ISSUE 3 | BY CONCORD PROJECT TECHNOLOGIES INC.

VELOCITY

INNOVATION AND LEADERSHIP FOR CAPITAL PROJECTS

THE FRONT-END DEFINITION ISSUE

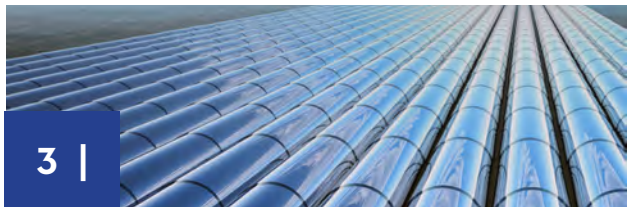
START SMART

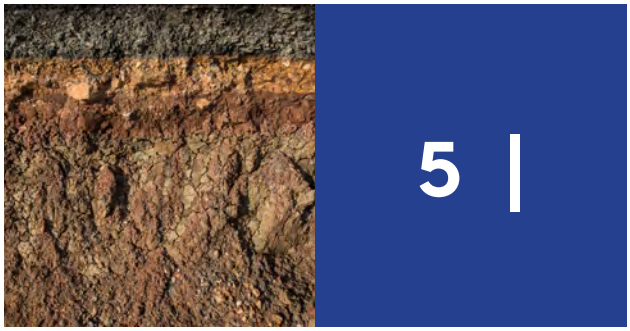
PLUS

Olfa Hamdi on how to get transactional costs under control

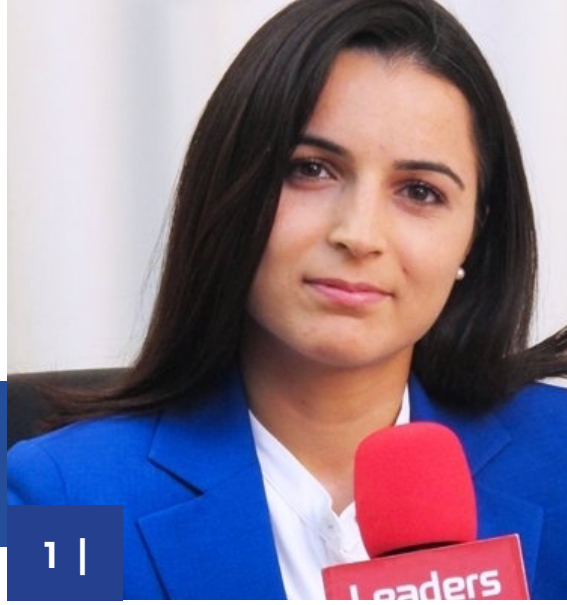
Khalil Aissaoui on the application of agile methodology to construction projects

CONTENTS





6 | BRINGING Scrum TO CAPITAL PROJECTS
BY KHALIL AISSAOUI
p. 10



EDITORS NOTE
BEGIN WITH THE END IN MIND

The first step to capital effectiveness is better front-end definition.

1 |

BY OLFA HAMDI

If you take one thing away from this spring edition of Velocity magazine, let it be this: capital effectiveness is not optional anymore.

Capital construction projects are getting bigger, and the vast majority still come in years late and millions over budget. That's not just bad for your bottom line. Investors simply won't tolerate it anymore: Ernst & Young's 2018 outlook of oil and gas analyst themes has once again ranked "discipline on costs and spending" among the top three key investor concerns. Beyond that, oil and gas is no longer the only energy game in town, and restive investors have the option to take their interests to the increasingly lucrative renewable energy markets. Let's not assume the funds will always be there.

In short: your capital effectiveness strategy is not just a best practice or a nice-to-have. It is foundational, critical, and non-negotiable. As Stephen Mulva warns in our piece about soaring transactional costs this month: We need to stop managing projects "like a caveman with a checkbook."

The first step is to radically rethink the way we execute the front-end definition on projects, and we've dedicated this entire edition of Velocity to helping you do just that. For starters, it's time we recognize that capital construction projects start long before the project manager is assigned. By failing to do so, aren't we firing the starter pistol after the horses have left the gates?

I am calling on Owner and EPC companies to expand the front-end view to include every single activity that happens from the day your commercial joint venture discussions start to after the first shovel goes into the ground. Start on the day the business opportunity presents itself, and build an organized, standardized and integrated project record in which traditional business-engineering silos are a thing of the past.

Create a project economy characterized by unprecedented collaboration, a flat supply chain, data-driven knowledge management and deep, granular visibility on everything from how much time was spent on a work package element to easy records access.

The next step is to sort out the fuzzy boundaries between accounting and cost-control, once and for all. Why are these two critical departments kept separate? In some cases, cost-control and accounting are on different ends of the country, or on different continents. If we want to build cost-conscious organizations, then we need to resolve this disconnect. Start by budgeting and accounting for integration as a separate project line item.

Finally, we need to recognize that a challenge of this scale can only be solved with technology. It's time for the industry to embrace collaborative, cloud-based technology that can provide unprecedented, cost effective project visibility and data-driven, AI-assisted knowledge management.

Let us be wise, and start today.

Olfa Hamdi
CEO, Concord Project Technologies Inc.

Pain Points

WHAT CAN YOU DO ABOUT SOARING TRANSACTIONAL COSTS?

FORTY PERCENT OF ALL PROJECT FUNDS ARE WASTED ON TRANSACTIONAL COSTS. **THAT'S TOO MUCH.**

BY OLFA HAMDI

In an important editorial published in February, Construction Industry Institute (CII) director Stephen Mulva warned that the capital projects industry is in a fiscal "death spiral" and that EPC companies need to stop managing projects "like a caveman with a checkbook."

It was a clarion call to industry leaders and capital project leaders, buttressed with a long list of troubling statistics.

The most jaw-dropping of those figures is the fact that 40 percent of the cost of creating a new capital asset is currently wasted on transactional costs.

"It's not a sustainable model," said Mulva, who also leads the OS2.0 project. "We have to employ the best business, financial, and accounting concepts, and we've got to do it now." In the editorial, he suggests that the solution is for EPC companies to create alternative financial products and services, and that is certainly one option. There is another powerful, complementary solution: platform technology.

To understand why, first we need to define what transactional costs are. Simply put, they're the costs associated with the exchange of goods or services. In the context of capital projects, transactional costs might include financial fees, legal fees, and dispute resolution costs along with logistics and communications costs. It also includes foundational project work like the cost of sourcing quotes, cost and schedule benchmarking, and assurance reviews (informational costs).

Industries prosper when transactional costs are under control. In capital projects, transactional costs proliferate, partly due to poor integration, and partly because of the contractual and operational friction between stakeholders.

How can technology promote integration and reduce transactional costs?

In an in-depth report last year, a team of McKinsey experts examined the role of technology in shaping modern industry. They conclude that digitization is driving a "radical reordering of traditional industry boundaries," leaving whole sectors ripe for disruption. The economic spoils, they say, will go to those who embrace powerful new technologies.

Platform technology has increased trust between customer and vendor. It provides independent, powerful, cost effective infrastructure to support value creation and efficient transactions. For capital projects, platform technology can streamline work processes by connecting project stakeholders and centralizing contractual needs. It can also enhance multi-stakeholder collaboration in a powerful way, by eliminating the need for the middlemen.

Why is the capital construction slow to embrace technology?

Our industry is clogged with middlemen who soak up disproportionate amounts of capital construction costs by providing integrative knowledge that companies can access far more efficiently with intelligent, secure, data-driven technologies. That's applicable to physical processes like procurement, as well as office processes such as quality and assurance reviews.

For instance, millions of dollars are wasted on the traditional stage-gate assurance reviews that can be replaced in part with integrated checklists powered by machine learning and artificial intelligence. Countless hours are spent checking email, hunting down documents, and collecting the data and insights required to make procurement and engineering decisions -- all of this can be easily and efficiently organized and integrated in the cloud.

There is a better way. The technology that can solve all of these problems already exists. What we need is the framework to link all the pieces together, and the willingness to innovate. Be an early adopter and embrace the success of other industries.

To paraphrase an old American proverb: To the early adopter will go the spoils.

Innovation in Construction: A Spotlight on T-CON™

Earlier this year, Petrochemical Update released its *US Downstream Capital Projects, Turnaround & Maintenance Market Outlook 2018*. The Outlook aims to provide decision-making advice, and this year it featured an innovative technology that fills the industry's long-standing gap of interoperability and inefficient use of resources: T-CON™.

Concord Project Techologies' T-CON platform was identified as one of the first cloud-based enterprise scalable platforms purpose-built for capital project teams. T-CON mirrors the EPC and Owner ecosystem, serving multiple collaboration channels and supporting continuous improvement without interfering with existing governance and assurance systems.

The T-CON Platform: Today's innovation is tomorrow's standard

T-CON is more than an integrator: This unique platform weaves a deep understanding of Advanced Work Packaging (AWP) into every company ecosystem. AWP can save up to 25 percent on chemical project construction and engineering costs. The T-CON platform leverages AWP protocols, artificial intelligence, big data, and a progressive knowledge architecture to support capital projects from beginning to end through a "Project Performance Acceleration Platform™." For the first time, Owner and EPC companies have the power to build the tools they need to leverage historical project data and facilitate multi-stakeholder collaboration through the entire capital project lifecycle.

Engineering and Procurement Dept.

Alignment: A New Paradigm

By The Concord Research Team

Why Advanced Work Packaging is the solution to improving alignment between engineering and procurement, plus a 3-part plan to get started.

Efficient construction performance is the goal of every capital construction project team. Ultimately, it is construction quality, speed and cost-control that matter. As leaders in capital project management, we keep our sights trained on this critical issue. Like you, we're always asking: How do we get better?

The first step is to adopt the Advanced Work Packaging (AWP) philosophy. Early evidence suggests that AWP boosts field productivity by as much as 25 percent, and drives down installed costs by as much as 10 percent. AWP is now widely considered an industry best practice. Here's a three-part plan to get started.

1 | Adopt a construction-driven mindset

Start by thinking of engineering and procurement as inputs into your construction work packages; consider them a data source for the field. This subtle paradigm shift will change the way you design your live project execution plan and how you build out your work packages. If you start from a construction-driven mindset, you'll design your engineering and procurement work packages with release plans that are explicitly designed to support your construction work packages and construction installation sequence.

2 | Improve alignment by defining construction sequence and work packages as early as possible

Once you've adopted a construction-driven mindset, make a commitment to defining your construction sequences and work packages as early as possible. Achieving the highest levels of engineering and procurement alignment requires that you start the process on day one -- and preferably sooner. Practically speaking, this means engineering and procurement departments need to be sharing data in ways that it can be simultaneously leveraged by both groups.

Why? Procurement teams need engineering support to understand the specifications for long-lead equipment, which is sometimes ordered beforeordered before the Final Investment Decision (FID) has been made. Fail at this critical alignment task, and you risk early mistakes that can have negative consequences for the entire duration of the project.

Experts agree that starting with strong alignment can make all the difference. "The disciplines have to be able to connect to each others' data without having to rely so heavily on data manipulation from one system tool to another for import/export purposes," procurement expert Scott L. Bullentini told Velocity. "In too many instances, the solution to gaps in integration is 'people power," as in, add another expeditor. But by this time it is too late, because the leading indicators and the forecasting of issues have passed by that moment in the schedule when there was still time to resolve the potential delay."

3 | Focus on aligning and engaging with vendors and suppliers

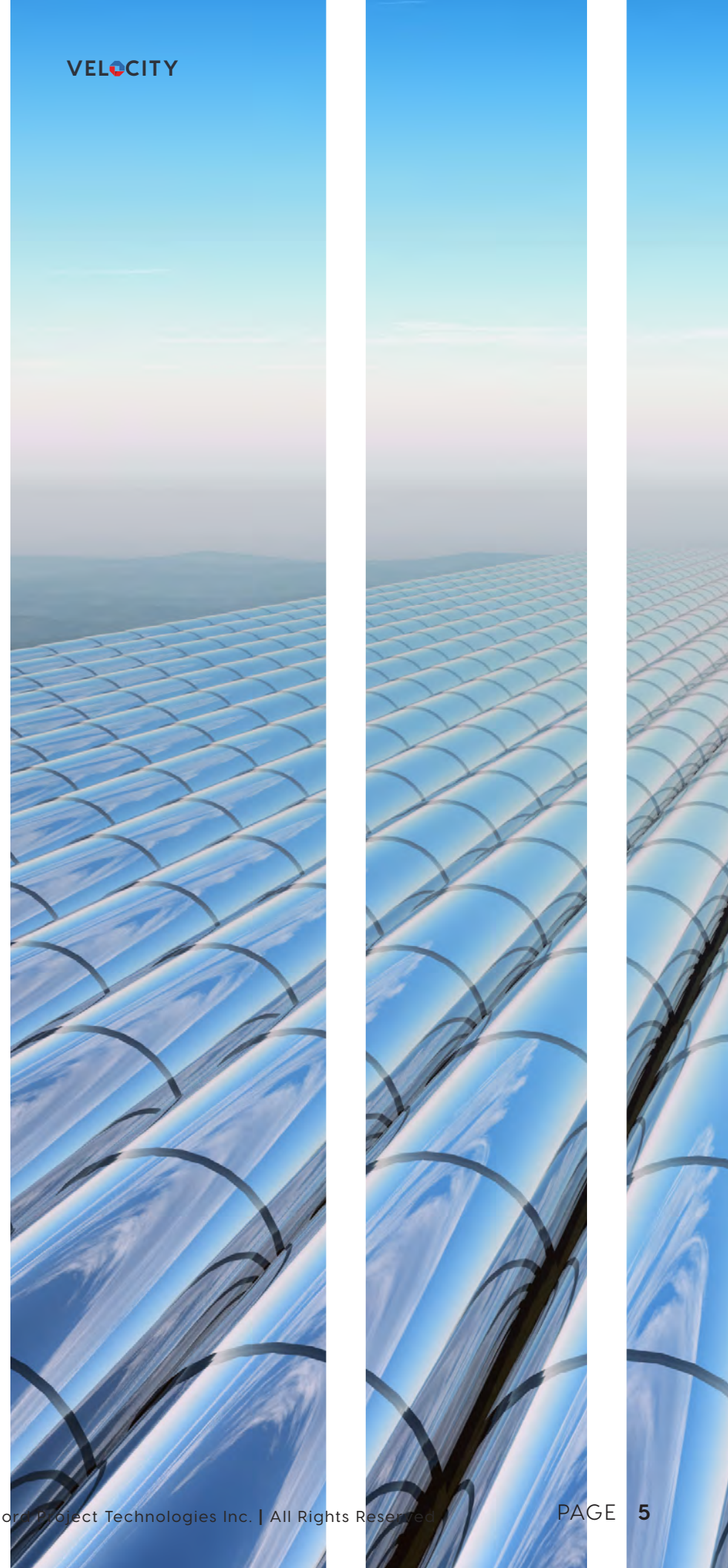
> "Early evidence suggests that AWP boosts field productivity by as much as **25 percent**, and drives down installed costs by as much as **10 percent.**"

Start thinking of your vendors as supply chain stakeholders and engineering entities. Again, this is a subtle shift in thinking that will have a marked impact on your approach to these critical relationships.

First, work on alignment. In complex construction projects, many vendors and suppliers will require engineering input or deliverables in order to do the work they're contracted to do. They need accurate data in order to do their jobs well, so make sure your team understands what data they need, and how they need it. "This is where the shift toward professional integration systems and teams is so valuable," Bullentini says. "The use of tangible means to data bridge without forcing IT systems and tools modification is extraordinary and unique. The opportunities for improving project outcomes is immense when we start to think in these terms and take action by sourcing the job of integration and alignment."

Next, tackle engagement. The key to getting vendors engaged is to involve them in the development of work packages, not just the execution. Ensure the supplier understands how the equipment will be used, why it is on the project's critical path, and make them conscious of the risks you'll face if equipment doesn't arrive on time.

Finally, make project managers responsible for key relationships. Suppliers and vendors who are responsible for equipment that is on the critical path should be overseen by the project management team, in addition to the procurement department. Continue to allocate resources to ensure the oversight and monitoring of the procurement process, but the project management team should ultimately be responsible for these critical path pieces.



Project Management Team

RETHINK YOUR CAPITAL PROJECT EXECUTION PLAN

BY OLFA HAMDI

Get total clarity and unrivaled project efficiency with a live, up-to-the-minute Project Execution Plan, hosted in the cloud.

Old-school capital project execution plans are rife with problems. Developed early, they're often written by contractors who don't know if they'll execute the project themselves, or if they're just laying the groundwork for a rival firm. Too often, they're template-based documents that are already out of date by the time the project is past the funding gate. Once approved, many function as little more than doorstops.

There's a better way. Owners and EPC contractors need to pay more attention to the project execution plan (PEP), transforming it into a live document that functions as the single source of truth on a project. A live PEP is the key to managing complexity, and the first step to more efficient, cost-effective construction on major capital projects.

Why now?

Paper-based project management is perpetually out of date. Modern communication technologies like email and cloud-based file-sharing have dramatically improved field-to-office communications, but most knowledge-management strategies in use today still force teams to make decisions based on outdated information.

Errors related to basic data inconsistencies are common. Think about how many scope statements your last megaproject had, and how much confusion that caused among the hundreds of people working on it.

The live PEP wasn't possible until recently, when technology finally caught up with the reality of contemporary project management. Today, complex backend architecture has the capacity to support a simple, straightforward user experience.

The promise of a live PEP

A live PEP establishes a strong governance model that helps owner companies achieve ambitious cost, schedule and quality goals. Use a live PEP to create a highly efficient capital project organization. It can help your company establish defined roles with clear lines of responsibility, along with reliable mechanisms for the collection of definition and execution data and KPIs. Live PEPs also have the power to help your company identify and mitigate risk, and draw meaningful learnings from previous projects. What are you waiting for?

1 A live PEP is owner-driven

Owner companies develop their own live PEPs. The company that will fund and operate a facility is best positioned to decide how that facility will be built and what it should achieve, and nobody has more incentive to keep costs under control. The owner company should hold the reins from mission and scope determination through risk mitigation and controls, and all the way to resource, procurement and construction strategies. This helps keep the current project on track, but also -- critically -- allows owner companies to track and analyze what works and what doesn't, in real time. These learnings can then be applied to future projects (no costly post-mortem required).

2 A live PEP leverages cutting-edge technology to remain constantly up-to-date

A key feature of the live PEP is that it is hosted in the cloud, and is therefore accessible anywhere teams are working. Instead of withering on a desk at company headquarters, the live PEP serves as a storehouse of up-to-the-minute direction and deliverables that can be updated in real time. For example, a live PEP might include the scope of work contained in a construction work package. The construction manager updates it continually as work is completed, and project managers -- and owners -- can see the project status in real time.

3 A live PEP is the single source of truth (SSOT)

When a PEP goes live, is elevated from foundational document to the most important document in the project management delivery system: A fully up-to-date handbook for every member of the team. It is where newcomers come to begin their project orientation and where the most senior executives in the owner company come to get a status update. For project managers, it provides a single source of truth, offering effective direction to cross-functional teams working on deadline-driven, technically complex capital projects.

Project Site Conditions

WHAT'S UNDERGROUND?

Find out by making site conditions a central piece of your front-end definition.

By The Concord Research Team

Comprehensive, detailed front-end definition is a critical component of smart capital project management. In capital-intensive, long-lifecycle projects, managers will always examine dozens and even hundreds of critical areas. In this article, we will provide a detailed examination of just one: site conditions.

Some degree of risk is inevitable, and every project team takes calculated risks. As always, missing information can cost the project in terms of execution performance. Early in the front-end definition process, the gap/risk analysis often pits investigative costs against the costs of addressing unforeseen discoveries later in the stage-gate process. This is true even though small investigative investments in the beginning often save millions down the line. Here are two examples of what this process can look like in its practical application.

Ex. 1: Soil Testing

A team is building an expansion on an existing chemical plant. The site is historically industrial, and the soil may be contaminated. Environmental regulation typically requires special handling of contaminated soil during the excavation process. In an attempt to keep the project on-budget, the team limits the number of soil tests that are performed. Later, contaminated soil is discovered during construction, and the owner has to pay extra to excavate and remove the contaminated soil. They may face environmental fines, and the project is delayed while remediation takes place. With proper definition -- specifically, extensive soil testing for all potential contaminants -- these costs and delays can be entirely avoided.

Ex. 2: Soil Borings

A team is building a project on non-virgin land, with a long history of construction and demolition. In an attempt to reduce front-end costs, the team takes a risk and limits the number of soil borings. Construction begins, and field crews discover an old building foundation that must be removed before work can move forward.

The result is long delays and additional costs that are magnitudes higher than the cost of the front-end soil borings. With proper definition -- specifically, a thorough geotechnical study with a sufficient number of soil borings -- these costs and delays could be entirely preventable. Instead of being late changes, they could have been incorporated into the cost estimate, making the project cost and schedule far more predictable.

VELOCITY

Site Condition Definition In 6 STEPS

Knowing site conditions means developing an intimate knowledge of the site location. Follow this simple checklist to refine your front-end definition of site conditions. You'll make smart, conscious decisions as you weigh investigative costs against the higher cost of dealing with unpredicted problems down the line. You'll be one step closer to delivering your project on-time, and on-budget.

- [ ] **1 | Site Layout and Site Surveys**
Define the site's geographical layout. Note major equipment location, major structures location, and ensure that existing project structures and new ones are well-defined to fit the constructibility sequence.

- [ ] **2 | Civil and Geotechnical Information**
Conduct a thorough geotechnical analysis of your site. If you have old studies of the site, make sure these studies are related to the overall location, and check that assumptions in the old study still hold true today. If a foundation is on your critical path, make sure you conduct enough soil borings to eliminate any risk. Update your risk register and be prepared for the worst-case scenario.

- [ ] **3 | Governing Regulatory Requirements**
Identify and plan for local, state and federal government permits necessary to start construction and operations. Consider disposal and recycling. Put a work plan in place to assure code compliance: this applies to construction, safety requirements, platting, fire, occupancy and structural limitations.

- [ ] **4 | Environmental Assessment**
Study air, soil contamination, water tables, vibration, impact on wildlife and endangered species. The cost and schedule impact of environmental considerations have to be studied and accounted for in the project's risk register.

- [ ] **5 | Utility Sources with Supply Conditions**
Define the availability of site utilities required for the project. For example, if construction is going to require a lot of power and the site is not connected with a utility power source, then the project will need to build a power substation.

- [ ] **6 | Local labor availability and productivity numbers**
Know the labor market conditions in your project locations. Areas experiencing a construction boom might present a labor shortage, and higher labor costs. If your project is being built in a new location where your company has no prior experience, you may need to investigate the labor market by collecting local data on turnover, safety, qualifications and permits. Finally, know your productivity numbers and how reliable they are, then validate your understanding of the labor conditions with your peers, industry experts and resources.

Agility Training

Bringing Scrum to capital projects

BY KHALIL AISSAOUI

How Agile Methods Can Benefit Construction Projects

One of the key concepts to the future of construction projects is the breaking of silos.

It's accepted in Advanced Work Packaging (AWP) that aligning departments and stakeholders, regardless of when in the project lifecycle their role begins, leads to better communication and enhanced alignment throughout the lifecycle of the project. The same concept holds true for project management methodologies: it can be beneficial to assess whether a methodology that historically belongs to one department might hold value in another.

Agile software development is an approach to software development that focuses on a dynamic, non-deterministic, and non-linear approach to development and planning. While agile methodologies have historically been in the purview of software development and management, they have important lessons that can be applied to benefit construction projects.

In this article, we introduce a lightweight, agile software development methodology -- Scrum -- and the insights it offers for the benefit of construction projects of any scale.

What is Scrum?

Scrum is an agile methodology for completing complex software projects. Like most agile methodologies, Scrum was originally created for software development, but has been found to work well for other complex scopes of work. This wide reach of Scrum is due to its deceptively simple implementation.

In Scrum, a product owner creates a prioritized wish list, called a product backlog. The product backlog is then assigned to a series of work phases called sprints. During the planning of each sprint, the development team subsets the product backlog into a sprint backlog and focuses their energy on those few entries. The team meets everyday to align on progress, goals, and expectations. At the end of each sprint, the work is ready for delivery and ready to hand to the end user, the client, or put on the shelves. The teams then meets for a sprint review, where they discuss any issues encountered and any lessons learned. As the next sprint begins, the team chooses another chunk of the product backlog and the entire process begins again taking into account previous lessons learned.

The end goal of Scrum is to ensure that the most pertinent and valuable tasks have been completed before the project ends. The iterative, cyclic strategy allows for a self-feeding cycle of continuous improvement throughout a project.

Agile Practices for Construction Projects

While the Scrum methodology might not be fit for the large, complex tasks in construction projects, especially as the overall predictability of the scope remains a key expectation in construction projects, there are valuable insights to be gained. Below is a list of key Scrum practices that could benefit and inspire your teams and organizations to deliver successful construction projects.

Try a daily alignment meeting

In Scrum, teams meet daily for up to 15 minutes to discuss the previous day's progress, the current day's plan, and any possible challenges they might face. This daily alignment allows the team to identify issues and help each other with challenges. Importantly, this daily meeting creates a greater sense of community within a team and contributes to a whole-project outlook, thus breaking silos. In construction projects, daily safety and planning meetings are regularly held in the field. However, this practice is not yet a standard in managing engineering and planning teams in the office. Such short daily alignment meetings could be used to support the implementation of Advanced Work Packaging to provide everyone with the overall progress of engineering and installation work packages.

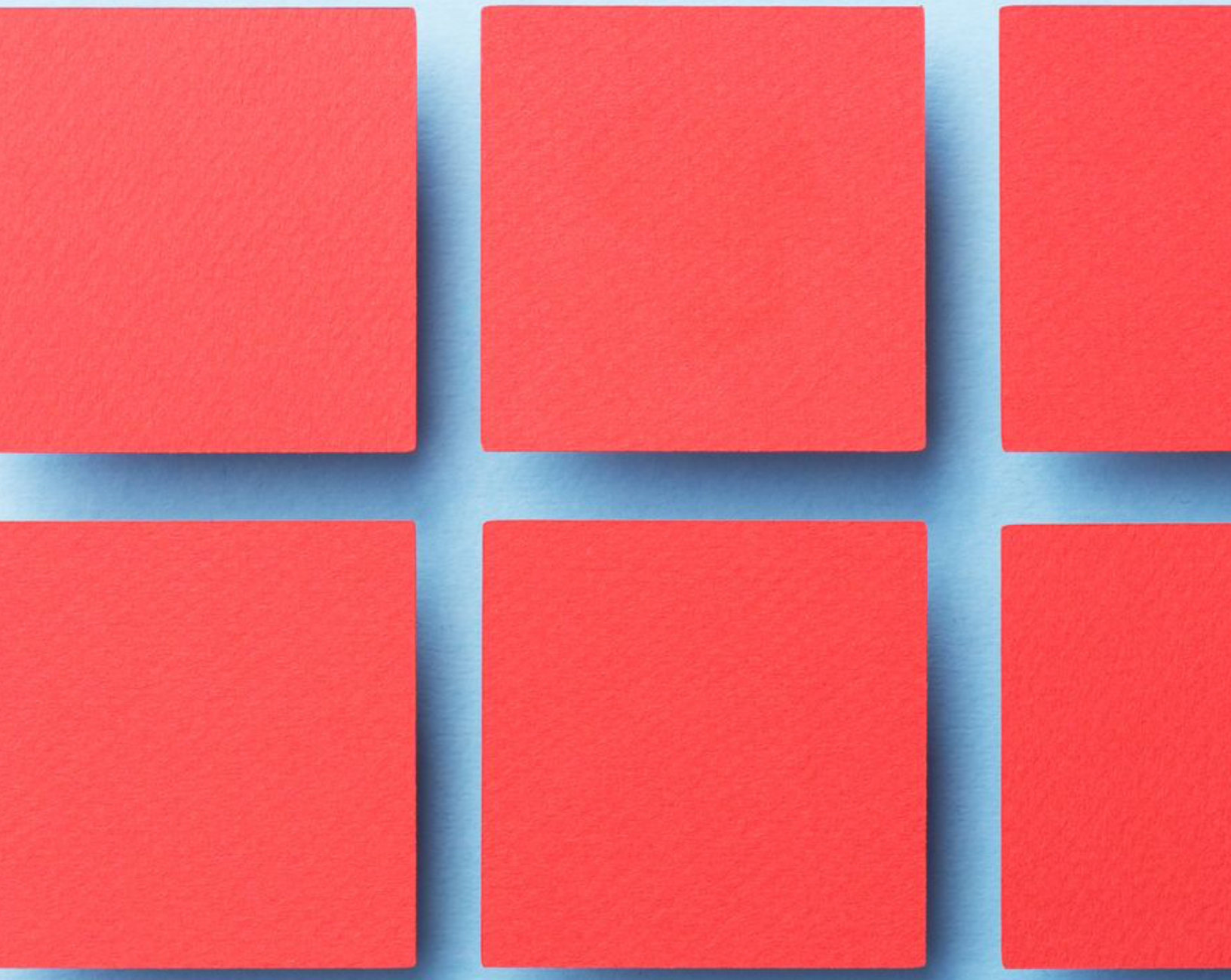
Start making work visible

The Scrum methodology calls for ceremonies that make progress visible for the entire team. Many teams make use of a board showing project and sprint progress, as a visual resource within and outside the team. This visual reminder of progress boosts motivation and morale with minimal extra work. In construction projects, a visual reminder of work package progress would benefit the work environment in the field and engineering teams in the office, and might even lead to increased productivity.

Benefit from continuous lessons learned

Scrum calls for a formal lessons-learned analysis at the end of each sprint, rather than at the end of each project or each major phase. Doing this leads to a more adaptive and agile process where inefficient practices and individual challenges are caught early and addressed before they become systematic. A lessons-learned analysis after the completion of each construction work package would allow construction projects the benefits of an adaptive process despite work packages not being as iterative as sprints in Scrum.

The Scrum methodology, used in software development, may be considered strange to construction projects. However, the Concord team believes key agile elements offer many parallels to AWP, a construction industry best practice.



Business & Project Leadership

Results-based PROJECT LEADERSHIP

Why capital project managers should focus on predictability and disciplined collaboration above all else.

BY OLFA HAMDI

One of my first jobs as a young engineer was working as a project analyst, watching capital project teams up close, documenting the gaps and the shortcomings of our industry's business practices and learning what works -- and what doesn't. Soon after that, I spent years at the Advanced Work Packaging Institute studying the specific methods that capital project leaders can use to build high-performing, multi-stakeholder teams. I've been learning and thinking and writing about leadership in the context of capital projects, and with my early construction field experience, I felt abundantly prepared to take on a leadership project of my own.

I left academia to co-found Concord Project Technologies, and I set about building my own global team. The task: To build the core operating system for a capital project delivery platform designed to serve an industry in which start-ups are rare and the stakes are high. I quickly realized that talking about leadership and practicing it are two very different things.

Leading is hard.

The costs of failed capital project leadership

Not only is leadership hard, but failing to lead well in capital projects can be extraordinarily expensive. McKinsey reports that mega-projects with budgets over $1 Billion are typically delivered a full year behind schedule, and a whopping 30 percent over budget. Leadership is critical -- IPA says leadership turnover can impact a project cost growth by up to five per cent.

Top companies invest heavily in establishing best practices and managing processes, but experts say that soft skills like leadership and organizational culture have too long been neglected. In the years to come, it is the cultivation and execution of these softer skills that will separate the winners from the losers.

Tim Swenk, an advisor on Capital Project Effectiveness at Endeavor Management, says companies working in capital intensive project execution need to take clear steps to address the shortage of leaders with these key skills.

"A lasting leadership development framework must be anchored from a business strategic intent, with unwavering commitment from top organization leadership," he told me in a recent interview.

Why predictability and disciplined collaboration matter most

For capital project managers, effective leadership boils down to results. I believe success comes from linking soft skills to action and that could be measured by two specific outcomes: the ability to achieve predictable project results, and the ability to develop a highly collaborative team.

1 | The ability to drive predictability (of project challenges, first!)

Unlike many enterprises in an Industry 4.0 world, capital projects remain rooted in hard, physical assets and their concomitant scopes of work -- but only on the project side. On the business side, the organization acts like most modern, virtual organizations in which most members spend their time negotiating their share of the value produced. This has become a major challenge for capital project managers, who must bridge the gap between the two, and deliver predictability from the project team to the business.

What is needed, first, is the ability of business to commission projects that are reasonably set for predictable results. Leaders must also be honest and upfront about the challenges the project is facing, detail possible paths and their attendant outcomes, and then proceed with confidence.

2 | The ability to drive disciplined collaboration

Here at Concord Project Technologies, we talk a lot about how to build a project team's capacity for disciplined collaboration. There are two key elements at play: your company's decision-making protocol, and the flow of information through your organization. Both of these processes have an enormous impact on your ability to make timely decisions that are supported by up-to-the minute project data and information.

Martina Asbury is a change management expert for capital projects. She says leaders usually address technical interfaces well, but internal organizational alignment is often dysfunctional.

"Breakdowns in communication, decision-making, and conflict resolution undermine the ability of the owner team to meet its production promises," she told me. "In the simplest terms, alignment must happen on three fronts: project objectives, project execution plans and clear roles and responsibilities."

Most capital project organizations don't have digital systems that support intense multi-stakeholder disciplined collaboration. However, in 2018, it is possible for hundreds of stakeholders all over the world to have access to the same platform and the same data, and for each of them to update that platform with the current status of deliverables from office to field, from the first gate to the last. Technology is an enabler to disciplined collaboration. Make the most of it!

Project Integration Unit

Integration MATTERS

Companies that want to reap the full benefits of vertical integration must make interface and integration management a separate line item, with unique deliverables, objectives, KPIs and budget. *Here's why.*

Today, many capital projects are executed by companies that are vertically integrated and responsible for many (or all) of the engineering, procurement and construction aspects of a project. This trend will only continue to grow as mergers and acquisitions continue to drive momentous consolidation across the EPC sector.

Discussion about interface management has waned in the face of sweeping consolidation, but it is more important than ever. Just because all of the moving parts are under the same brand banner does not guarantee that they are automatically working together as one.

If you're not scoping, planning and budgeting for internal interface management and integration efforts, chances are the work has unwittingly been added to the responsibilities of your project managers. Integration should be an explicit practice: It requires time and tools to do properly, and that's why it should be handled by independent professionals.

Ignoring the need for professional integration management also places undue burdens on your IT department. The reality is that modern project management happens largely online, and IT departments don't have the resources or project expertise to manage company-wide and project-based data integration.

Separate integration from overhead, and make it part of your project cost.

Here's what professional project integration looks like, though people, processes, deliverables and information (PPDI).

Integrate your people

Your integration team will clarify roles and responsibilities, and ensure that every stakeholder is prepared to come to the table with relevant input when required. From planning meetings to issuing reminders in advance of critical project gates, the integration team makes sure the people involved in a project are aligned around key objectives, sharing important information and communicating with the right colleagues. If you're using powerful integration software like T-CON™, the team will make sure your project managers can check the status of any project element at a glance, from work package status to data integration efforts. From anywhere.

Enforce the Single Source Of Truth rule (SSOT)

Projects plagued by informational discord rarely succeed. Your project integration team ensures that all people, departments and partners are contributing to and working from the same up-to-date data, records and information.

In the digital age, it is more critical than ever to ensure that information and data are consolidated, accurate and current. With an integration team in place, decision-makers at all levels no longer have to dig to find the most relevant, up-to-date information, which means decisions are smarter and risks are more effectively mitigated.

It's a game-changer for companies committed to quality assurance, and provides a strong competitive advantage.

Align work processes across stakeholders

Once the people are aligned and key information is organized and centralized, the integration team focuses on aligning work processes across all stakeholders, inside and outside the company. For example, in the beginning and throughout a project, they'll document requirements for each key deliverable and work package and monitor the maturity of the documents, with a view to being fully prepared as the project approaches key gates. As you approach the full funds authorization gate, for example, your team will be able to see at a glance whether your project is on track.

It's time to rethink integration. As mergers and acquisitions continue and more capital projects get sanctioned, companies are getting more complex and internal integration is more important than ever. If integration is not done well, the cost will show up through indirect costs, causing unpredictable cost growth. The only way to ensure that integration is done well is to allocate to it a unique budget with the deliverables, objectives, KPIs and digital tools to go with it.

Liberate your project managers and give them the tools and teams they need to get projects done, on-time and on-budget.

> “Separate integration from overhead, and make it part of your project cost.”

INVEST IN COMPLEXITY MANAGEMENT

An Interview with John Noonan

BY VELOCITY INTERVIEWS

John Noonan is the author of The Megaproject Paradox and director and principal consultant at JNC Pty Ltd, an Australia-based consultancy focused on managing complex organizations and megaprojects. Noonan has extensive experience working with large capital projects, mainly in the energy, resources and defense sectors. He is running for public office in South Australia with an agenda built around making Australian public projects more effective, with predictable outcomes.

This interview has been edited for length and clarity.

What is the Megaproject Paradox?

The term was originally coined by Oxford University professor Brent Flyvbjerg. Megaproject owners invest US$ Billions in the project preparation phase to simultaneously predict two very important numbers for megaproject execution: (i) an accurate estimate of how long construction will take, and (ii) a fact-based estimate of the construction cost. These predictions are almost always wrong. Individual projects routinely come in over budget in the order of US$ Billions, with global cumulative losses measured in the US$ Trillions. This is the Megaproject Paradox, and it's a serious issue: In what other industry would we accept 100 percent failure rate all the time?

What do you think are the biggest causes of megaproject failure?

Failure usually starts when the Owner lacks strategy and governance. If the Owner is disorganized, unclear on strategy or using traditional megaproject management methods that have been proven to be ineffective on complex, large-scale projects, then the Megaproject Paradox is guaranteed to arise. Owners need to look to new methods to avoid the paradox.

Ignore those who say, "time to construct" and "cost to construct" are the only important benchmarks in the execution phase. I've suggested that there are at least twelve execution phase benchmarks that matter (see sidebar). These parameters provide an Owner with a clearer picture of the project's health. One of these parameters is **Scope Complexity.** Measuring Scope Complexity in capital projects has not been well studied. Scope Complexity measurements must consider design, staff, contracts, technology, and location in driving the risk profile of a megaproject.

What are the limits of the current risk analysis and benchmarking techniques for capital projects?

Megaproject preparation phases are mired in traditional thinking that relies on the appointment of a so-called "A-Team," as well as the stage-gate system around which all decisions are made. Considering the failure rate of megaprojects, this thinking has proven to be ineffective. I advocate for new, sophisticated digitally powered techniques that support high-level scenario planning and rehearsal for engineering, staffing, contracting, construction and collaboration.

What is the most important quality for a megaproject management team?

One word: Agility. Companies must use agile management strategies in conjunction with traditional stage gate processes. In the 21st Century, major Information Technology and Telecommunications Technology (IT&T) advancements happen constantly. Megaproject management techniques must reconcile the long megaproject execution phase life cycle with the short IT&T technological change time frames so that the best IT&T technologies are embraced. Agile megaproject management techniques can help do that.

What is an Organizational Digital Twin, and why should companies care?

A Digital Twin (DT) is a virtual representation of a system, a living model that allows a business to drive business outcomes prior to deployment of the system. The term Digital Twin is well understood for the asset engineering model. In the case of megaprojects, we need to use real-time data and other sources to create a Digital Twin of the megaproject organization. The Organization Digital Twin allows the Megaproject Executive Leadership Team (ELT) to use scenario planning for the Megaproject Organization Design process. It also allows megaproject managers to take a snapshot of the organization performance at any given point in time and use that snapshot to most effectively manage Organization change within the Megaproject Execution Phase of the Life cycle. The Organization Digital Twin enables sophisticated new digital platforms to merge with existing Engineering Digital Twins to ultimately resolve the Megaproject Paradox.

Noonan Megaproject Parameters

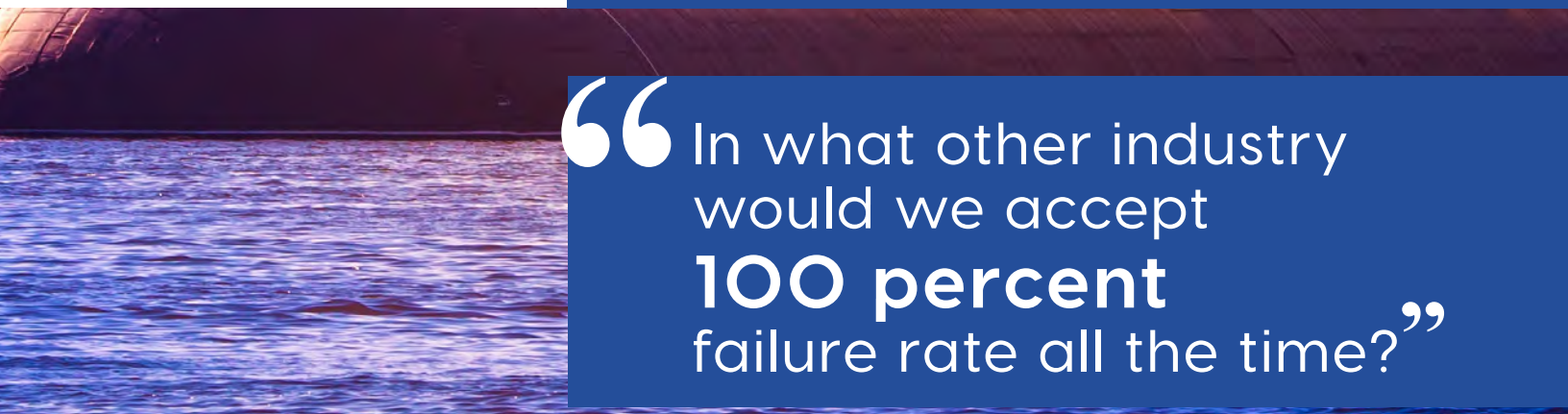
Owners can avoid the Megaproject Paradox by ensuring the development of the Organization Digital Twin using the following parameters. These parameters must be defined in detail prior to the Execution Phase, and then constantly updated and maintained during the entire Megaproject Life Cycle. Once these parameters are defined, and the Organization Digital Twin model developed, appropriate tools can be used to perform scenario planning for the Execution Phase Organization.

Noonan Governance Parameters for the Megaproject Execution Phase of the Life Cycle

1. Construction Strategy
2. Construction Organization Culture
3. Construction Organization Structure
4. Construction Organization Behavior

Noonan Descriptive Parameters for the Megaproject Execution Phase of the Life Cycle

1. Construction Ownership Vehicle
2. Construction Life Cycle Timeframe (aka Time To Construct)
3. Construction Cost
4. Construction Scope Complexity
5. Construction Contract
6. Construction Organization
7. Construction Geographic Location
8. Construction Risk



> “In what other industry would we accept **100 percent** failure rate all the time?”

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