

The cover features a central blue circle containing the title. Surrounding this circle are various construction and technology icons: a smartphone with a play button, a crane, a drone, gears, a person in a hard hat, a cloud with a smile, and a code editor window. The background is dark blue with abstract shapes and lines.

2017

THE 6TH ANNUAL CONSTRUCTION TECHNOLOGY REPORT

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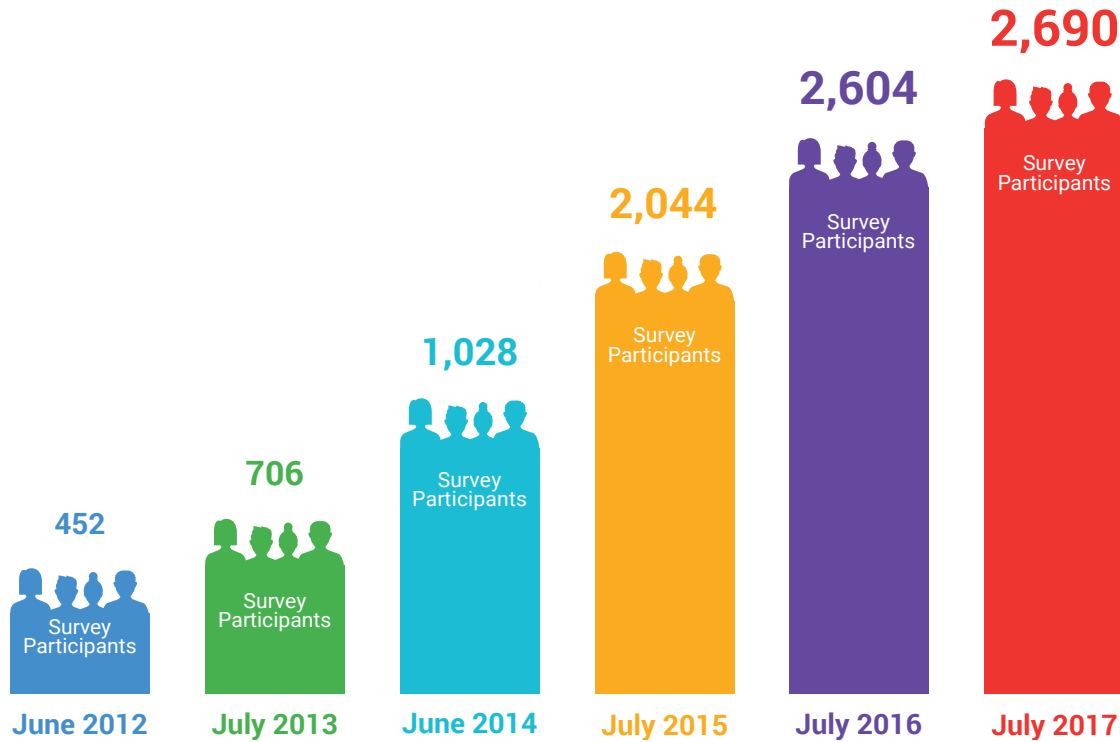
CONSTRUCTION SCIENCE
TEXAS A & M UNIVERSITY

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LEARN MORE ABOUT THE ANNUAL SURVEY BEHIND THE REPORT



The 6th Annual ConTech Survey was conducted in July 2017, and distributed to over **60,000 construction industry professionals via email, social media, advertisements, and online publications.**

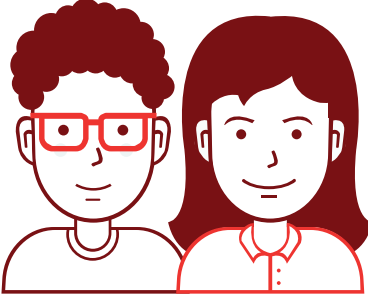
2,690 professionals responded and 716 were disqualified for not meeting required participant criteria. Respondents self-identifying as Educator or Student, Construction Services Provider or Construction Technology Provider without direct involvement or influence in construction operations were disqualified. Respondents who failed to finish more than the first section of the survey were also disqualified.

Percentages shown throughout this report are based on the number of respondents for each individual question, unless otherwise stated. **Only the percentages on pie graphs will add up to 100% - on other graphs, respondents were able to select more than one answer.** You will also notice that while the survey dates back to 2012, not all historical data is included in the report. **(Past reports are still available at jbknowledge.com/report.)**

Instead, we aim to bring you only the most notable changes and comparisons in data over the past five years. **Some of prior years' survey questions may have been omitted or changed in this year's survey and other questions were added. In our effort to only present the most leading-edge data, we may have pruned questions we deemed less applicable to today's industry.** Respondents were able to submit comments on each page of the survey, some we've shared throughout this report, along with other highlights, definitions and disclaimers. This report reveals the comprehensive results from the 2017 ConTech Survey with commentary and analysis from the perspective of a construction technology consulting provider. **As we develop the 2018 survey, we encourage you to send us your feedback. We are also happy to provide excerpts and graphs for re-print upon request. Any re-print of the contents of this report without permission from JBKnowledge is a copyright violation.** Any re-print, press, or other inquiries can be sent directly to Editor-in-Chief, Liz Welsh, liz@jbknowledge.com.



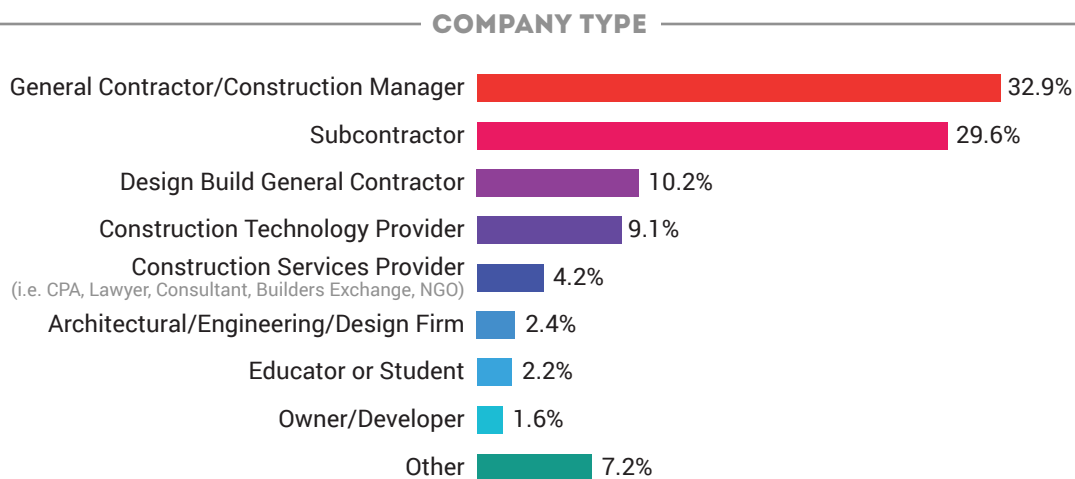
SURVEY PARTICIPANTS



LEARN ABOUT THE COMPANIES THAT SHAPED THE 2017 CONTECH REPORT

The 2017 Construction Technology Report's respondents branch across a diverse spectrum of the construction industry from consultants and architects to industrial construction managers and residential builders. Survey answers are self-reported. On select questions, respondents were encouraged to choose as many career titles or certifications that apply. Other questions were only offered to respondents with certain decision-making capabilities.

The 2017 ConTech Report is proud to continue the trend of improving the report by introducing new questions every year for a more complete, robust resource with deeper levels of understanding.

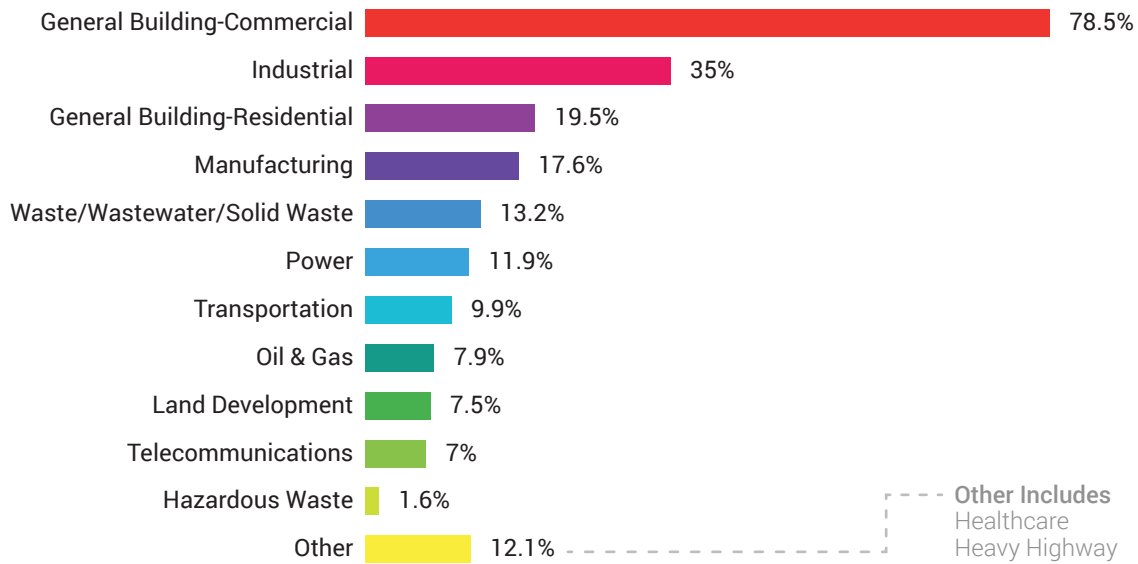


What industries had the most survey respondents?

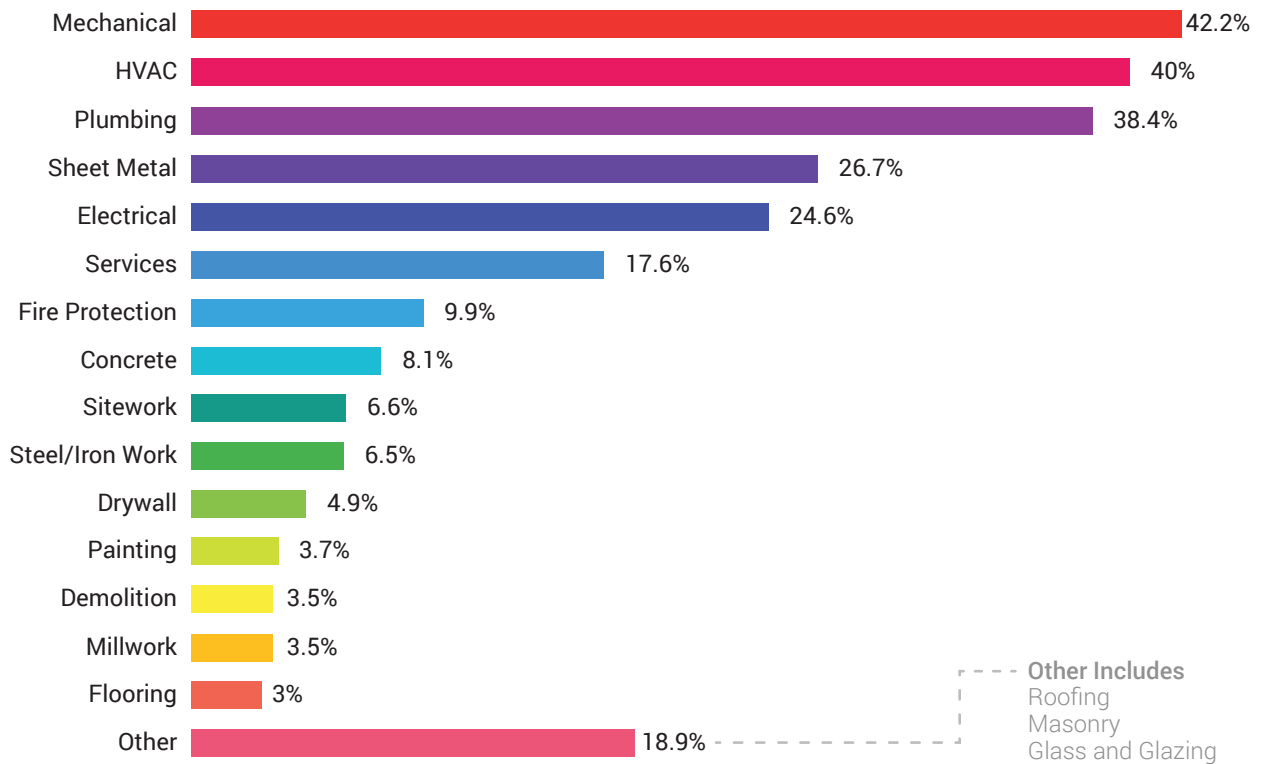
The 2017 Construction Technology Report saw an increase in respondents who are subcontractors, and a decrease in general contractors - **this does not necessarily mean general contractors are underrepresented in this year's report!** Because respondents were permitted to self-identify with as many roles as they deemed suitable to describe the breadth of their work, many respondents selected both General Contractor and Subcontractor. General Contractors may be filling a dual-role by performing subcontractor work as well.

While this year's report boasted a 20% increase in those who reported Industrial as their primary industry as compared to 2016, commercial builders are still the primary participants in the survey.

PRIMARY INDUSTRY



SUBCONTRACTOR-PRIMARY TRADE



WHAT ARE THE TOP TRADES OF SUBCONTRACTOR SURVEY RESPONDENTS?



1. Mechanical
2. HVAC
3. Plumbing
4. Sheet Metal
5. Electrical



Why this makes sense:

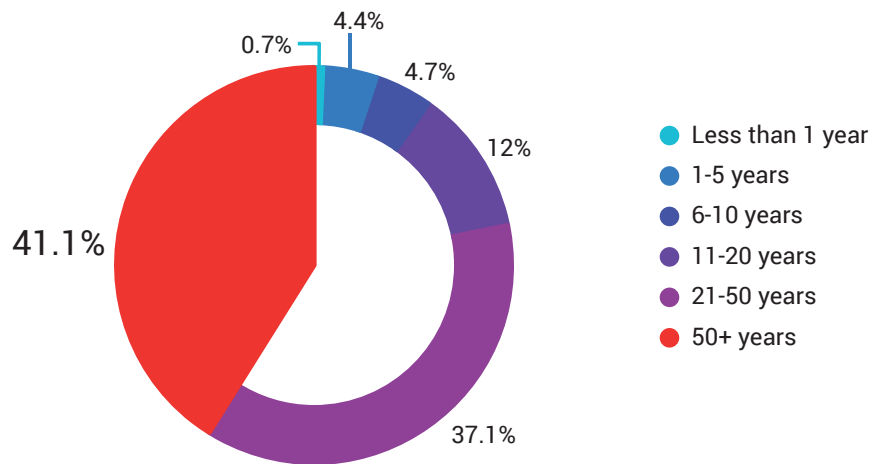
Mechanical contractors are likely to practice a combination of some or all of these trades listed! With the Mechanical Contractors Association of America as a partner of this industry survey and report, responses from their members have had a growing influence in the results year after year.

SURVEY PARTICIPANTS COMMENTED



"Our company is an interstate pipeline company, so we act as an owner, operator, engineering & construction management company all at once."

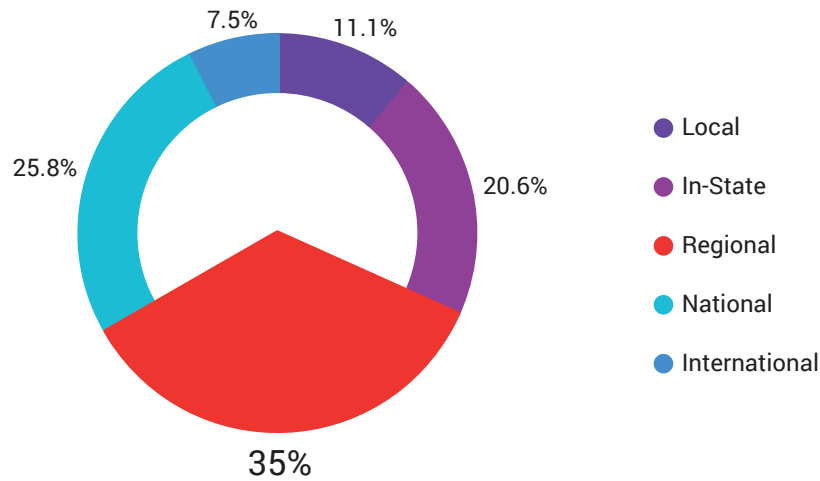
YEARS IN BUSINESS



How long have survey respondents been in business?

The greatest number of respondents work at companies who have been in business for over 50 years. At 41.1%, this number has grown 3.6% since last year, eclipsing last year's group with the greatest number of respondents – companies in business between 21 to 50 years. A reason for this could be tenured or multi-generational companies' natural progression into the next age bracket.

RANGE OF WORK

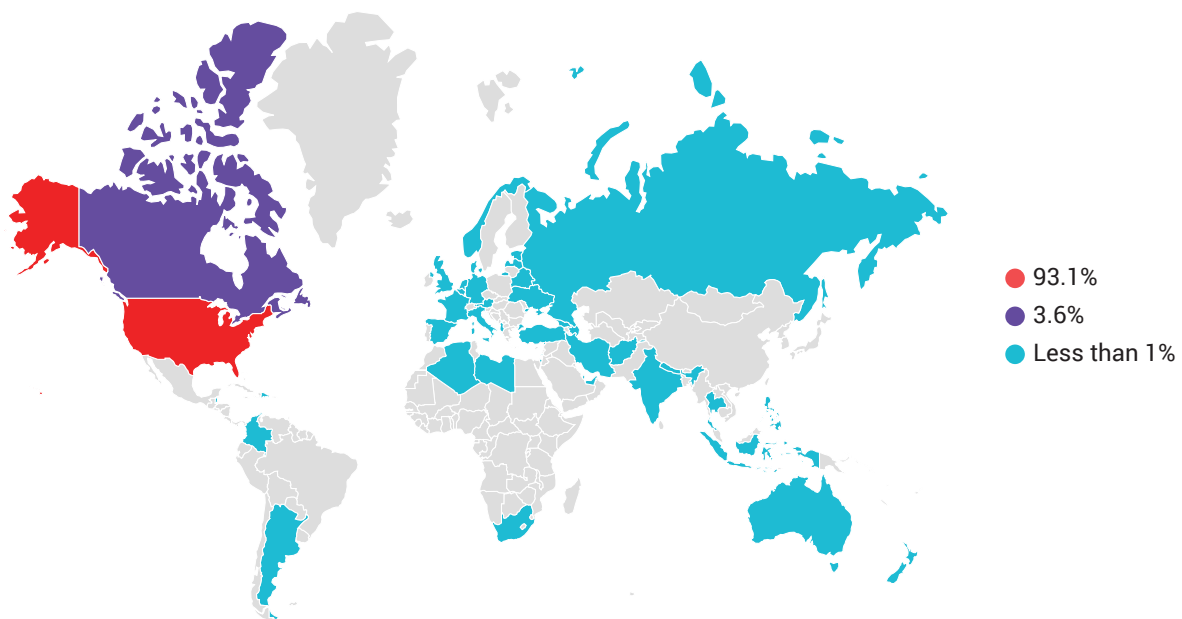


Where are respondents building in 2017?

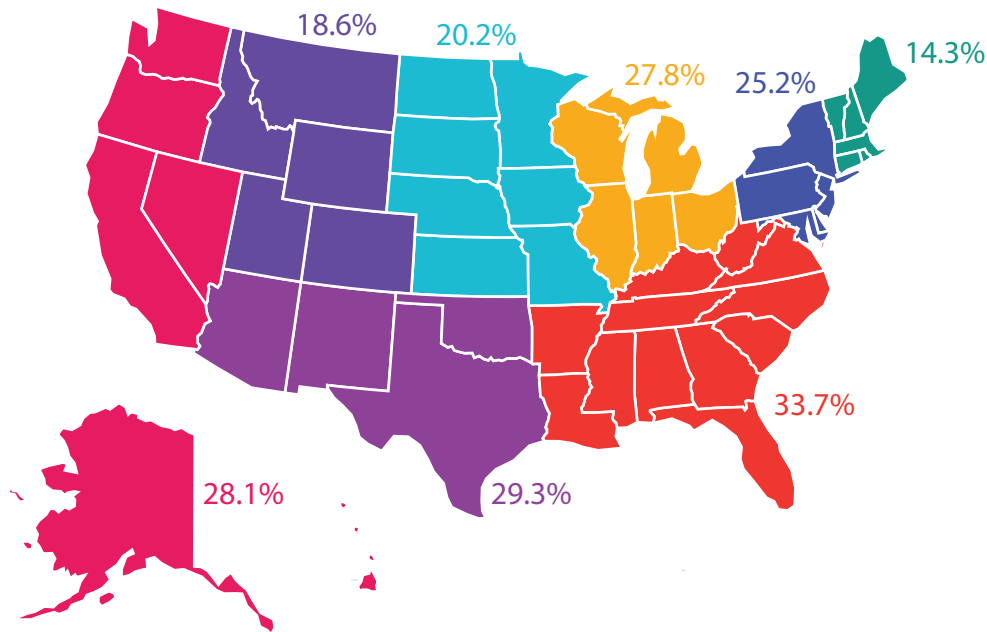
Our survey respondents’ range of work has branched out beyond local projects since 2016.

Respondents reported a 2% decrease in local and in-state projects, and a 4% increase in international work. It’s difficult to deduce whether respondents are actually completing fewer local and in-state projects, or if this year’s survey simply saw more international respondents.

COUNTRY

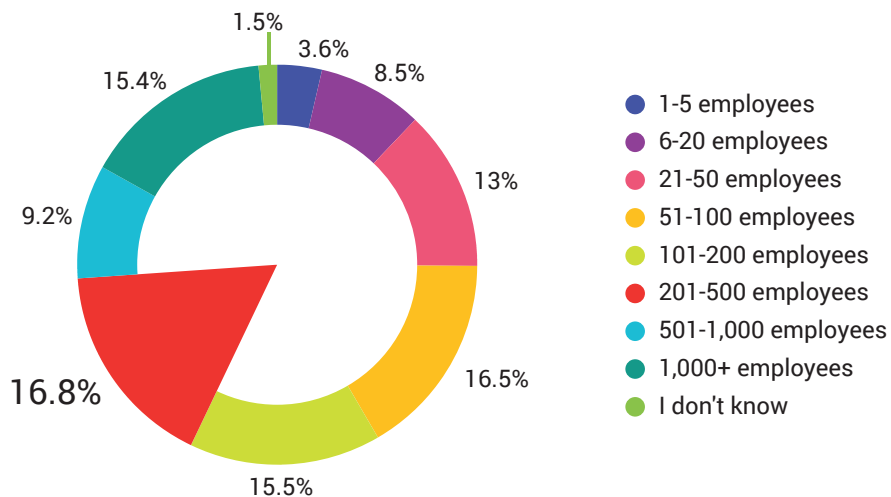


PRIMARY AREA OF WORK

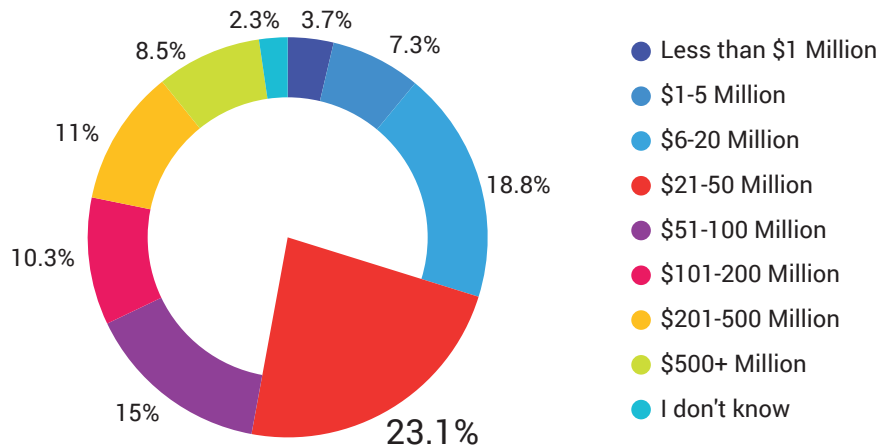


Due to 35% of all respondents reporting that they work regionally within the United States, this year delved deeper into which regions respondents are primarily performing work. We learned that of all the regions, **33.7% of respondents reported Southeastern United States as their primary work region, while Northeastern United States claimed the least respondents at 14.3%.**

SIZE OF COMPANY



ANNUAL SALES VOLUME



LEARN ABOUT THE INDIVIDUALS THAT SHAPED THE 2017 CONTECH REPORT

What job titles did survey respondents report?

The 2017 Construction Technology Report saw a shift in the top job titles of respondents.

The prior year's job titles of Executive or Accounting were unseated this year. Estimating or Project Management tied as the most frequently reported job title in 2017 with each title fetching 24% of responses.

WHAT WERE THE TOP 5 JOB TITLES REPORTED?

1. Estimator
2. CFO
3. Vice President
4. Controller
5. Project Manager

The job titles reported are closely associated with executive roles, although responsibilities reported were largely enmeshed in the heart of operations.

JOB TITLE



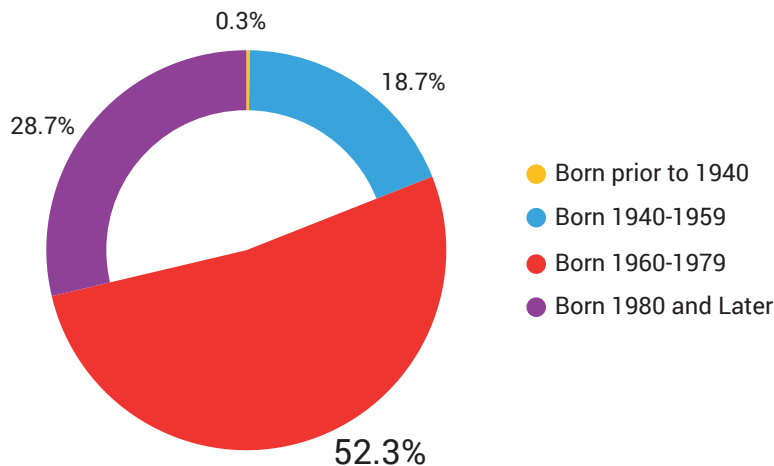
PRIMARY ROLE



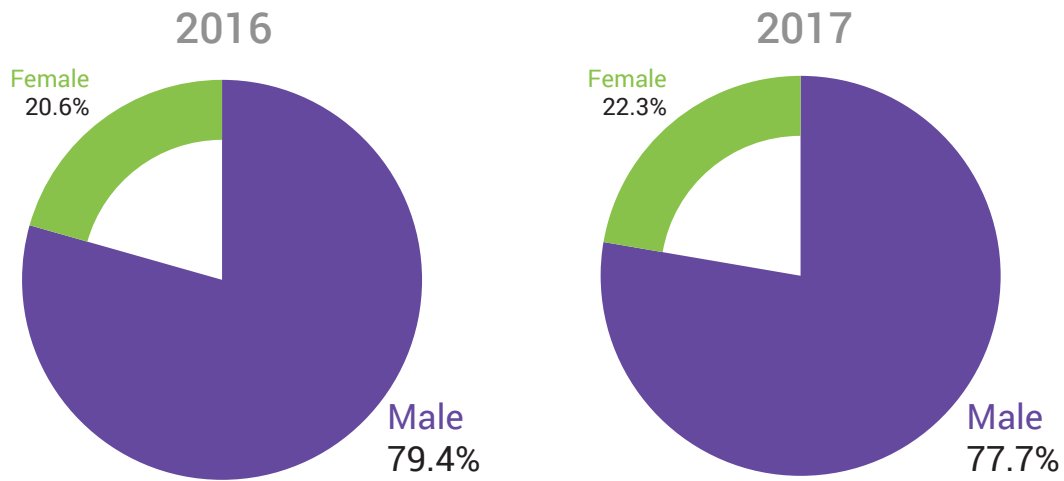
Have the age and gender of respondents changed since last year?

The survey results of 2017 follow previous years' trends, **over 50% of respondents were born between 1960 and 1979**. The number of respondents born before 1960 have decreased, while those born after 1980 have increased. As the industry faces skilled labor shortages, it'll be important to see this younger generation grow in years to come.

GENERATION



GENDER



A promising piece of data is the continued, if slow, increase in female respondents. **The number of female respondents increased in 2017 from 20.6% to 22.3%.** While the construction industry is still below the national workplace average of 47% female (U.S. Bureau of Labor), recent reports show an upward trend as more women join the industry.



IT BUDGET



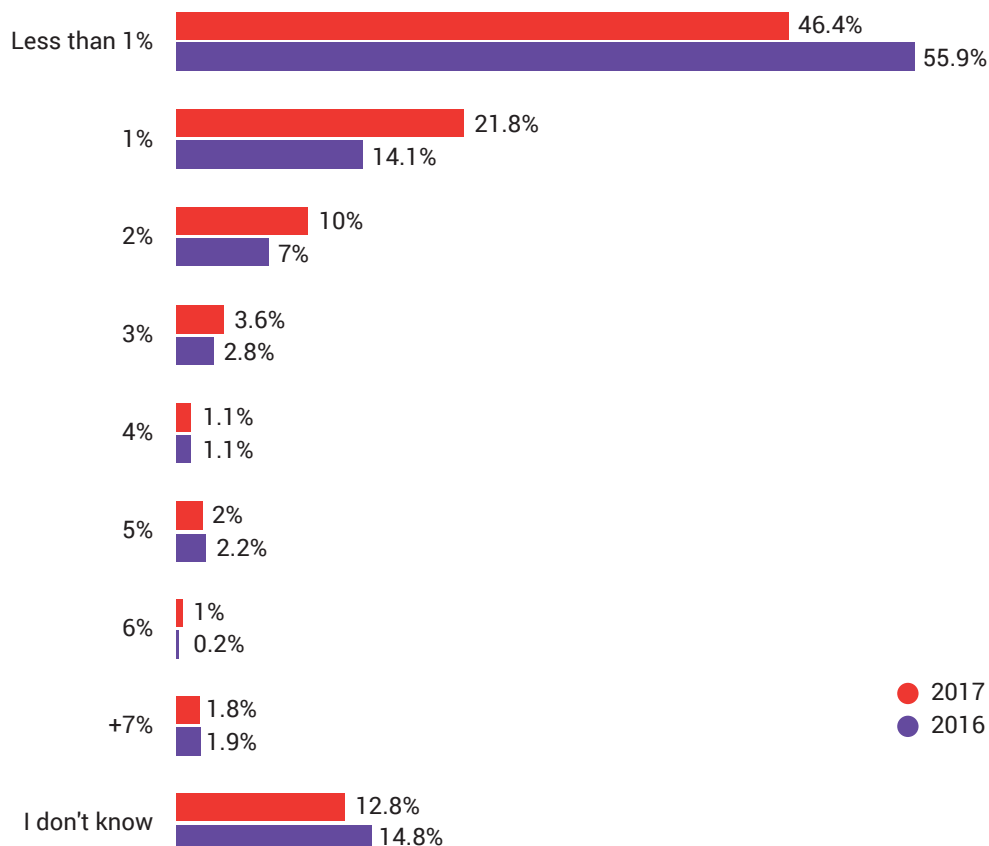
SEE HOW COMPANIES SPENT THEIR 2017 BUDGET ON IT

How much are companies spending on IT?

The 2017 ConTech Survey was carefully constructed to only ask budget-related questions from respondents identifying themselves as staff with involvement in financial decisions, i.e. those who selected “financial management” or “accounting” roles. When presented with the question: “What percentage of your company’s annual sales volume was spent on IT in 2016?” a perplexing 12.8% of respondents reported “I don’t know.”

Despite a noticeable uptick in those allocating more than 1% of their annual sales volume to IT, construction continues to budget the least for information technology compared to other industries. The largest shifts in IT budgets over the past year were respondents reporting spending Less than 1% of Annual Sales Volume on IT which **decreased by 9%**. Another significant change from 2016 is those who reported spending **1% of their Annual Sales Volume on IT increased by nearly 8%**. Among companies with less than \$100 million in annual sales volume, only one respondent reported allocating over 2% of that sales volume to IT.

HOW MUCH OF ANNUAL SALES VOLUME ARE COMPANIES SPENDING ON IT?



HOW HAS IT BUDGETING CHANGED IN 2017?

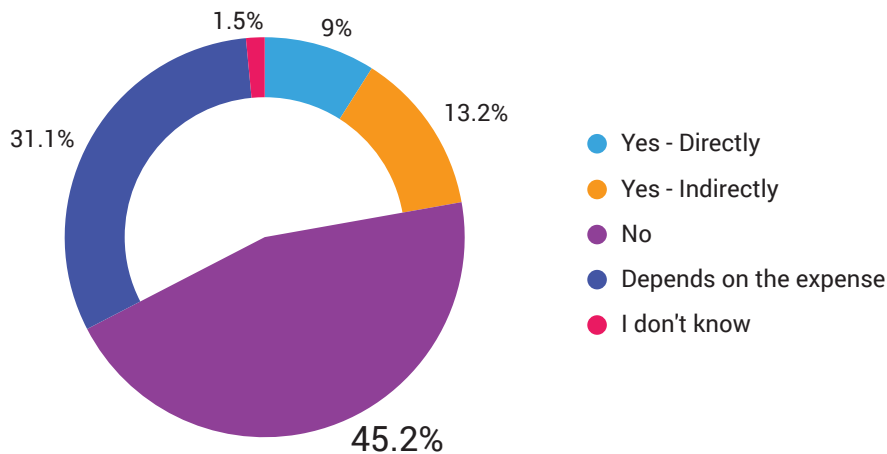
Compared to 2016, the 2017 construction survey reported:



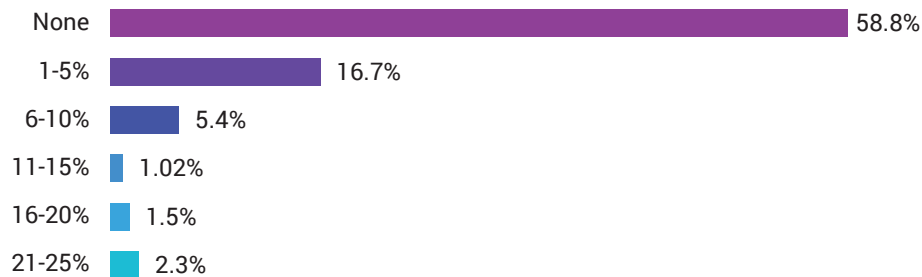
- Fewer companies have an IT budget of less than 1%.
- Fewer companies have an IT budget of only 2%.
- More companies have an IT budget of 3% or more.
- Fewer companies reported that they don't know the percentage spent on IT.

This year's report indicates more companies are realizing the value of dedicating funds to IT and recognizing the need to plan for technology upgrades.

BILLING IT EXPENDITURES TO PROJECTS



PERCENTAGE OF IT EXPENSES REIMBURSED BY OWNERS



How are IT expenses billed?

To show how builders are recapturing IT expenses, the 2017 ConTech Survey asked: Does Your Company Bill IT Expenditures to Projects? and What Percentage of IT Expenditures are Reimbursed by Project Owners? Most companies are not billing IT to projects nor are they being reimbursed by owners for IT expenses. This reveals that most construction companies are missing an opportunity to legitimize and recapture IT expenses to help justify the investment on future projects. Until contractors

themselves learn the value of IT and how to apply it, they will have a hard time selling that value to owners and clients. The data does show, however, that general contractors are more likely to bill IT expenditures to projects than subcontractors.

SURVEY PARTICIPANTS COMMENTED

"IT costs can sometimes be an itemized portion of our reimbursables or merely billed via our overhead mark-up."

"IT expenditures are billed to the project only if specific hardware/software is required by the specifications."

"Job dependent. Most are small jobs and we can't get away with the percentage of contract for technology fees yet"



IT STAFF



TAKE A LOOK AT HOW CONSTRUCTION COMPANIES ALLOCATE HUMAN RESOURCES FOR IT

What are the drawbacks of not having a dedicated IT department?

21.9% of respondents reported that their company tasks certain employees with IT responsibilities without tasking the employee with full-time IT priorities. This means that those working on IT are shared resources with conflicting priorities – and one of their responsibilities, either their day job or their IT duties, will suffer. The threshold seems to be at \$20 million in annual sales volume – above this, companies are much more likely to have a dedicated IT department.

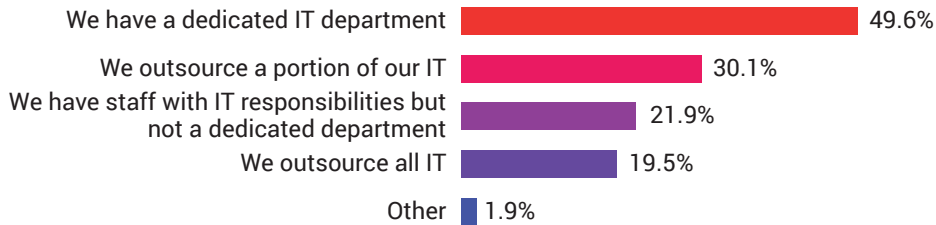
SURVEY PARTICIPANTS COMMENTED



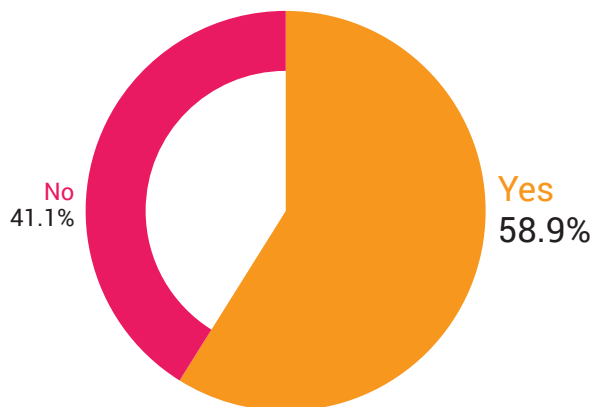
“Our company consolidated offices and relocated positions. Many IT people did not accept offers to relocate and the IT department has been struggling to find replacements.”

DEDICATED IT DEPARTMENT

2017



2014



2016



What is a Construction Technologist?

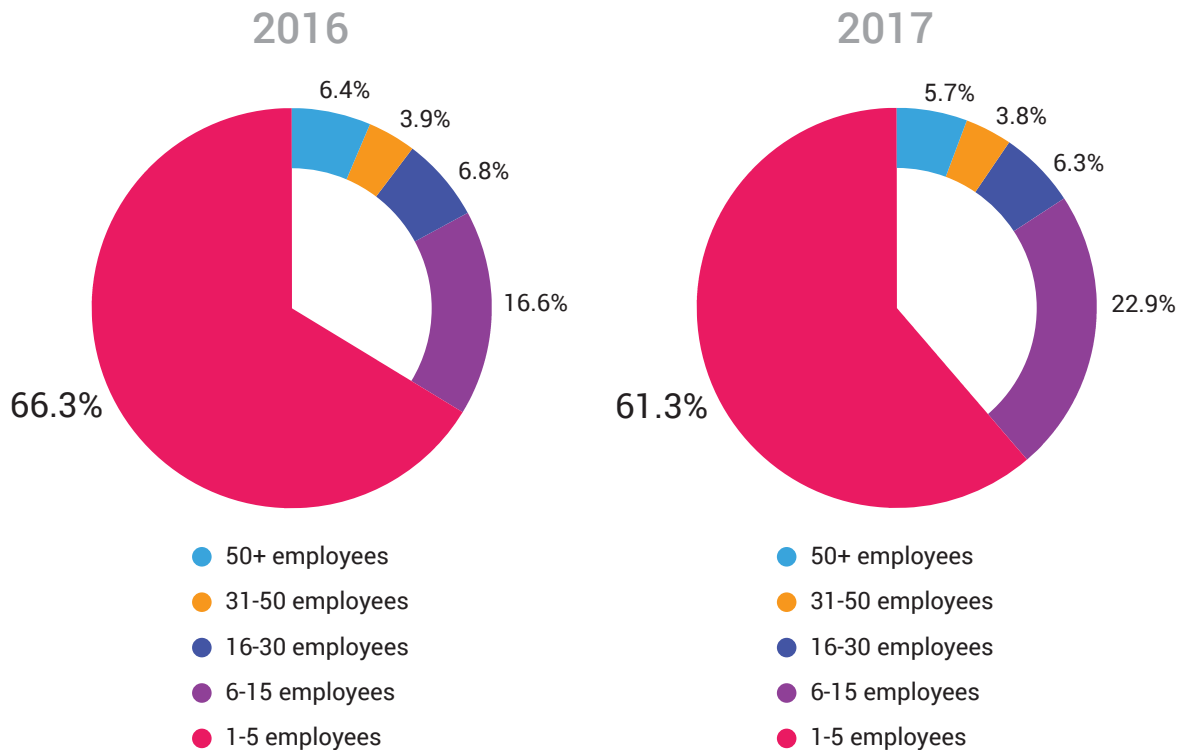
It's important to note that 30.1% of companies this year are outsourcing a portion of IT. This presents an opportunity to scale resources for the company, but it creates the challenge of managing new vendors and processes. The industry has the opportunity to develop and make way for a Construction Technologist role within construction companies. This specialist can centralize and manage priorities and processes to drive innovation and return on investment. Their deep understanding of technology, construction, and business goals uniquely positions them for overall company success.

SURVEY PARTICIPANTS COMMENTED

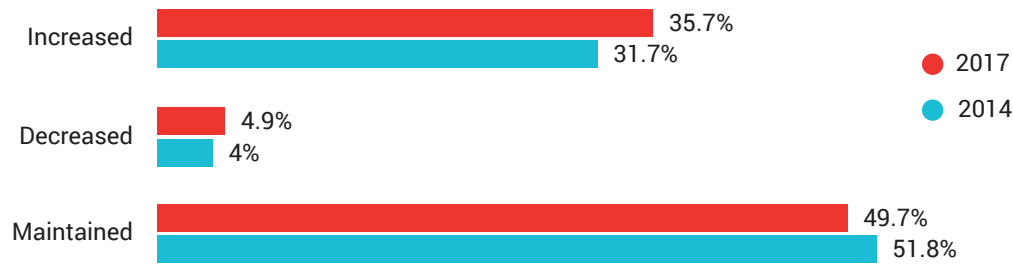


"We have cut two open IT Management openings this year due to budget. These would have been new roles. We also use temps and consultants for fixed scope projects."

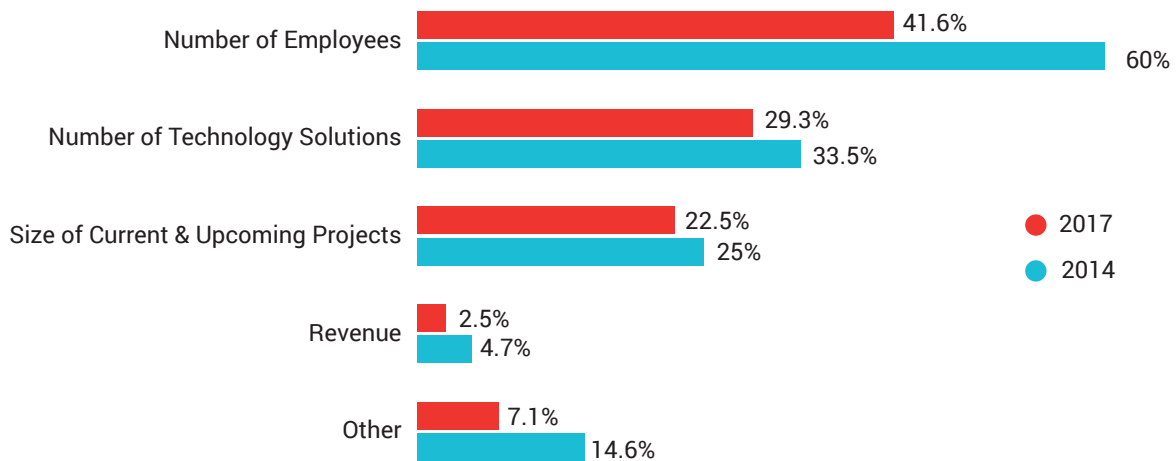
NUMBER OF EMPLOYEES DEDICATED TO IT



SIZE OF IT STAFF



SIZE OF IT STAFF DEPENDS ON



What's changing in IT departments?

Respondents' fluctuating reports over the years indicate companies are trying new tactics to manage IT needs, but the factors impacting those decisions remain the same. **It's hopeful to see an increase in IT Staff in 2017 over 2016; the increase is likely correlated with the increase in IT spending noted earlier in this report.** Companies reported the following considerations: number of (total) employees, number of technology solutions, and size of projects affecting the number of IT employees. **A company's corporate objectives and strategy-based budgeting are a more accurate method for determining a company's IT needs than the size of staff or projects.**

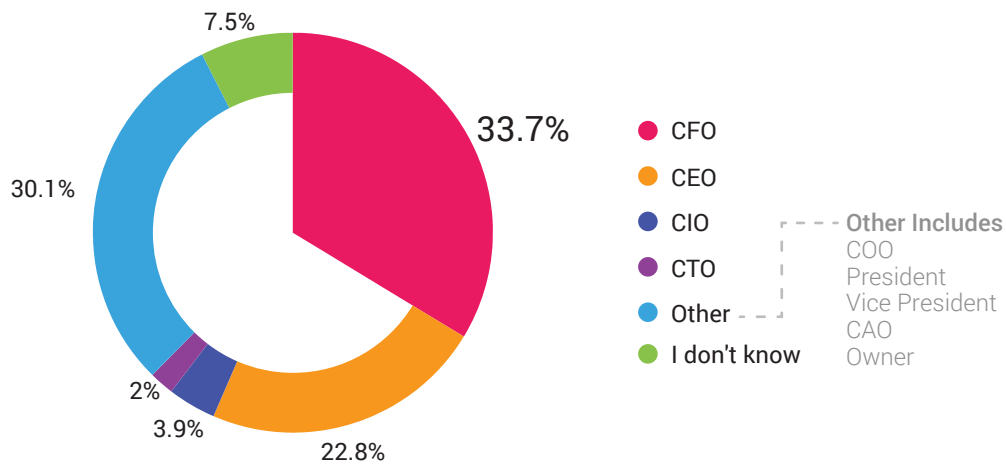
Interestingly, another year reported revenue as the least influential factor on IT staff numbers; even though we know construction companies allocate less for IT than most other industries. It's good to see the number of total employees in a company is becoming less of a factor over the number of

technology solutions. The number of employees at a company and the number of IT staff needed does not always correlate, aligning them proportionally doesn't allow for changes in IT trends, solutions and projects.

JOB TITLE OF HIGHEST RANKING IT STAFF MEMBER



WHO MANAGES THE IT STAFF



Who manages the IT Staff?

As with prior years, **2017's report named the CFO as the job title tasked with leadership of the IT staff, with CEO as the second-most reported answer.** CFO's are expected to have more technological-literacy now than ever before. Companies with larger staff should consider adding a CIO/CTO to sit alongside the CFO, also reporting to the CEO, to focus on IT issues independent of, but advised by, financial strategy and limitations.

WHAT IS THE TITLE OF YOUR HIGHEST RANKING IT STAFF MEMBER?



1. IT Manager/Specialist
2. CIO
3. Director
4. Vice President Information Technology
5. Vice President

Accounting and financial management job titles commanded last year's survey as the highest-ranking IT staff member. 2017's survey results show the growing importance placed on IT leadership.



DATA SECURITY

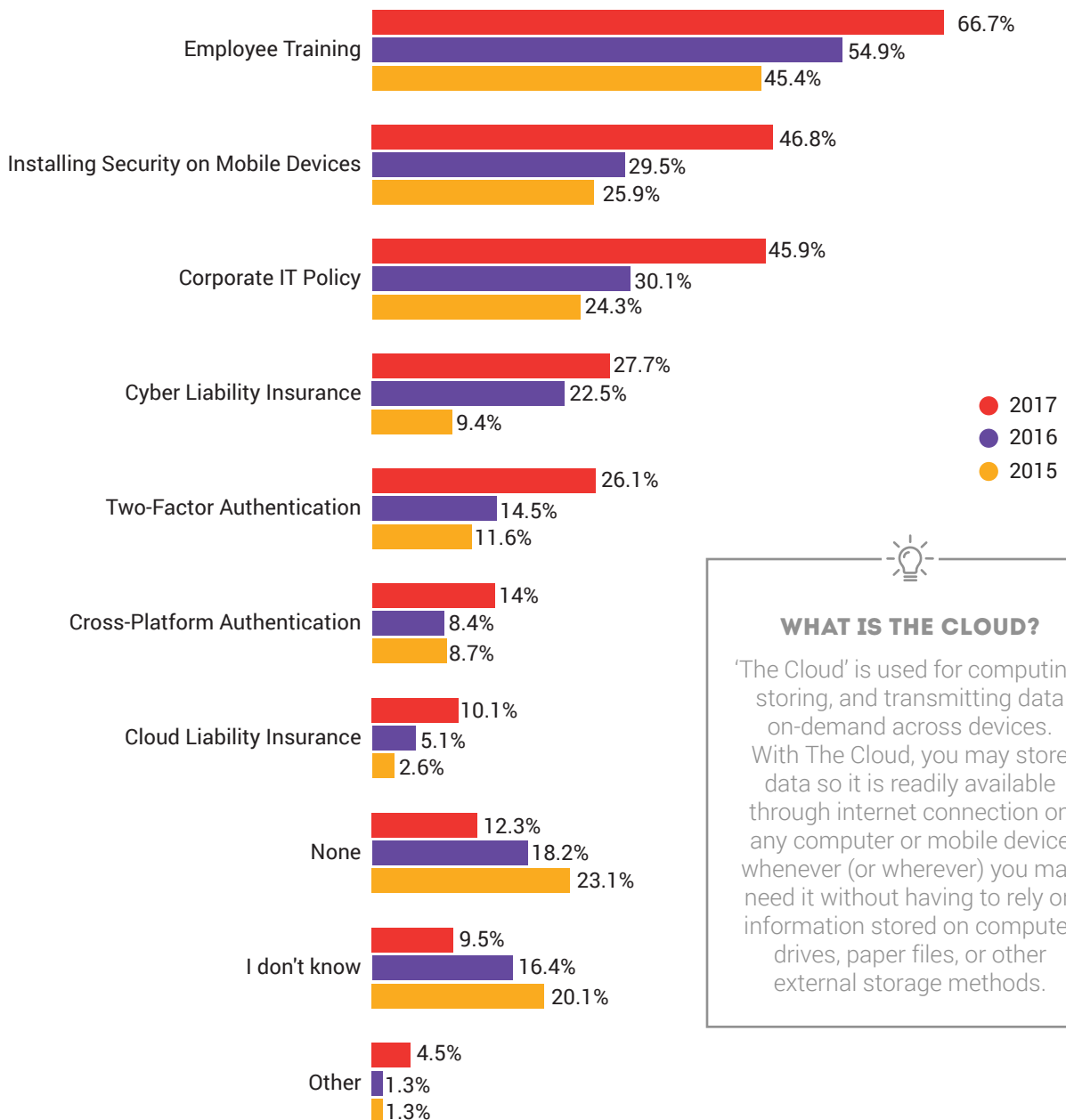


REVIEW HOW COMPANIES ADDRESS DATA SECURITY IN THE CLOUD

Are more companies securing cloud data in 2017?

Companies reported a very promising effort in securing cloud data in 2017! **Actions to ensure data security and management (employee training, installing security on mobile devices, corporate IT policy, etc.)** have reported an increase of 15 to 20% more application over the past year.

METHODS OF SECURING CLOUD DATA



WHAT IS THE CLOUD?

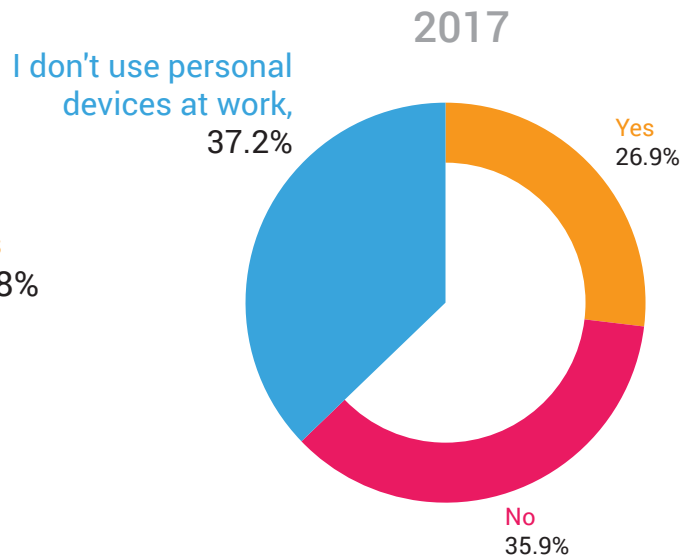
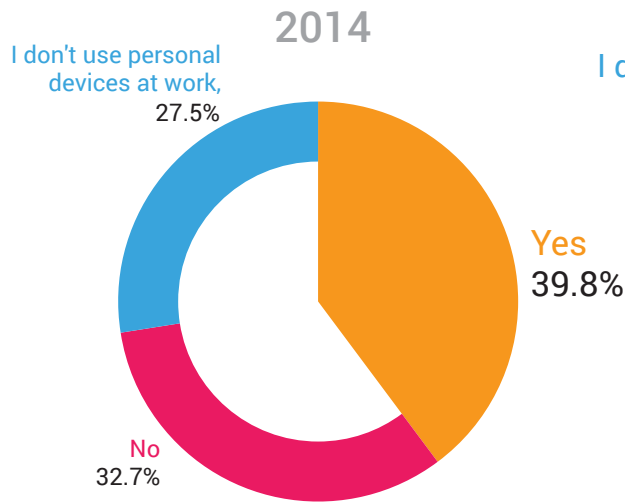
'The Cloud' is used for computing, storing, and transmitting data on-demand across devices. With The Cloud, you may store data so it is readily available through internet connection on any computer or mobile device whenever (or wherever) you may need it without having to rely on information stored on computer drives, paper files, or other external storage methods.



SURVEY PARTICIPANTS COMMENTED

"We have an annual cybersecurity training requirement for 100% of employees."

DO COMPANIES SECURE PERSONAL DEVICES?



SURVEY PARTICIPANTS COMMENTED

"With the exception of Accounting, we treat protection of our corporate data like going over the speed limit - it's not an issue until something happens that has consequences."

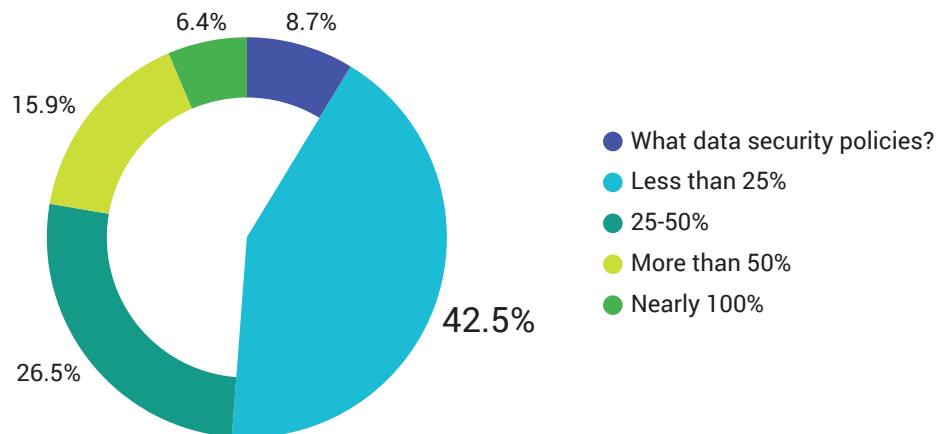
"Nearly 100% people know the internal data security policies but only a handful of people understand them."



SECURING MOBILE DATA

The 36% of companies not securing the mobile data on employees' personal devices used at work, are leaving their corporate data vulnerable. With no effort to secure data or the device, the employer is unable to control the flow of information an employee stores or transmits, especially when accessing social media, connected to unsecure WiFi networks and sending personal communications.

PERCENTAGE OF EMPLOYEES TRAINED ON DATA SECURITY POLICIES



Why the disconnect between data?

It's encouraging to see the progress companies have made on securing cloud data. All methods of securing cloud data have seen at least a 5% increase in application since 2016. **However, even though 67% of respondents reported they are training employees on securing cloud data, nearly 80% of them admit that only half of their employees really understand and apply the policies.**

Data implies IT training is either **not** as prevalent as reported or not fully implemented and monitored as necessary to drive full adoption. No matter the reason, the fact remains that **companies are still significantly vulnerable and should adopt more strategies and educate more employees in an effort to secure data.**



MOBILE STRATEGY



READ HOW MOBILE DEVICES IMPROVE WORKFLOWS IN THE OFFICE AND ON CONSTRUCTION SITES

How important is mobile data to builders?

Last year's report delved further into how devices such as tablets, smartphones, and wearable devices are impacting the industry. 2017's data supports the adage, "The iPad is the new hammer!" **Research over the past five years is irrefutable, mobile devices certainly have a place on construction projects.**

SURVEY PARTICIPANTS COMMENTED



"While I don't use any devices other than my desktop for work, our supervisors and field employees do. All supervisors and foreman have tablets (all are iPads) that are provided by the company."

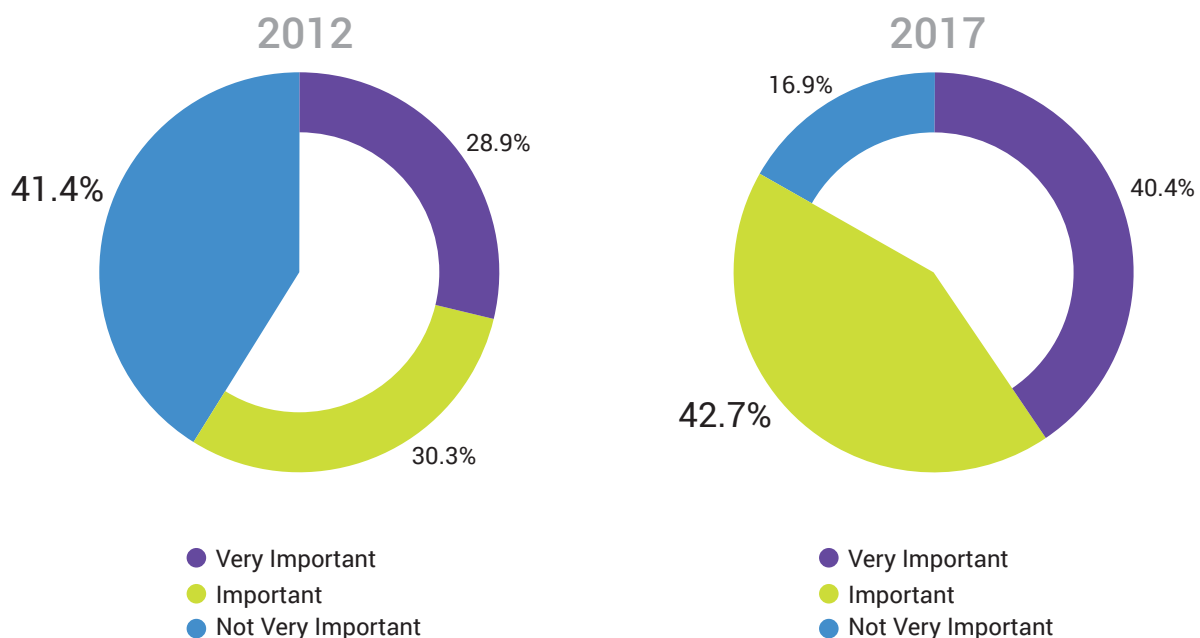
PRO TIP



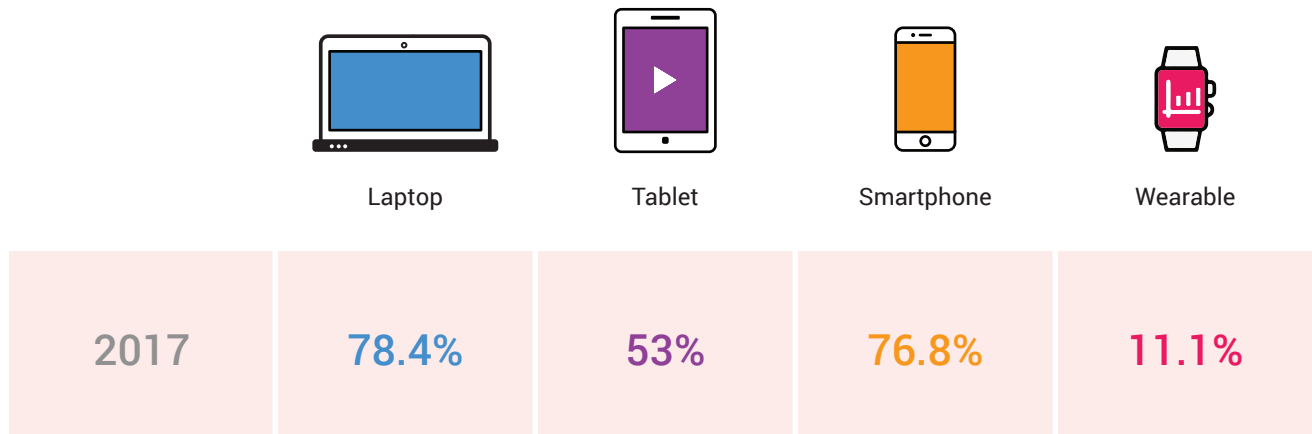
If your company uses tablets for field work, protect your investment by providing products such as Runner's Seat Belts to anchor your devices to users.

When comparing the importance of mobile devices in 2017 versus data from 2012 – you will notice an overarching harmony in opinion, **83.1% of all respondents found mobile capabilities to be Important to Very Important, with only 16.9% of respondents finding mobile capabilities Not Very Important.**

HOW IMPORTANT ARE MOBILE CAPABILITIES



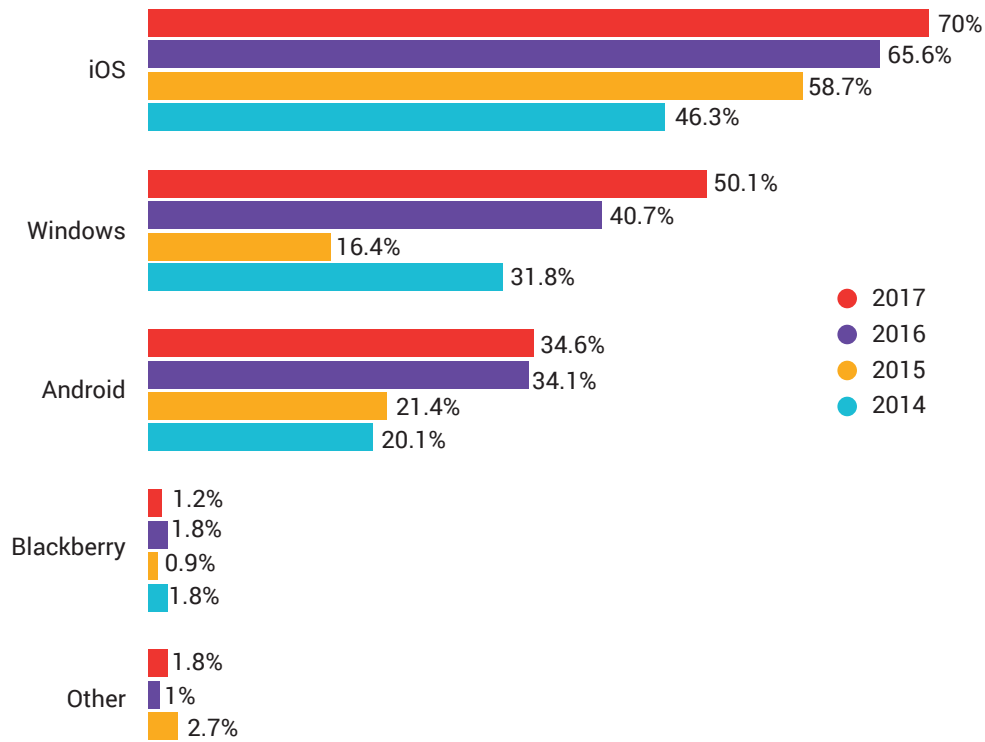
DAILY MOBILE DEVICE USAGE



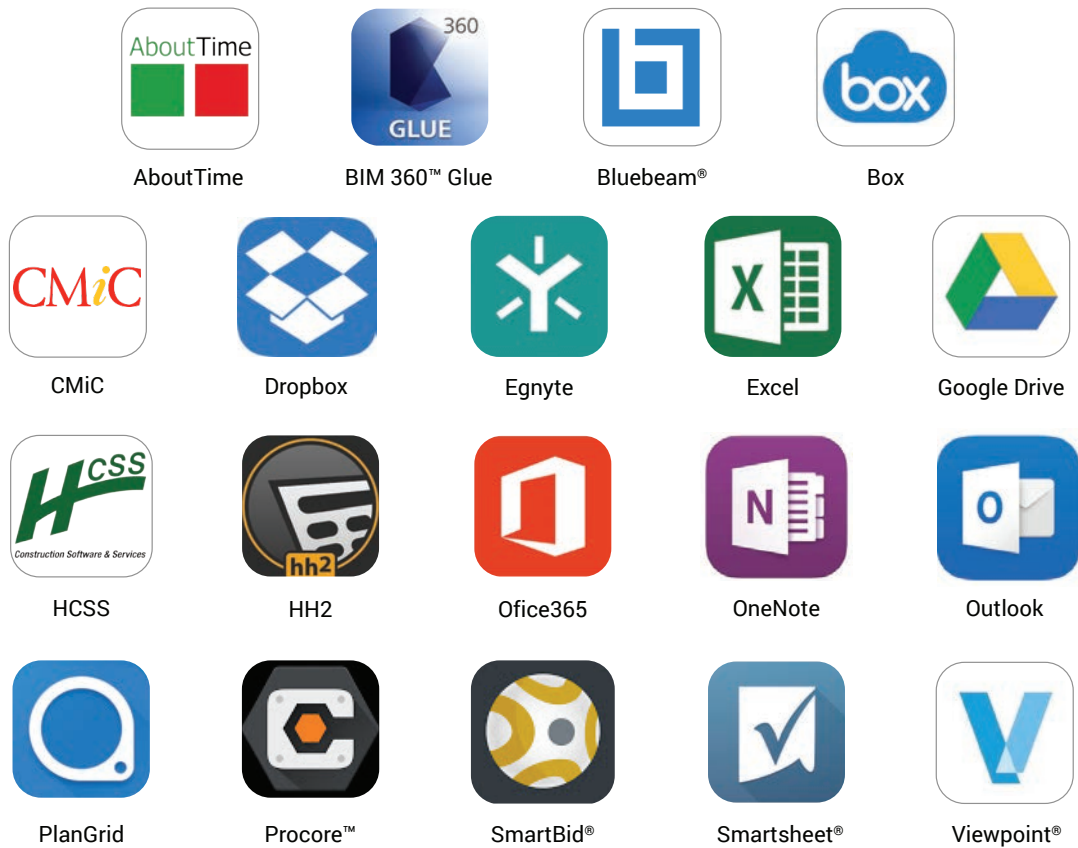
What devices and operating systems are most popular?

While adoption of apps and devices has grown since 2013, respondents in 2016 reported using fewer mobile devices daily in every category besides wearables. **A possible explanation for the decrease in apps and devices in play may be because respondents are eschewing the use of multiple devices in favor of a single device for multiple purposes.** In terms of operating systems, **iOS remains the most widely used operating system.** Respondents use of Windows and Android is still growing, albeit at a slower rate of growth than previous years.

MOBILE OPERATING SYSTEMS IN USE



TOP MOBILE APPS



WHAT ARE THE TOP 3 MOBILE APPS CONSTRUCTION COMPANIES ARE USING?

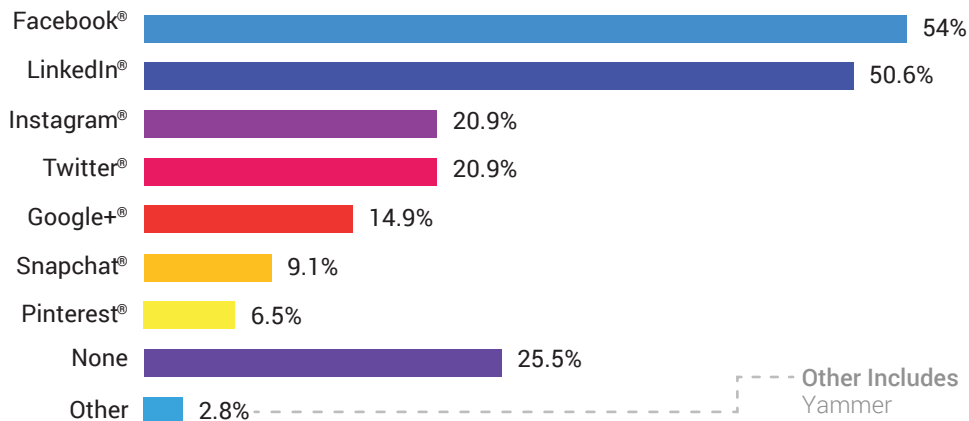


1. Procore
2. Bluebeam
3. Plangrid

Year after year, the top mobile apps identified by this report are solutions for integrating workflow processes between the field and office. There is a significant appetite for mobile, project-focused tools that enhance collaboration and communications.

Last year's ConTech Report solidified the necessity of apps in the construction industry. Although this year's data indicates more mobile software apps available than ever before, respondents reported using fewer apps than previous years. **The shrinking number of apps in use may be due to the emergence of more robust all-in-one apps.**

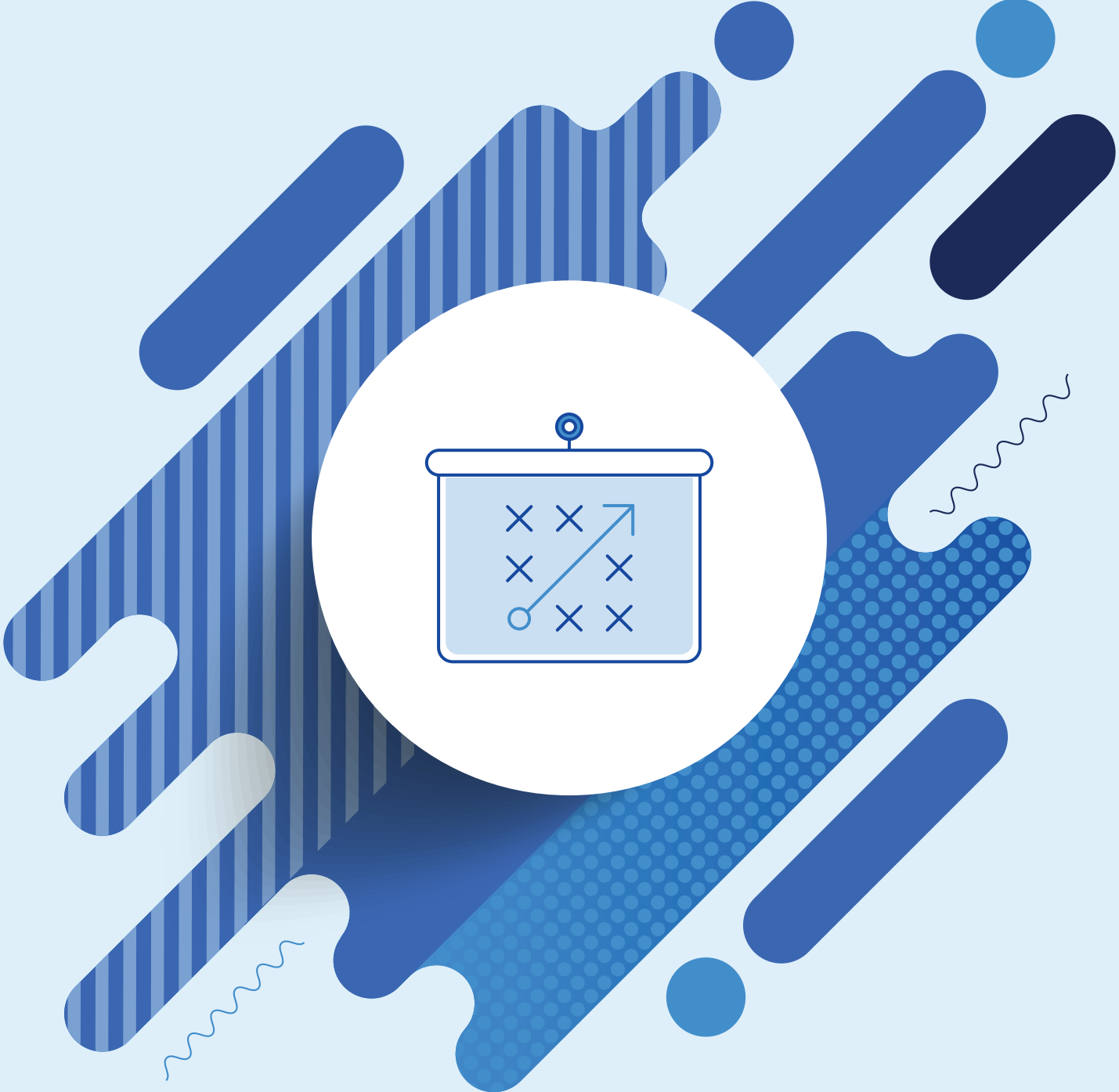
SOCIAL MEDIA MOBILE APPS



Are construction companies using Social Media?

In 2014, Forbes reported businesses with a social media presence experience stronger brand recognition, customer experience, inbound leads, and rates of conversion. Social media's ability to bolster business credibility and build lead pipelines is common knowledge widely covered by mainstream media outlets. **Perhaps one of the most sobering revelations in this year's data is 25.5% of respondents still do not use any form of social media.** Among respondents who are using social media, Facebook and LinkedIn are significantly more utilized than other social media platforms.

WORKFLOW STRATEGY



HOW COMPANIES USE TECHNOLOGY TO COMPLETE DAY-TO-DAY WORKFLOWS



WHAT ARE WORKFLOWS, EXACTLY?

Workflows are the necessary and repeatable processes which go into completing projects.

This year, the survey introduced new questions about workflows to gain greater insight into the processes companies are using to complete projects. How can companies use technology to maximize efficiency and decrease risk? Or more aptly, is the industry missing a vital workflow solution or are respondents missing crucial technology education?

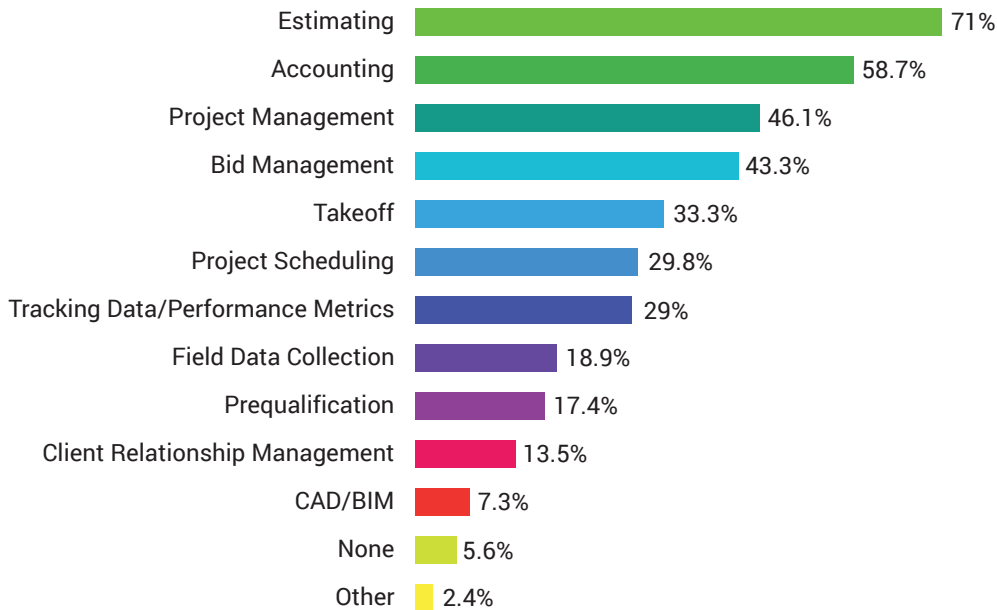
Are companies relying more on spreadsheets or software?

The workflows most dependent on software are Accounting at 85%, followed by Estimating with 60%, with Project Management and Scheduling both reporting 50%.

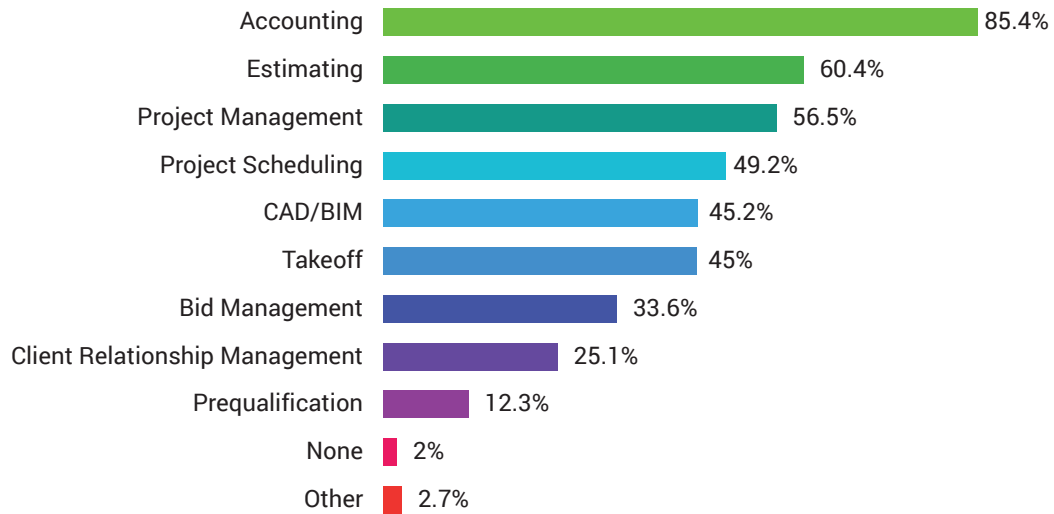
Interestingly, the data shows the same departments reported workflows are dependent on spreadsheets, only in a different order. The workflows most dependent on spreadsheets are Estimating at 70%, Accounting 59%, and Project Management at 46%.

These dependencies remained consistent no matter the size of the company.

WORKFLOW DEPENDENT ON SPREADSHEETS



WORKFLOW DEPENDENT ON SOFTWARE



WHY SPREADSHEETS AND SOFTWARE?

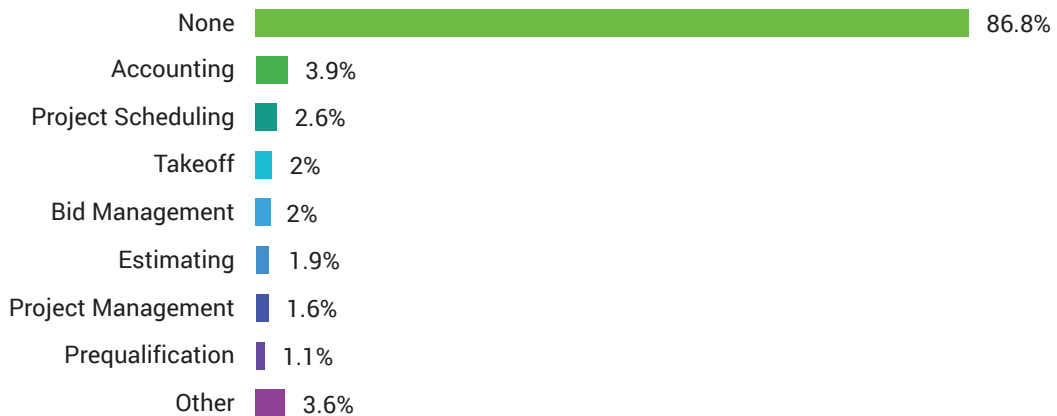
It's difficult to say why so many construction workflows involve both spreadsheets and software.



- Are companies using spreadsheets as a way to transfer data between software solutions?
- Does workflow software fall short in functionalities for data entry and reporting therefore spreadsheets are still needed?

Despite the reason, duplicate work always costs in terms of risk and efficiency.

OUTSOURCED WORKFLOW



Are companies outsourcing workflows?

Respondents made it clear, companies, resoundingly, are not outsourcing most workflows.

Respondents are instead choosing to meet all workflow needs in-house.

A drawback to choosing not to outsource is the responsibility of training, professional development, and maintaining quality systems falls squarely on the company instead of an outsourced professional. When a company chooses to manage workflows in-house, it's important to consider seeking external advice or consulting on systems and processes in order to achieve optimal implementation and results.

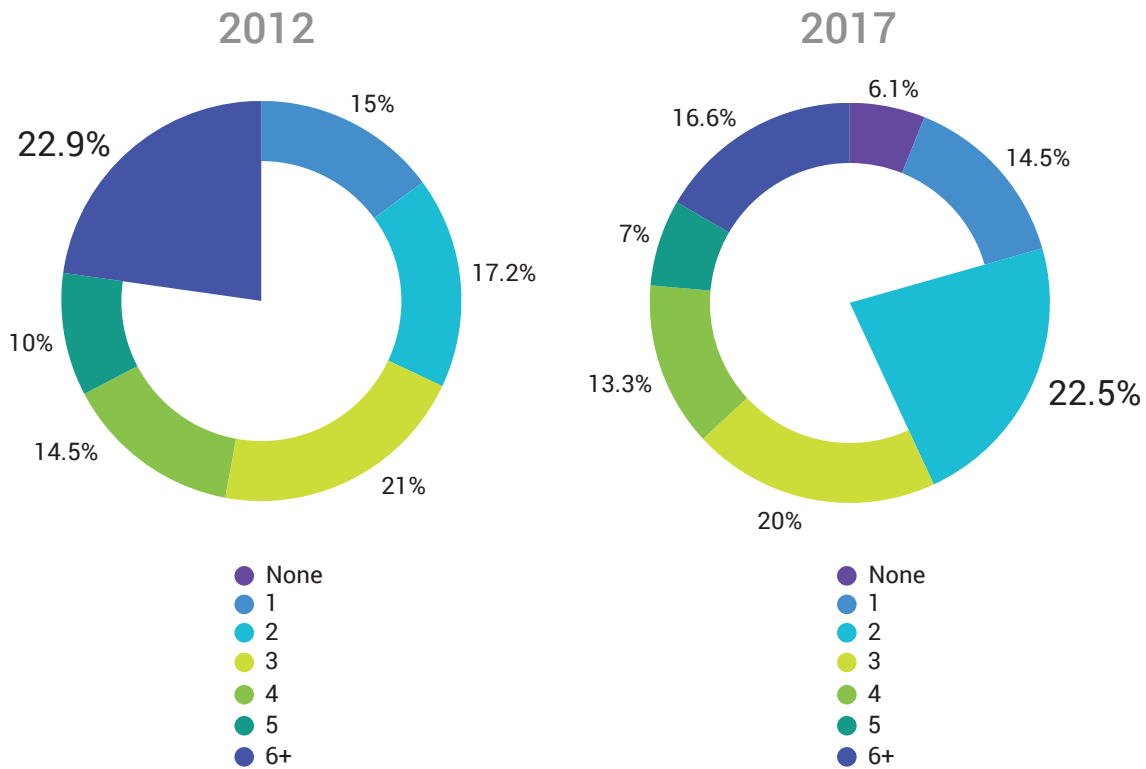
What workflow needs a dedicated technology solution, according to respondents?

The most requested technology solution was BIM. The large concentration of respondents requesting BIM solutions begs the question: are respondents aware of the existing applications available across the BIM spectrum? If respondents are aware of BIM applications, is it a knowledge gap preventing respondents from using BIM?

Other popular responses requested workflow solutions for safety and scheduling, which also have existing solutions. Workflow technology responses echo the sentiment often heard in construction technology consulting - "We don't know what we don't know." A resulting hesitance towards new technology's price, training time, ROI, and lack of technological literacy often stunts the prospect of exploring that new technology.

The responses to this question show that respondents often are not aware of the resources already available within the industry - hopefully this report helps.

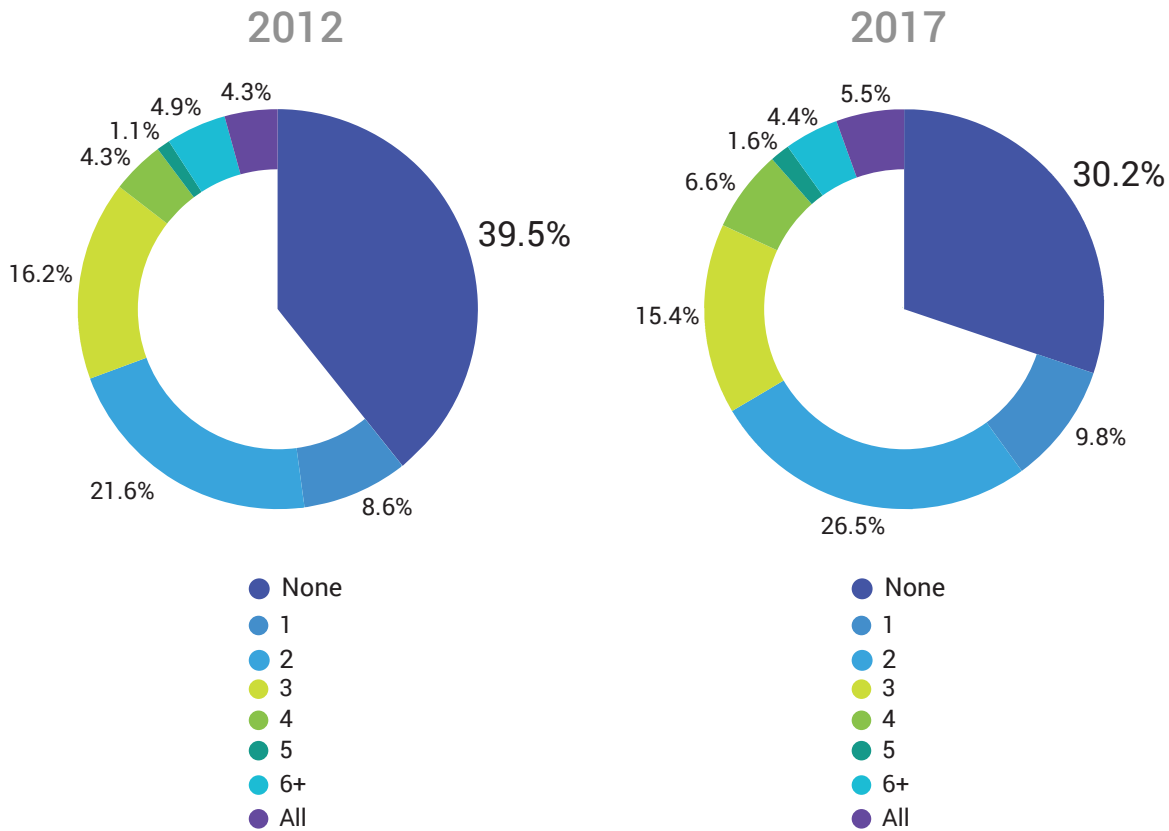
NUMBER OF SOFTWARE APPLICATIONS IN USE



How many software solutions does the average contractor use?

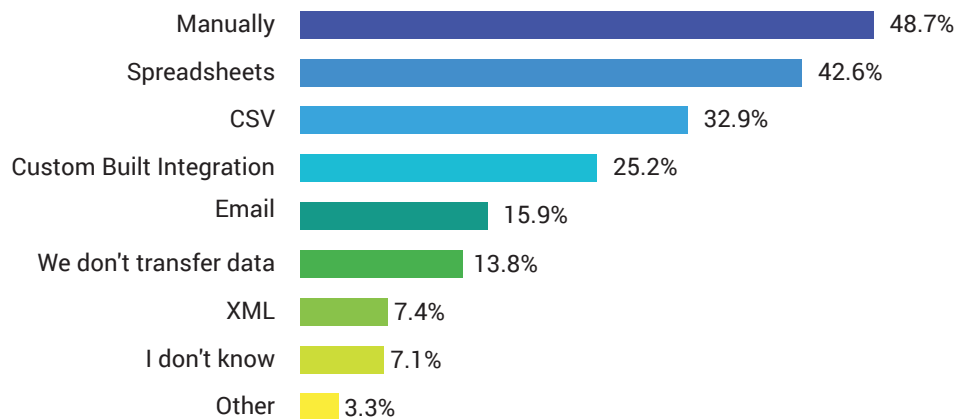
Continuing prior years' trends, the number of software solutions in use continued to decline in 2017. The largest group of respondents in 2012 reported using 6 or more software solutions. The largest group of respondents in 2017 reported using only 2 software solutions. Popular software in 2017 may integrate more features rendering additional software superfluous, or respondents may have simplified and trimmed down their technology tools due to cost or implementation issues.

NUMBER OF SOFTWARE APPLICATIONS THAT INTEGRATE



This year, 30% of respondents reported that "None" of the applications in use will integrate, a 10% decrease since 2012 however a 3% increase since 2016. It seems that integration efforts made by technology providers either aren't hitting the shelves, aren't making it off the shelves, or are simply not meeting the data integration needs of users. As contractors opt to use fewer and fewer solutions, those tech providers who want to stay competitive have to make data integration a priority or risk being pushed out by all-in-one solutions.

HOW DO YOU TRANSFER DATA WHEN APPLICATIONS DON'T INTEGRATE?



Construction technology providers are showing signs of leading the industry to solutions in the area of integration. The addition of Procore's App Marketplace and the recently launched Autodesk BIM360 Connect and Construct Exchange have created integration marketplaces for construction technology solutions. This provides greater possibilities for integrating individual applications to the overall Construction Technology Ecosystem. Vendors of individual point solutions can design and control integrations that customers can depend on now and into the future.

What happens when software does not integrate?

Since 2014, survey data has reported an increase in respondents manually entering data between software that will not integrate. **2017 marks the first time in the ConTech Report's history where manual data entry has decreased.** While the decrease was only a meager <1%, it inspires hope for future instances of manual data entry continuing to decrease.

Builders using custom-built integrations increased 2%, this is likely due to the emergence of new third-party tools and developers for bridging the gap between legacy systems and APIs of new apps.

When choosing a software solution, contractors are seriously underestimating the importance of integration. When embarking on the software selection process, contractors should create a detailed plan for how the new software must communicate data internally and externally. Select a software solution that solves as many points of integration possible rather than settling for processes that will have to be duplicated later.

With few IT staff resources, it's understandable that most construction companies don't have someone leading the way on software selection and implementation (i.e. someone demanding integration capabilities at the enterprise level.) Instead, **respondents reported solutions are being adopted at the departmental level, without considering how the data enters and leaves the department.**

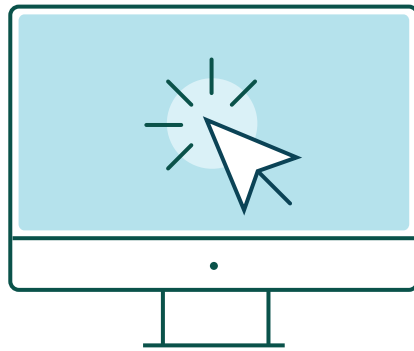
SURVEY PARTICIPANTS COMMENTED

"We LOVE manual data entry. Our Estimating to Operations project turnover files look like someone put a copy of Tolstoy's 'War & Peace' on a copy machine and hit 500 copies. Then it's up to the PM to 'digitize'."

"All of our software integrations were custom-built using 3rd party consultants."

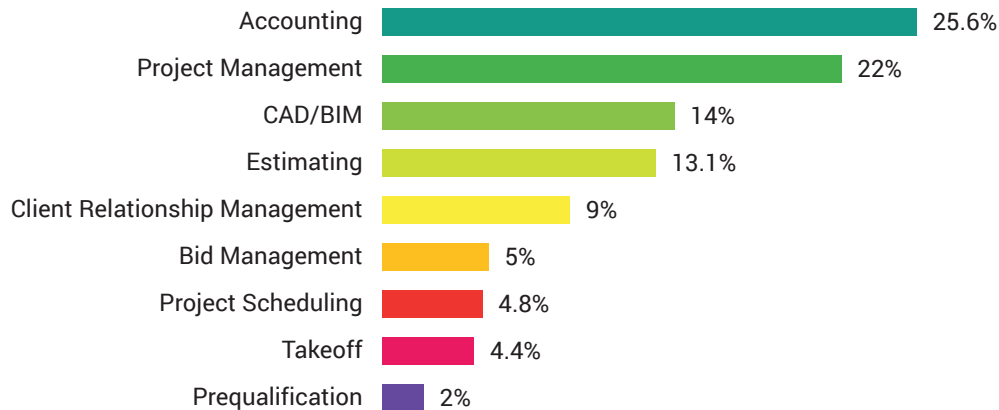
"Integrations break too often. We utilize 75% CSV through an import function on the target app, and 25% re-key."

SOFTWARE IN USE



DIG INTO THE SOFTWARE THAT COMPANIES ARE USING THROUGHOUT THE CONSTRUCTION PROCESS

WORKFLOW SOFTWARE IMPLEMENTED MOST RECENTLY

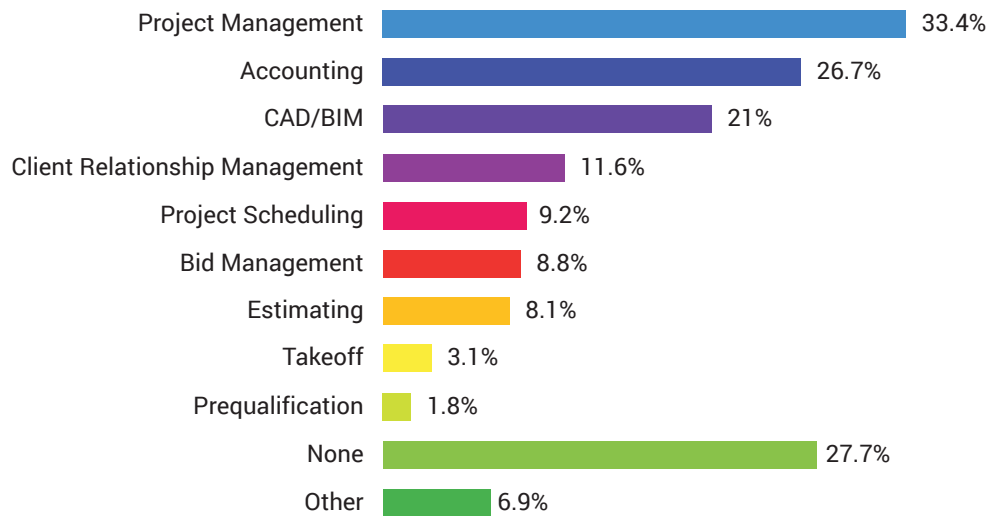


What software did respondents implement most recently?

A new question added to the 2017 survey asked respondents what software their company had implemented most recently to improve workflows; at 26%, Accounting Software had the most responses. Switching new accounting software is a major initiative with a significant impact on business, so this reveal came as a surprise. Further analysis indicated the 26% was partially influenced by smaller companies maturing into ERP systems.

The next most popular recently implemented workflow software was Project Management at 22%. Project Management encompasses data transfer, field to office communications, and workflow. Project Management's cross-functionality gives it the potential to reach the largest number of team members, there have been some big movers with attractive offerings in the space (as indicated in the Project Management solution data below.) The fewest number of respondents reported implementing software for Preconstruction (such as Bid Management, Project Scheduling, Takeoff, and Prequalification). As previously indicated in the report, Preconstruction workflows still rely heavily on spreadsheets.

SOFTWARE PROVIDERS THAT OFFER MOBILE APPS



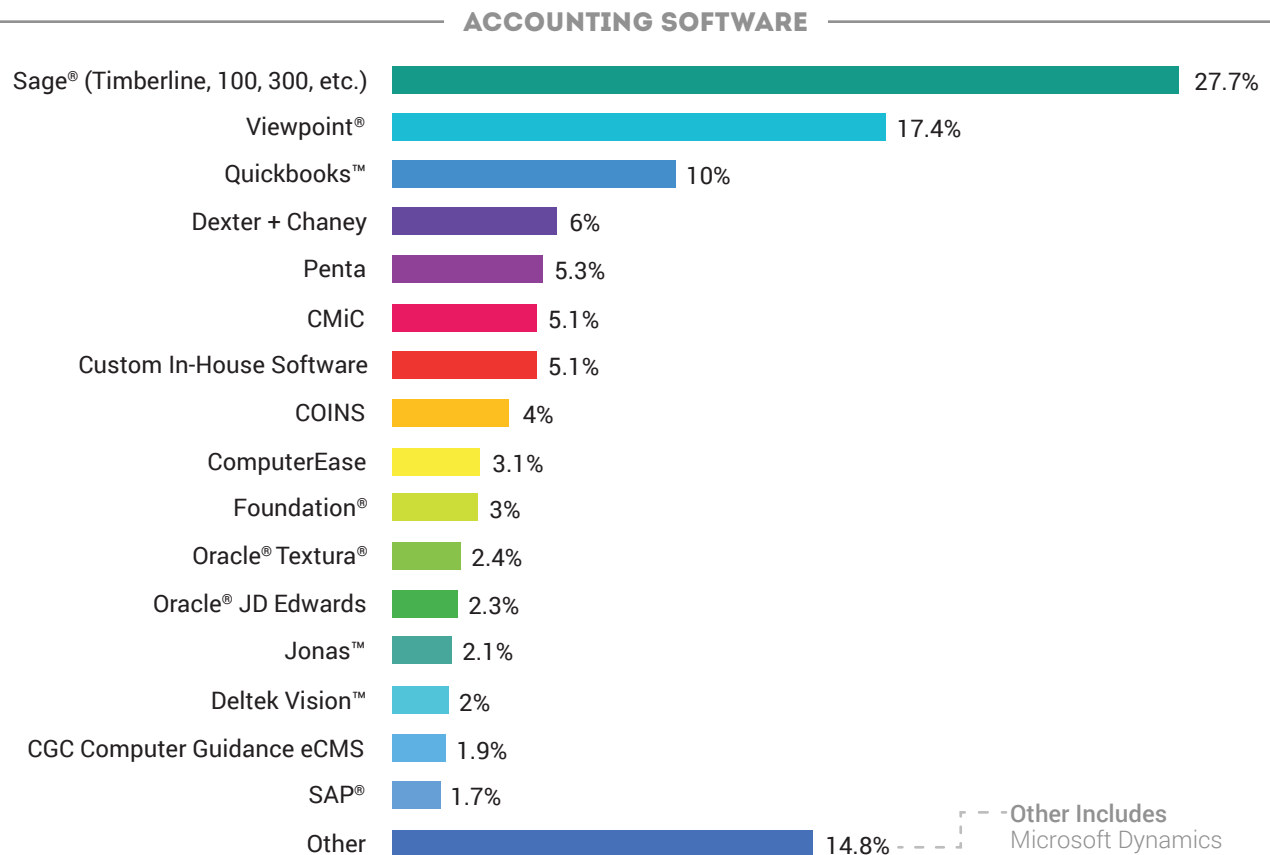
The 2017 ConTech Survey asked respondents which workflow experiences they are enhancing using software with accompanying mobile apps. Typically, Project Management and Accounting Software have accompanying mobile apps for their web-based software. CAD/BIM software follow in with nearly as many respondents. Preconstruction solutions offer the fewest options for mobile apps.

What accounting software are construction companies using?

Sage® software solutions provide versatile options for builders of all sizes, making it the most used accounting software for this year's respondents.

Viewpoint® acquired Dexter + Chaney earlier this year, merging two ERP powerhouses. **Viewpoint was the second most popular accounting software reported this year.** It will be interesting to see how the acquisition will impact Viewpoint's popularity among respondents in subsequent years.

While Quickbooks® is not construction-specific, it provides a more dynamic and efficient accounting solution than Microsoft® Excel. Quickbooks is also a great option for companies who have not yet aged into the necessity for an ERP system.



What prequalification software are contractors using?

This year's responses indicate most respondents still are not using a dedicated prequal solution.

Beyond that, SmartBid®, a construction bid management software that also has a prequal component to help general contractors qualify subcontractors, was the most popular response.

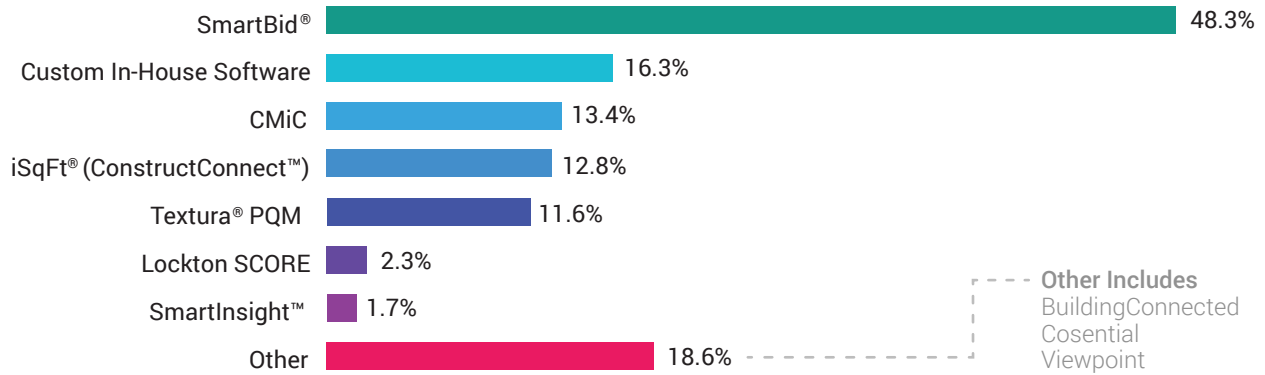
It appears prequalification is still not a priority for most contractors. They either perform prequal internally with a custom-built solution, or use other preconstruction software to augment the prequal process required by owners and GCs. With a growing labor shortage in the industry, contractors are having to search farther and wider for partners on projects – it seems prequal would become more important and not less.

WHY SO MUCH SMARTBID?



It's important to note that SmartBid® is a product of JBKnowledge, the publishers behind this annual survey and report. Therefore, SmartBid® users are frequent participants year after year and often dominate the preconstruction software categories relating to bid management software and prequal software. The survey is widely distributed to tens of thousands of construction professionals above and beyond SmartBid® users.

PREQUAL SOFTWARE

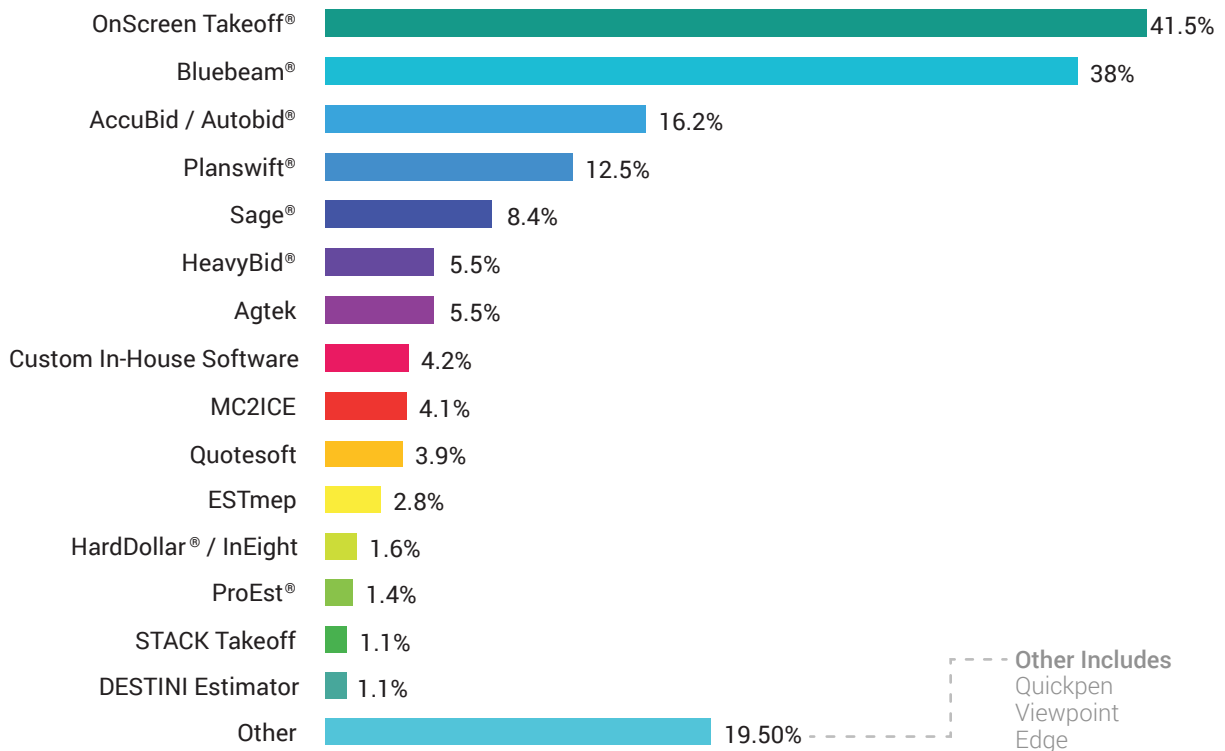


What software are builders using for estimating and takeoff?

Trends in Takeoff software have remained largely unchanged since last year. OnScreen Takeoff® continues to lead takeoff software with Bluebeam® trailing a mere 3% behind.

Estimating software experienced a small shift at the top. Sage® experienced a 4% increase since last year, while the significant changes came from AccuBid and QuickPen which each jumped 10% since 2016.

TAKEOFF SOFTWARE

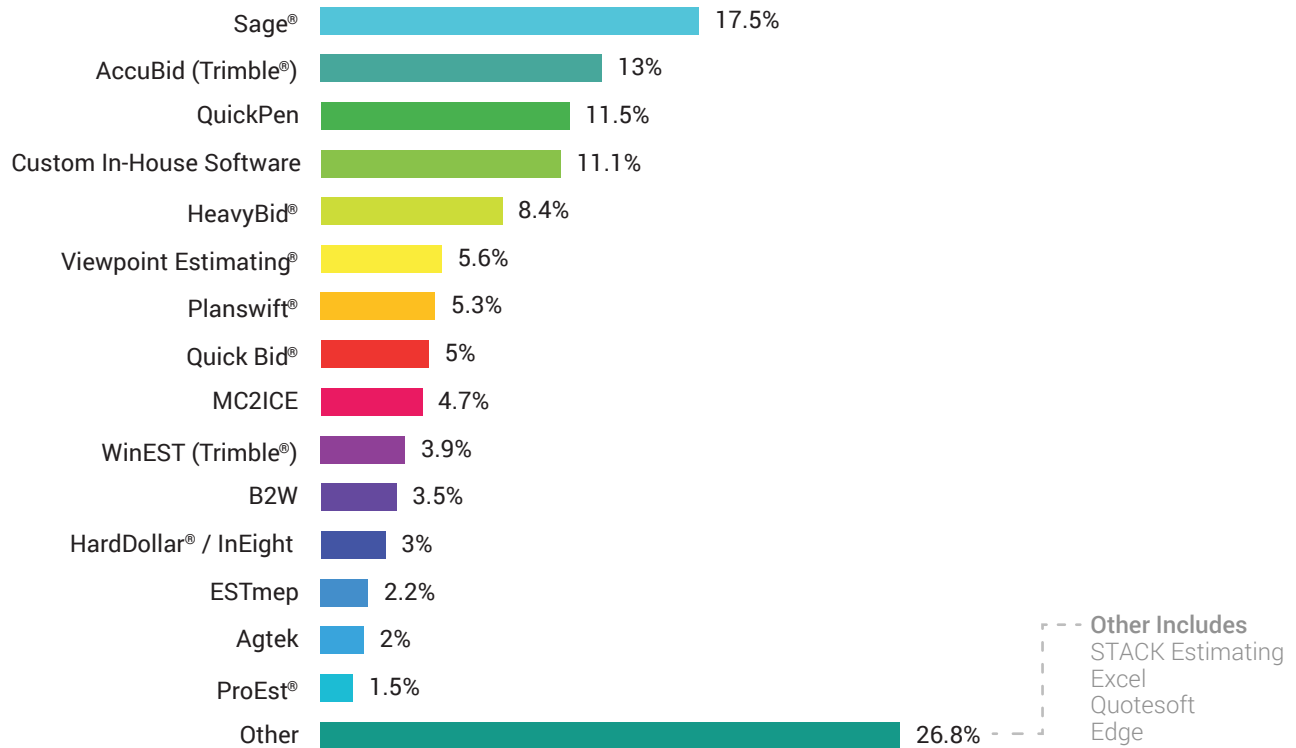


WHAT ABOUT THOSE USING SPREADSHEETS OR MANUAL PROCESSES?



You may have noticed that this year’s survey omitted the long-standing answer choices “manual entry” and “spreadsheet” in the Software In Use section. This is due to the added “Workflow Strategy” section earlier in the survey where respondents were asked first, which workflows involve dedicated software versus spreadsheets, then second, which software is in use. In order for respondents to gain entry to the questions regarding takeoff software, for example, they must have specifically indicated use of software for takeoffs. Though we couldn’t escape a few Excel write-ins...

ESTIMATING SOFTWARE



What software are companies using for bid management?

SmartBid® retained its place at the top of bid management software for general contractors as well as gaining 6% in popularity. iSqFt® remained as the second most utilized invitation-to-bid software. BuildingConnected and Procore™ garnered more reported users than 2016 while other tools reported only nominal changes.

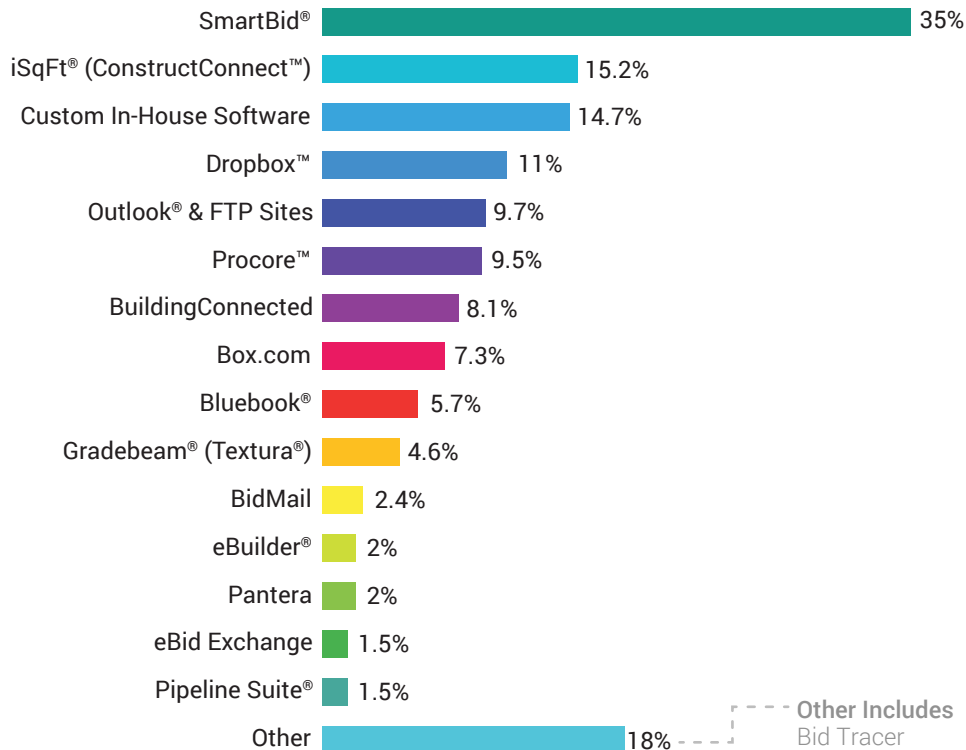
The third, fourth and fifth place solutions range from in-house custom systems to ad-hoc email and file sharing systems. We see again that respondents consider themselves using “software” if Outlook or file sharing is involved, regardless of if the software is dedicated to construction workflows.

AGAIN, WHY SO MUCH SMARTBID?



It’s important to note that SmartBid® is a product of JBKnowledge, the publishers behind this annual survey and report. Therefore, SmartBid users are frequent participants year after year and often dominate the preconstruction software categories relating to bid management software and prequal software. The survey is widely distributed to tens of thousands of construction professionals above and beyond SmartBid users.

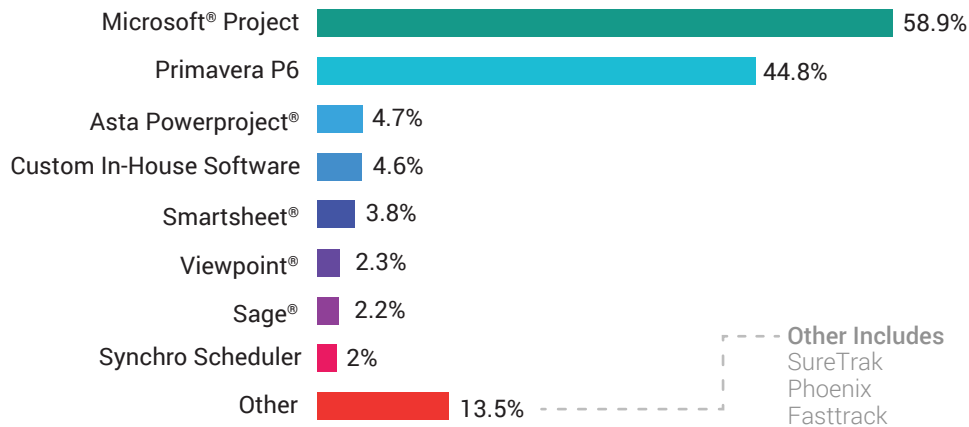
INVITATION TO BID SOFTWARE



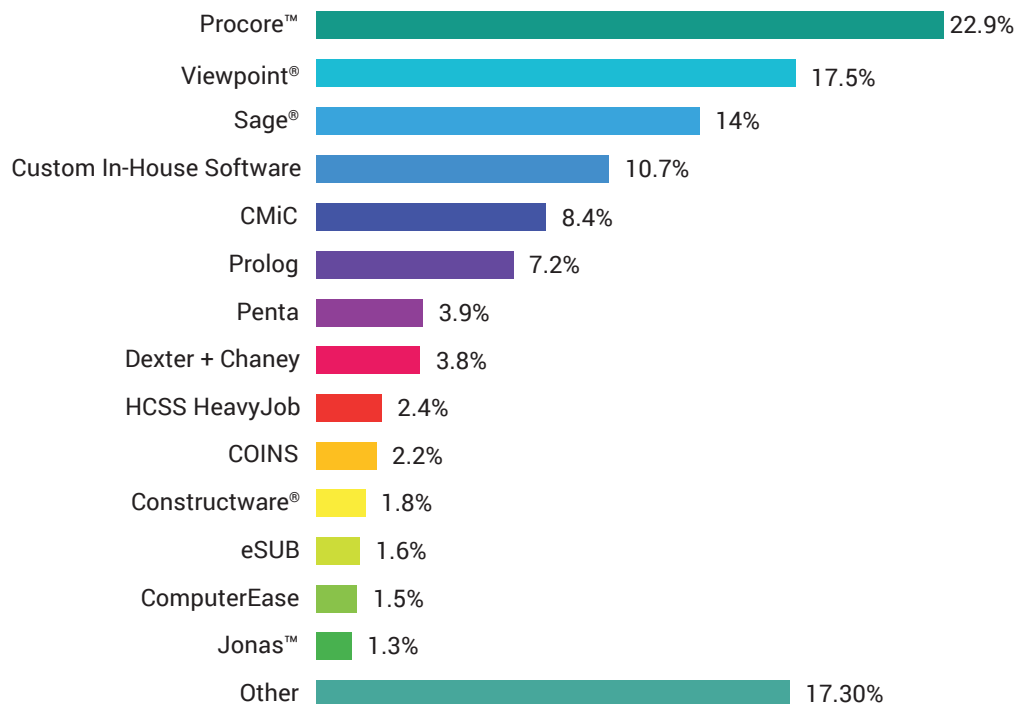
What project scheduling & management software is most popular?

Asta Powerproject® surpassed custom software this year as the third choice for project scheduling software. Following Microsoft® Project and Primavera 6 is a big win for Asta which has roughly 1/10 of the market share by comparison. The gains for both Asta Powerproject® and Synchro Scheduler may be explained by both software's ability to tie scheduling into BIM.

PROJECT SCHEDULING SOFTWARE



PROJECT MANAGEMENT SOFTWARE



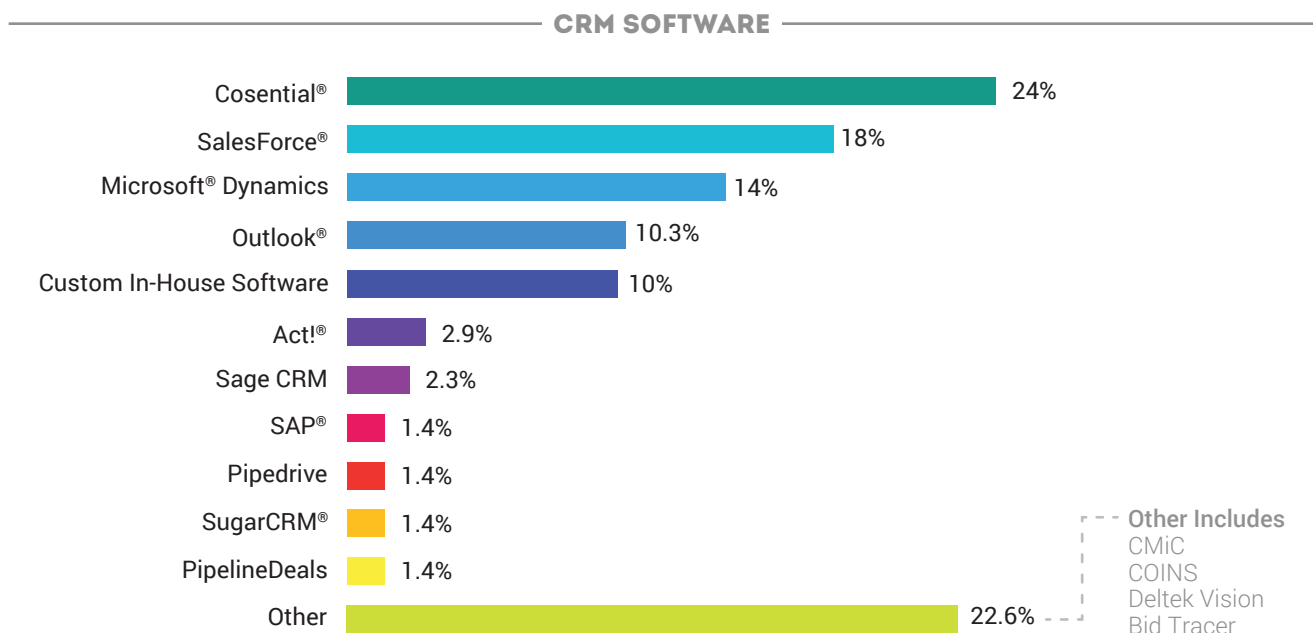
As expected, project management software responses were dominated by ERP systems, however project management-specific solutions are on the rise in 2017. **eSub broke the top 15 responses for project management software this year** and other project management software making a showing in this year's survey as "Other" write-ins were InEight, Kahua, and Red Team.

While ERP systems overshadow project management systems in market share, this year's data shows **Procore® may be the utility tool to help builders seek methods beyond ERPs to improve project management and field workflow**. Procore's full court press on the industry has paid off in the last year helping them beat Viewpoint as the most preferred project management software.

What software are companies using for client relationship management?

Client relationship management software remains a void within the industry with only a paltry 9% of respondents reporting the recent implementation of client relationship management software. Survey responses indicate an alarming number of businesses still rely on antiquated approaches of spreadsheets and rolodexes for maintaining client databases. Popular client relationship management tools often have a higher price-point which may be seen as an unnecessary luxury item by builders unaware of integrations and prospecting tools.

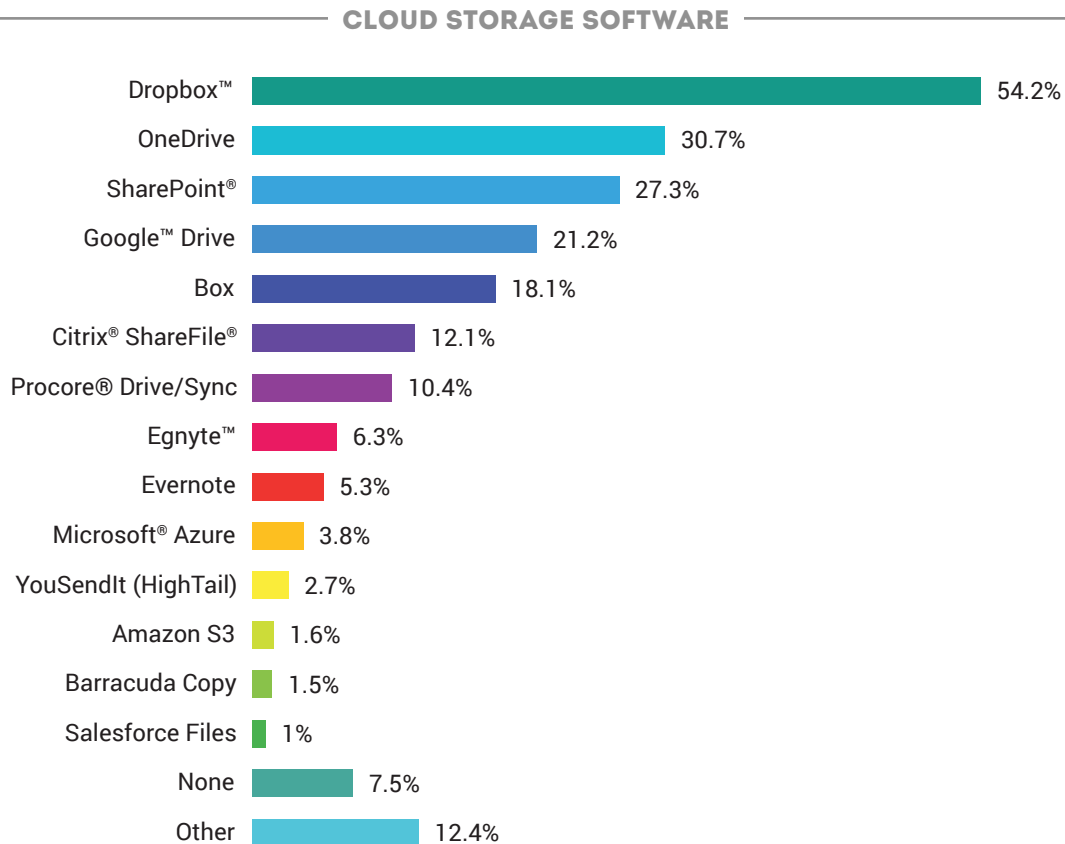
Cosential made the jump in 2017 to the most popular client relationship management software, surpassing previous industry favorite Salesforce by 7%. Of the builders prioritizing client relationship management software, stand-out platforms included Cosential, Salesforce, and Microsoft® Dynamics all of which boast project-centric, highly-configurable offerings with integration capabilities.



What software do companies use for file storage & sharing?

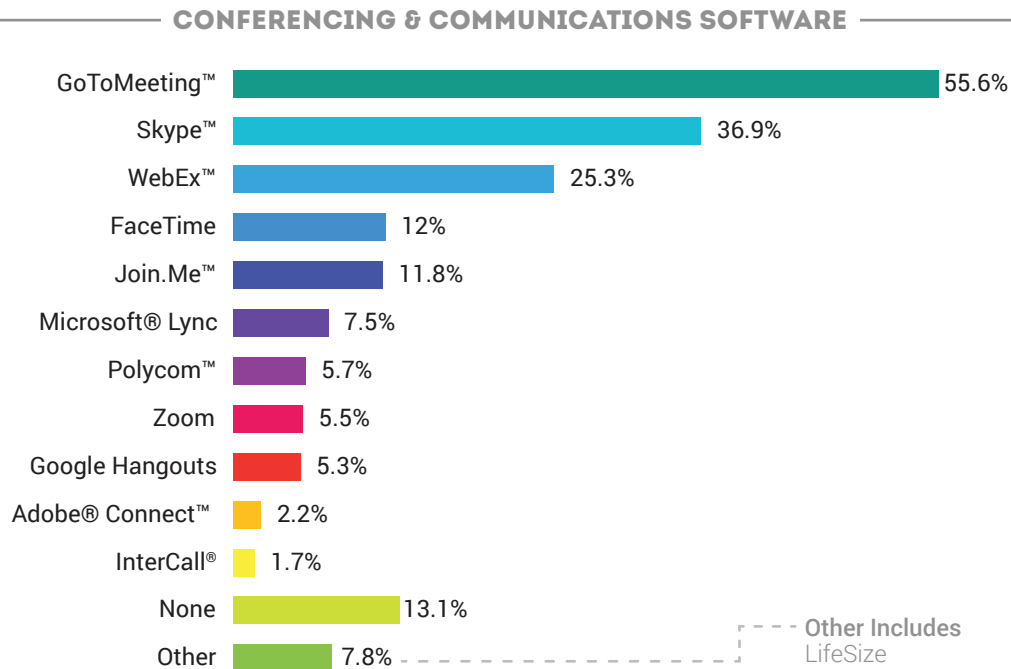
There are few changes to report on preferred file storage and sharing software in 2017 versus previous years. Dropbox remains the titan among all other software options. **Dropbox has topped the rankings in previous years and is likely to continue an upswing with its large file sharing capabilities and integrations with Autodesk.**

Making a fresh appearance in this year's graph is Procore® Drive with 10%. **Procore Drive's industry-specific capabilities poise the software to contend with third party providers like Dropbox and OneDrive in years to come.**



How are companies conferencing and communicating?

GoToMeeting has not lost its foothold as the conferencing tool of choice; however, Skype gained 6% popularity this year. Skype's gain may be small considering the colossus of GoToMeeting but still indicates some alternative methods in play. Zoom marked appreciable gains this year, but only at 1/10 of the market share of GoToMeeting.



BIM

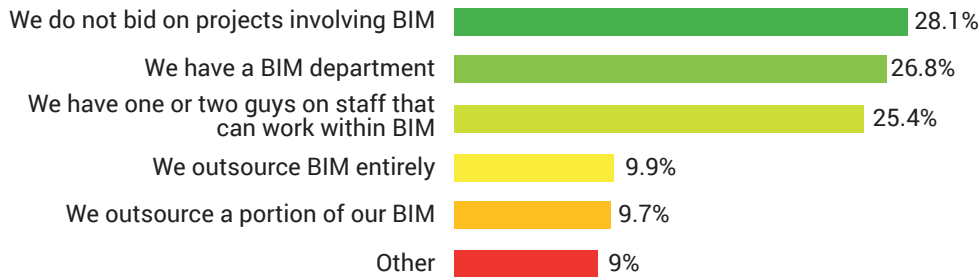


THE APPLICATIONS AND CHALLENGES ASSOCIATED WITH BIM & VDC

How are companies approaching BIM?

Last year, companies showed the shift from BIM Staff to more comprehensive Virtual Design & Construction teams with leaner processes, optimized staffing, and enhanced workflows. **2017's ConTech Survey checked in with respondents to see how the transition to dedicated VDC was going, the results were troubling.**

DOES YOUR COMPANY HAVE A BIM DEPARTMENT?



27% of respondents reported having a dedicated BIM/VDC department. A startling 28% reported that their company does not bid on projects involving BIM. Another unsettling revelation is the 25% of respondents who reported only one or two members trained to work on BIM projects...without BIM as a main priority or responsibility. Similar to the threshold for IT departments, it seems once companies hit more than \$20 million in sales volume they are more likely to have a dedicated VDC department.

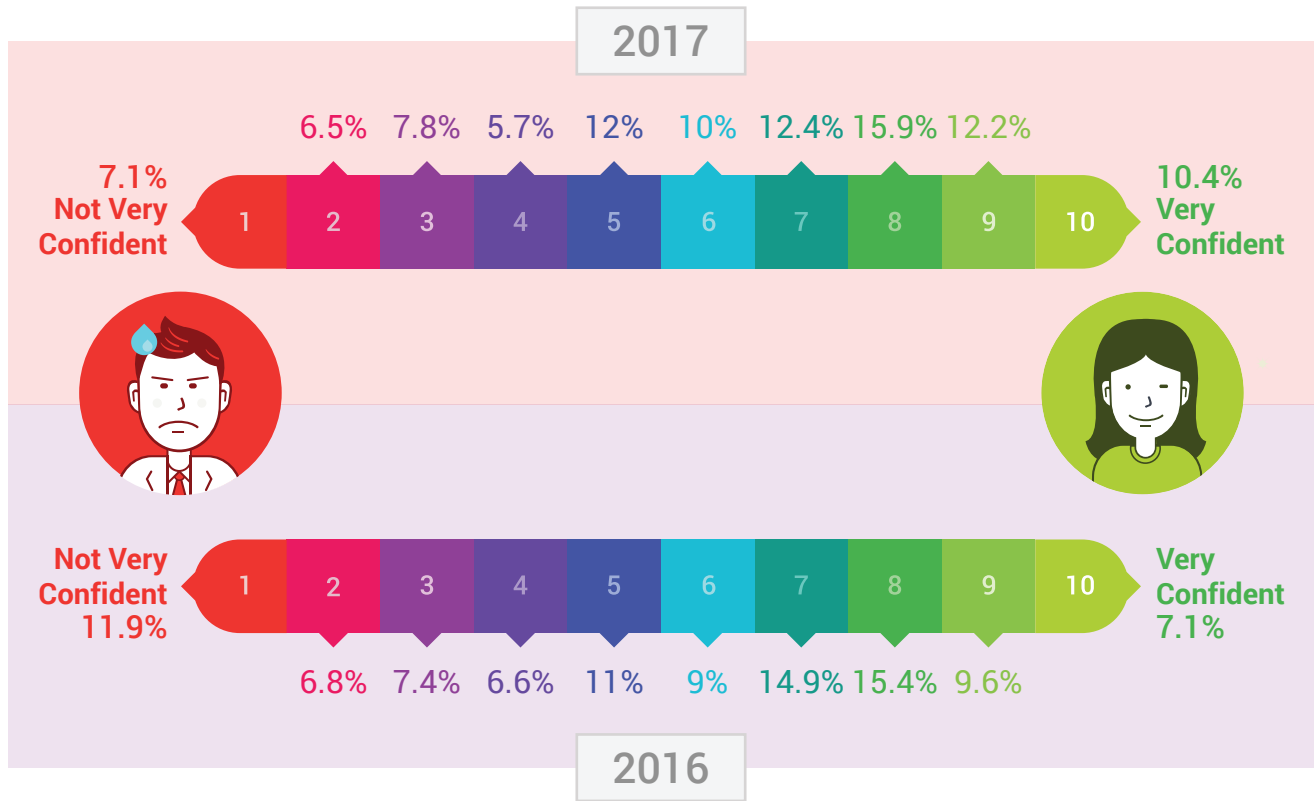
A multitude of resources exist for outsourcing BIM projects. However, the same amount exists for BIM education on existing technology, training and implementation for companies that could be utilizing BIM in-house to get more work. Unless builders make BIM a priority, they will fall behind BIM standards like those imposed in the UK when they come to the US. These standards will be arriving sooner rather than later and those poised for adoption will be the clear winners. The US lacks a pipeline of experienced BIM staff to meet the inevitable future of demand.

SURVEY PARTICIPANTS COMMENTED



"Everyone is able to work with BIM. It is not a specific department, it is part of peoples' job. We only hire people with BIM skills or we train them to work with BIM."

CONFIDENCE IN ABILITY TO MAXIMIZE VDC

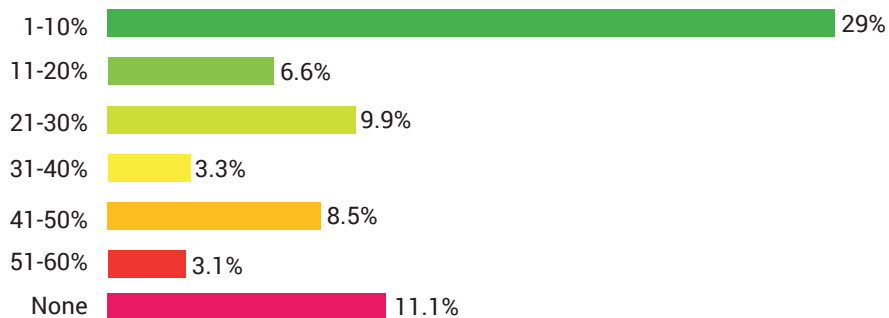


How confident are companies in maximizing VDC?

Companies are feeling slightly more comfortable with their abilities to maximize VDC in 2017. The largest percentage of respondents expressed the highest levels of confidence in their company’s ability to maximize VDC, while the smallest percentage expressed low levels of confidence.

Although nearly 30% of companies reported opting out of BIM projects, companies taking on BIM projects are gaining confidence in their ability to maximize the output of BIM workflows.

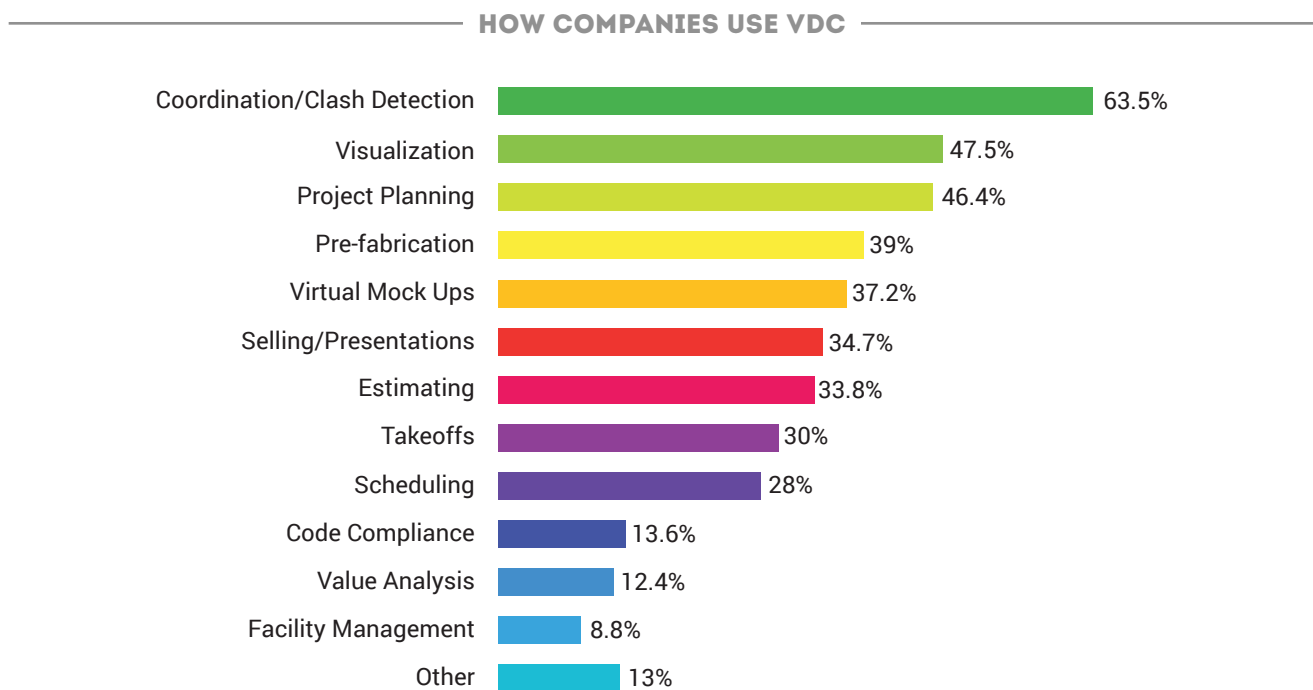
PERCENTAGE OF PROJECTS USING VDC



How are companies using VDC?

Few changes were observed over the rankings of how respondents are using VDC/BIM over the past year. **Clash Detection/Coordination continue to champion the responses**, with Visualization, and Project Planning experiencing only nominal changes from last year.

Pre-fabrication and Virtual Mock-Up moved into the top five uses for VDC, improving the future quality and safety of construction projects and showing that builders are experimenting with BIM throughout construction workflows to see where it can save the most time and add value. Ultimately, the value in BIM is detecting problems and solutions digitally before projects start, to avoid physical re-work later.

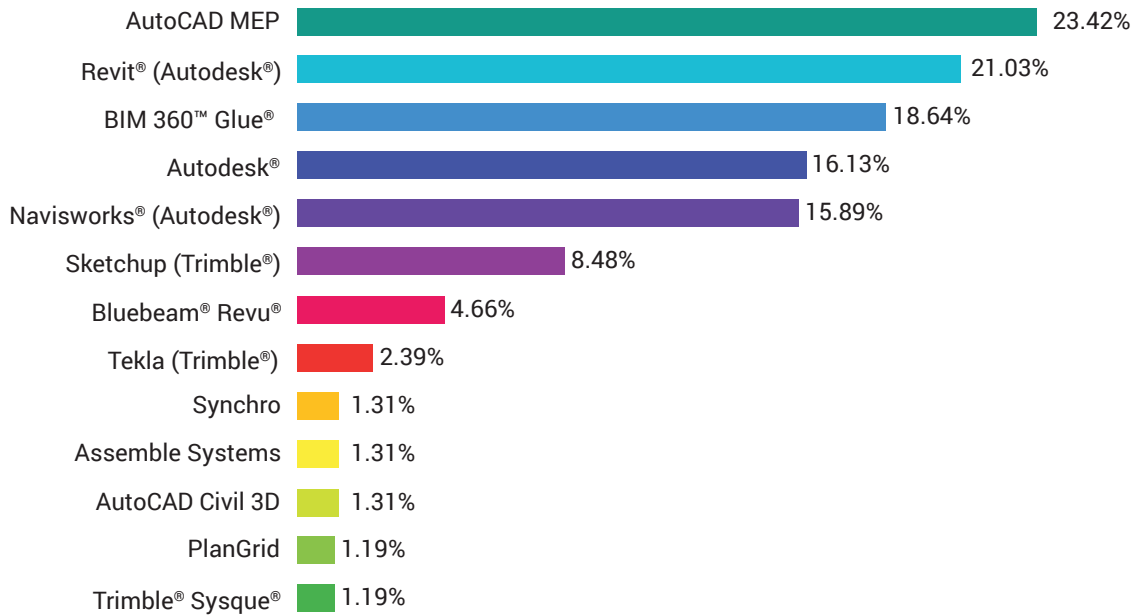


What software and apps power your BIM workflows?

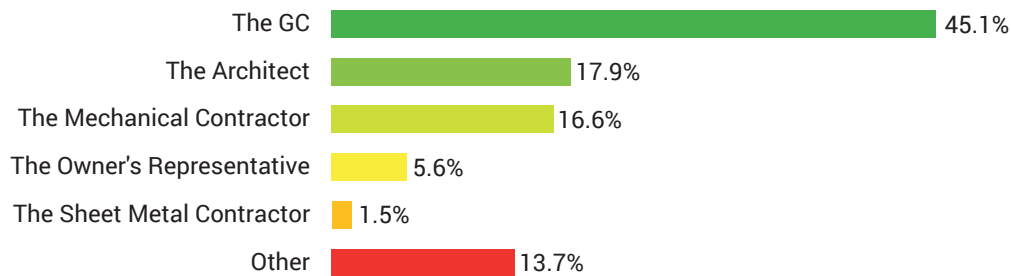
When it comes to the apps and software driving virtual design and construction, respondents clearly favor those by Autodesk. The top 3 responses are all Autodesk tools, each reporting over 15% of respondents.

Sketchup by Trimble is the first preferred app not powered by Autodesk to make a showing. **However, with under 9% of respondents reporting use of Sketchup, Trimble has a long way to go to contend with the force of Autodesk.**

CAD/BIM SOFTWARE & MOBILE APPS



VDC PROJECT LEAD



Who takes the lead on VDC projects?

General Contractors were overwhelmingly reported to be in charge of BIM/VDC related projects.

Nearly tied for responsibility on BIM projects were Architects and Mechanical Contractors at roughly 17% of responses each. **We anticipate seeing more Mechanical Contractors leading BIM efforts in the future since they often have a lot to gain or lose on a project depending on early clash detection.**

What are the biggest challenges facing BIM?

Resoundingly, 2017 ConTech Survey respondents found common issue with the lack of capable VDC labor, the lack of buy-in on BIM workflows, and the unreasonable time restraints on coordination.

Earlier survey sections echo this sentiment by describing the disconnect between dedicated VDC departments, knowledge of existing BIM software, and an overarching attitude of VDC as a low-priority item.

A review of the written comments (many listed below) amplifies all of these issues and also highlights other important points like disjointed processes and varying regional demand. If builders need to invest time and dollars into their VDC resources, they also need to see a clear demand or the resources will go to higher priority needs.

Builders would do well to track BIM trends regionally and adapt VDC strategies early-on, as more and more owners begin requiring BIM. The value of implementing BIM versus the risks presented from attempting to deduce physical solutions during construction could prove to be immeasurable.

SURVEY PARTICIPANTS COMMENTED

"As a design firm there are several; first, most employees don't understand the importance of constructing the model correctly and embedding necessary and useful information. Second, facility managers don't recognize the importance of the models."

"Being a national GC, we run into situations where our subs aren't utilizing BIM, that usually holds us back the most."

"Clash detection and priorities. Needs to be more of a round table or 'big room' rather than 'first with complete drawings gets the location."

"Coordination process is typically a joke; most GC's we work with do not have contractual teeth to enforce requirements of the BIM Execution Plan. We are also regularly left out of the coordination effort until it is far too late for us to utilize other."

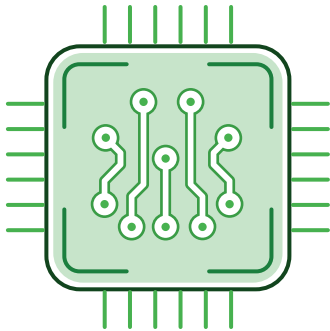
"Finding competent people to use the software and do the work."

"Lack of consistent owner understanding. This creates issues with the deliverables we receive from the designer. Frequently the model cannot be relied upon."

"Finding enough time to dedicate to the process and technology. Also, the current region/market has not yet started to fully adopting/integrate the BIM process on projects."



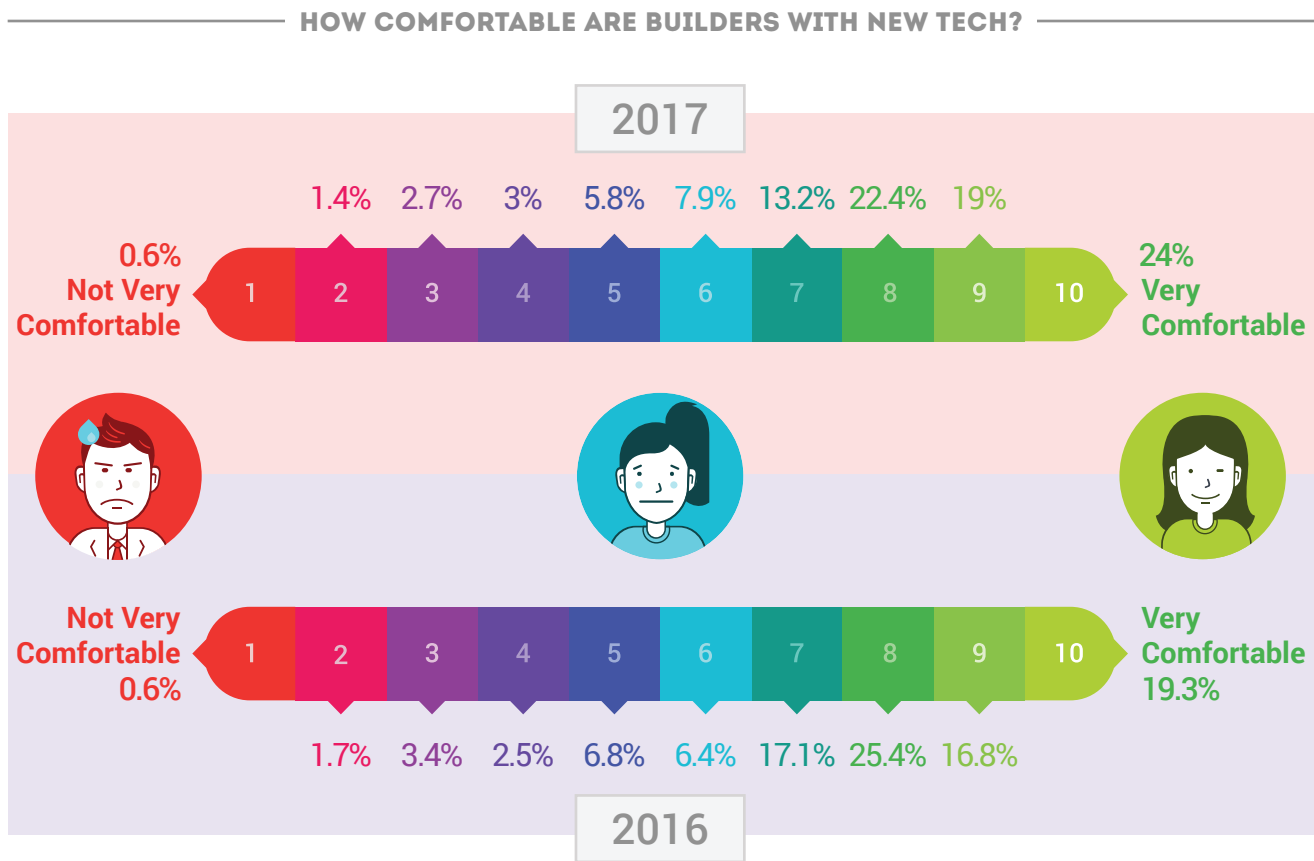
RESEARCH & DEVELOPMENT



DISRUPTING WORKFLOWS AND TECHNOLOGY WITH RESEARCH AND DEVELOPMENT

What prevents companies from trying new technology?

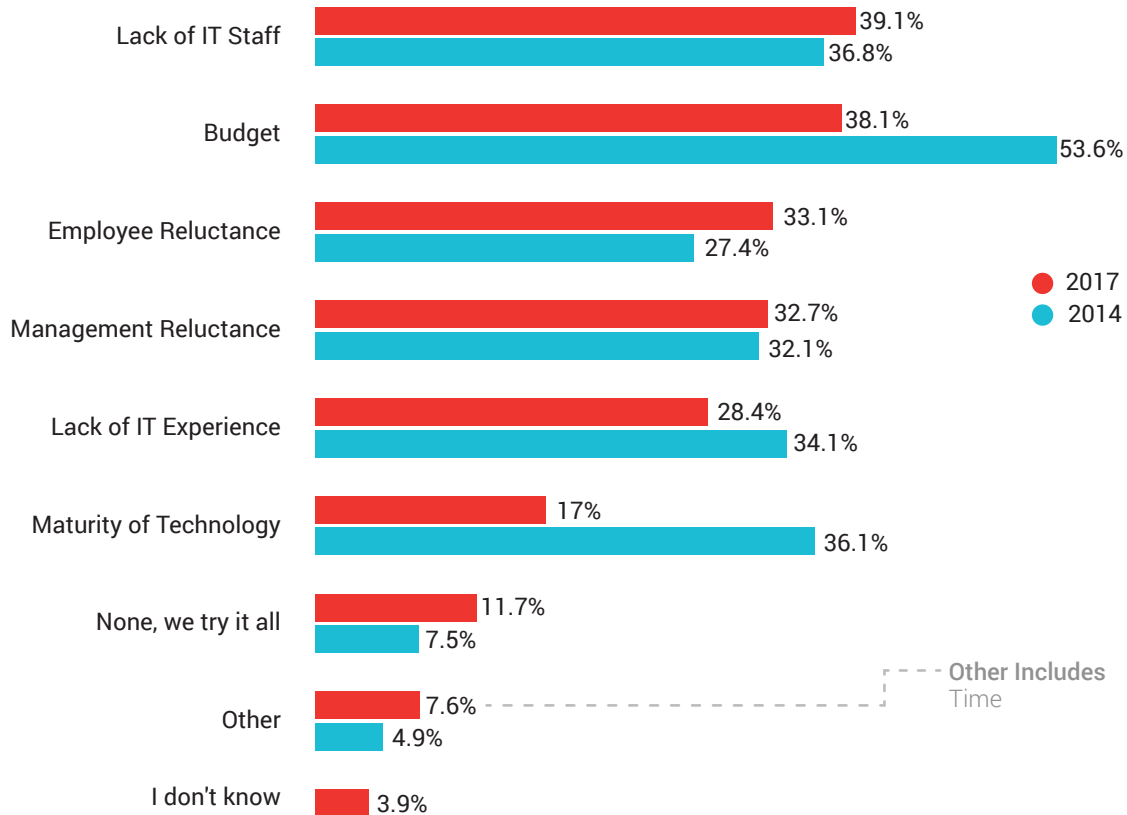
When questioned how comfortable they are with new technology, most respondents reported a higher level of confidence than previous years. **The majority of respondents, despite their age, reported feeling “comfortable” to “very comfortable” trying new technology.** Even respondents born between 1940-1959 reported an average 8 out of 10 comfort-level with new technology. These statistics indicate employees do not consider themselves the obstacle to trying new technology.



So, what are the obstacles to adopting new technology? **Management reluctance to try new technology is the only factor steadily increasing since 2014.** Lack of IT staff and Employee Reluctance remain issues, while the influences of Budget and Maturity of Technology have declined notably over the last three years. These changes seem intuitive as technology matures, prices decline and paves the way for competitive products. As more product choices enter the market at cheaper prices, management and employees are often overwhelmed with choices – the wrong purchase could

lead to buyer's remorse. **2017's ConTech Report indicates the biggest factors influencing technology adoption are people and budgets.**

THE MOST LIMITING FACTOR IN ADOPTING NEW TECHNOLOGY



What workflows do contractors hope will be automated in the future?

A new question in this year's survey asked what workflows respondents believe are prime for automation in the immediate future. **Several construction workflows can be automated using technological advancements such as 360 cameras, drones, pre-fabrication, and BIM.** Technology has become more streamlined than previous years; 360 cameras take one composite image now instead of several images to piece together. As drones grow more complex, they are capable of serving more diverse automated workflows.

The responses regarding workflow automation resulted in a three-way tie.

11% of respondents report they hoped "none" of their workflows would be automated, this may be attributed to the fundamental misunderstanding between what automation actually entails.

11% of respondents hoped **Estimating** workflows would be automated soon.

11% of respondents look forward to **Project Management** workflows becoming automated.

Perhaps the most revealing of all of the responses was the below comment:



SURVEY PARTICIPANTS COMMENTED

"We just need to use the automation available to us now versus continuing to do things the old way."

What knowledge do you hope the next generation of builders will bring to the industry?

2017's ConTech Survey wanted to understand the cracks in the industry that could be filled by the next generation of professionals. Respondents were asked what they hope architecture, engineering, construction management and construction science students across the country are learning to build a better industry in the future.



FIELD EXPERIENCE WAS THE MOST REQUESTED SKILLSET

which aligns with the earlier reported shortage in skilled labor.



BIM WAS THE SECOND MOST REQUESTED SKILL.

The lack of BIM skills is a reoccurring theme throughout the report.



THE THIRD REQUESTED SKILL WAS TECHNOLOGY

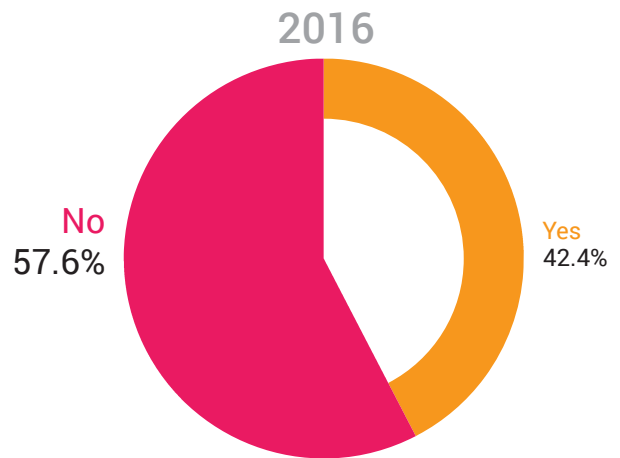
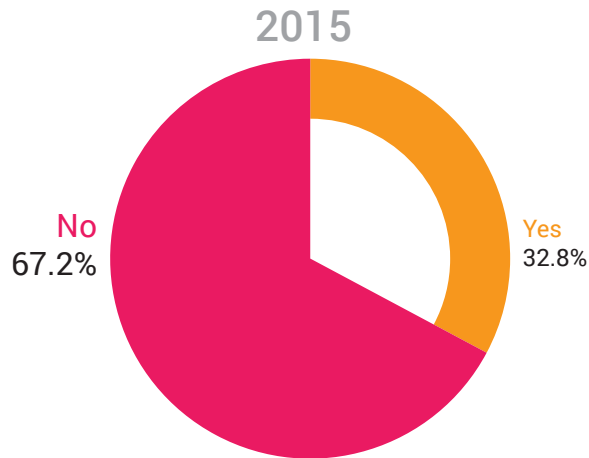
given the confidence expressed by builders adopting new technology and the increase in those testing emerging technology in 2017, it's inspiring to see companies expressing a desire to press forward and bring on talent to further technology R&D efforts.

What about Research & Development budgets?

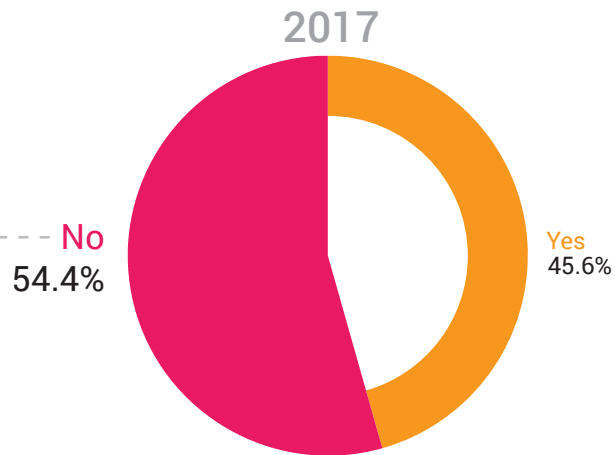
Over the last three years, respondents have reported **growing dedicated Research & Development budgets**. Still, fewer than half of all respondents reported having dedicated Research & Development budgets. In further analysis, the statistics showed that companies tend to have an R&D budget once

they hit \$6 million in annual sales volume. This is a much lower threshold than the \$20 million in annual sales volume often required to have dedicated BIM or IT staff (noted earlier in this report). This may be because an R&D budget can be a more incremental investment with less risk than dedicated R&D staff.

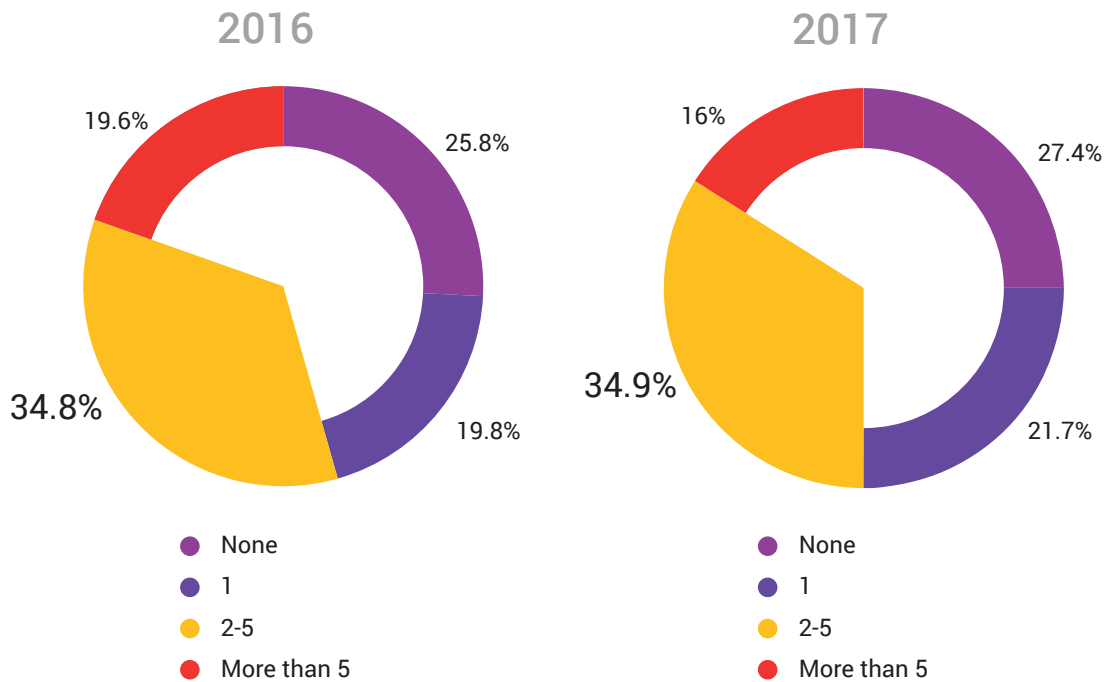
DEDICATED R&D BUDGET



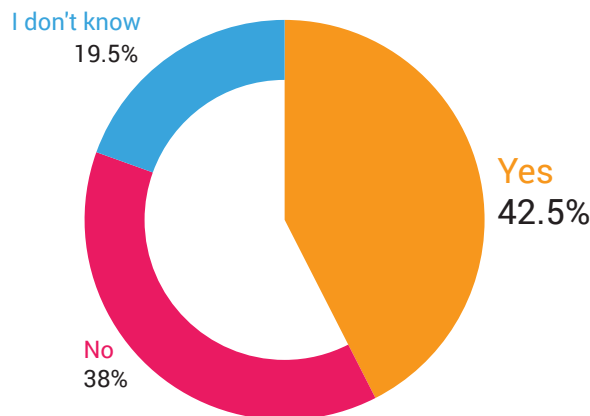
- No, because:**
- We don't have budget for it.
 - We perform R&D as needed.
 - R&D is not needed.
 - It's not a priority.
 - Our company is too small.
 - IT handles R&D.
 - We are working on it.



NUMBER OF EMPLOYEES DEDICATED TO R&D

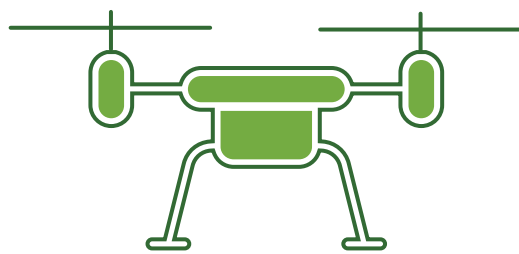


DEFINED R&D PROCESS



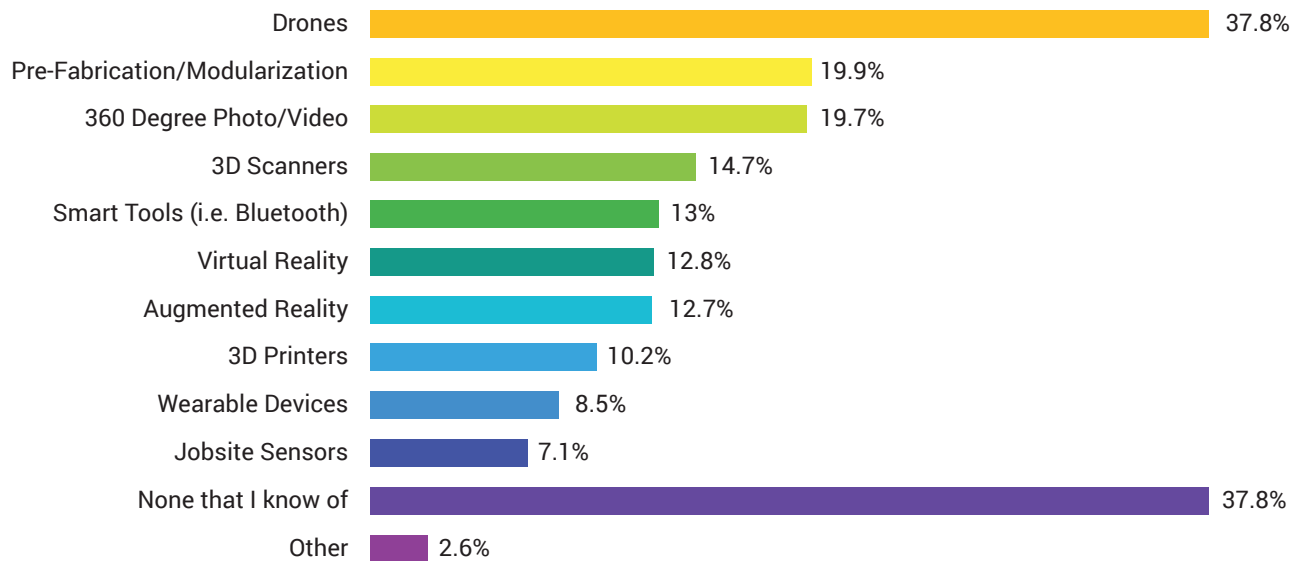
Although it's difficult to speculate the reason, respondents reported dedicating more IT budget yet fewer employees to Research & Development than in 2016. Many respondents also reported "No" or "I don't know" regarding whether their company has a defined Research & Development process. While R&D suggests a looser structure of systems and processes, it's still imperative to set goals and expectations for any allotted budget to validate its use. Even companies who allocate R&D budget upon request should have a system for tracking its use and championing those that bring value to the company through disrupting and improving current workflows.

EMERGING TECHNOLOGY



THE TECHNOLOGY DISRUPTING CURRENT WORKFLOWS AND DRIVING INNOVATION

WHAT EMERGING TECH ARE COMPANIES TRYING?



What emerging tech are companies trying?

While roughly 38% of respondents reported their company is not experimenting with emerging technology, **it's inspiring to note that this number has decreased by almost 20% over the last year.**

For those who are exploring emerging technology, **drones once again reign over all other tech offerings, growing 10% in popularity this year.**

Making a commanding showing, pre-fabrication technology use has risen 12%. The apps StructionSite and Holobuilder gained popularity as supported by the 13% increase in 360 Degree Photos/Videos. Falling prices and growing number of features contributed to 3D scanning and reality capture from solutions like Leica, Faro and Matterport nearly doubling since 2016.

SURVEY PARTICIPANTS COMMENTED



"With the deluge of emerging technologies becoming more prolific on projects, certain items are becoming 'standard construction tools.' Our timeline from inception, through R&D, to implementation is so long."

What's new in 360 degree video and photo tools this year?



360 photos continue to claim their foothold as a revolutionary tool for the construction industry. Here are the highlights from 2017:

- **LG** entered the scene driving hardware innovation with a lower pricepoint
- **Ricoh's** new models integrate 360 photos directly to software solutions
- **Holobuilder's** latest move is integration with BIM 360
- **Bluebeam** and **PlanGrid** now natively support photo embedding
- **StructionSite** overlays multiple 360 photos to create x-ray vision like images

What can we expect from laser scanning in 2017?



Laser scanning growth is fueled by the continued adoption of BIM in the industry. The newest incarnate of laser scanning is a breed of user-friendly handheld devices. This new generation of laser scanning allows portability and convenience without sacrificing the quality. Here are more highlights from 2017:

- Preferred brands for laser scanning include **Leica BLK360, Paracosm px-80 and ZEB-Revo**
- **Occipital acquired by Paracosm** ushering in continued innovation
- **Leica Pegasus Backpack** integrates with Lidar and 360 photos
- **Matterport** joined forces with **Leica** to integrate 360 photos and Lidar for immersive 3D images with self-registration
- **Hexagon** owned companies' **Multivista** and **Leica** partner for documentation of the as-built environment with Construction Documentation as a Service

- **Faro** makes laser scanning more accessible with **Focus M70** for under \$25K

What's changed in augmented reality this year?



Augmented Reality is shifting on multiple levels this year, with advancements in video games and consumer devices, progressions of the technology is being filtered into the construction industry.

Here's what's new:

- **Apple's AR Kit** allows low-end access via iPhone or iPad, allowing for field measurements, and visualization of virtual models
- **Hololens'** new integrations allow collaborations with designers and consumers for visualization, as well as planless construction and pre-fabrication
- **Daqri** released new Smart Glasses for better user experience as compared to the previously existing helmet
- **Daqri Smart Glasses and Hololens** are now certified as protective eyewear, advancing their value on jobsites

What is new with virtual reality?

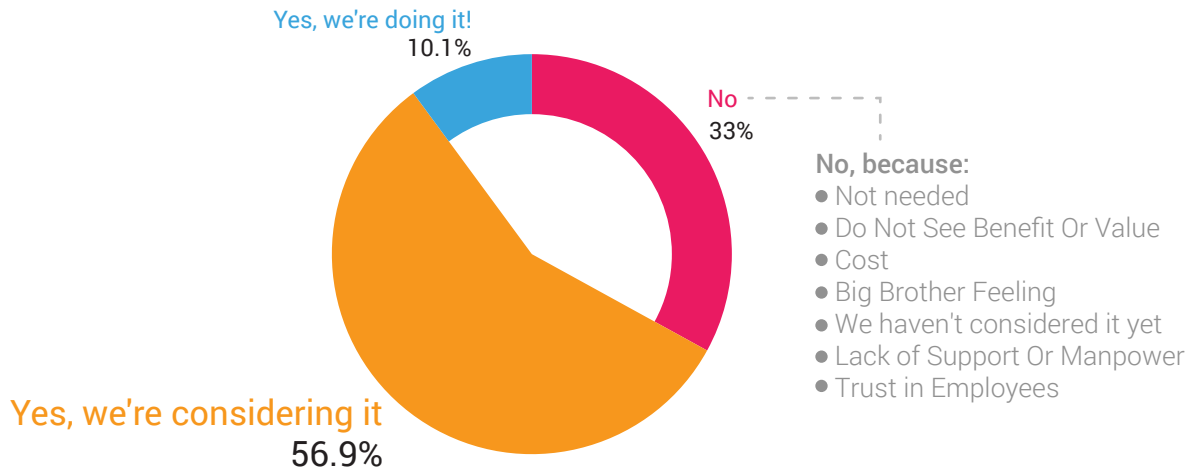


Virtual Reality has shifted from a sales tool to a vital piece of the construction workflow. Virtually reality platforms are being pushed from mere visualization to dynamic design tools relied upon throughout the building information modeling process. Here are some highlights from 2017:

- **Oculus Rift** leads the way in terms of price-point and mobility
- New VR platforms are creating an immersive environment for training workers on and off site. This will revolutionize safety awareness and training.
- Skanska USA Building demonstrated live connection to Material Cost Data in VR and announced the availability of the entire Revit model and BIM data for filtering.
- Continued advancements create the opportunity to design in a real-time, completely immersive space, leaving the mouse and keyboard behind.

THE IMPACT OF DRONES, SMART TOOLS, AND SENSORS ON THE JOB SITE

ARE COMPANIES TRACKING THEIR EMPLOYEES?



How do companies feel about employee tracking?

For most survey respondents, job site employee tracking technology is more than just a passing craze. **57% of respondents reported they were "Considering" using worksite tracking.** Despite the assumed privacy concerns (the Orwellian "Big Brother" sense of being watched) the true barriers preventing companies from implementing employee tracking were reported as: a lack of need for tracking, lack of benefits from employee tracking, and the cost of tracking. Privacy concerns or "that Big Brother feel" came in as the fourth most reported reason that respondents are reluctant to try employee tracking.

SURVEY PARTICIPANTS COMMENTED

"We tried tracking vehicles and there were threats of quitting."

How are construction companies using sensors for jobsite tracking?



Reluctance to adopt worksite sensors over privacy concerns have been assuaged by the benefits of safety and tracking information. Triax experienced a sharp increase in adoption with its innovative safety platform making it the preferred sensor of 2017. Their addition of a Tag for equipment positions

them to continue to innovate in the space. These innovations coupled with other IoT, wireless jobsites, productivity and tracking tools from Rhumbix, Redpoint, CAT, and DEWALT make the outlook for 2018 impressive.

What's new with drone hardware and software in 2017?



With 2016's implementation of the Federal Aviation Administration's UAV Part 107, commercial drone use has expanded. The construction industry's experimentation and adoption of drones continues into 2017, as part of drones' steady rise to industry standard. Penetrating nearly 40% of the industry, according to survey respondents, drones have reached a tipping point and are now viewed as essential jobsite tools instead of just a luxury. Here's what's new in 2017:

- **DJI** is clearly the brand of choice when it comes to drones for construction use
- As previously mentioned, **drone insurance (while not required in the US) is available from companies like Verifly**
- **Construction workflows dependent on drones are expanding;** such as earth movement, site documentation, structural inspections, and percent complete calculations

What smart tools are builders trying?



Innovations in smart tools over the last year include tracking features on new tools as well as offering additives to retrofit older tools with new technology solutions. Smart tools are also working to increase compliance with new Silica Dust Regulations.

DEWALT championed the smart tool portion of our survey. DEWALT Tool Connect is becoming standardized on more models, with the Tag which can be added to any device for tracking GPS

location. **DEWALT's The Connector can also be added to any DEWALT 20 Volt Max tools to add tracking without adding weight.**

Milwaukee One Key is also holding strong in the Smart Tool game with Tick for tracking, tool profiles, and remote granular controls.

INNOVATIONS IN PRE-FABRICATION, MODULARIZATION, & 3D PRINTING

What changes are happening in pre-fabrication?



Pre-fabrication, modularization, and 3D printing are providing simpler construction solutions. As more companies adopt BIM, pre-fabrication gains a deeper stronghold within the industry this year with pre-fabrication's ability to deliver on products within the supply chain constraints of modern construction. Subcontractors are actually beginning to specialize in pre-fabrication so as to meet local demands and get materials quicker following a more delivery-based, "Amazon" model.

Pre-fabrication saw some momentum in 2017 with improvements to existing companies FabPro1, as well as new vendors Stratus and Manufacton. FabPro1 integrates with a cloud-based repository for Revit Models, making pre-fabrication a breeze. Manufacton works with BIM and VDC or traditional 2D-based workflows.

What's happening in modularization?

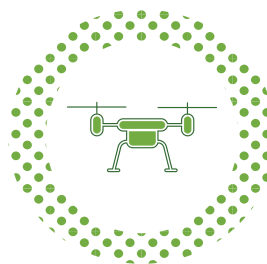
Modularization is experiencing renewed interest, sparked by large hotel giant Marriot investing in modular efforts that helped a 97-room hotel reach completion two months ahead of schedule.

Modularization has also been tapped as a possible solution to the nationwide housing crisis. As the housing shortage reaches critical mass, builders are stepping up.

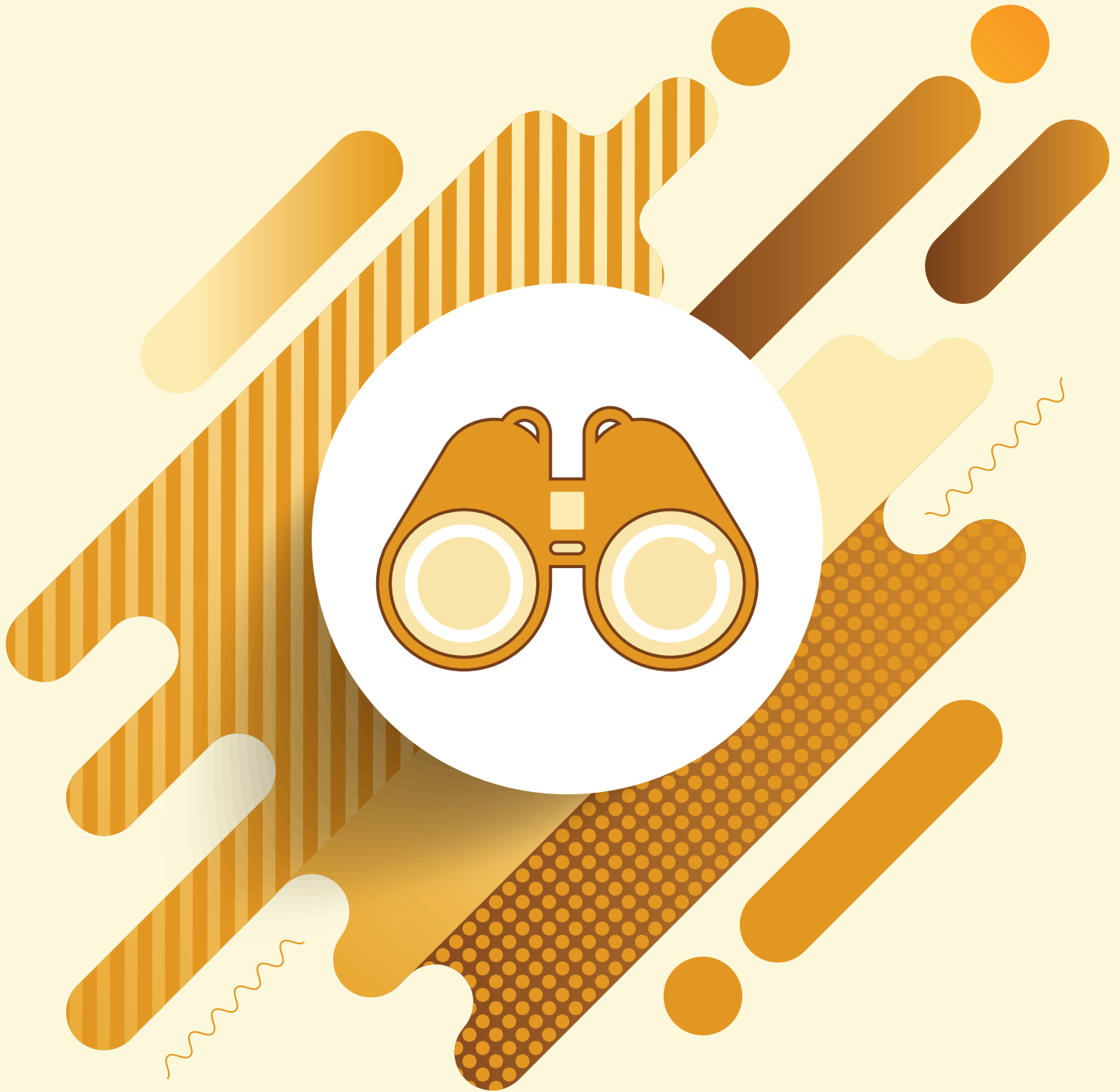
What were the breakthroughs in 3D printing this year?



While strides in 3D printing are gaining ground, the 3D printing industry on the whole is still in its early stages. As the cost of 3D printing continues to drop and barriers to adoption continue to decrease, commercial use of the latest materials and printing techniques may soon be more widely available. Regardless, the industry is pressing onward in the form of **uploadable designs brought to life courtesy of Branch Technology. Apis Cor uses geopolymers, concrete, and fiber concrete to print buildings quickly and efficiently with minimal waste, and Fastbrick prints 3D printed bricks then meticulously places them within a specified framework.**



LOOKING FORWARD TO 2018



THE CHANGES AND INNOVATIONS TO SHAPE THE FUTURE OF CONTECH TO COME

What will happen?

We can't predict the future but we can certainly follow the trends. The goal of this annual report is to show the trajectory, triumphs and occasional obstacles the industry faces as technology adapts and changes. After compiling its contents, here's what we understand will happen over the next year.

The construction industry will continue to innovate given the technologies interspersed throughout our daily lives, including apps, smartphones, tablets, and other devices. The industry will continue to force business technology providers to match the efficiency, availability and low-cost we get from our consumer tech providers. Until then, contractors will opt to use personal devices and try personal solutions to solve short term problems. **Therefore, the lines will continue to blur between personal and corporate data, hardware and software, so data security will remain a key issue.**

Automation is here and will gain traction, whether companies and individuals embrace it is a matter of choice and education. Education around what "automation" means for each company is key. If more construction professionals understood the work tasks that automation and Artificial Intelligence technologies can augment and enhance, they might focus less on the tasks they will "replace."

The demand for BIM will continue as will BIM's influence on how construction projects are bid and won in 2018. Companies still not exploring BIM will find themselves more and more limited in areas of work.

Workflows will be further digitized as companies mature and update processes, tinker with the latest mobile apps and devices, but they'll need integration capabilities to follow. Software and devices will continue to become more affordable, and with more technology options than ever before, companies are using fewer solutions than ever before to avoid the headache of integrating data across multiple solutions. To remain competitive, tech providers will have to continue to team up to get on contractors' short list of solutions that offer simplicity and data continuity.

What do we want to happen?

As always, we want to see a stronger, savvier construction industry every year. We want technology to inspire, motivate and get contractors "geeking out," no matter their role on construction projects.

Technology has the opportunity to connect individuals across departments, projects and geographies to drive collaboration and innovation like never before. We've seen change start at the top with tech-minded CIOs and at the bottom with an estimator begging to try out BIM. We hope this report sparks you, whether you're at the top or the bottom, to inspire change and challenge how your company can harness technology better.

In past reports, our calls to action have ranged from "Become a tinkerer!" to "Stop using spreadsheets!" and "Please check out BIM!" Our focus in 2012 was to learn if builders trusted cloud software, in 2014 if they cared about wearables and in 2016 if R&D departments were even a thought.

In 2018, we hope the trend in allocating more annual sales volume to IT continues and companies take concerted efforts to recapture costs from owners by learning how to allocate and justify technology per project. **We hope to see dedicated IT staff grow, especially the role of a Construction Technologist for all IT and training needs.** As outlined earlier in the report, a Construction Technologist is a team member who specializes in IT but with experience in construction to solve problems that costly, unspecialized third-party resources cannot.

Finally, we hope every company reading this asks themselves how they can create a culture of "geeking out." In the office and on the construction site, investigate how games, contests and other incentives can encourage employees to try and adopt new tech — and ultimately ensure your company gets their money's worth on every tech investment.

It starts at the top, or the bottom. Either way, it starts with you.

Keep geeking out,

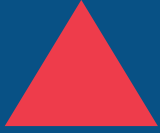
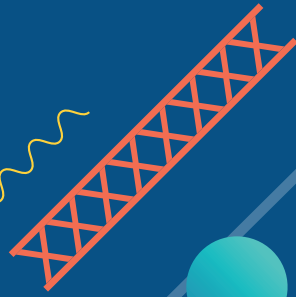


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SPECIAL THANKS



Thank you to every construction professional who has completed one of our annual Construction Technology Surveys since 2012. We cannot thank you enough for taking the time to help us build this living resource for our industry.

Thank you to our partners, MCAA, CFMA and Texas A&M University's Construction Science Department. We hope this report helps you continue to educate and lead the next generation of leaders in our construction industry.

Thank you also to the many media publications, organizations, companies and other online mediums who distribute and share the survey and report year after year. We are happy to provide excerpts and graphs for re-print upon request. Please send all re-print requests to our Editor-in-Chief, Liz Welsh, at liz@jbknowledge.com. Any re-print of the text and/or graphics in this report without permission from JBKnowledge is a copyright violation.

And last but never least, thank you to the JBKnowledge geeks who contributed tirelessly to the contents report:

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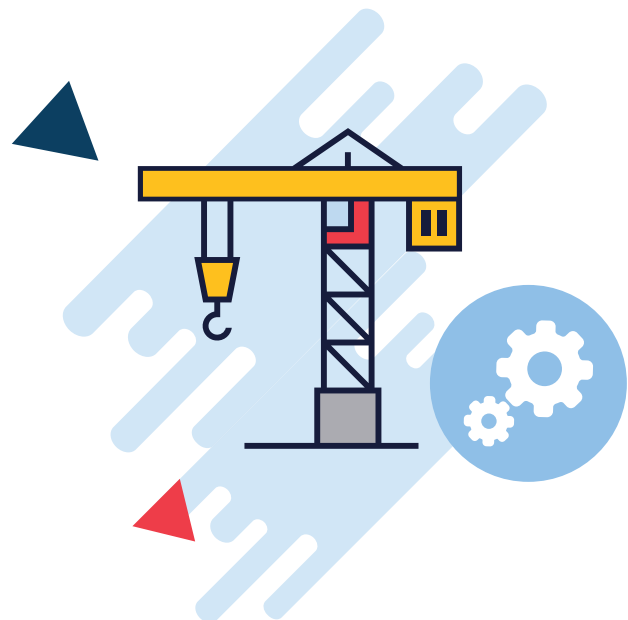
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THANK YOU TO OUR PARTNERS



About the Mechanical Contractors Association of America

The Mechanical Contractors Association of America (MCAA) serves the unique needs of approximately 2,600 firms involved in heating, air conditioning, refrigeration, plumbing, piping, and mechanical service. MCAA does this by providing their members with high-quality educational materials and programs to help them attain the highest level of managerial and technical expertise. Through their Construction Technology Initiative, MCAA has partnered with JBKnowledge to provide research, presentations and resources about the impact that technology is having on the built environment and its practices, helping contractors to leverage that information to continue to deliver the best results for owners.

MCAA includes the Mechanical Service Contractors of America, the Plumbing Contractors of America, the Manufacturer/Supplier Council, the Mechanical Contracting Education and Research Foundation and the National Certified Pipe Welding Bureau. For more information about MCAA, visit www.mcaa.org. Follow MCAA on [Facebook](#), [Twitter](#) and [LinkedIn](#).



About the Construction Financial Management Association

Founded in 1981, the Construction Financial Management Association (CFMA) is the only organization dedicated to providing construction financial professionals in North America with unparalleled career development and networking opportunities. Along with publishing the award-winning CFMA Building Profits, CFMA offers educational, professional, and connection programs through its 98 chapters, Annual Conference, and online learning to its more than 8,100 members. CFMA members are CFOs, controllers, and treasurers working at major commercial construction contractors in general,

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About the Texas A&M University Construction Science Department

The construction education program at Texas A&M University was established in 1946, and now enrolls approximately 1,050 undergraduate students pursuing a **Bachelor of Science in Construction Science** and 75 graduate students pursuing a **Master of Science in Construction Management**. Both the undergraduate and graduate programs were among the first programs in the nation to obtain [American Council for Construction Education \(ACCE\)](#) accreditation. The program is serviced by approximately 42 full and part-time **faculty members**, 20 of which hold Ph.D. or equivalent degrees, many of which have extensive construction industry experience. The program integrates principles of architecture, technology, engineering, business and project management, in order to prepare students to effectively manage the total construction process. Specialized course work in building systems, materials and methods of construction, scheduling, cost estimating, structures, construction management, law and business/labor relations are also taught. This interdisciplinary approach provides the student with the best possible exposure to the various tools needed to become a construction industry leader.

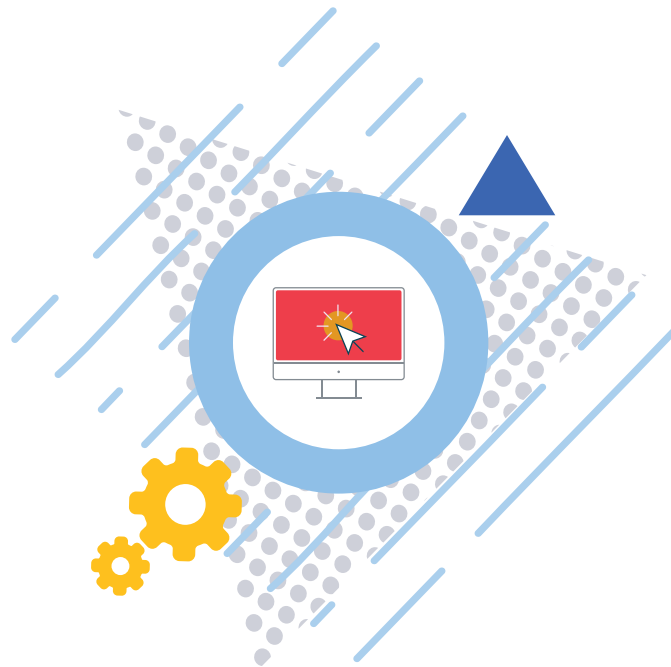


About ProNovos Construction Analytics (PCA)

ProNovos Construction Analytics is an intuitive cloud-based construction analytics platform built for contractors of all types and sizes. Through a unique data driven experience, PCA unleashes the power of your most valuable assets, your people and your data, by automating the transfer and integration

of data from your existing business applications to a single Construction Analytics Platform. This single source of data delivers one version of the truth to everyone from the field to the office. The ProNovos Construction Analytics Platform gives decision makers immediate access to historical job costs and financial ratios, providing an aggregate view of all current and historical job data in pixel perfect dashboards. JBKnowledge used the ProNovos platform to analyze the 2017 ConTech Survey respondent data and uncover or validate correlations between questions.

ProNovos Construction Analytics (PCA) is the industry leader in Construction Analytics, Business Intelligence and Reporting software. Learn more at www.pronovos.com.



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JBKnowledge is a family of professionals building great technology since 2001. We develop web, mobile and wearable solutions for construction and insurance.

JBKnowledge is the maker of the SmartBid construction bid management software, SmartCompliance certificate of insurance and vendor compliance management software, and SmartInsight, the fastest growing online construction network for finding work and contractors.

We offer a range of professional services to help companies transform their technology solutions including: IT Staff Augmentation, Strategic Consulting, Enterprise Application and Software Development, Mobile and Wearable Applications, and Research & Development Outsourcing.

We are based in Bryan/College Station, TX (Aggieland, Whoop!) and serve construction clients on an international basis. Tune in to our weekly construction technology podcast, The ConTechCrew, or attend one of our ConTech Roadshows throughout the U.S. to geek out with us more frequently.

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