teams, activities, and ways of working across projects has limited the scaling up of improvement initiatives and discouraged companies from investing in structural improvements.

The industry has passed on results of productivity improvements

In some cases where the industry has improved its productivity and where construction companies could have improved their margins, many of these benefits are passed upward (to suppliers) or downward (to their customers) in the value chain. While this would be accounted for with perfect economic labor productivity statistics, margin pressure is strongly felt by construction firms and hinders their ability to invest in further improvement.

Passing improvements down may benefit customers. For example, for modular homes, end customers expect lower prices or faster delivery because they expect higher productivity and have less choice during the design process. Therefore, the value created with productivity improvements is partially dissipated to customers or is needed to overcome adoption barriers.

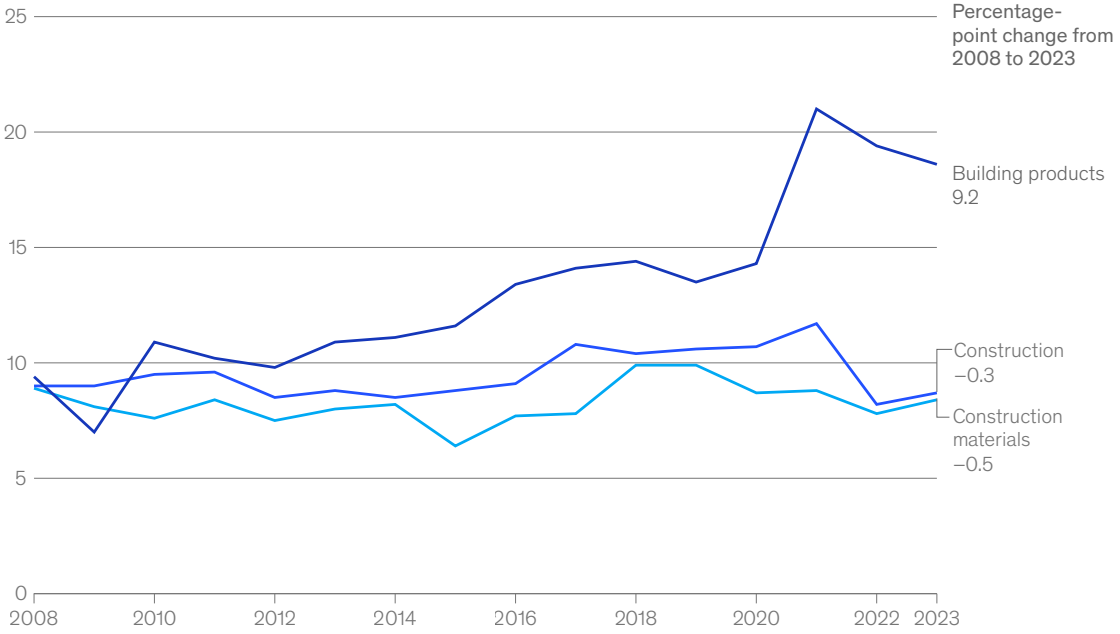
Though, prices to customers have increased as materials costs have risen. Construction companies were squeezed in the process: the post-tax ROIC of construction companies (and raw-material suppliers) decreased by 0.5 percentage points globally between 2008 and 2023, while product suppliers saw their returns rise 9.2 percentage points over the same period (Exhibit 7).

[19] "Modular building systems: Overview and benefits," National Association of Homebuilders, accessed May 22, 2024; Amina Niasse, "Prefabricated home shipments on the rise in a pricey property market," Reuters, November 7, 2023.
[20] Maurice van Sante, "Lagging productivity in construction is driving up building costs," ING Think, December 12, 2022.

Exhibit 7

Returns on capital have been under pressure in construction while increasing by more than nine percentage points in building products.

Post-tax ROIC by sector, 2008–23,[1] weighted average, %



[1]Based on 798 companies across the globe.
Source: McKinsey Corporate Performance Analytics, 2023

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Tender dynamics and low margins limit investments in construction firms

Despite high risks, construction is a relatively low-margin industry, leading to low degrees of investment. Under the pressure of competitive tenders, particularly when construction companies have excess capacity, tender teams factor gains from productivity into cost estimates within proposals, keeping margins thin or even leading to losses when they don't materialize. In the United Kingdom, for example, most pricing is done on a cost-plus basis, so the sector sees relatively consistent bid margins. Nonetheless, a 2019 study in the *Journal of Building Engineering* examined 2,700 projects and found that 44 percent of construction projects end at a loss.[21]

McKinsey analysis has found that tenders prepared in periods of high competitive pressure led to projects with lower realized margin. A less intuitive finding, however, is that the margins assumed in these circumstances were, on average, on par with tenders prepared with less competitive pressure. In other words, in these examples, the competitive pressure led to overly optimistic cost estimations rather than up-front margin reduction.

Low margins in general have contributed to construction companies' caution about investing in productivity: current ROIC rates often require a capital-light approach, and risky returns on investment are harder to swallow with thin earnings.

[21] Lukman A. Akanbi et al., "Investigating profitability performance of construction projects using big data: A project analytics approach," *Journal of Building Engineering*, November 2019, Volume 26.

Projects have become more complex, exposing construction companies to more risk

In tender processes, the lowest bid is often the winning bid. Skeptics argue, however, that these winning bids too often come from the player with the grandest underestimation of risks rather than the player that is best and most productive, which adversely affects productivity in the sector. In principle, dealing with complexity and risk adds real customer value, can be charged for, and thus could drive up value added and productivity if properly handled. Yet in most of construction, mispricing and mismanagement of risk undermine this mechanism. Some industry experts argue that the current approaches to risk-sharing and cost estimation cannot keep up with the ever-growing increase in project complexity, risk, and scope.

One reason for rising complexity is that brownfield projects make up a larger share of the pipeline, increasing from 13 percent in 2012 to 22 percent in 2022.[22] This adds complexity and uncertainties that are typically underestimated in the early phases of a project and ultimately reflect poorly in a company's productivity. Brownfield projects are susceptible to large cost overruns, and researchers found that brownfield profit margins were more than 40 percent lower than those of greenfield projects.[23]

Moreover, lump sum contracts—a prominent pricing mechanism in the industry[24]—without sufficient hedges prevent the transfer of unexpected cost items or time delays to buyers. While this type of contract has increasingly begun to address the topic of financial risk allocation, companies still struggle to accurately cover and manage all potential unknows—from costly errors in construction to time delays due to the discovery of endangered species in the area. For example, in 2020, a large Dutch construction company decided it would not participate in tenders above a certain multimillion-euro threshold after being held responsible for cost overruns due to unforeseen risks in large governmental infrastructure projects.

To increase the predictability of outcomes and productivity, it will be necessary for owners and construction companies to factor in, reduce, and manage complications, such as long lead times in the value chain and complicated permitting processes.

Labor market tightness and workforce churn have affected skill levels

Tight labor market conditions historically correlate with steep construction productivity declines because of firms having to bring inexperienced workforces onto projects. A large part of skill level is built on tenure and apprenticeship. New workers may require additional training and control and, consequently, achieve lower rates of productivity. For example, during US Gulf Coast piping projects, productivity for major process-industry projects fell by 40 percent or more each time the labor market tightened, forcing owners to extend project timelines by 20 to 25 percent.[25]

Productivity declines also occur when people take construction jobs temporarily instead of forging a career there. When labor needs are urgent, there are often less exact matches for candidates with the required skills. Companies tend to accept a less-skilled or less-experienced workforce for the sake of delivering a project on time, but research on the impact of temporary employment on productivity shows that temporary labor has a damaging effect on productivity.[26]

Timely delivery takes priority over productivity improvements

In construction, productivity is rarely a primary metric that companies use to measure the operational success of projects. Oftentimes, companies prioritize hitting the delivery date over any other goalpost. When end products have already been contracted or other parties depend on work being finalized, a day of delay would cost the owner company more than if they added a large amount of extra workers to finalize the work on time.

[22] Total Projects Split IPAT dataset, GlobalData's construction intelligence center, 2023; based on 86,000 confirmed large construction projects across 91 countries over ten years (2012–22).
[23] "Investigating profitability performance," November 2019.
[24] *Construction contracts and law report*, Royal Institute of British Architects, 2022.
[25] Construction operations data from Westney Capital Analytics, a McKinsey company.
[26] Domenico Lisi and Miguel Ángel Malo, "The impact of temporary employment on productivity," *Journal for Labour Market Research*, March 2017, Volume 50, Number 4.

Improving productivity and reducing idle times across all subcontractors and tasks while meeting throughput requirements would require systemwide efforts to improve workflows, reduce bottlenecks and variability, balance loads, and improve project production rates. In larger projects with multiple trades and complex interdependencies, managing these additional factors can be more difficult compared to smaller projects with one experienced foreman in charge.

Construction companies and project owners can set a course for improvement

Improving productivity is not only an imperative for society but also an opportunity for individual companies to add value and gain a competitive advantage. Higher project margins provide companies the opportunity to enhance price competitiveness or increase cash flow. Moreover, a better handle on productivity enables more predictable project delivery, enhancing credibility and leading to less firefighting.

To increase productivity, construction executives can first ensure that the evergreen, foundational measures are in place to set teams up for success, including adequate team staffing, robust planning and design processes, fewer and better handovers, and the apprenticing of capable people. Although these foundational measures are necessary and often considered common knowledge, they are not always common practice.

For the step change improvement of productivity that will be needed to fulfill societal demands, companies need to go above and beyond foundational measures. Subsequent articles in this series will thoroughly explore the more transformative approaches that owners and delivery partners could adopt, including the following:

— *Adopt project steering 2.0.* Conventional project management relies on earned-value-management systems, but these s-curves can disguise performance issues and delay intervention, enabling further cost and schedule delays. Project teams can follow the lead of manufacturing and shift their focus to production rate metrics, such as meters welded, volumes excavated, and drawings reviewed. Steering projects in this way will allow teams to be more proactive and help them resolve issues before they materialize.

— *Nurture a supplier ecosystem across projects.* Supplier ecosystems can help delivery partners provide owners with transparency, credibility, and predictability by providing teams more stability, which will help improve learning curves, interfaces, ways of working, and innovation. Instilling habits across an ecosystem can build the trust and better practices required to gradually promote positive end-to-end change across projects.[27] Owners will typically set up these partnerships and role model the desired way of working.

— *Upskill project staff.* Skilled labor shortages pose a massive upskilling and leadership challenge for the industry. Given high-pressure and short timelines, project staff are tempted to fall back on suboptimal behaviors and ways of working. Leaders can foster an aptitude for learning among their teams to help team members upskill regularly. Technology-supported learning journeys, systematic apprenticeships, and project academies focused on hard and soft skills will all become more popular in years to come.

[27] Francisco Marques, Gonçalo Ribeiro, and Erik Sjödin, "The strategic era of procurement in construction," McKinsey, April 19, 2023.

— *Scale initiatives across project portfolios.* There are many examples of successful productivity improvements within specific project teams. However, rolling out improvements across a project portfolio is difficult. Change management in a project portfolio context is even harder than in an individual project. Tailored approaches and different capabilities are needed to establish improvement at scale.

— *Apply technology in ways that have a direct impact on productivity.* Technologies such as generative AI could fundamentally transform how capital projects are delivered. Investments in technology should shift from the "shiny objects" like drones or monitoring software to technology that streamlines and accelerates engineering, procurement, and construction.

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