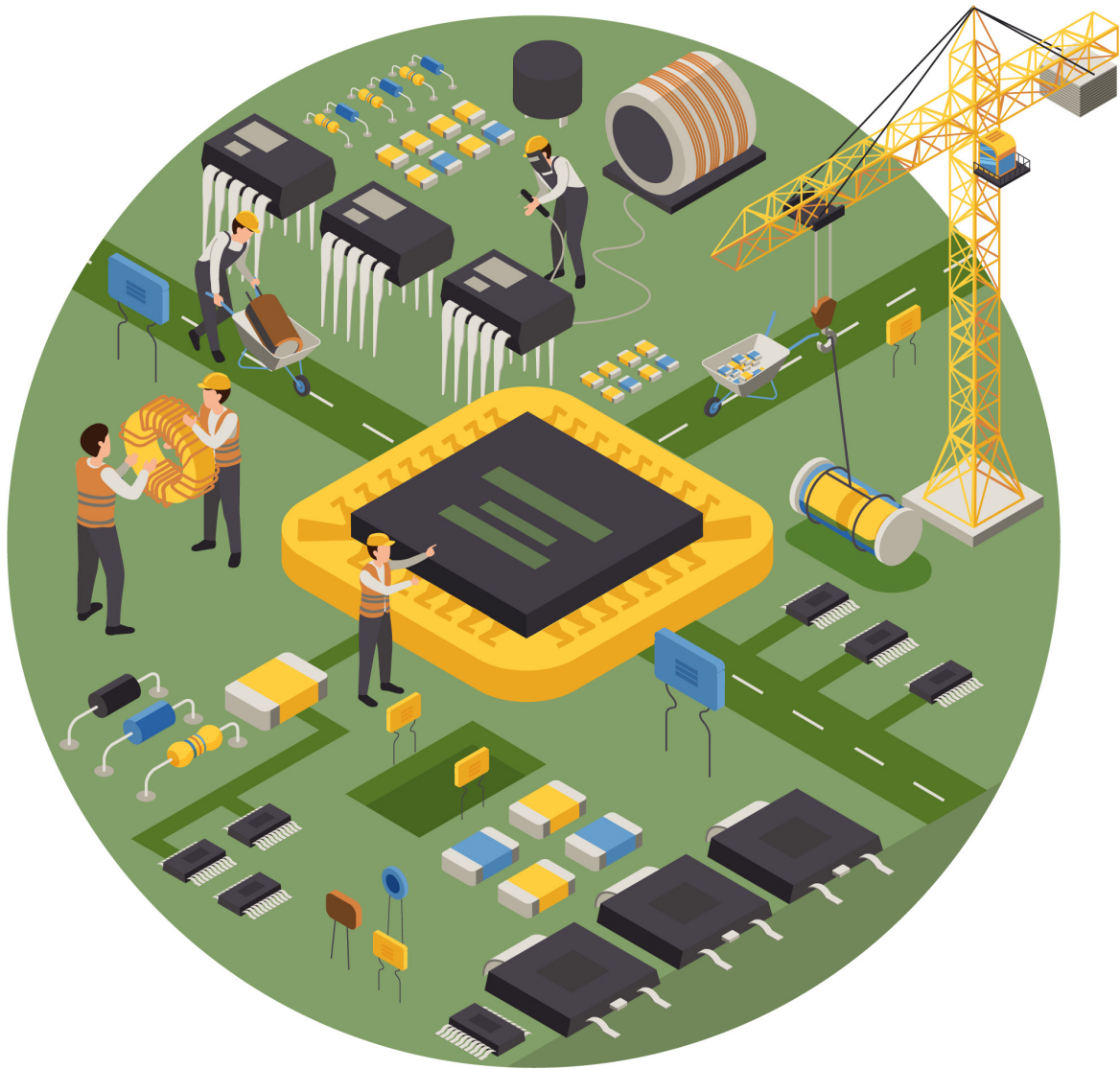




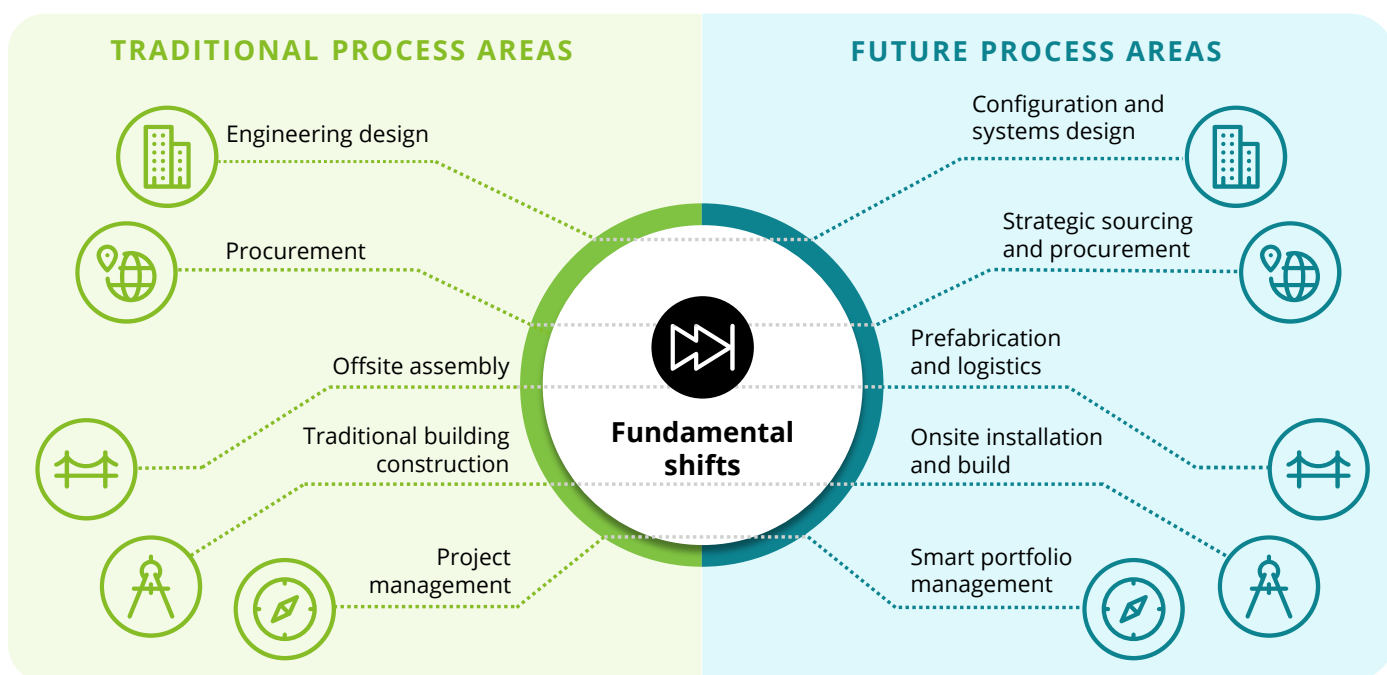
The future of construction

The fundamental capability shifts needed for long-term success



Deloitte’s [“The future of construction: Key trends shaping engineering and construction”](#) article highlighted how the engineering and construction (E&C) landscape appears to be changing rapidly. So, the key question is – are industry leaders ready to harness the full potential of changing industry dynamics to benefit their clients, their people, their organizations, communities, and society more broadly? While many E&C firms are gradually shifting from primarily manual processes to deploying point solutions and single-use cases, or ‘pockets of digital’, making a successful transition often requires fundamental shifts in the overall ways of working. These key fundamental capability shifts are expected to involve moving from traditional process areas to more sophisticated operations in the future (figure 1).

Figure 1. Building an organization ready for the future of construction likely requires fundamental shifts



Source: Deloitte analysis

From engineering design to configuration and structural design



Today, structures are engineered-to-order (ETO). As prefabrication and modular construction become more prevalent, design teams can prioritize value in their engineering, with early make versus buy decision for components, a focus on specification and part rationalization, and leveraging digital twin/BIM technologies for streamlined design and data sharing. The future of construction may well consist of 'building blocks' that can be configured-to-order (CTO).

From procurement to strategic sourcing and procurement



In light of supply shortages and changing requirements, companies could shift from the tactical acquisition of materials, supplies, or services needed to successfully operate a business or complete a construction project, towards strategic sourcing and the implementation of supplier collaboration and development programs. In doing so, E&C companies can learn from supplier management practices in retail and manufacturing, where digital supply networks (DSNs) have revolutionized how companies make, buy, and partner. Moreover, an ecosystem approach can enable true interoperability throughout the supply chain, and respond to disruptions better.¹

From traditional construction practices to onsite installation and build



The scale that assembly lines can enable is increasingly attractive to construction companies building hundreds, if not thousands, of almost identical structures (warehouses, clinics, data centers, etc.). While the establishment of permanent manufacturing operations is just an idea to most, companies are making investments to ensure that most of the construction process takes place in a controlled, sequential environment and that the complexities of the jobsite are reduced to a minimum.

From project management to smart portfolio management



Given the need for heightened visibility across supply networks and the construction process, stakeholders need specialized project management solutions. As the physical distance between supplier, prefabrication, and construction locations increases, they should be adjacent digitally.² Some companies are looking beyond 'dashboards', investing in control tower functions or construction command centers that can provide end-to-end visibility across a portfolio of projects while enabling dynamic workflow management based on advanced project controls, key performance indicators (KPIs), and real-time constraints.

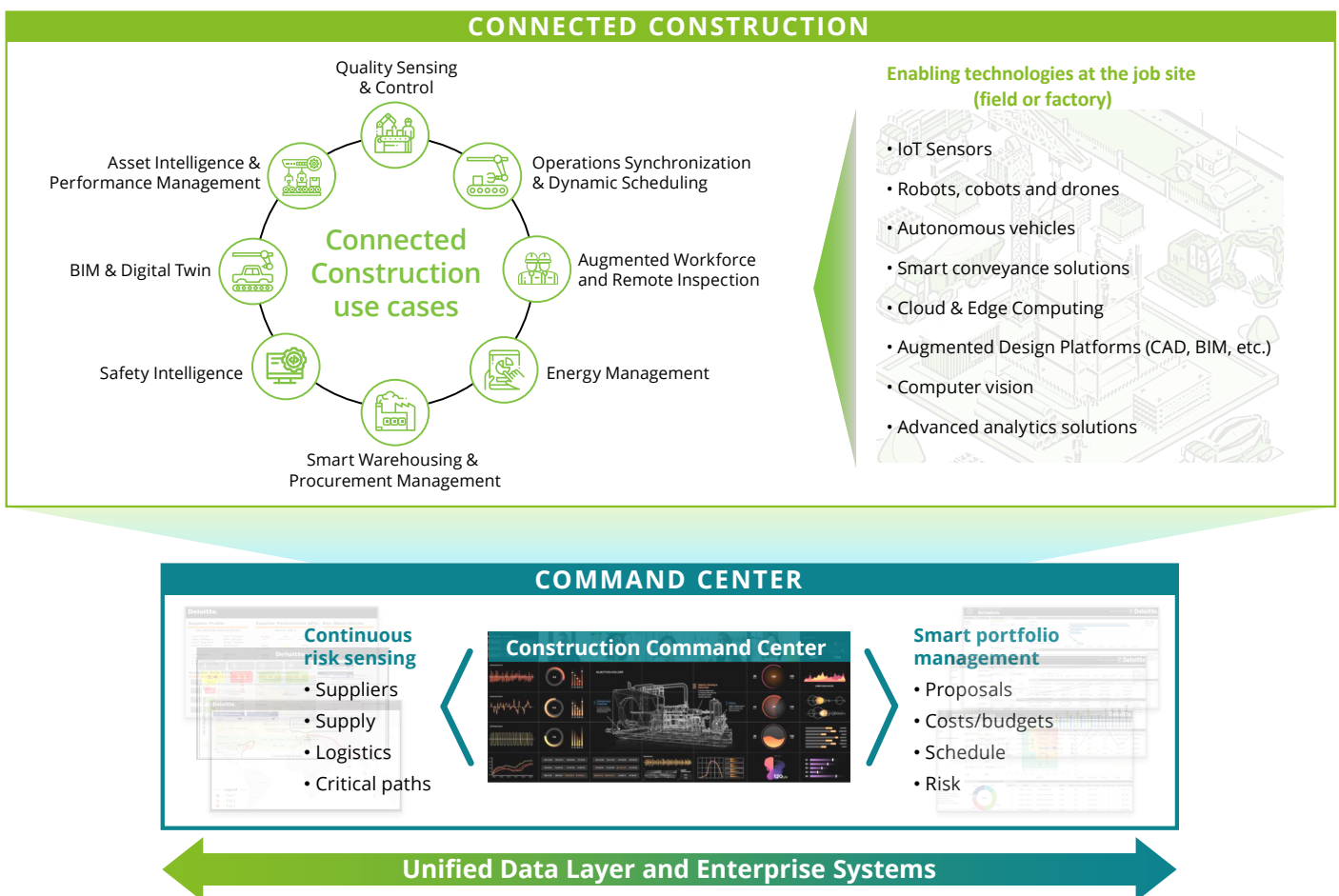
To effectively prepare for these fundamental shifts, an E&C firm's transformational efforts should be underpinned by a strategy to connect prefabrication and warehousing facilities, construction sites, and extended supply networks through a command center – a set of tools and techniques that allow firms to proactively manage their end-to-end construction process in real-time and achieve new efficiencies through connected visibility, proactive exception management, and predictive insights (figure 2). Three critical inputs to consider to establish a well-functioning command center include:

1. The first input is **data**. Command centers can leverage an E&C firm's existing data and merge it with new insights from internal systems, sensors, Internet

of Things (IoT), connected devices, partner, and supplier data.

2. Once data sources have been identified, the next input is **analytics and visualization**. Using machine learning and unique algorithms to sift through data, the command center can quickly spot issues, identify the root cause, and route alerts to business leaders to solve issues quickly and effectively.
3. Lastly, a crucial component that unlocks the incremental value is **user-based insights**. When issues are identified, those alerts and insights should be delivered in the right context to the right individuals to drive improved outcomes.

Figure 2. Introducing Connected Construction use cases and the Command Center



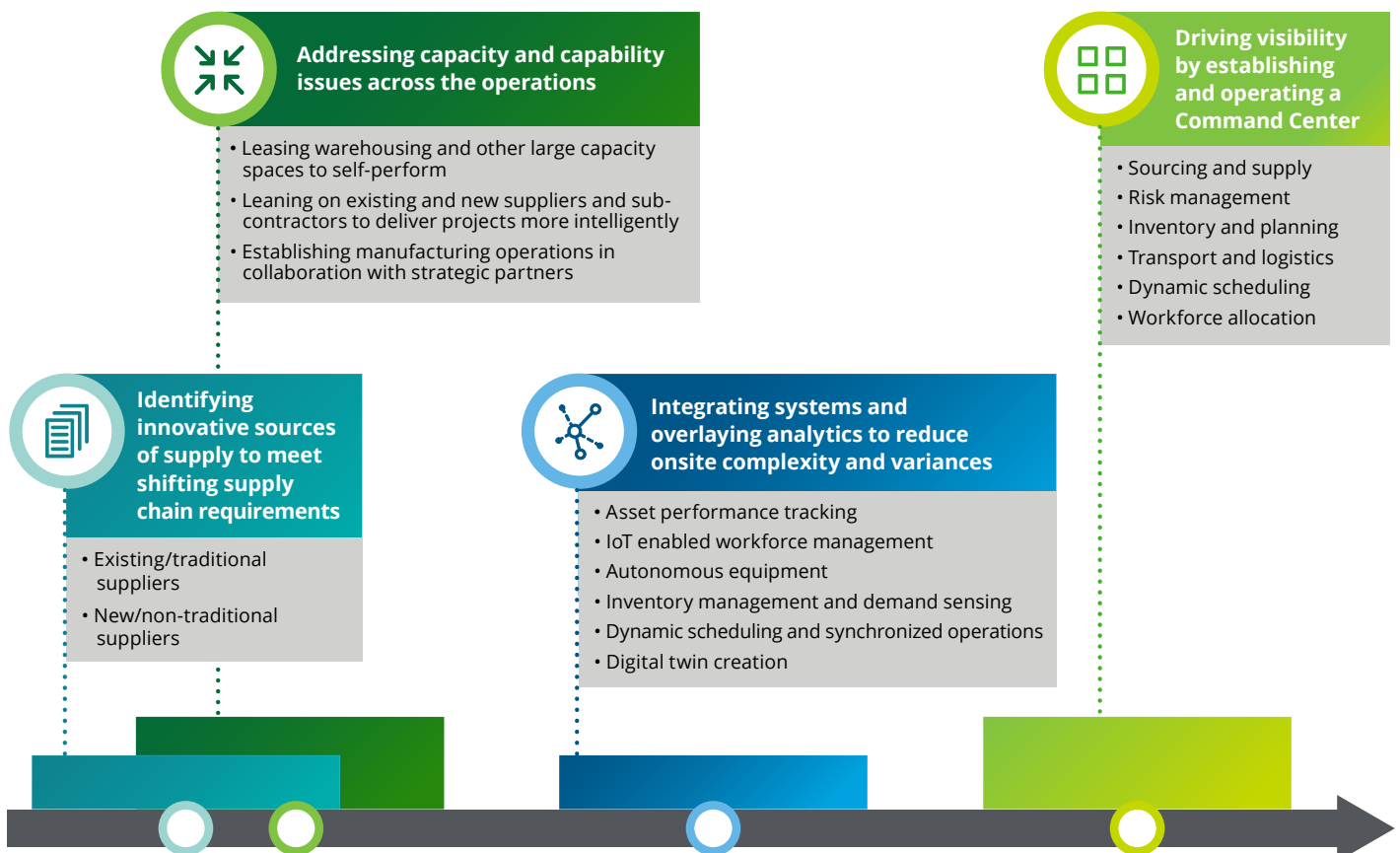
Source: Deloitte analysis

Connected, integrated, and automated operations to drive value in the future

Today, most E&C firms are still involved in early-stage efforts, with connected and integrated operations focused on optimizing the entire construction value chain.³ But as customer pressures increase, projects become more challenging, operations become more dispersed, and market behaviors remain highly variable, firms should increase their scope of integration and automation to improve their ability to manage this growing complexity and ambiguity. As a result, firms should shift their focus from integrating across the value stream to integrating across the assets.

As seen in Deloitte's future of construction vision (figure 3), this may result in accelerated technology investment in three domains: intelligent operations to improve the operational process through automation and digitization; command centers to bring data together from across the value chain; and intelligent enterprise to refine specific construction processes.

Figure 3. Enabling the connected construction vision through smart operations and integrated supply chains



Source: Deloitte analysis

Smart connected, integrated, and automated operations provide a single baseline built on real-time tracking of information. This positions firms to deliver step-change improvements in decision-making through advanced analytics, enable remote management of assets where feasible, and streamline workforce allocation and

utilization. To lay a strong foundation for a successful future and deliver desired outcomes, E&C firms should focus on having a holistic technology convergence approach that connects, integrates, and automates construction sites with the entire value chain on a secure, intelligent infrastructure.

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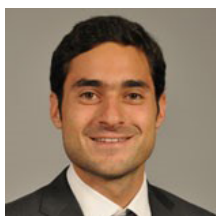
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Endnotes

1. Deloitte, "Ecosystem pathways for connected construction," 2020.
2. Deloitte, "2021 engineering and construction industry outlook," 2021.
3. Deloitte, "Winning with connected construction," 2019.



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