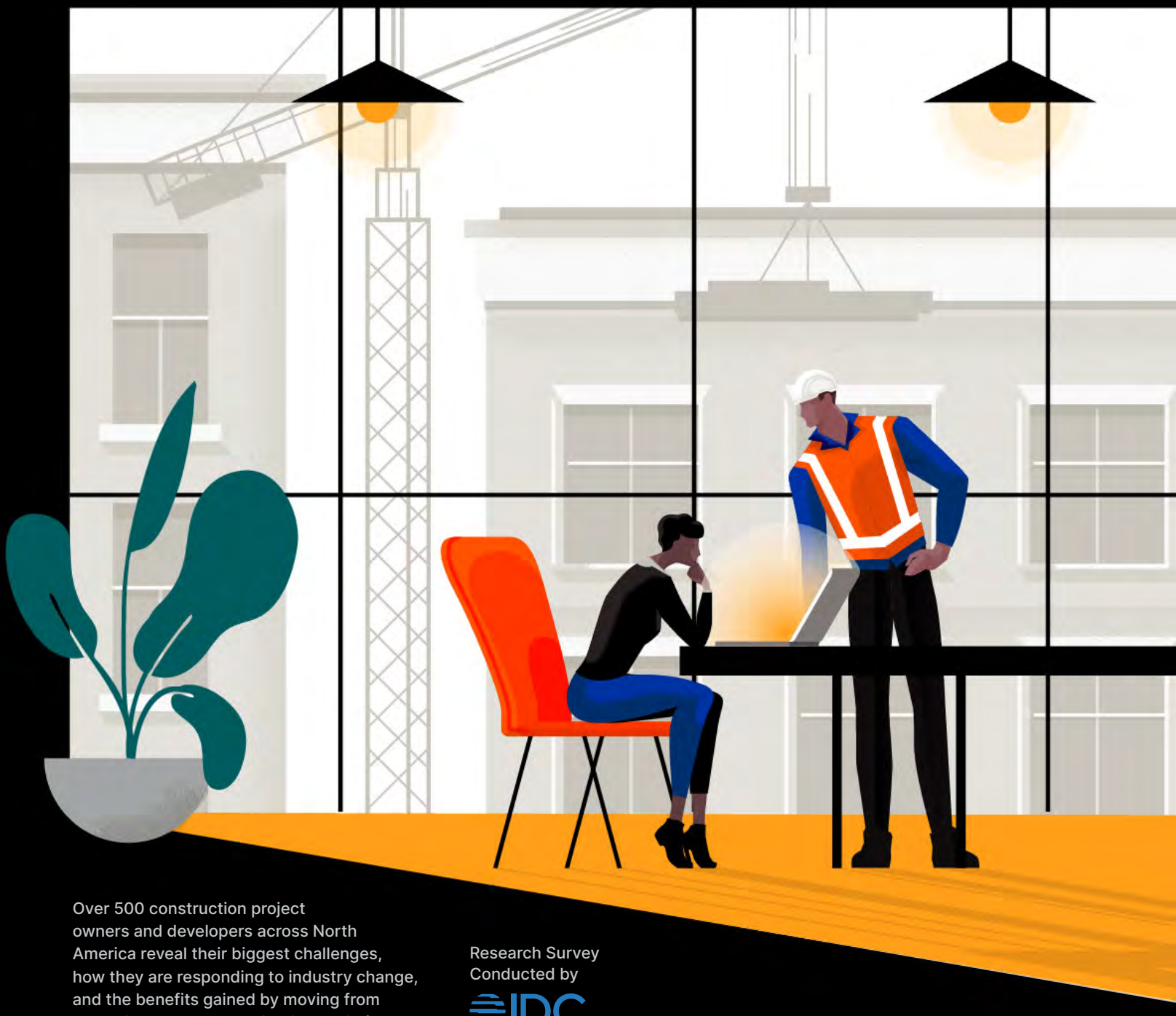
PROCORE

Owners at the Leading Edge

How Construction Project Owners are Using Technology to Achieve On-Time, On-Budget Performance



Over 500 construction project owners and developers across North America reveal their biggest challenges, how they are responding to industry change, and the benefits gained by moving from manual processes to technology solutions.

Research Survey Conducted by

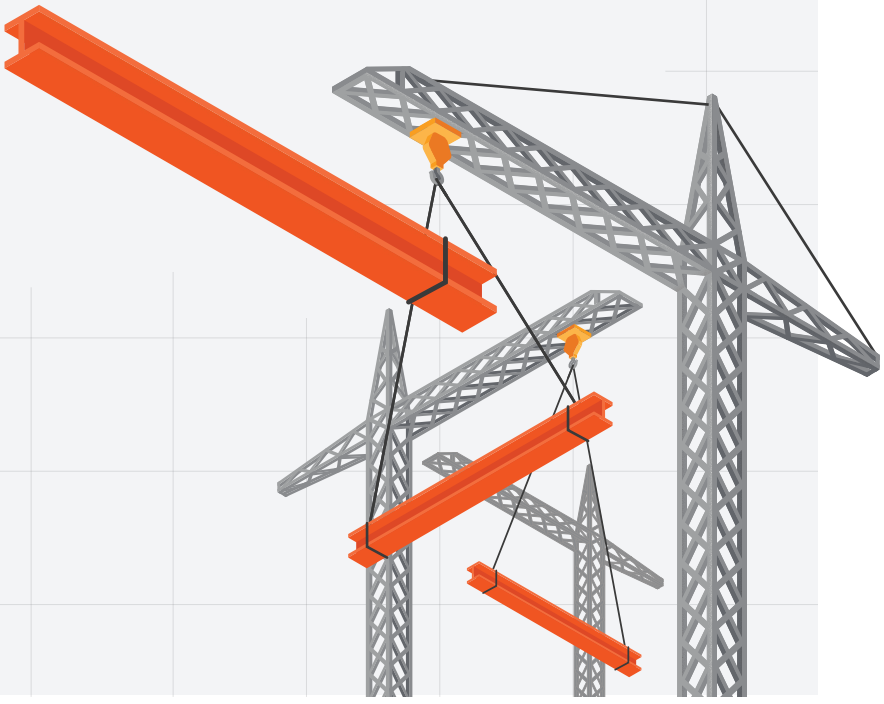
IDC

Contents

About the Survey

This industry-wide survey included over **500 North American construction project owners and developers including private corporations, governments, healthcare and education institutions, and commercial real estate owners and operators**. Over the past 12 months, these owners have delivered varying types of projects, from capital improvements (62%) to industrial, including turnarounds (51%), to ground-up development (44%).

Conducted in May 2021 by IDC, the survey sought to learn about owners' challenges and how they've responded to them—or plan to. It also focused on changes being planned or adopted to improve processes, workflows, and application modernization, and what benefits can be gained by moving from manual processes to digital approaches.



Executive Summary

Budget and scheduling. The findings of this survey showed clearly that these are top-of-mind challenges in the construction industry. After the uncertainties brought on by a global pandemic, virtually every owner is taking a hard look at issues of **project delivery**, **data utilization**, **digitization**, **collaboration**, **governance**, the **efficiency of financial controls**, and more—all with an eye to ensuring on-time, on-budget delivery of projects.

The demand for tighter project control, collaboration, and clear communication paths are critical, for many important reasons:

+ Get data from the field to decision-makers and back with the speed and accuracy needed to make good decisions.
+ Ensure the right information gets to the right people on-site to keep projects on track.
+ Mitigate risks and the need for rework or deficiency remediation.

Some owners, especially those with larger-scale projects, accept there will be a level of uncertainty, but they rely on technology to provide a connected platform as a single source of data, processes, and controls for all stakeholders. This approach helps navigate the uncertainty as successfully as possible.

Those that adopt this approach are clearly reflected throughout the survey in the way owners perform in delivering projects on budget and on schedule. The survey identifies significant differences between the high and low performers based on performance against budget and estimate for days/project completion time to segment survey respondents:

HIGH PERFORMERS

17% of responding organizations who were **least over budget and estimate** for days/completion time

LOW PERFORMERS

19% of responding organizations who were **most over budget and estimate** for days/completion time

In general, the survey found that owners leveraging digital solutions are delivering projects on budget and on schedule. Owners reliant on manual or siloed personal productivity solutions (Excel, SharePoint, Dropbox, local drive document storage, or outdated custom legacy solutions) are delivering projects late and over budget.

On the other hand, digital solutions with a focus on integrated software and a connected platform (offering data connectivity, reporting, and trending) lead to efficiency and productivity gains that help deliver projects on budget and on time.

Since manual, paper-based processes and/or non-integrated, siloed software solutions lack data connectivity, there is no aggregate or holistic reporting, which can cause issues like scope creep, rework, and an increased likelihood that projects will be delivered behind schedule and over budget.

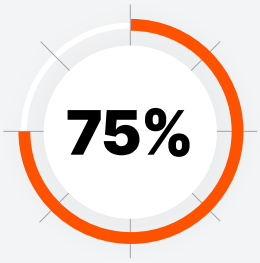
While there are several reasons for the results, better on-budget and on-schedule performance often corresponded with embracing integrated technology. For those playing catch-up when it comes to technology, there are many actions they can take to begin narrowing the gap.

The State of Construction: Late and Over Budget

The importance of on-schedule, on-budget performance contrasts dramatically with the reality for a majority of owners. **Both historically and today, a large majority of construction projects are late and over budget—often by significant amounts.**

Regardless of the nature of the project or the management approach, more than 75% of respondents said they were late and over budget. Collectively, they averaged 27% over the planned budget and 69 days late compared to the planned schedule.

The survey also found that, for every project, an average of six changes were made to baseline budgets and five changes to baseline schedules. These changes resulted in owners experiencing an average 15% increase in project costs.



of projects delivered **late**, **over budget**, or **both**

69
DAYS

Project delivery averaged **69 days late**

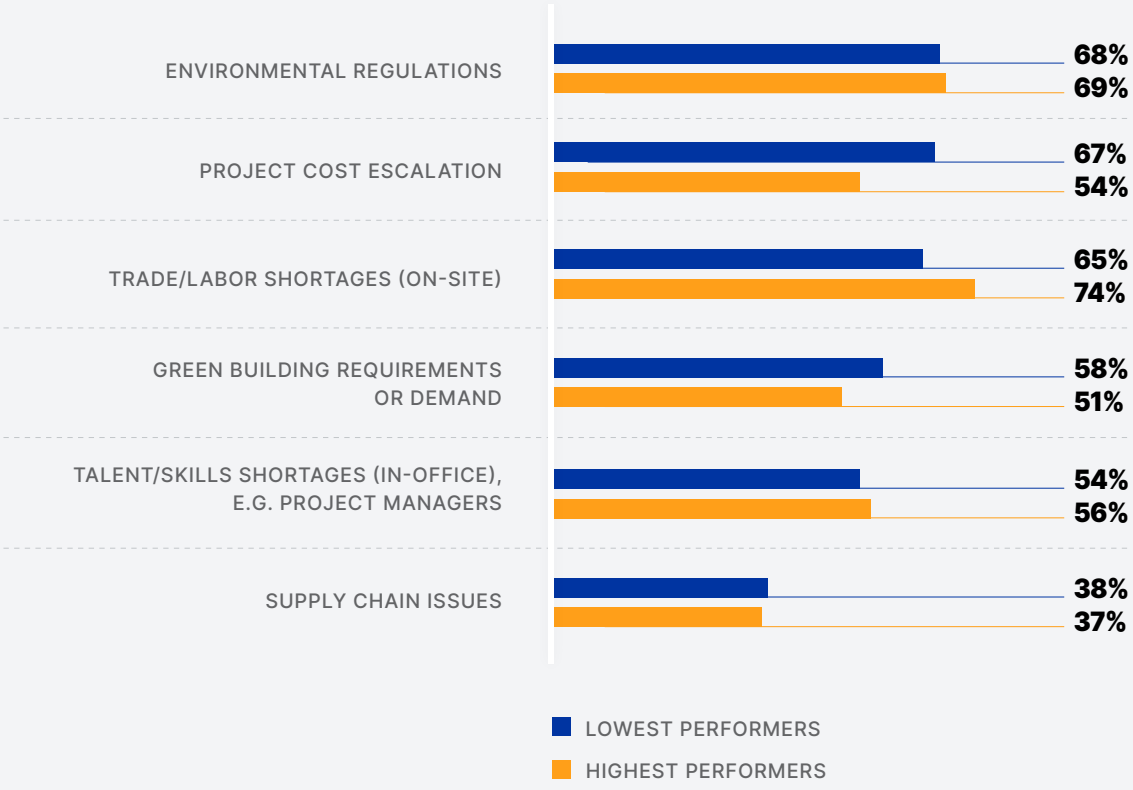
Costs **increased 15%** due to changes in budget and schedule

Key Project Challenges: Labor Shortages & Cost Escalation

Why are so many projects late and over budget? According to the survey results, the biggest challenges on construction projects are on-site trade and labor shortages, cost escalation, and environmental regulations. While these are challenging for all firms, they are significantly impacted by the maturity of project controls and project management, and whether data and applications are integrated or exist in silos.

To what degree are the following posing a challenge for your organization when it comes to construction projects?

(Percentage of respondents who indicated a challenge)



“Uncertain times mean you’re uncertain about your costs, and costs determine the viability of a project. When there’s uncertainty, it typically results in project cost escalation and demand for better data to run better cost analyses.”

Warren Shiau
Research Vice President, IDC

PROCORE®

Finding Skilled Trades & Labor

One of the biggest issues facing owners is finding skilled on-site trades and labor, as well as high-performing in-office talent. This has been a particular issue through the pandemic, but the challenges are typically worse for companies in a manual, paper-based environment, versus those taking advantage of technology.

> **"Trade and labor is part and parcel of estimating project timelines and viability, so when there's a labor shortage, it impacts costs. And the longer it takes to finish a project, the more your costs escalate. For companies without proper processes in place, those problems are only going to be exacerbated."**
>
> **Warren Shiau**
> Research Vice President, IDC

The most pressing skillset and staffing shortages are found in planning, design, and scoping. The lowest performing companies are more likely to rely on manual processes and technically obsolete solutions such as siloed personal productivity software (Excel, SharePoint, Dropbox). These solutions tend to increase staffing challenges since the most skilled employees are less likely to be attracted to environments using outdated work processes.

Only 24% of respondents said they're well-staffed, with the right skillsets around financial governance, reporting, and controls, and only 32% are well-staffed for planning, design, and scoping. This makes sense as these tasks are typically completed by consultants or contracted employees rather than in-house staff.

Every owner is tasked with planning and delivering capital projects and trying to do more with less. The challenge is to attract top talent to their project delivery teams and empower their workforce with tools to maximize their performance.

Which of the following best describes your organization's **level of staffing** with regard to the teams that work on construction-related activities?

	Shortage of skilled staff	Adequately staffed but could use more skills acquisition	Well-staffed with the right skills
PLANNING, DESIGN & SCOPING OF CONSTRUCTION PROJECTS	**18%**	**50%**	**32%**
FINANCIAL GOVERNANCE & REPORTING AND CONTROLS OF CONSTRUCTION PROJECTS	**20%**	**56%**	**24%**

Retaining Talent

What's key to retaining skilled project staff? Survey respondents said enabling job responsibilities to be carried out with better technology (67%) and helping staff improve their productivity within existing tasks (60%). Half cited shifting job responsibilities to higher value-add tasks.

What this points to, for many owners, is a need to make the jump from a current state of manual or ineffective processes and disconnected or siloed data, to a platform technology solution. That kind of technology is the foundation for integrated solutions for governance, reporting, controls, and analysis, as well as more advanced solutions such as augmented reality and drones.

Which of the following approaches do you believe have the best potential to help you retain your skilled project staff?

Project Cost Escalation

Paper-based, manual processes (even if they incorporate some digitization) create **process** and **workflow inefficiencies**, **poor visibility and accountability**, and **ineffective controls**, **reporting**, and **analytics**. These issues, **caused by the lack of a connected technology environment** in key areas of **project delivery**, are contributing factors to the overall issue of projects coming in **late and/or over budget**.

While paper-based processes are an issue, so are digital technologies that are siloed or disconnected. This includes productivity software, such as Excel, SharePoint, or Dropbox (as well as custom software) that support manual processes and calculations, but aren't connected in any way.

When looking across the project delivery lifecycle, there are critical points where lower-performing companies are more likely to employ manual and disconnected processes, data, and workflows:

+ **Earlier planning & development stages** — drawing management, budgeting, and pre-construction activities including analysis of earlier planning and development data, and how that informs estimating.
+ **Once project execution is underway**— financial controls, change order management, and on-site incident tracking.

All of these can be directly correlated with schedule delays and, in particular, cost overruns. As such, it is clear the ability to digitally connect all necessary people, processes, and data across the project lifecycle is critical to alleviating the issue of project cost escalation.

"Around 39% of construction projects are still managed with manual or mostly-manual processes. That is gigantic. At a top-line level, this use of manual processes—even extending to paper-based processes—is a big factor behind companies being over budget."

Warren Shiau, Research Vice President, IDC

Digitization = On-Time, On-Budget Project Delivery

The key difference between the highest and lowest performers in the survey comes in the **adoption of technology** in areas that impact reporting, controls, analysis, and ultimately productivity.

This includes technology for project data centralization and software workflow automation, particularly in areas such as RFIs, drawings, and other key project management and control processes.

However, many companies still rely on manual and siloed tools and methods in their project management practices. The inefficiencies and risks caused by lack of digitization can be traced directly to the overall issue of projects being late and/or over budget.

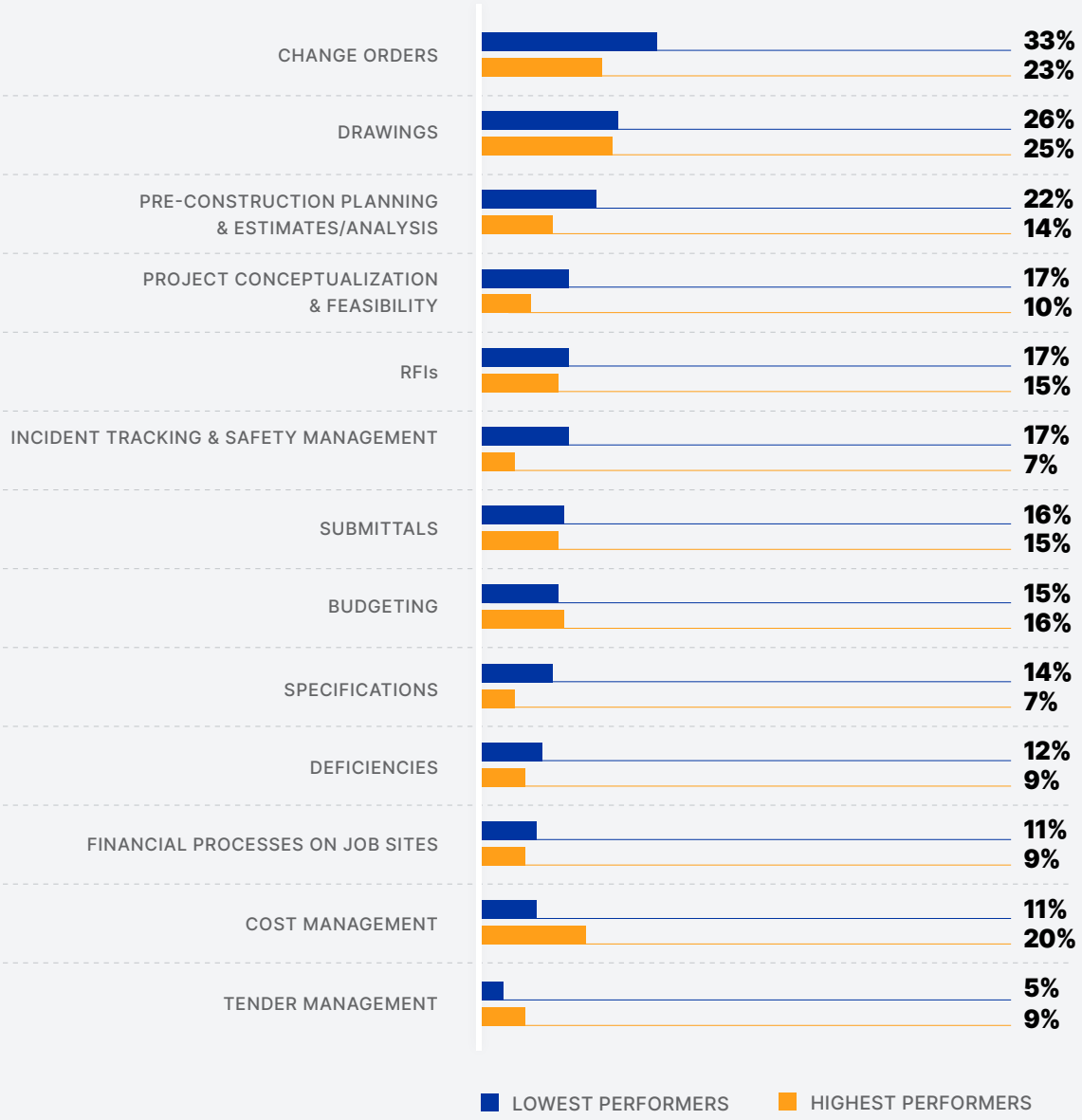
> **"If you're paper-based or siloed in the planning stages, then you lack flexibility later on. So when you need to implement a change, it's not as easy as when this process is digitized and automated, particularly with drawings and specifications."**
>
> **Warren Shiau**
> Research Vice President, IDC

In fact, only about 15% of survey respondents are using an integrated software suite across key aspects of construction project management and control. The remaining 85% still use productivity-based software. Importantly, the highest performers have implemented connected digitization in key areas of the construction process. The lowest performers on the other hand are more likely to be using ad hoc spreadsheets or outdated software as noted in this chart:

MANUAL PROCESSES HOLD TEAMS BACK

How **digitized** are your organization's **processes and workflows** in the following construction project areas?

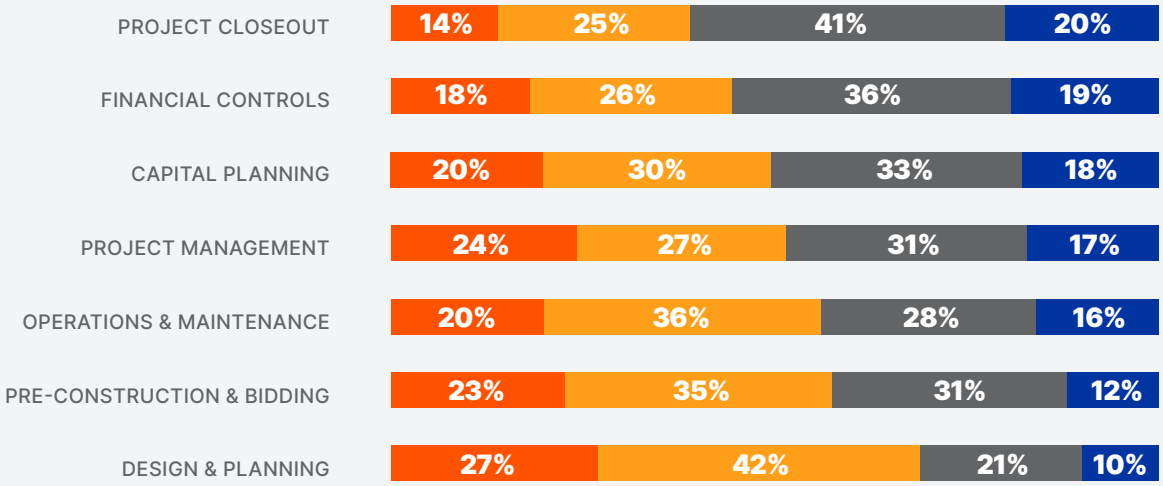
(Sum of mostly/fully manual and/or paper-based)



Paper-based, manual processes and non-integrated software go hand-in-hand with lack of standardization, transparency, efficiency, and accountability in controls and processes. The data in the chart below shows how the lowest performers are using some form of manual and non-integrated productivity software or legacy custom applications for critical capabilities across the project lifecycle, as well as when the asset is handed over to operations and maintenance.

How is your organization's **use of software** in the following construction project areas best described?

- **Productivity software** (e.g. Excel, SharePoint, Dropbox) to assist manual processes and calculations
- **Customized software/ spreadsheet** programs developed ourselves
- **Different non-integrated software solutions** purchased for specific governance processes or controls
- **Integrated software suite** that handles most of these and other functions



Selected answers only shown. Percentages may not add up to 100% due to rounding.

Project Management & Controls: High performers use formal controls; low performers lack digitization, and integration.

The **highest performers** among construction project owners and developers are more likely to have formalized controls with bidding process compliance, construction cost reporting, percentage of completion estimates, incident tracking and safety management, as well as construction schedule reporting. They also have more defined processes around pre-construction planning and estimates/analysis, submittals, and bid/tender management.

On the other hand, the **lowest performers** lack digitization and integration and make heavy use of paper and manual processes—clear ties to poor or lagging financial and operational performance. The survey results point to key areas where the lowest performers can improve their on-time, on-budget performance. These include:

+ Project conceptualization and feasibility
+ Pre-construction planning and estimates/analysis
+ Specification management
+ Financial processes on job sites
+ Change order management
+ Incident tracking and safety management

The lowest performers are also more likely to use productivity software and/or legacy applications for key capabilities across the project lifecycle. So it's not surprising they lag behind the highest performers in adopting technology that impacts reporting, control, and analysis and future potential for productivity and efficiency gains that come from adopting integrated technology.

There's a need for all owners to do more with less, to empower their workforce, and attract top talent. Failure of the lowest performers to adopt technology hinders those abilities. So they continue to get poor results. All of this points to the increasing need for digitization, integration, and modernization.

Project Management Performance: Digitization mitigates unwanted or unexpected delays and cost overruns.

Changes that result in delays or cost increases are sometimes inevitable. But in many cases, underlying issues with **data**, **processes**, and **technology tools** create the risk that leads to unwanted or unexpected delays or cost increases, which could have been mitigated with improvements in these areas.

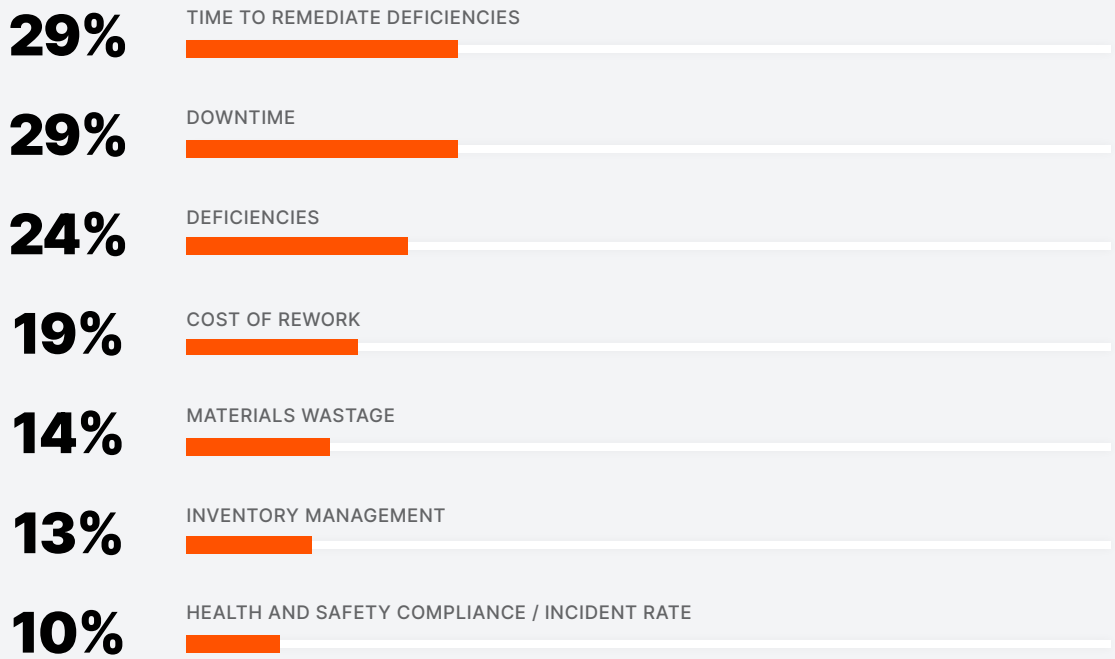
Survey respondents reported the biggest issues with project management performance in three areas:

1. Time to remediate deficiencies
2. Downtime
3. Deficiencies

The survey results show that lack of digitization and ad hoc or informal controls and processes **all link to the poorest performance**. This includes manual or paper-based drawings, construction planning, and change orders, as well as non-integrated productivity software and non-integrated technology tools used for project controls and management. Collectively, these lead to increased downtime and require a greater amount of time to remediate deficiencies.

RATING PROJECT MANAGEMENT PERFORMANCE

How would you rate **performance in the construction projects** your organization has undertaken across the following areas? (Sum of not acceptable and very poor)



Formal Processes & Controls: Standardization linked to on-time, on-budget project delivery.

It's important to have standardized, formalized, and well-maintained processes and controls facilitated by better technology. The survey found that the highest performers (who are more likely to deliver projects on-budget and on-schedule) are more likely to have formalized processes in place, particularly in certain controls-related and construction process-related areas. These include:

CONTROLS-RELATED AREAS:

+ Bidding process compliance
+ Cost reporting
+ Percentage of completion estimates
+ Incident tracking & safety management
+ Schedule reporting

CONSTRUCTION PROCESS-RELATED AREAS:

+ Pre-construction planning & estimates/analysis
+ Submittals
+ Bid/tender management

Project management encompasses many functions critical to on-budget, on-schedule completion. Yet many aspects of project management tend to be handled in an ad hoc or informal way during project delivery by about 40% of companies.

These include completion estimates, project expenditures to budget, financial processes on job sites, change orders, and construction schedule reporting.

Project management functions that are most often ad hoc or informal include pre-construction planning and estimates/analysis, specifications, bid/tender management, and submittals—averaging about 35%.

The highest performers are more likely to have formalized and regularly updated, standardized processes in specific areas. The lowest performers might want to consider implementing:

On the controls side: Specific control areas that involve field to office (or cross-functional) communication provide an ability for owners to correctly understand and to report on real-time status and accurate data. Standardized, formalized, and well-maintained processes and controls make all of this possible.

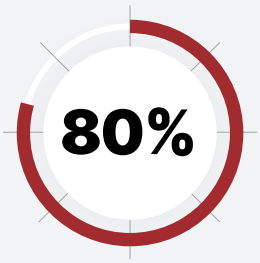
On the construction process side: Proper communication, information, and diligence during planning and pre-construction (including bidding and bid management) lead to a project that is more realistic and executable within the planned cost, scope, and schedule, and sets owners up for a higher likelihood of successful project delivery.

“Any business that manages itself on an ad hoc basis—especially if their financial controls are ad hoc—is more likely to be late or over budget.”

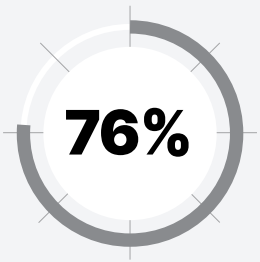
Warren Shiau, Research Vice President, IDC

Which of the following **best describes** how your organization approaches the following per each major construction project it undertakes?

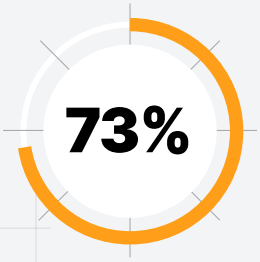
(Percentage of respondents with a formalized process and controls)



PROGRESS PAYMENT REQUESTS



PROJECT CONCEPTUALIZATION & FEASIBILITY



BIDDING PROCESS COMPLIANCE

72% RFIs, DRAWINGS

70% CONSTRUCTION COST REPORTING

69% INCIDENT TRACKING & SAFETY MANAGEMENT

68% SUBMITTALS

65% SPECIFICATIONS, BID / TENDER MANAGEMENT, CONSTRUCTION SCHEDULE REPORTING,

62% PRE-CONSTRUCTION PLANNING & ESTIMATES/ANALYSIS

59% PERCENTAGE OF COMPLETION ESTIMATES

58% CHANGE ORDERS, FINANCIAL PROCESSES ON JOB SITES

57% PROJECT EXPENDITURES TO BUDGET

New Tech = New Value

Integrated technologies and software suites can help project delivery teams deal with the challenges that make projects late and over budget while improving overall operational and financial performance.

New technologies and trends that owners and developers are planning to adopt over the next 12 months (if they have not already done so) include **Building Information Modeling** (BIM), **modular construction**, and **green building construction**. When it comes to budgeting and scheduling, the greatest predicted impact on project performance in the next three years is BIM (53%) and connected supply chain (44%), according to the survey results.

OWNERS ARE ADOPTING NEW TECHNOLOGIES

Within the next three years, which of the following do you believe will have the **greatest impact on improving** your organization's construction project performance compared to **budget** and **schedule**? (Select up to three)

53%
BUILDING INFORMATION MODELING (BIM)

34%
PREDICTIVE ANALYTICS FOR COST MODELING

26%
TOOLS FOR GREATER COLLABORATION DURING PRE-CONSTRUCTION

44%
CONNECTED SUPPLY CHAIN

30%
DIGITAL TWIN

24%
DATA CENTRALIZATION TECHNOLOGIES

41%
PRE-FABRICATION OF COMPONENTS

26%
MODULAR CONSTRUCTION

22%
SOFTWARE WORKFLOW AUTOMATION

“The survey shows that project owners and developers are identifying what needs to be done. But if the adoption of these technologies is going to be effective, they need to look at modernizing their data, applications and IT infrastructure—or else they won’t be fully able to take advantage of these game changers.”

Warren Shiau, Research Vice President, IDC

Data Centralization is Key to New Technology Adoption.

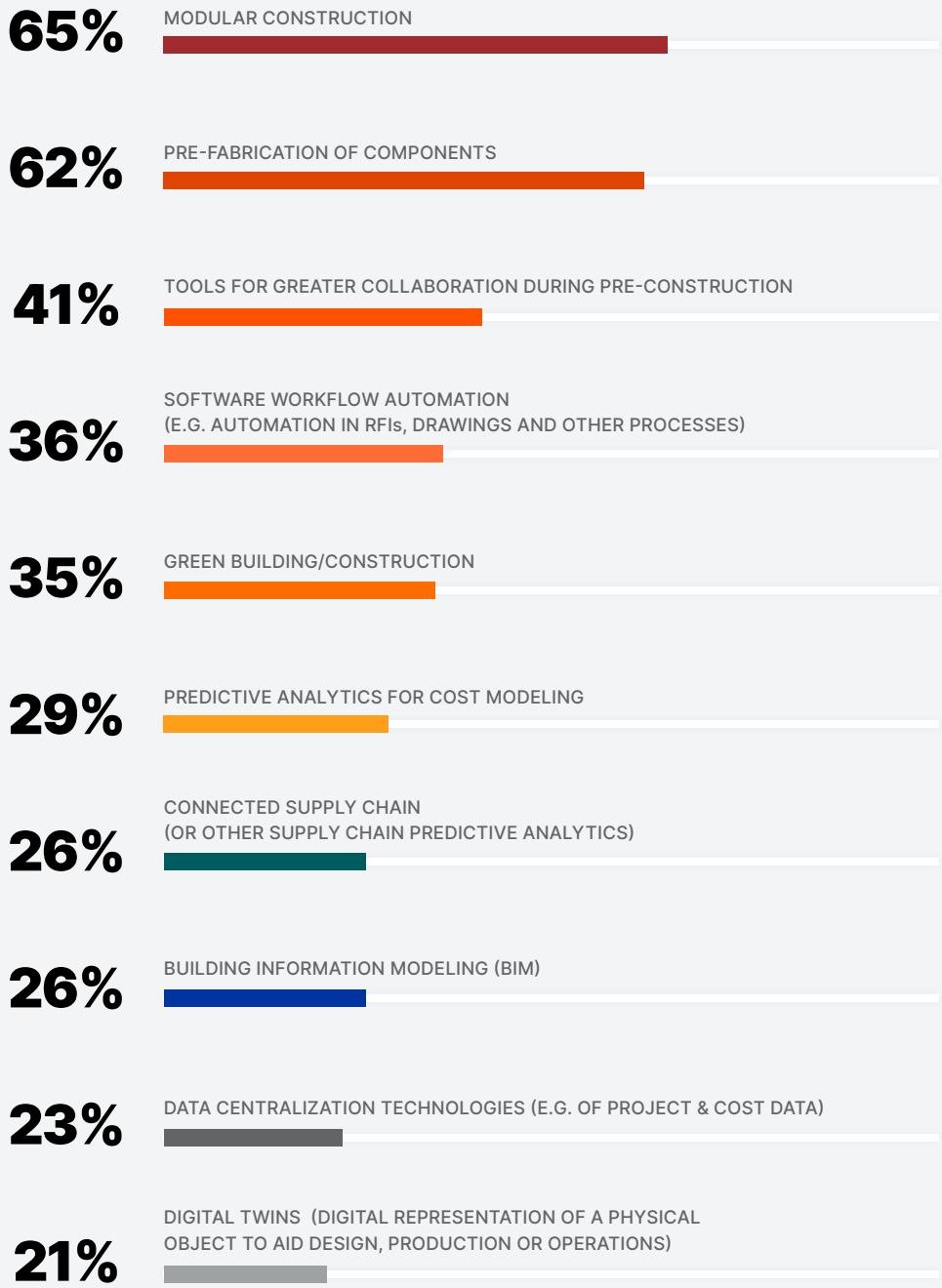
Many owners and developers are considering, planning, or in the process of adopting new technologies. These include **centralization** of all project data (including cost management), **predictive analytics** for cost modeling, **tools for greater collaboration** during pre-construction, and **connected supply chains** or other supply chain predictive analytics.

It's important to note, though, that these technologies cannot be adopted effectively without addressing the issues of software and data silos, or ad hoc/informal controls, processes, and workflows. Those adopting newer technologies—whether for better cost performance, enhanced collaboration, or improved on-time delivery—are more likely to reap those benefits if they also address data infrastructure modernization and automation.

> **"For those still using paper-based or manual processes, adopting these newer technologies is going to be more difficult and less effective without modernization."**
>
> **Warren Shiau**
> Research Vice President, IDC

Which of the following **technologies** has your organization adopted, or does it intend to adopt?

(Percentage of respondents who have already implemented or adopted)



Mitigate Risk with Tighter Control Over Processes.

There's a clear need to keep tighter control of processes for real-time decision making and risk mitigation as potential issues arise. Supply chain uncertainties are one example of how critical it is for owners to anticipate cost impacts resulting from changes in their environment.

At the same time, many owners find it challenging to conduct this sort of sophisticated analysis of their construction projects due to a lack of expertise and skillsets for financial governance, reporting, and controls. While that is a challenge for many owners, it is particularly problematic for the lowest performers in this survey.

To take full advantage of future trends in supply chain optimization (which theoretically drives down cost and risk by increasing predictability and accuracy), companies need to start using purpose-built technology that provides the capability to collect and utilize project data, such as analyzing variations from the plan that will cause changes. While a connected supply chain isn't the most pressing issue for survey respondents, it is perceived as a key opportunity for future efficiency gains.

Construction delivery methods are evolving.

Given the challenges facing owners and the critical importance of on-budget, on-schedule performance, it's no surprise they're experimenting with different project delivery methods to best achieve their goals.

Increased use of Integrated Project Delivery (IPD) and Construction Manager at Risk (CMAR) had the strongest association with an increase in on schedule project delivery, while increased use of more traditional DBB had the strongest association with an increase in on-budget project delivery (likely versus complete in-house delivery).

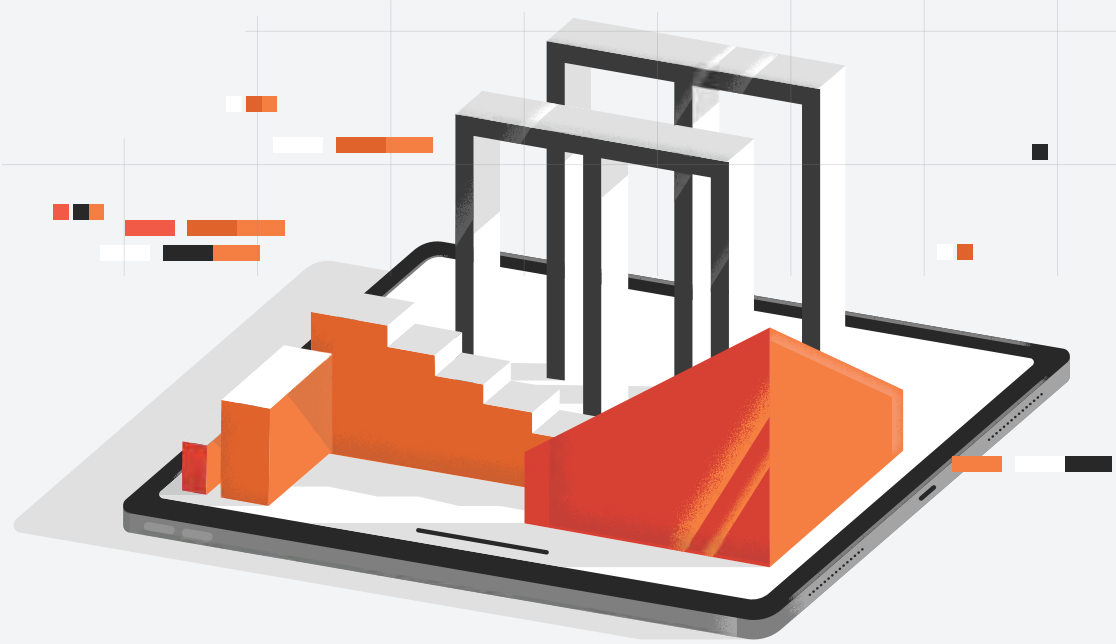
Digitization and integration, implemented together, facilitate more collaborative project delivery methods such as Design-Build (DB) and Integrated Project Delivery (IPD). Since these newer methodologies are more collaborative in nature, the more discipline built into controls and processes—particularly the ability to work together in real-time from a single source of data—the better that collaboration will work and the better the methodology will deliver results.

> **"When adopting a new construction project delivery methodology, such as Design-Build or Integrated Project Delivery, the more digitized and integrated your processes—and the more formalized those processes are—the better that methodology is going to work."**
>
> **Warren Shiau**
> Research Vice President, IDC

IMPACT OF PROJECT DELIVERY METHODS

You indicated your organization has increased its use of the following project delivery methods. What has the **impact** of shifting towards these methods been? (Please select all impacts that apply)

	Increase in on-time project delivery	Increase in on-budget project delivery	Reduced project risk
DESIGN-BID-BUILD (DBB)	**40%**	**59%**	**35%**
INTEGRATED PROJECT DELIVERY (IPD)	**61%**	**50%**	**37%**
CONSTRUCTION MANAGER AT RISK (CMAR)	**64%**	**44%**	**33%**
DESIGN-BUILD (DB)	**43%**	**53%**	**30%**
PUBLIC-PRIVATE-PARTNERSHIP (P3)	**32%**	**61%**	**40%**



Looking Ahead: What's Next for Owners

The survey results clearly indicate that owners and developers of construction projects are well aware of the long-term outlook for their industry, what will impact them, and how they can move forward with new technologies and methodologies. Evolving technologies and increased automation impact everything from project delivery to filling skills gaps and alleviating staffing shortages.

Many companies are already embracing technology for more effective project delivery, data utilization, collaboration, financial controls, governance, and more—all with an eye to ensuring on-budget, on-schedule delivery of projects.

While some owners are still hesitant or concerned about implementation, it's not necessary to implement everything at once. An approach whereby specific controls and processes are digitized will have an immediate impact. Then, it's possible to build on that success.

By replacing paper-based, manual processes, old-school spreadsheets, and siloed productivity applications with digitized, centralized, and integrated systems, companies delivering these projects can move toward their own definition of success in both operational and financial efficiencies—and away from project delays and cost overruns.

The survey results show that an integrated technology platform offers clear benefits to owners across the project lifecycle, from idea through successful completion. The right platform can help those who commission and manage the project take control of schedules and budgets.

Taking steps to modernize the technology infrastructure will future-proof the business, gain competitive advantage, accelerate innovation, and attract top talent.

Procore construction management software connects everyone and everything on one platform, so you can build better. To learn more, visit procore.com.

> **"It's visibility that counts. Visibility means you can pull data from your operations or your supply chain and run the analysis you need. If you have an integrated solution with functionality for controls and processes, that's a game-changer."**
>
> **Warren Shiau**
> Research Vice President, IDC

PROCORE®

Procore is a leading provider of construction management software. Over 1 million projects and more than $1 trillion USD in construction volume have run on Procore's platform. Procore's platform connects key project stakeholders to solutions Procore has built specifically for the construction industry—for the owner, the general contractor, and the specialty contractor. Procore's Marketplace has a multitude of partner solutions that integrate seamlessly with Procore's platform, giving construction professionals the freedom to connect with what works best for them. Headquartered in Carpinteria, California, Procore has offices in the United States, Canada and around the globe. Learn more at Procore.com.

International Data Corporation (IDC) is the premier global provider of market intelligence, advisory services, and events for the information technology, telecommunications, and consumer technology markets. With more than 1,100 analysts worldwide, IDC offers global, regional, and local expertise on technology and industry opportunities and trends in over 110 countries. IDC's analysis and insight helps IT professionals, business executives, and the investment community to make fact-based technology decisions and to achieve their key business objectives. Founded in 1964, IDC is a wholly-owned subsidiary of International Data Group (IDG), the world's leading tech media, data and marketing services company. Learn more at IDC.com.

Produced by
PROCORE TECHNOLOGIES, INC.

Procore manages your projects, resources and financials from project planning to closeout. Our platform connects every project contributor to solutions we've built specifically for this industry—for the owner, for the GC, and for the specialty contractor. Our App Marketplace has over 150 partner solutions that integrate seamlessly with our platform, giving you the freedom to connect with what works best for you, even if we don't build it. The ability to easily communicate across disparate teams makes it easier to work together by eliminating silos and establishing a single source of truth. It's how Procore gives your team access to everything they need to know to get their job done.

IF YOU HAVE ANY QUESTIONS,
GIVE US A CALL AT 866 477 6267

OR EMAIL US:
SALES@PROCORE.COM

Talk with an Expert

VISIT THE JOBSITE >

Procore's Hub for
Original Content

WATCH PROCORE TV >

Procore's Official
YouTube Channel

MORE RESOURCES >

Free eBooks &
Downloads