



WHITE PAPER

Overcoming chaos to achieve efficient control: The four pillars of capital project success

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Executive summary:

As the world moves toward a carbon-free future, companies must modernize and decarbonize critical infrastructure to support the global economy. This push could mean a “once-in-a-lifetime” surge of capital projects. To reach net-zero ambitions by 2050, investment in capital expenditure will need to be almost 60% greater than it is today.¹ The expected wave of capital spending on physical assets will total an estimated \$130 trillion by 2027.²

Relying on traditional, inefficient project delivery methods hindered by fragmented decision-making and siloed project data is a recipe for chaos. Project managers, supported by the C-suite, must focus on building a data-centric culture of connected decision-makers by unifying teams across owner-operator, EPC, and sub-contractors.

Aligning all stakeholders around a single source of cloud-based data will not only enable trusting, transparent, and collaborative relationships, but will also provide the opportunity to develop asset ecosystems based on repeatable, successful project execution models. Using the four pillars of capital project success, capital project decision-makers can deliver projects on time, within budget, and meet sustainability goals.

A fast-changing industrial landscape

Communities are relying on industry to turn government and corporate promises into reality. Smart cities, net-zero energy emissions, sustainable electric car manufacturing, and low-carbon food production are pushing enterprises to take a more connected approach to completing major projects.

This shift toward net-zero emissions will require significant investment in capital projects. Yet many organizations struggle to secure an investment decision because of the upfront cost, inflationary concerns, increased sustainability regulation, and the need to upgrade technology.

Despite these challenges, industry must deliver. From energy to construction, transportation to utilities, owner-operators and their engineering, procurement, and construction (EPC) partners must design and build capital projects that address the growing demand to minimize environmental impact.

But there's just one problem: Capital projects are already complicated. They demand large, geographically scattered workforces, multiple layers of stakeholders, and many moving parts, which means projects are rarely completed on time and within budget.

The blame game: The primary reasons for project delays

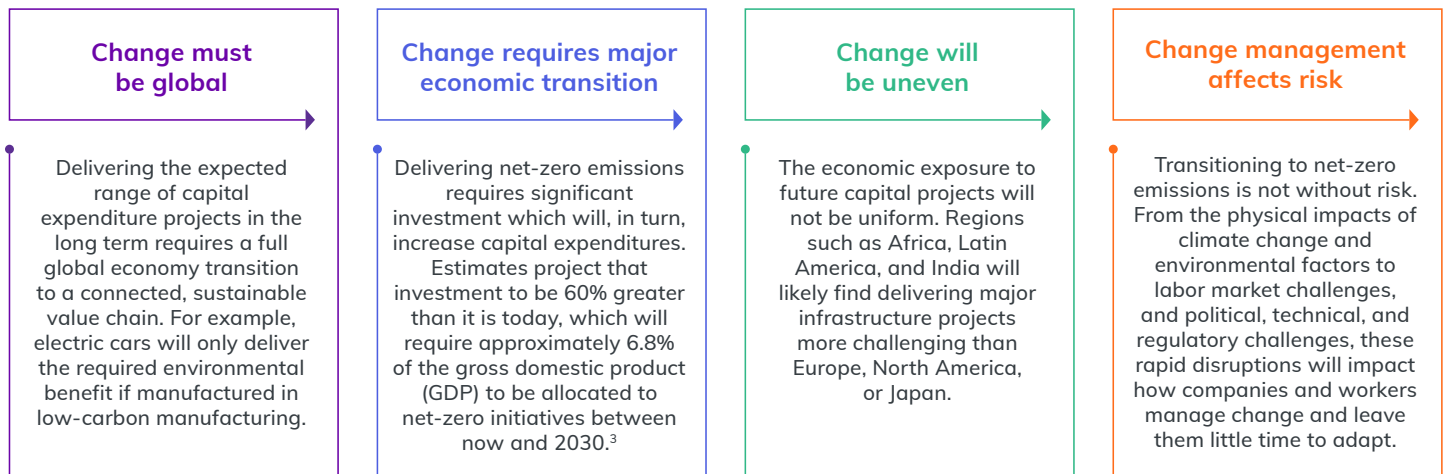
- Weak project control
- Ineffective change management
- Poor contractual oversight
- Siloed teams
- Disparate data

Owner-operators, EPCs, and subcontractors are facing rapid change, and inefficiencies, inaccuracies, disparate project data, and siloed decision-making is a recipe for chaos. The outdated project delivery systems that many industrial companies rely on today will no longer cut it. To overcome these challenges while meeting new and future net-zero and sustainability demands, senior decision-makers must take a data-centric approach to ensure capital projects maintain efficiency and control.

Given the high cost of construction, the next generation of assets must be “set and forget” – designed and constructed so that low operating costs offset the initial capital expenditure investment.

How can industries prepare for change?

Capital investment will be front-loaded, meaning companies must be ready for change now. To capitalize on new efficiencies, organizations must move to a “design one, build many” approach – and that requires an organizational culture, skills, and technology overhaul.



To meet the new criteria for success, owner-operators, EPCs, and partners must create a digital ecosystem that focuses on:

Trust and collaboration



Projects run more smoothly when there is trust between owner-operators, EPCs, and subcontractors. Replacing siloed spreadsheets with readily-available data and insights enables sharing and operationalizes best practices.

Agility and flexibility



Stakeholders need real-time insights to stay both agile and flexible. By synchronizing activity between owner-operators, EPCs, and subcontractors, all stakeholders can optimize every part of the project execution process.

Focus and enablement



Any digital project ecosystem must break down silos and integrate all project phases, including FEED process engineering and design, design and procurement, and procurement and construction.

These tools can ultimately enable success, but must first be underpinned by a connected data strategy that allows teams to access insights anytime and from anywhere.

From chaos to control: The four pillars of order and efficiency

Organizing, tracking, and maintaining the data required to execute a capital project can be a daunting, full-time task that requires whole teams to manage. Even the most astute workforces have trouble navigating disconnected data, and projects can quickly spiral out of control.

Despite teams' best efforts, project dependencies and interdependencies, cross-disciplinary miscommunications, a slew of cascading downstream effects, and occasional bad luck often undermine efforts to promote engineering and construction efficiency.

While digitalization can certainly mitigate some chaos, true transformation is only possible when data, people, and processes are connected in the cloud.

To stave off delays and cost overruns and optimize project execution, stakeholders must create a digital framework to give the right people access to the right information at the right time. Unifying all engineering data across 1D, 2D, and 3D from initial concepts through to construction not only allows for better decision-making at each phase, but also enables a trusted, collaborative environment among all disciplines and stakeholders.

With transparent, real-time contract management, teams can manage change effectively while identifying and mitigating project risks earlier in the process. Industrial companies can transform capital project delivery by putting in place the four pillars of order and efficiency:



1	<p>In the new era of capital project delivery, there is no room for inefficiencies and siloed working. The way forward requires owner-operators and EPCs to develop a repeatable formula for achieving project excellence. Successful project delivery hinges on a data-driven culture underpinned by empowered high-performing teams that embrace collaborative working.</p>	<p>When decision-makers have real-time access to trusted data throughout the entire value chain, they can make better, faster decisions while minimizing data verification time and unplanned downtime. By bringing supply chain partners into the data ecosystem, industrial operations can deliver multiple projects on time and within budget.</p>
2	<p>Senior decision-makers need more than verified data to successfully deliver capital projects. They need a connected environment where all stakeholders have access to necessary information from planning through construction.</p>	<p>When all users have access to the same source of unified engineering data in the cloud, they can better work together to mitigate risk, maximize their skill sets, and make informed decisions to improve efficiency and ensure successful project outcomes.</p>
3	<p>The biggest hindrances to successful capital project delivery are ineffective, outdated approval systems and processes. In addition, contract management weaknesses impact bottom-line performance, accounting for 9%³ of lost revenue.</p>	<p>By having the right digital system in place, stakeholders can eliminate project errors and preserve margins. For example, change approvals should be managed and controlled through a contract life cycle management system to ensure an efficient and streamlined process. Execution should be carried out through a connected platform, which will improve the effectiveness of capital project delivery.</p>
4	<p>Creating a data-centric culture aligned around a single hub of contextualized data is the cornerstone of every successful digital transformation and future-focused capital project. Although organizations already have large amounts of data, many lack the right processes and tools to use that data to drive project performance.</p>	<p>Organizations spend a lot of time thinking about how best to gather data, but don't always have a strategy in place for what to do with that data. By first mapping data collection strategies to business goals, companies can then map subsequent tools to overarching business objectives to understand how, exactly, a connected data ecosystem drives business value.</p>

Centralizing data not only drives business value, it gives owner-operators and EPCs the foundation they need to create synergy between engineering and construction so they can eliminate handover risk and effectively execute change. This also enables an accurate, real-time audit trail to help defend against claims and mitigate commercial disputes.

The benefits of the four pillars

By creating connected capital projects, owner-operators and EPCs can improve:

Health and safety: Create cleaner, greener capital projects that minimize emissions and carbon footprints. Ensure assets are operating at optimal levels to prevent catastrophic failure.

Cost optimization and control: Identify trends, overruns, and deviations earlier, and take corrective action sooner to improve cost management and control.

Forecasting: Analyze historical and current data alongside market trends to predict potential cost fluctuations, make proactive planning decisions, and mitigate financial risk.

Resource allocation: Use real-time insights to identify underutilized resources or inefficiencies to optimize resource allocation, minimize waste, and reduce costs.

Risk Management: Monitor operations in real-time to detect early warning signs of failure and take proactive corrective action. With the right insights, companies can more efficiently allocate resources, prevent unnecessary failures, and continually optimize risk management strategies.

Cash flow: Efficiently track and manage invoices to improve cash flow.

Logistics and materials management: Ensure the right materials are ordered at the right time, minimizing waste and avoiding unplanned downtime.

Conclusion

As demand for capital project delivery intensifies, owner-operators, EPCs, and subcontractors must break free from outdated methods that will set them up for future failure. Creating a collaborative, data-focused culture that empowers teams through a single, cloud-based platform will get the right insights into the hands of the right people and transform capital project delivery.

By implementing the four pillars of order and efficiency, owner-operators and EPCs can gain new levels of project management insight and control and enable cross-stakeholder collaboration in new and replicable ways. This new digital ecosystem will not only allow owner-operators and EPCs to work together to build capital projects that run on time and within budget, it will also enhance margins and optimize cash flow. In addition, these new, replicable processes will enable them to reach sustainability and net-zero goals, which will further improve financial margins and cash flow.

AVEVA's software is trusted by 90% of leading industrial companies. Discover how we can support your next capital project through **unified project execution and management** strategies.





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About the author

Jesse Baez leads project execution for the engineering portfolio. Jesse's unique blend of technical and business acumen stems from his Engineering degree and MBA in Information Technology. He excels at driving successful marketing efforts that align with the company's strategy.

James Wade is Senior Marketing Manager for AVEVA's portfolio of Simulation and Learning products. He helps communicate the role of process simulation to spark ingenuity for engineers and operators throughout the value chain. James holds a B.Sc. in Mechanical Engineering and Engineering and Public Policy from Carnegie Mellon University and an MBA from New York University.