



Overcoming construction challenges through digitalization

EBOOK



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Introduction

“Few engineering and construction companies have captured the full benefit of digital,” notes McKinsey & Company.

But today, the need to embrace digital is growing as the global construction industry faces a range of pressing challenges—from inflation and supply chain disruptions to margin erosion and a decreased workforce. At the same time, the field must strive to maintain cost efficiency, safety and schedule compliance, among other demands. In this landscape, digitalization offers the sector the tools and technology they need to thrive and overcome obstacles standing in the way of future success.

Digitalization (also known as digital transformation) is a widely used term, but success in this area is often elusive. For most organizations, it is an ongoing journey. It can be defined as the integration of digital technologies into all areas of an organization or industrial facility to fundamentally change how business processes and operations are conducted. By both digitalizing information and challenging the status quo, the goal is to dramatically enhance organizational value.

But how do you implement digital transformation successfully? Construction companies who achieved this had a notable commonality—collaboration. Of course, digitalization involves embracing new technology solutions and updating legacy systems, but shared knowledge and teamwork are just as important. Unlocking the right data, for the right stakeholders, at the right time and encouraging easy knowledge transfers is key to securing strong and effective digital strategies and operations.



Another key component to successfully implementing digital transformation is ensuring organizational culture is appropriately set up and calibrated to handle such a dramatic shift in work. This can be especially difficult for organizations that have little in the way of digital solutions or have a lower competency for digital execution, compared to larger or more sophisticated organizations. Paul Connell, Senior Strategy and Enablement Lead at Octave, says, "In order for organizations to make this transition, senior leaders need to be proponents of this shift and truly enable their organizations to make the decisions and changes necessary to take full advantage of the benefits offered by going digital. In some cases, this won't be an easy change, but it is necessary if companies want to maintain a competitive advantage in the marketplace. By

embracing digital technologies, companies find themselves able to adapt more easily to changes in the market and ultimately increase their margins. It can be a long journey to change how an organization functions, but leadership needs to be the driving force behind this change."

In this eBook, we will explore the value of digitalization for the construction sector, alongside the common challenges that you may expect to face on your digital transformation journey. Despite these challenges, we will discuss why this journey is worth investing in and look ahead to what the future holds for construction, exploring why digital tools lie at the heart of this.



Encoding the value of digital transformation

When strategized and implemented correctly, digital transformation increases profits and productivity. In fact, McKinsey & Company's research shows that companies may see a 14-15% increase in productivity and cost reductions of 4-6%. So why are companies in engineering and construction late adopters of the digital approach? And what can be gained from embarking on a digital transformation journey?

The construction sector faces key challenges when it comes to welcoming new technologies, namely legacy systems and decentralized data, where teams or projects are existing within siloes. Many companies also see resistance to change and an emotional attachment to old processes from their workforce, making new technology difficult to implement. However, these obstacles also provide exciting new opportunities.

In recent times, many industries, including construction, have witnessed the emergence of a diverse array of rapidly evolving digital technologies. The vast amounts of data they generate and manage facilitate informed decision-making and increase collaborations between teams because of data visibility.

New technologies also increase digital competency among workers. Teams can stay aligned to the latest technology that makes their role easier, more collaborative and ensures they don't get left behind as industry practices (and technology) evolve.

The impact on safety and risk management is also notable. Solutions available today promise to enhance worker safety and mitigate risks. New tools are also elevating workforce capabilities, improving skill development and streamlining training processes.



14-15%
increase in productivity



4-6%
cost reductions

Data sharing for intelligent construction operations

Software solutions will play a crucial role in enabling intelligent construction operations. The challenge of establishing an interconnected and intelligent information ecosystem, that forms the foundation of the industry's digital transformation, is that it must apply to all players and stages within construction. This 'obstacle' can be overcome with digital solutions by their ability to enhance information sharing between teams and key stakeholders. The Royal Institution of Chartered Surveyors' Digitalisation in Construction Report 2023 highlights the importance of data and information sharing as it is directly linked to "whole-life and whole-asset thinking."

A prioritized digital transformation that bolsters the industry's competitive edge, meets regulatory demands and ensures long-term sustainability and resilience will require effective project management where all parties are sufficiently informed. To achieve a balanced strategic framework, digital engineering and construction projects must fulfill short-term operational priorities as well as long-term objectives.

While digital assets ensure a comprehensive and integrated approach to asset management, digital projects facilitate agile responses to evolving market dynamics. Information from both enables companies to maintain a robust digital thread throughout the asset lifecycle while concurrently adapting to the construction sector's ever-changing demands.



Digital projects occur when, across the full project lifecycle (plan, design, execute) your engineering and construction projects become more autonomous and sustainable through improved data velocity, visualization and collaboration.



Digital assets are industrial assets that, through an increase in digital maturity, realize better operational integrity, performance and sustainability while reducing risk throughout operations, maintenance and security processes.

An array of challenges and barriers

Establishing an intelligent information ecosystem in which digital transformation can thrive, however, is a complex undertaking. Success or failure rests on several internal and external elements linked to technological transformation, business transformation and cultural transformation.

While each of these hurdles is distinct, navigating overall complexity may require a strategically tailored approach. Peter Wilson, Executive Industry Consultant, EMIA at Octave, says, "A robust digital strategy, at its core, is one that drives growth, profitability and sustainability by seamlessly integrating technology with business objectives. In a context that's rapidly changing—economically, socially, geopolitically and technologically—the best way to do this is to focus on agility and resilience. We strongly believe in 'digital your way': you should not borrow from somebody else's playbook or best practices but chart a roadmap that starts from where you are and takes you to a more effective, profitable and sustainable version of yourself."



Modernizing legacy systems

A conventionally pervading technological challenge hindering the widespread adoption of modern digital solutions and streamlined, more agile processes is linked to legacy systems. Legacy systems (outdated and often obsolete technology infrastructure and software applications that were implemented in the past) pose limitations on data management and overall system performance.

However, this challenge also offers a poignant opportunity for modernization. As stated in the Digitalisation in Construction Report 2023, innovations such as artificial intelligence and machine learning are set to define the future of the construction sector, transforming "multiple facets of construction, ranging from design and planning to project management and maintenance."

Octave's portfolio of solutions is designed to support construction companies during their modernization and digitalization journeys.

"Innovations such as artificial intelligence and machine learning are set to define the future of the construction sector."



Balancing automation and a people-oriented transformation

The rapidly evolving digital landscape in the construction sector has been historically propelled by a quest for heightened efficiency, enhanced quality assurance standards and scalability.

However, the construction sector is facing the same challenge as many other industries—the impending retirement of a large section of its experienced workforce. This may result in the loss of an array of specialized skills, informal know-how and essential knowledge. Therefore, retaining an adept workforce will be instrumental in maintaining protocols and procedures, ensuring a seamless and continuous evolution for the construction sector.

Attrition of certain demographics is certainly a challenge in the construction industry, but it also presents an opportunity Octave is embracing. Paul Connell comments, "With [Octave's] Smart Digital Reality vision, we look to bring customers into a digital environment where automated data sharing is standard. The prospect of being able to leverage data across multiple work processes and solutions is truly powerful and we're getting closer to this goal every day. With some Octave applications already involving some form of AI, we're looking at novel ways to implement AI into the construction industry, which will not only further autonomize daily project work processes but free up existing project personnel to refocus their efforts in more meaningful areas of project analysis and management."



Design

Schematics & 3D
Engineering analysis
Engineering info management
Geospatial



Build

Construction
Project performance
Supply chain management
Completions



Operate

Enterprise asset management
Asset performance
Quality assurance
Operations optimization



Protect

Public safety
Inter-agency collaboration
Physical security
Industrial cybersecurity

— **Databridge Pro** —

Databridge Pro is Octave's common integration platform that seamlessly moves and transforms data across systems, connecting and enabling workflows end-to-end across the Design, Build, Operate and Protect pillars.

Achieving efficiency and regulatory considerations

Digital transformation, meanwhile, is showing some prowess in transforming yet another seemingly insurmountable construction sector hurdle: meeting a variety of regulatory standards and expectations while also maintaining efficiency and within budget.

A key consideration for the construction sector, which will only increase in the coming years, is to meet rising sustainability demands. Currently, "buildings are responsible for 39% of global energy-related carbon emissions, 11% from materials & construction and 28% from operational emissions," according to the PwC Construction and Housebuilding Outlook.

To this end, Deloitte reports that "E&C companies face a multidimensional challenge on this front as they adapt to evolving market trends and environmental regulations and meet customer demands for greener buildings while also preventing construction costs from accelerating too rapidly."

Peter Wilson echoes this, noting that "operational proficiency, regulatory/ environmental compliance and project-level performance means that every new project [...] must have the best availability and use of information at virtually every decision point. The companies that are updating their strategies around the effective use of integrated information are the ones that have the best chance of success in the long run."

Wilson also discusses that the risks associated with compliance hurdles are stark. "Dealing with stakeholder management or compliance as extraneous requirements that come on top of your existing business is a sure way to failure. Instead, embed these considerations into your business control



solutions and your own journey of continuous improvement. From a technical standpoint, using technology solutions that can close the gap between compliance, learning and procedure management can make a world of difference."

Alex Ong, an Industry Consultant in the APAC region for Octave, underscores that key tenets of any strategic approach must include "transparency, accountability and commitment for partners in business compliance."

When approached with finesse, the limitations may be turned into "opportunities for growth, sustainability and responsibility to our community," he suggests.

The hallmarks of a good digital strategy

To ensure successful digital projects, Peter Wilson emphasizes the importance of "specialization." He comments that construction stakeholders will need "technologies and partners" to meet the unique building infrastructure requirements.

Paul Connell comments, "I firmly believe that a robust digital strategy is pivotal for growth, efficiency, profitability, and safety. In continuously evolving and complex project environments, failing to embrace data-driven technologies risks not just companies' competitiveness and relevance, but can also lead to internal work process breakdowns, declining margins and diminished trust among their potential clients or customers."

In short, digitalization is key to taking construction projects and organizations into the future. Quality data and easy access to this data are at the core of improving a number of operations, enabling teams to work more seamlessly and accurately. This data is the golden thread that will run through different departments, projects and facilities, tackling key industry challenges such as siloed operations, attracting and training new talent, and meeting cost, schedule and environmental goals. In a winning digital strategy, these factors should be easy to spot.



Conclusion

While the global construction sector is grappling with inflation, supply chain disruptions, margin erosion and workforce shortages, the industry has increasingly embraced digitalization to optimize operations, grow and evolve. And although implementing digital transformation may pose its own unique challenges, it is an important step forward to secure, efficient and reliable construction execution.

To tackle the challenges of digitalization and progress forward, Octave's subject matter experts suggest working with a partner who understands your long-term goals to develop strategic approaches that could be the key to overcoming hurdles.



About Octave

Octave is a leader in enterprise software, turning data into decisive action and intelligence into your edge. Our software solves for and simplifies complexity, from the design and build to operations and protection of people, property and assets – for any scope, at any scale. For decades, we've partnered with customers to sharpen performance, elevate efficiency and amplify results. From factory floors to entire cities, our solutions are tuned to scale up what's possible from day one onward.

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