

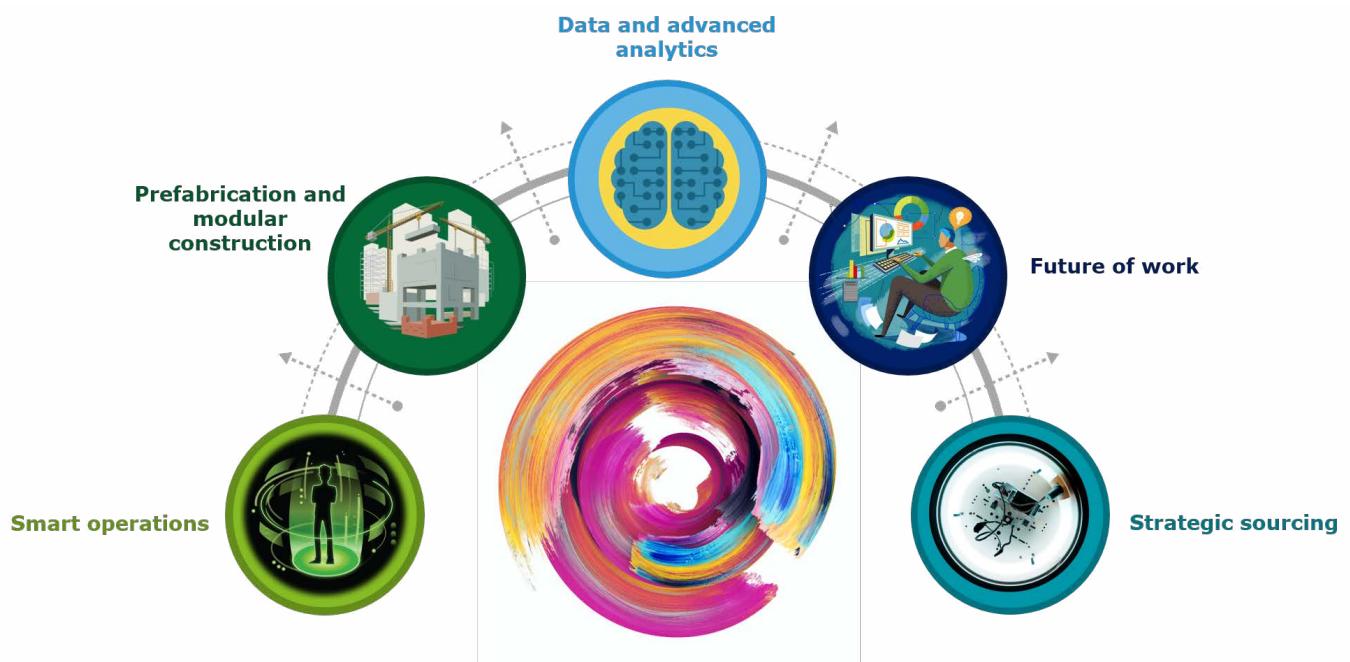
## The future of construction

Key trends shaping engineering and construction

# Forces of change

Changes in customer demand, the nature and economics of construction, and the realities of the modern supply chain have led to fundamental shifts in the way engineering and construction (E&C) firms tend to do business. Construction is no longer simply about building unique structures and physical infrastructure. Fundamental shifts are happening that can push E&C firms to explore radically new ways of creating and capturing value as they make the leap toward the fourth industrial revolution. Five key trends are largely driving the future of construction (figure 1).

**Figure 1. Trends shaping the future of construction**



Source: Deloitte analysis

## Smart operations



E&C firms and owners alike are increasingly looking to deploy and integrate Industry 4.0 technologies to enable data-driven decisions, drive dynamic scheduling, and reduce budget and schedule variances, often across multiple sites<sup>1</sup>. These technologies range from building information management (BIM) and digital twins to remote project monitoring using sensors and drones. 76% of E&C executives in a recent Deloitte survey indicated they are investing in digital technologies to address broader cost and margin challenges, and 24% are investing in drones and robotics at job sites to increase worker productivity and efficiency.

## Prefabrication and modular construction



Borrowing from cost-efficiencies and learnings in manufacturing, construction companies and owners are increasingly attracted to the up to 30% improvements in costs that could be enabled through offsite construction<sup>2</sup>. Besides material costs, modularization and prefabrication can also help reduce labor costs, ensure better design and quality control, and shorten project schedules to help minimize budget overruns<sup>3</sup>. There is an increased appetite to rethink how this is done through process redesign, the development of a strategic ecosystem of collaborative vendors and partners, and the evaluation of long-term manufacturing operations. In fact, 26% of E&C executives in a recent Deloitte survey indicated increasing their use of prefabrication and modular products, and that number is expected to grow in coming years.

## Data and advanced analytics



Data and advanced analytics are becoming the core enabler of future success in the construction industry. They can move business decisions from reactive to predictive and can enable E&C firms to outpace their competition. For example, technologies such as digital twin use 3D data to generate building profiles and blueprints of building parts/components in real-time, but integrating these technologies with scheduling and maintenance systems could provide visibility and operational improvements across the building lifecycle. It is with advanced analytics, artificial intelligence, and machine learning that E&C companies can embark on the journey to becoming insight-driven organizations.

## Future of work



A rapid influx of digital technologies, ongoing labor shortages, COVID-19, and new workplace protocols present E&C firms with work, workforce, and workplace challenges. While the industry has been consistently adding new jobs, challenges due to talent shortages persist. Bureau of Labor Statistics data suggests that since 2017, while the number of job openings has almost doubled, the number of new hires has increased by less than 10%<sup>4</sup>. This gap is partly due to the fact that the industry is likely to incorporate more digital technologies into key workstreams to further enhance productivity, efficiency, and worker safety. These changes make it important for E&C firms to start thinking of how roles and jobs might change to reflect the use of these new technologies. For instance, many E&C firms are today looking to hire more data scientists and software developers than traditional engineers.

## Strategic sourcing



Despite many E&C firms altering their cost structures, most are suffering due to increasing material costs, contract extensions, and even extended schedules leading to cost overruns. According to Associated General Contractors (AGC) data, input costs for general contractors have soared nearly 13% from April 2020 to February 2021, driven by rising material costs<sup>5</sup>. There is a shift from tactical procurement ‘to meet budgets’ towards strategic sourcing to reduce complexity, drive value and enable ecosystems of strategic vendors and partners. This is primarily due to the continued cost pressures and supply chain risks, heightened customer demands, and a need for labor, material, and technology partners. This ecosystem approach can likely be a key enabler to adjusting to new market realities, helping to better respond to or drive future disruptions.

To navigate this rapidly changing industry landscape, E&C firms should develop a connected, integrated, and automated operations foundation – a dynamic, always-on network that provides continuous access to information, analytics, and insights, with a host of efficiency and productivity-enhancing technologies. With this foundation, E&C firms could consolidate construction management platforms with analytics layers to enable dynamic scheduling and inform data-driven decisions in the short term. And in the long-term, they could deliver turnkey solutions with preferred ecosystem partners. This should help E&C firms deliver greater certainty on schedules and budgets, increase productivity, and reduce disruption onsite. This new industry standard that digitizes and connects job sites by overlaying data analytics can help drive dynamic, data-driven workflow management and decision-making.



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## Endnotes

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- 2 Avi Friedman, Vince Cammalleri, "Cost reduction through prefabrication: A design approach," Taylor & Francis Group, June 9, 2015. Georgia Pacific, "The power of prefab: controlling project quality and cost," 2019.
- 3 Dodge Data & Analytics, "Prefabrication and modular construction," 2020.
- 4 U.S. Bureau of Labor Statistics, "Construction Industry: Workforce Statistics - Employment, Unemployment, and Openings, Hires, and Separations," accessed November, 2020.
- 5 Associated General Contractors of America, "2021 Construction Inflation Alert," 2021.

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