THE STATE OF
SCAFFOLDING TECHNOLOGIES 2020

How Leading Scaffolding Companies Are Transforming Their Businesses for the Future

ABOUT THE REPORT

Scaffolding Technologies Hold the Promise of Greater Profitability

Across the construction sector, we've seen a host of digital innovations, such as Building Information Modeling (BIM) and integrated project management platforms, becoming the lifeblood of business operations. These technologies serve a single purpose: to transform businesses through the digitization of data, workflows and projects. From preconstruction planning to commissioning and closeout, you can see their impact throughout the project life cycle - improved operational efficiencies, faster design with increased accuracy, higher productivity, and safer job sites, among others.

Scaffolding businesses are rapidly catching the digital transformation wave. Technology adoption is accelerating across the trade: new scaffolding software, Augmented and Virtual Reality (AR/VR) technology, drones, and even robots. A diverse range of solutions have emerged that promise to transform one of the world's oldest industries.

However, the growing challenges in IT complexity and project financing, along with workforce upskilling and reskilling, are creating transformation gaps in the scaffolding trade.

The Scaffolding Digital Outlook survey, which was conducted during the second quarter of 2020 in collaboration with ScaffMag, features the collective perspectives of executive leaders and trade specialists from 167 scaffolding companies across Europe, America, Asia Pacific, and Africa. In this report, we share their insights into technology priorities and assess the digital adoption levels of key segments of the industry--from early adopters (more focused on experimental pilot projects) to digitally mature organizations (in the process of scaling technology deployment).

A key finding of this report is that digital transformation is rapidly sweeping across the scaffolding industry. The majority of surveyed companies are actively piloting or scaling digital technology in their business.

Approximately 85% of respondents indicated that they have more than one digital application in place. Of the 15% of businesses that are not currently using digital scaffolding technologies, the majority (57%) have it on their radar for 2020.

As they should: over the last few years, scaffolding businesses have grappled with the combined pressures of rising labor costs and increased competition. Standing between this proverbial rock and hard place, industry leaders have discovered that digitizing manual processes isn't just an option—it's the key to survival.

However, the Scaffolding Digital Outlook survey also identified several perceived obstacles to successful digital transformation. The primary software choice among respondents vary from basic spreadsheet to complex inventory management. And most leaders rely on solutions built for the broader construction industry like AutoCAD to digitize their business, which are too costly and time-intensive to learn for tradespeople. As the industry is just beginning its digital transformation journey, the costs and complexity of digitalization remain key impediments to the majority of surveyed organizations. And it's only to be expected.
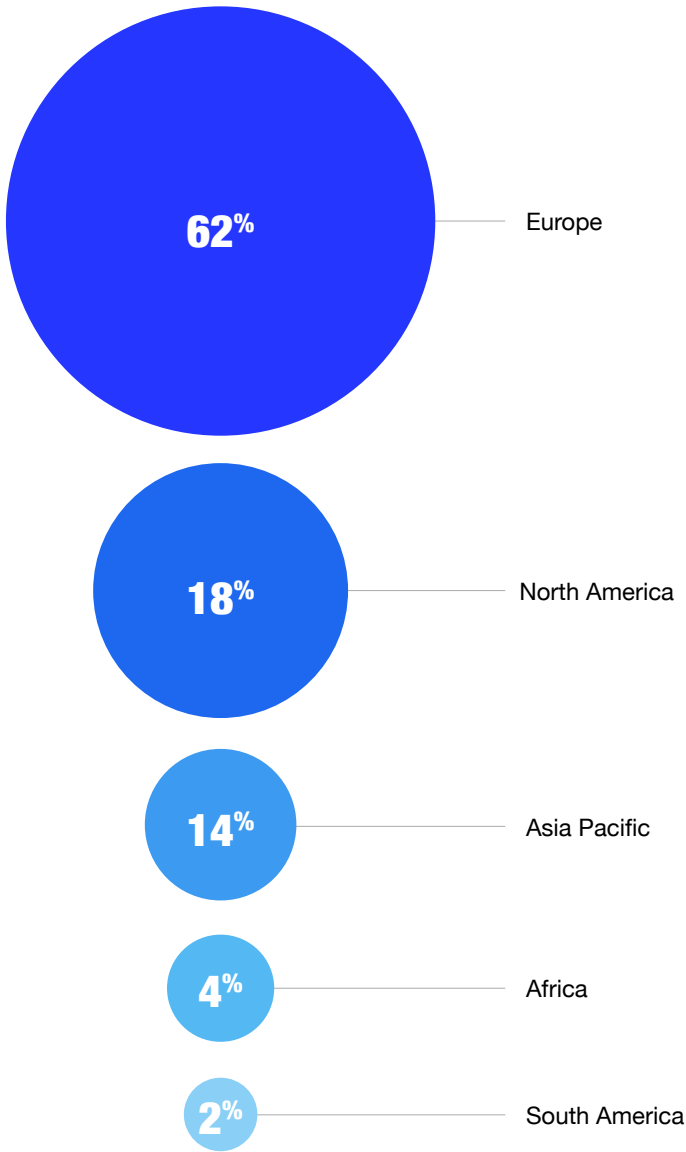
The returns of technology investments aren't always immediately apparent, while operational costs are incurred daily and margins are thin. This inherent gap poses budget concerns for project-driven scaffolding businesses. That said, businesses are finding success by shifting their focus from radical to incremental digitalization. This explains why the majority (56%) of respondents prioritize investment in integrated software that immediately reduces labor expenses and improves operating margins. Additionally, the availability of subscription-based SaaS solutions enables businesses to avoid large capital expenditures and easily scale their transformation efforts as their businesses grow.

How do leaders exploit these new digital opportunities and build new competitive advantages in the digital age we live in?

In this report, we dive into the scaffolding technology landscape to identify where businesses are seeing the most success. From that vantage point, we turn our focus to scaffolding software to benchmark industry adoption levels, discuss investment priorities, and provide insights into how you can leverage new technologies to strengthen your business.
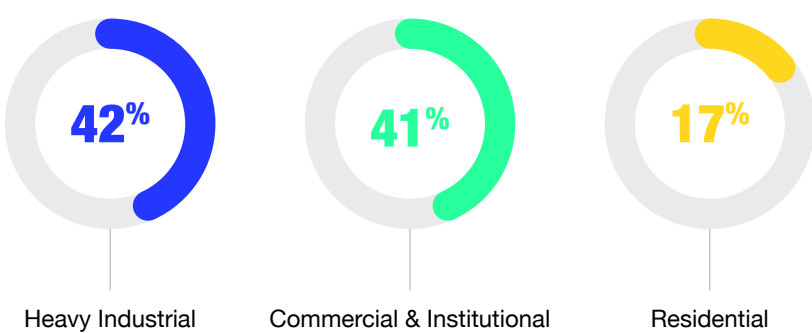
Survey Demographics
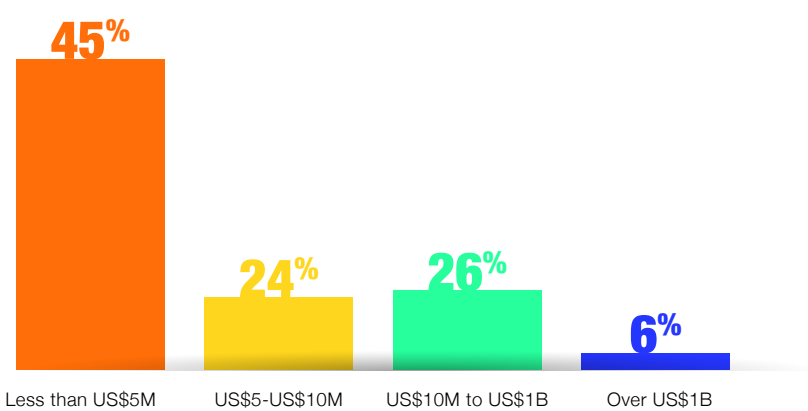
Percentages might not add up to 100% due to rounding

62% — Europe

18% — North America

14% — Asia Pacific

4% — Africa

2% — South America

Job Functions

33% C-Level Executives

37% Senior Management

30% Tradespeople

Type of Entity

42% Heavy Industrial

41% Commercial & Institutional

17% Residential

Annual Revenue

45% Less than US$5M
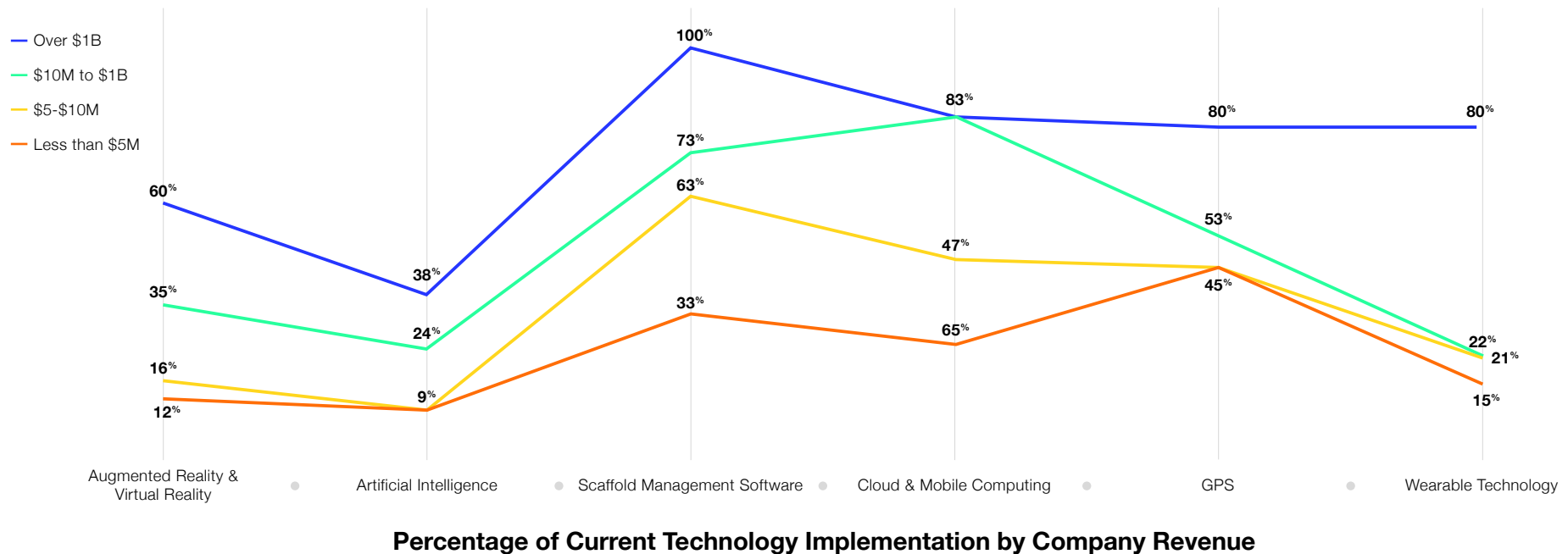
24% US$5-US$10M

26% US$10M to US$1B

6% Over US$1B

DIGITAL MATURITY IN SCAFFOLDING TECHNOLOGIES

TECHNOLOGIES ARE TRANSFORMING SCAFFOLDING BUSINESSES

Of the 85% of respondents who indicated having some digital applications in place, 57% are growing in maturity with multiple scaling initiatives. As expected, companies with higher revenue are accelerating technology adoption, but that's not the entire picture.

Legend:
- Over $1B
- $10M to $1B
- $5-$10M
- Less than $5M

Data points by technology:

Augmented Reality & Virtual Reality: 60%, 35%, 16%, 12%

Artificial Intelligence: 38%, 24%, 9%

Scaffold Management Software: 100%, 73%, 63%, 33%

Cloud & Mobile Computing: 83%, 47%, 65%

GPS: 80%, 53%, 45%

Wearable Technology: 80%, 22%, 21%, 15%

Percentage of Current Technology Implementation by Company Revenue

When breaking down investment priorities we noticed an underlying trend in cloud and mobile computing as well as scaffolding software adoption against the overall digital landscape.
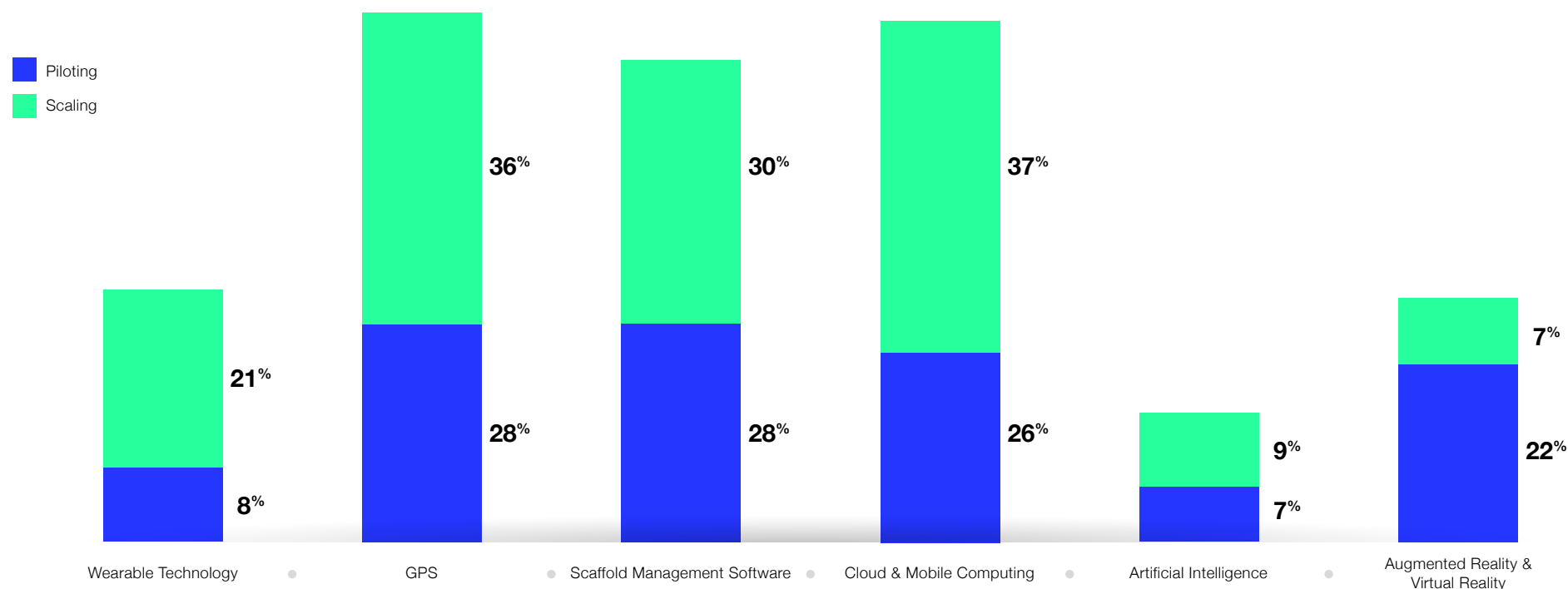
Data centralization is the key enabler of interconnectivity and mobility on the job site. From fundamental applications such as online storage and communication channels to complex work execution platforms, cloud and mobile computing are a catalyst for digital transformation at 63% of surveyed organizations. The impact of seamless data transmission is reflected in the higher rates of investment in scaffold management software, with 58% reporting that they have adopted software solutions. And the contributing factor is clear. With SaaS implementations, companies can solve the budget constraint that is tied with an upfront deal in enterprise software development. Software solutions connect back-office and field operations for real-time information

sharing. That way, contractors can easily report job status with clients while coordinating work across sites and avoid delays or downtime.

On the other end of the adoption scale, the survey revealed that only 15% of businesses have adopted AI-powered solutions. Despite the hype around AI over the last few years, its benefits and use cases for the scaffolding sector are still hazy.

With an 18% adoption rate, augmented reality and virtual reality (AR/VR) solutions are increasing in popularity among more digitized organizations (those with current investment in scaffold management software). Some of the prominent use cases include design visualization and scaffold inspection. But even then, there are relatively few respondents that have exploited these technologies to innovate within their scaffolding businesses.

Common construction equipment like GPS-enabled systems and wearables are growing in maturity. According to our report, GPS is one of the most widely adopted technologies, with 64% organizations either piloting or scaling these applications. In addition to location-based tracking, 21% companies are also embracing wearable technology to collect and deliver data about field environments and activities and, most importantly, increase safety for crews.

Piloting
Scaling

	Piloting	Scaling
Wearable Technology	8%	21%
GPS	28%	36%
Scaffold Management Software	28%	30%
Cloud & Mobile Computing	26%	37%
Artificial Intelligence	7%	9%
Augmented Reality & Virtual Reality	22%	7%

Scaffolding Technologies Adoption Levels

The expansion of digital transformation across the industry promises to bring multiple improvements, as described below.

INCREASE OPERATIONAL EFFICIENCY

One of the competitive advantages of the construction cloud in general, and software deployment in particular, is real-time connectivity. Traditionally, contractors and owners work in a silo with limited information sharing between trades. Scaffold plans are communicated on paper, while crews have to rely on manual data entry and radio communication to track materials or RFI submittals. Change orders happen all the time due to miscommunication or inaccurate project scope. And this inefficiency often results in rework, causing cost overruns and project delays.

Now, field mobilization is possible thanks to cloud and mobile technologies. Workers can log requests in seconds, collaborate virtually on a shared platform, and get instant updates on the project requirements as well as design modifications. This increases productivity significantly. It's no wonder many organizations will continue to invest in software to centralize data.

IMPROVE SAFETY

The safety of working platforms is greatly dependent on scaffold plans and erection processes. Changes to the design can affect the safety of scaffold users, especially when you need to modify drawings, materials specifications, and other critical construction documents.

Low-tech, hand-drawn models are becoming obsolete. Furthermore, being over-reliant on paper causes a disconnect between scaffold erectors and users. Crews don't have clear visibility into the material list should changes happen, which may lead to costly delays during erection, while changes in scope or fall protection plans can create hazards when they're not reflected in the last set of prints. That's why a great number of surveyed organizations make safety a priority when it comes to employing new technologies, specifically design software and new visualization capabilities.

SAVE COST

Without accurate planning, tracking, and inspection, scaffolding costs can quickly skyrocket and negatively impact other projects and overall profitability. Fortunately, cloud connectivity has made cross-trade work coordination seamless.

A delay or lack of access can inflate the costs of work depending on the scaffold. A digital record of materials needs and scaffolding activities can facilitate timely response to requests and efficient utilization of equipment, which can be accessed anytime, anywhere. As a means of identifying hazards and suitability before build, new construction equipment like drone surveillance and AR/VR-enabled 3D modeling help reduce the risk of rework and cost overruns.

Facility managers have to depend on multiple parties to stay updated on a project. A connected job site solves this challenge by enabling more collaborative approaches. Moving from traditional spreadsheets to cloud-based project management software, and from on-site inspections to virtual handovers, software utilization is growing rapidly across the industry.
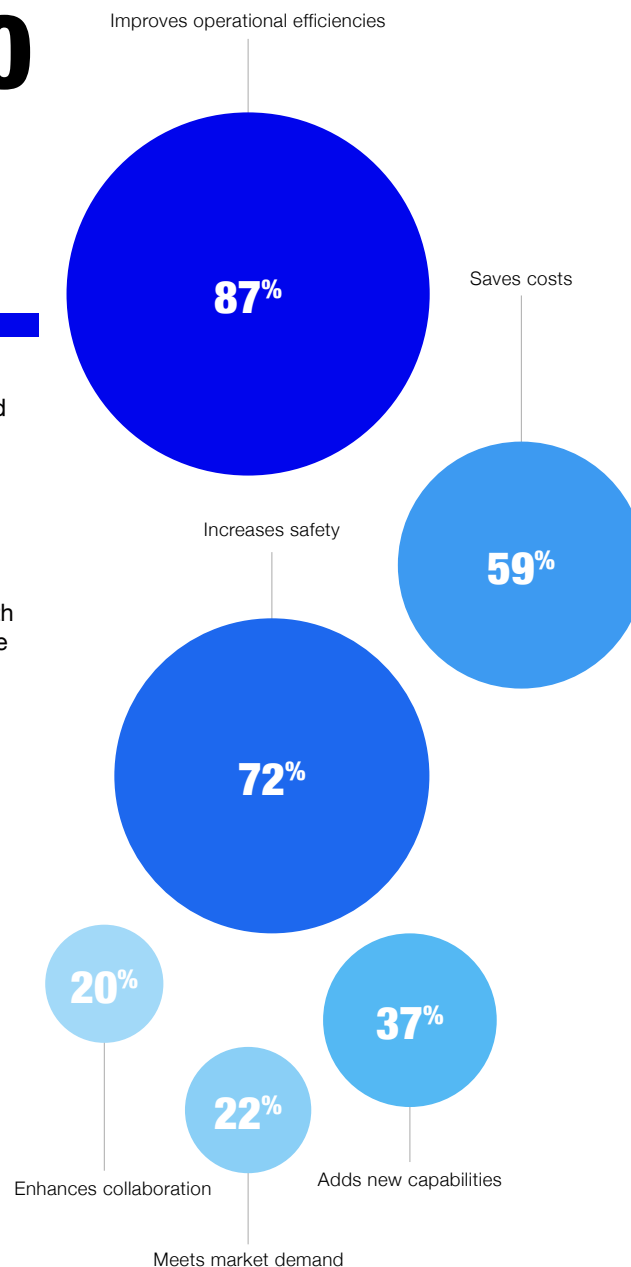
BEATING HEADWINDS TO REACH NEW HEIGHTS

By replacing manual, time-consuming processes with streamlined digital solutions, 87% of respondents noted significant improvement in their organization's daily operations. And that doesn't come as a surprise.

The fundamental shift into the digital era is, first and foremost, driven by the need for higher productivity. Innovations in scaffolding technologies have enabled companies to enhance collaboration, exploit new growth opportunities with added digital capabilities, and reduce costs. Technology also plays a critical role in building a safety culture with more comprehensive and accurate design plans. Precise planning helps to avoid surprises on the job, ensuring timelines and budgets are honored with the only modifications being planned ones.

Key Benefits of Software Implementation

Improves operational efficiencies

87%

Saves costs

59%

Increases safety

72%

20%

Enhances collaboration

22%

Meets market demand

37%

Adds new capabilities

Despite the tremendous benefits of digitalization, as many as 78% of respondents are concerned about the cost of implementation. Meanwhile, 73% believe that new technologies present a steep learning curve for employees who are used to operating in a low-tech, labor-intensive environment. Even with the right technologies and people in place, many organizations find it challenging to scale due to the fragmented value chain, as different functions follow their own standard operating procedures.

Successful digital transformation hinges upon organizations accelerating the adoption of scaffolding-specific solutions. Regardless of the use cases, these innovations are expected to streamline processes with intuitive, easy-to-use features, while offering additional solutions tailored to the company's unique needs.

Challenges of Adopting a New Scaffolding Technology

78% Implementation cost

73% Steep learning curve

71% Complex IT infrastructure
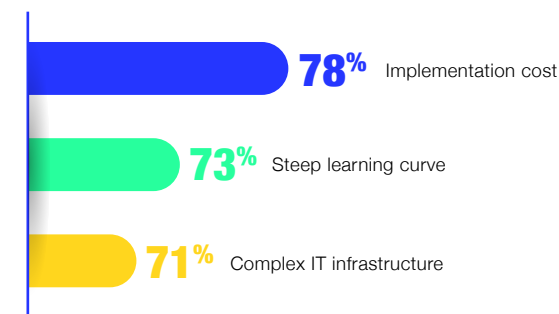
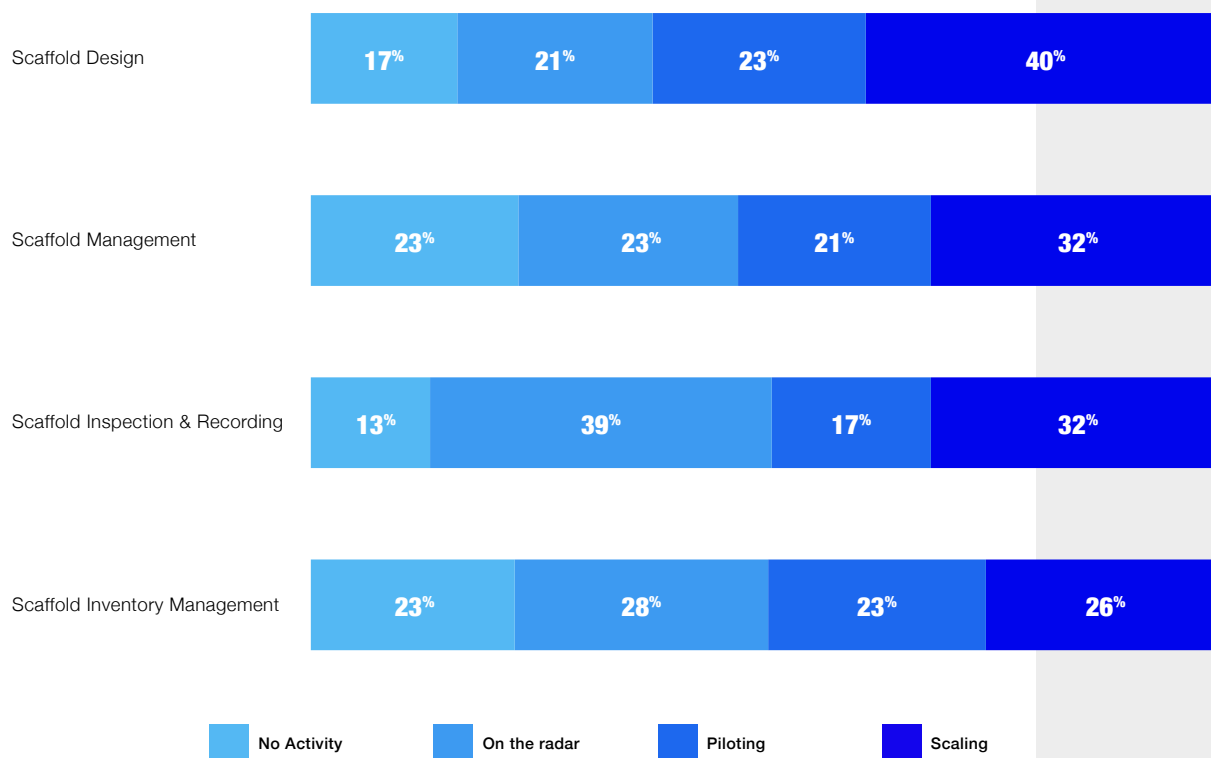DIGITAL READINESS LEVELS IN

SCAFFOLDING SOFTWARE DEPLOYMENT

Historically, the construction sector is ranked at the low-end of the MGI Industry Digitalization Index[1] and productivity gains have been meager. But our survey results show a promising outlook.

Across the industry, leading firms are turning to software solutions in response to the demand for safer, faster construction projects. More specifically, scaffold design and management software attract 63% and 53% of current deployment activities respectively.

Level of Scaffolding Software Implementation

	No Activity	On the radar	Piloting	Scaling
Scaffold Design	17%	21%	23%	40%
Scaffold Management	23%	23%	21%	32%
Scaffold Inspection & Recording	13%	39%	17%	32%
Scaffold Inventory Management	23%	28%	23%	26%

Legend: No Activity, On the radar, Piloting, Scaling

Organizations who have successfully digitized back-office operations are more inclined to integrate software solutions for field execution, enabling optimum process digitalization. Based on our survey, the adoption level of inventory and inspection software is in direct proportion to scaffold management implementation.

In a crowded marketplace, leading companies are winning with the right digital assets.[2] The use of scaffolding software has rewired the design and engineering framework – smoother data flow between office to field communication, speedy design with enhanced accuracy, and a thriving safety culture. We'll dive deeper into each performance category later on.
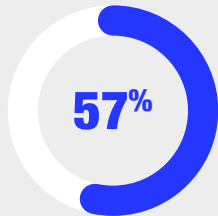
[1] James Manyika, Sree Ramaswamy, Somesh Khanna, Hugo Sarrazin, Gary Pinkus, Guru Sethupathy, and Andrew Yaffe, "Digital America: A Tale Of The Haves and Have-mores," McKinsey Global Institute (MGI), December 2015.

[2] Jacques Bughin and James Manyika, "Measuring the full impact of digital capital," McKinsey Quarterly, July 2013.

SCAFFOLDING MANAGEMENT SOFTWARE

Adoption-level by Entity Types

42%
67%
25%

Heavy Industrial
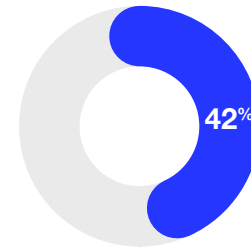Commercial & Institutional
Residential

At a Glance

57%
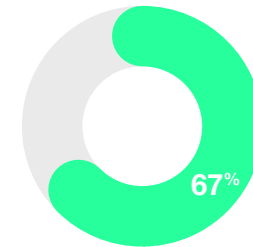**of respondents are dissatisfied with their current scaffold management software.**

36%
of commercial scaffolding contractors are still using Excel to manage projects.

Scaffold management software should enable frictionless collaboration between the back office and on-site teams. It replaces manual requests and estimates with a collaborative platform. Everyone can benefit from smoother workflows, reduced downtime, and improved safety.

Key Benefits of Scaffolding Management Software

71% Accurate progress tracking

39% Design modification tracking

34% Seamless handover

SCAFFOLD DESIGN SOFTWARE

Adoption-level by Entity Types

65% Heavy Industrial

72% Commercial & Institutional

38% Residential
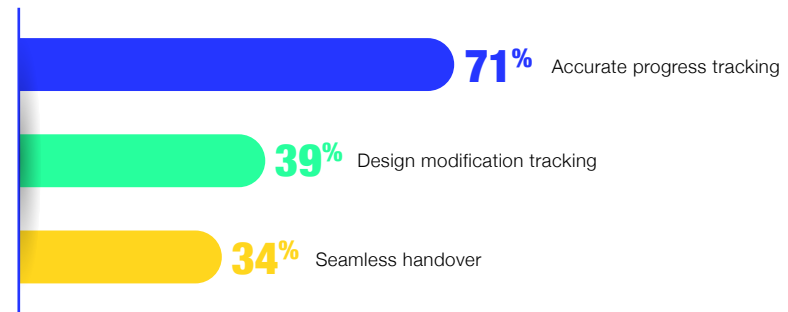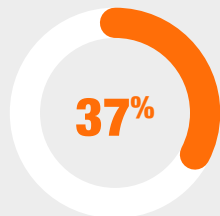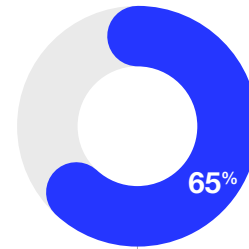
At a Glance
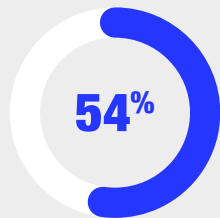
54% of respondents are dissatisfied with the design, modification, and visualization capabilities of existing solutions.
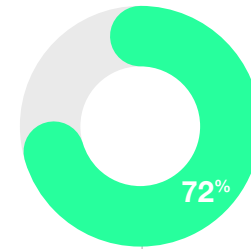
37% are looking to invest in AR/VR to enhance visualization capabilities

Many successful contractors rely on design software to speed up the planning process. Leveraging the capabilities of 3D scaffold modeling, they are able to communicate the critical construction components with high precision for safe erection, ensure accurate material counting for competitive quotes, and reduce rework with better as-built drawings. Scaffolding-specific design software is rising in popularity, as it offers ease of use and more purpose-built features for scaffolding components.
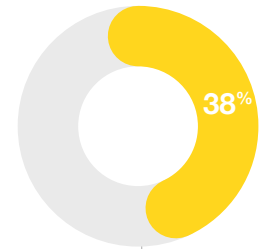
Key Benefits of Scaffold Design Software

64% Instant material calculation

61% Various design rendering options

13% Automatic design rendering
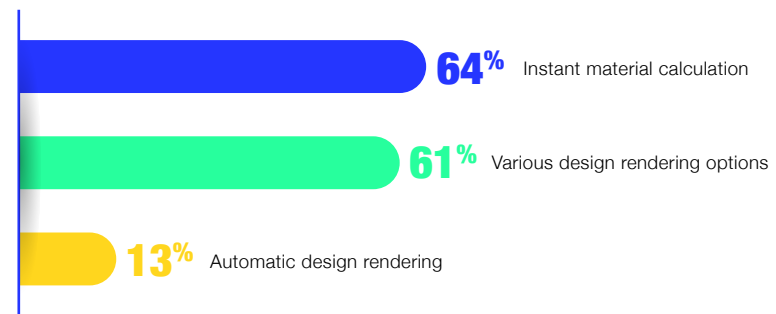
SCAFFOLD INVENTORY MANAGEMENT SOFTWARE
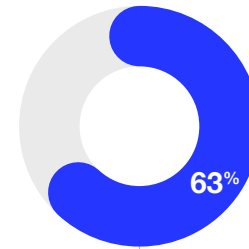
At a Glance
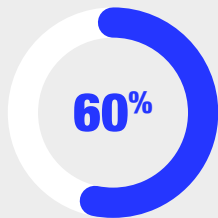
60% of respondents expect better billing and reporting capabilities from their applications.
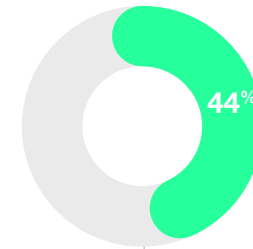
70% have implemented GPS technology in addition to the use of inventory management software.

A solid scaffold inventory management solution helps you monitor all the moving parts of the project, from inventory levels to invoicing and equipment tracking. This software is the backbone of scaffold rental management, helping you enhance the utilization of the entire fleet and forecast capacity to service future projects.
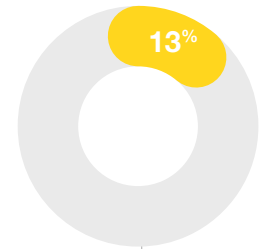
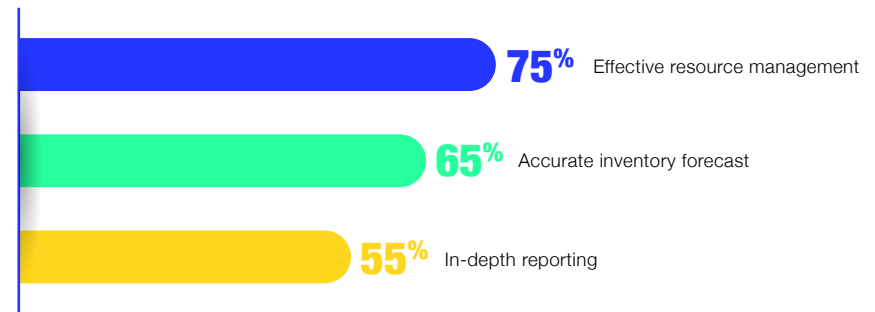## Adoption-level by Entity Types

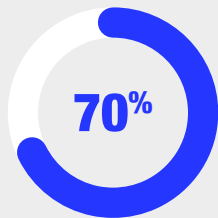63% Heavy Industrial

44% Commercial & Institutional

13% Residential

Key Benefits of Scaffold Inventory Management Software

75% Effective resource management

65% Accurate inventory forecast

55% In-depth reporting

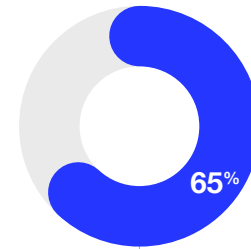# SCAFFOLD INSPECTION & RECORDING SOFTWARE

At a Glance

70% of respondents indicate the limitation of on-site accessibility in current solutions.
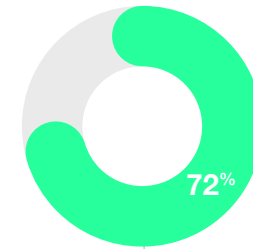
52% of them look to add new cloud computing capabilities to enable better information sharing between office and field.

Scaffold inspection software enables high-quality inspections with more reliable record-keeping. It automates asset movement tracking for real-time inventory visibility. With less time spent on manual inspections, you can dedicate more time to site safety monitoring. At the same time, built-in compliance requirements also ensure that no errors slip through the cracks.
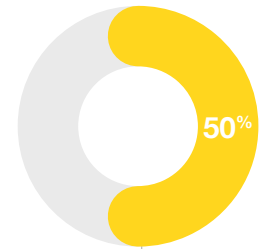
Adoption-level by Entity Types

65% Heavy Industrial

72% Commercial & Institutional

50% Residential

Key Benefits of Scaffold Inspection & Recording Software

70% Complete audit trail

65% Fulfill necessary legal requirements

55% Accessible via cloud and/or mobile technology
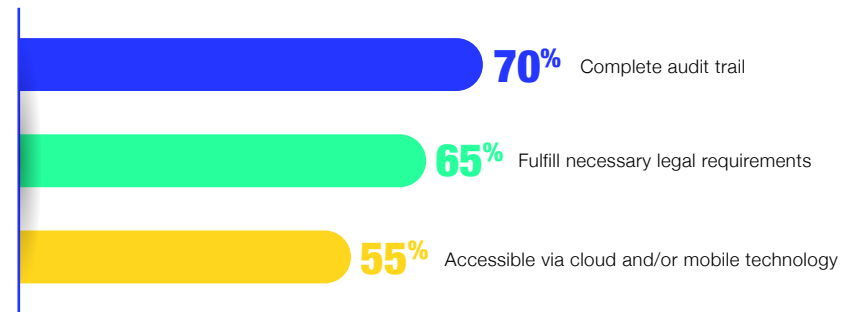
INVESTMENT TRENDS IN 2020 AND BEYOND

Digital adoption is gaining momentum across scaffolding industries. Consistent with our findings, scaffold management software remains the key enabling technology. Notably, 28% of surveyed organizations indicated the potential of AI in scaffolding, despite the current low adoption rate.

Below is an overview of 2020 investment priorities in each area. This figure shows the relative adoption of key technologies across the scaffolding industry.

90%

54%

46%

35%

28%

Scaffold Management Software

Cloud & Mobile Computing

Drones

Augmented & Virtual Reality

Artificial Intelligence
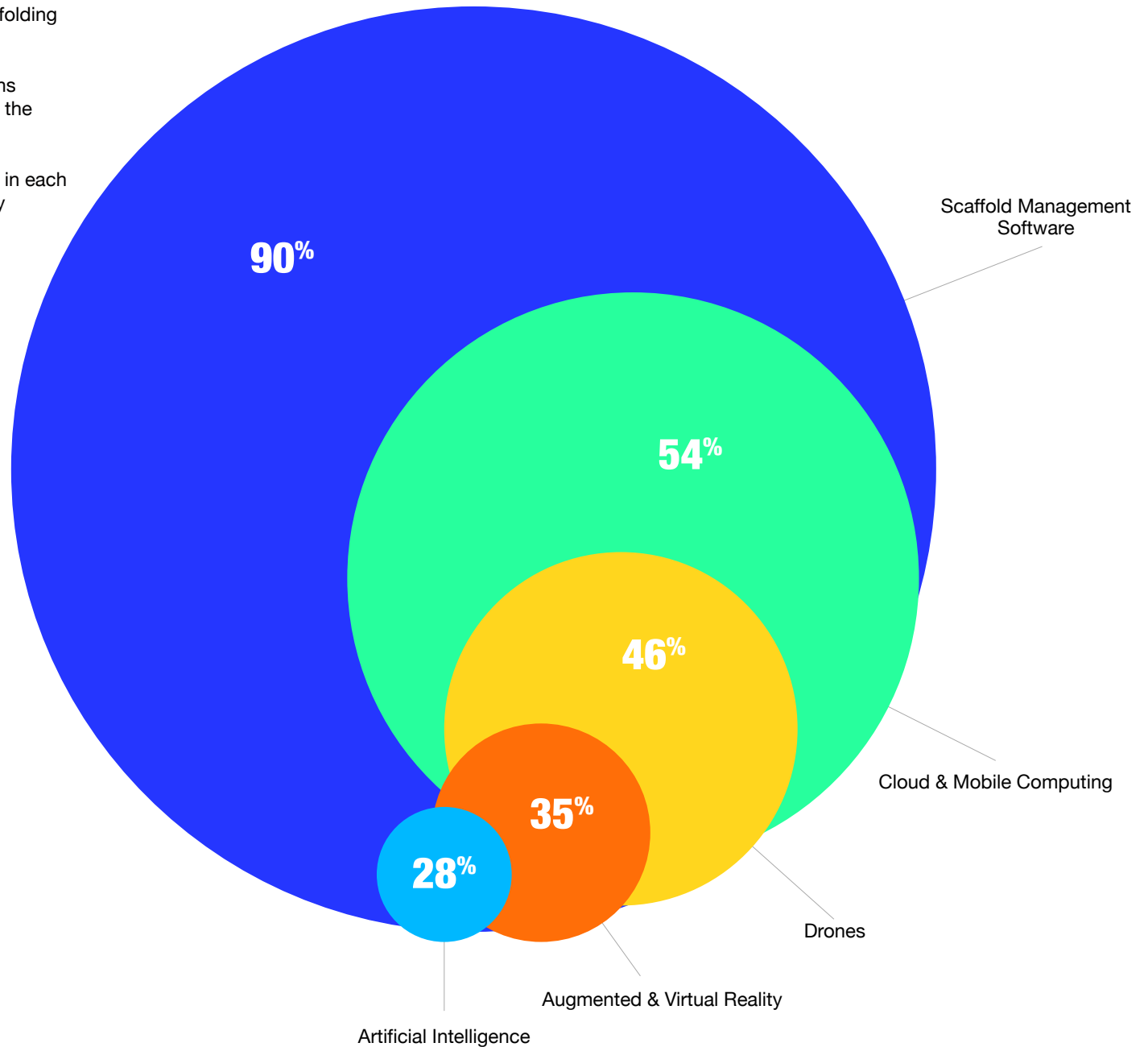
Scaffolding Technology Investment Priorities in 2020

SCAFFOLD MANAGEMENT SOFTWARE

Contractors operating on commercial and heavy industrial construction sites see more direct value from scaffolding software adoption.

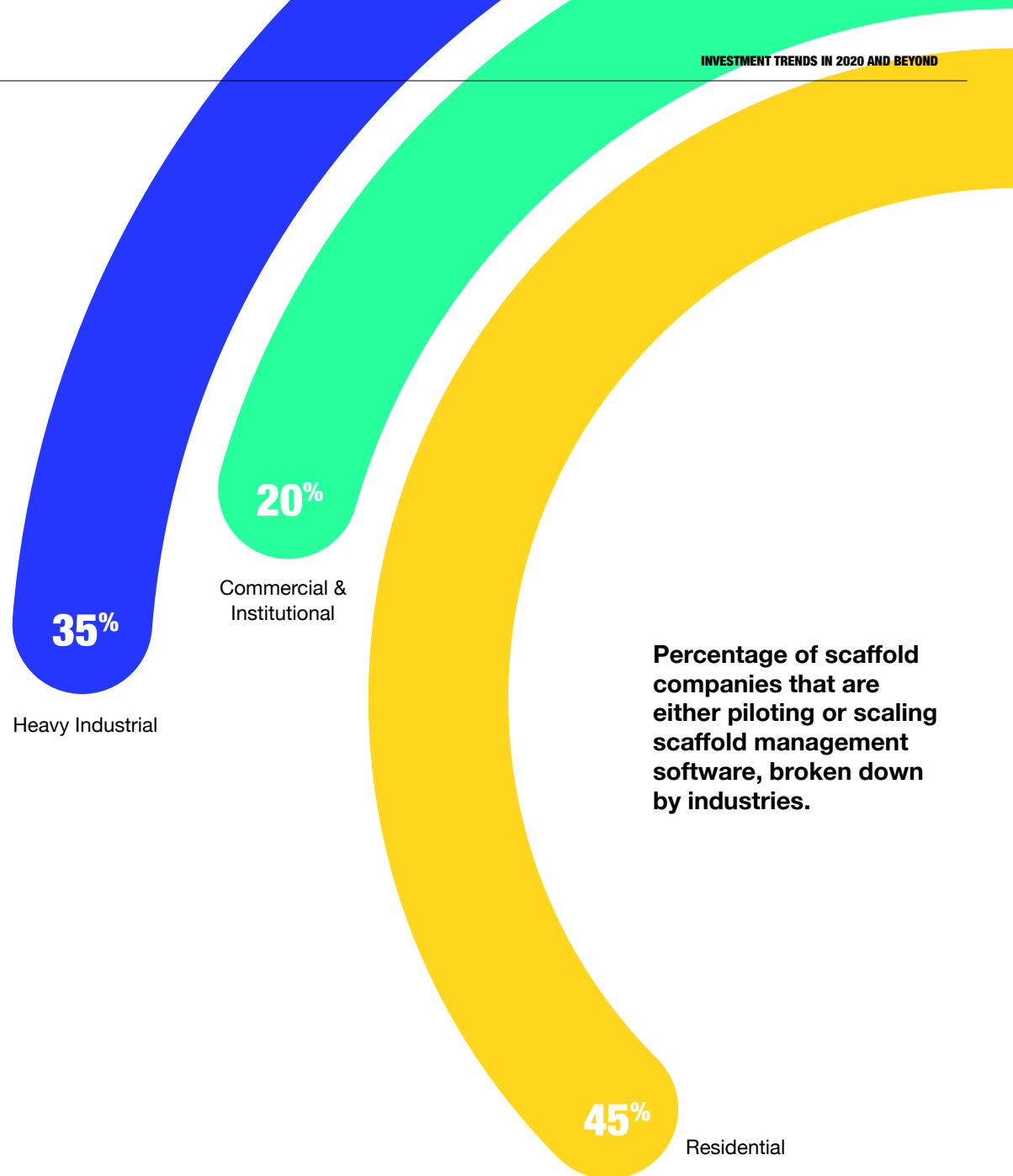Consistently, contractors have departed from paper-based methods to digital work execution platforms for managing scaffolding projects. Focusing on cross-functional collaboration, scaffold management software solutions replace manual requests and inspections with instant submittal and faster approval of RFIs.

Everyone can benefit from frictionless communication flow, more efficiency and less reworks . Built specifically to facilitate cross-trade collaboration on major projects, scaffold management software help streamline processes with automatic bills of materials and inventory tracking.. Owners and contractors will be able to stay aligned on scope as well as progress, ensuring precise planning from start to finish.

In assessing the level of software deployment in specific functions, we found that 25% of adopters prioritize investment in scaffold inspection, tracking, and recording, the majority of whom are commercial and industrial contractors. On the other hand, the design software segment will see the majority of companies (50%) looking to scale existing solutions in 2020, with a strong emphasis on material calculation and design rendering options. The key competencies for software vendors include real-time connection, a secure audit log, and full compliance with safety standards.

20%
Commercial & Institutional

35%
Heavy Industrial

45%
Residential

Percentage of scaffold companies that are either piloting or scaling scaffold management software, broken down by industries.

AUGMENTED AND VIRTUAL REALITY (AR/VR)

AR/VR technologies are more widely adopted by firms that deal with the complex, challenging environments of industrial construction and maintenance.

Three-dimensional technology is widely used in the design and visualization of the scaffold model presentation. Innovators are taking 3D modeling to the next level with augmented and virtual reality. Being able to visualize the entire scaffold before it's built gives contractors a huge competitive advantage – it helps customers, who are less familiar with scaffold structures, to understand the proposal and catch potential changes easier.

Working at height involves major risks. Using VR simulators, workers can get exposure to a new environment in a safe, controlled space. The implementation of AR/VR is apparent in industrial job site, where location accessibility is a challenge. Now, contractors can easily spot high-risk areas to optimize construction approach during the planning phase.

In this regard, up to 71% of organizations with an AR/VR investment agenda are in the process of scaling their scaffold design software implementation.

14%

Residential

28%

Commercial & Institutional
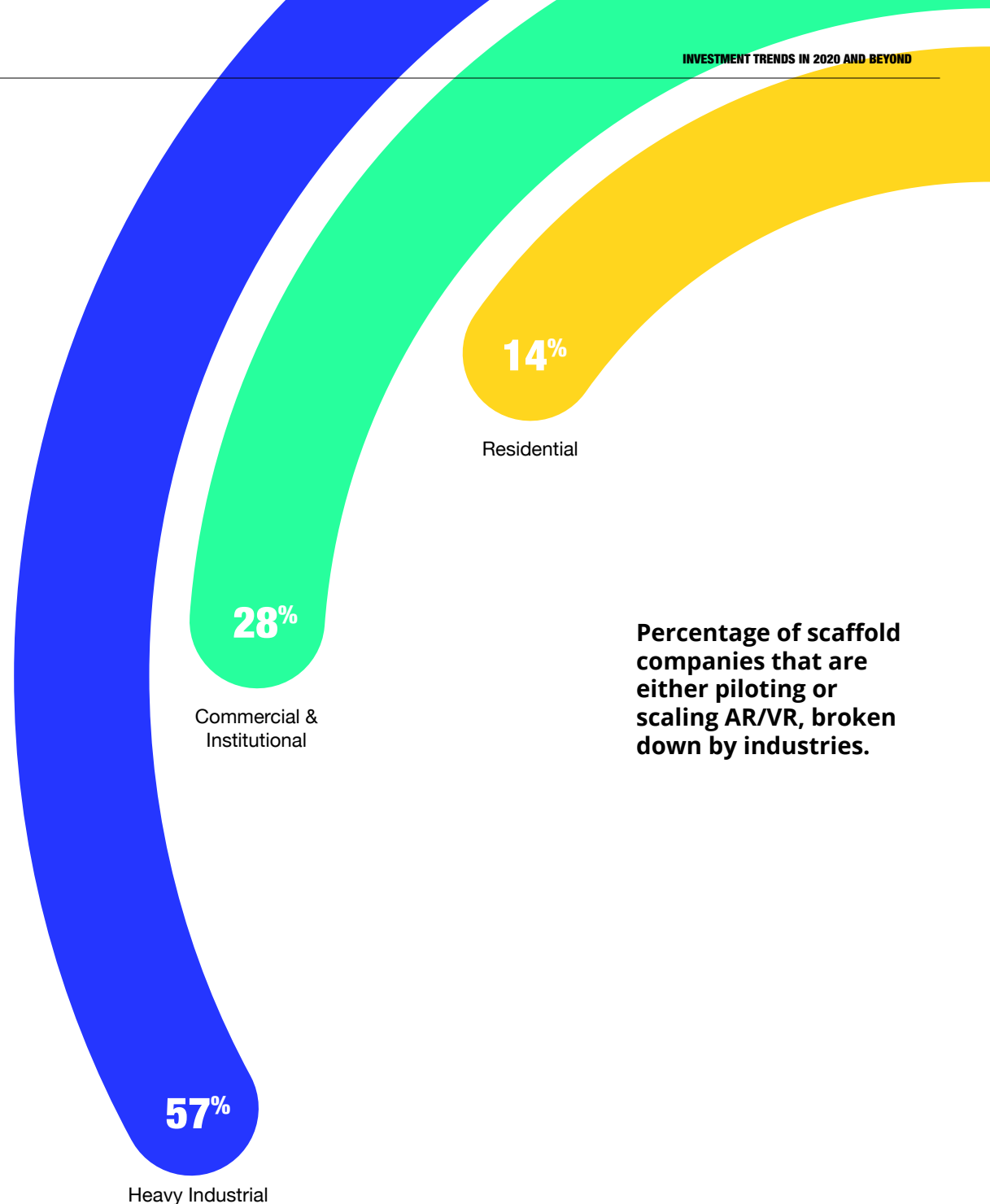
Percentage of scaffold companies that are either piloting or scaling AR/VR, broken down by industries.

57%

Heavy Industrial

DRONES

Drones are becoming part of the essential tools to aid inspections, especially for commercial and industrial projects.

Together with AR/VR technologies, drones give contractors the ability to capture surveillance of hard-to-reach zones or even inaccessible areas. This footage can also provide important documentation to facilitate the effective transfer of knowledge across different projects. Half of the surveyed organizations have utilized drones for field surveys, especially among contractors that operate across more than 10 branches.

12%

Commercial & Institutional
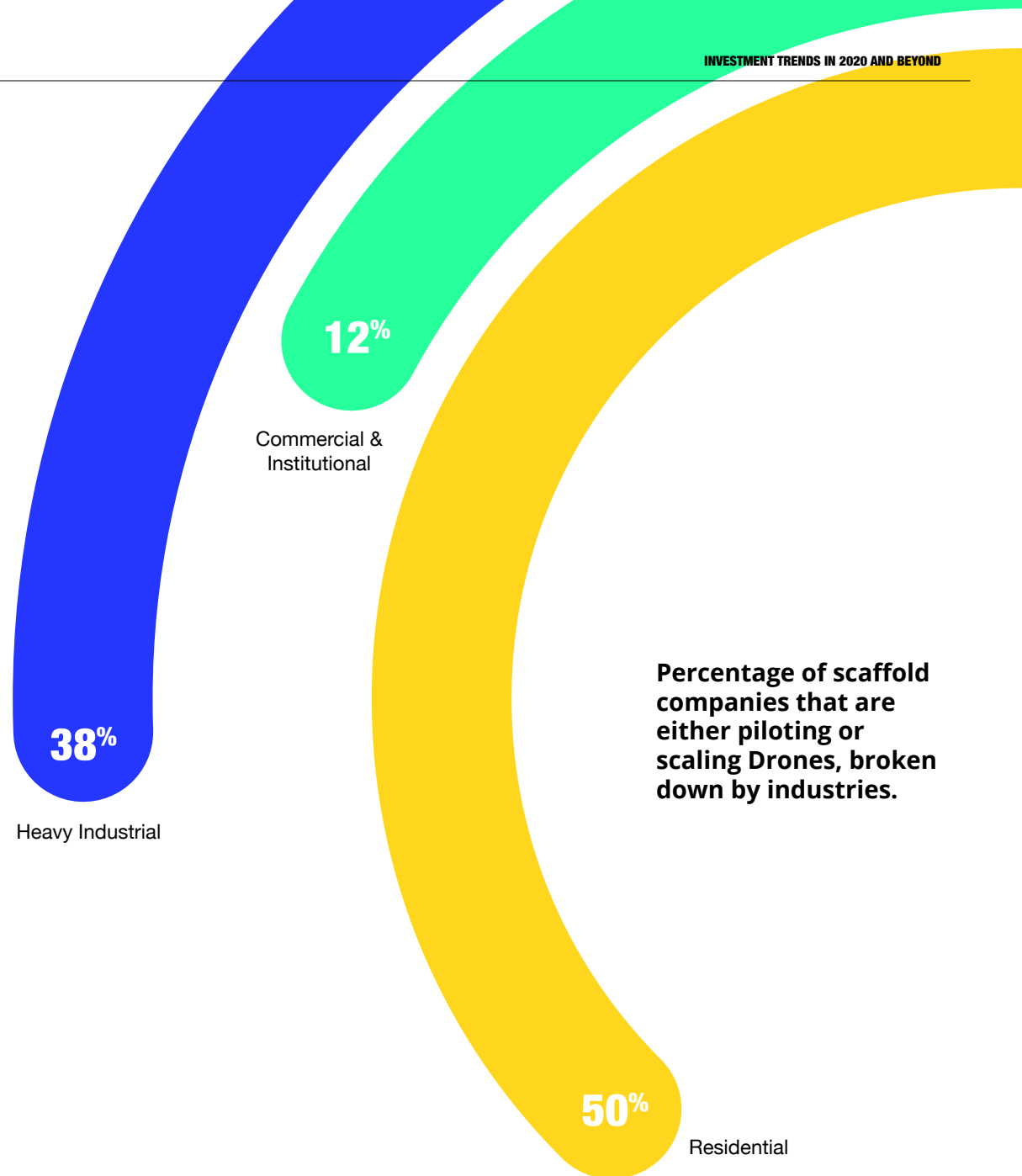
Percentage of scaffold companies that are either piloting or scaling Drones, broken down by industries.

38%

Heavy Industrial

50%

Residential

CLOUD AND MOBILE COMPUTING

The majority of scaffold companies in commercial projects leverage cloud and mobile computing to digitize project data, making information sharing between stakeholders and tradespeople much easier.

The shift from legacy systems to modern scaffolding management software also opens up new strengths in field mobility. Organizations that focus on developing cloud infrastructure also seek more customization capabilities. Up to 73% of surveyed respondents also expect better vendor support.

As most software can be deployed across devices, contractors are using mobile-enabled software to coordinate field execution, primarily in commercial space. Connected through the cloud, construction data gets transferred in real-time, allowing crews to communicate seamlessly whenever and wherever they are. It only takes a few clicks to log a new scaffold request as opposed to hours wasted in paper trails. Essentially, scaffolders are now equipped with a digital tool belt to help them perform work more efficiently.

9%

Heavy Industrial

27%

Commercial & Institutional

Percentage of scaffold companies that are either piloting or scaling cloud and mobile computing, broken down by industries.

63% Residential

ARTIFICIAL INTELLIGENCE

The use of artificial intelligence in construction is emerging in almost every industry vertical, especially in major projects that are data intensive.

Thanks to the widespread use of scaffolding management software, there's a huge amount of data readily available for predictive analytics. With machine learning capabilities, construction professionals can now process project data and extract meaningful insights in seconds. That's where AI is expected to show significant impact.

For instance, a manual inventory utilization forecast can take hours, but with AI, it's a matter of seconds. The power of AI is exponential in estimating and bidding on construction projects. While the potential of AI applications in the construction industry is clear, it will take a longer time to see its tangible benefits for scaffolding trades.

20%

Commercial & Institutional

40%

Heavy Industrial

40%

Residential
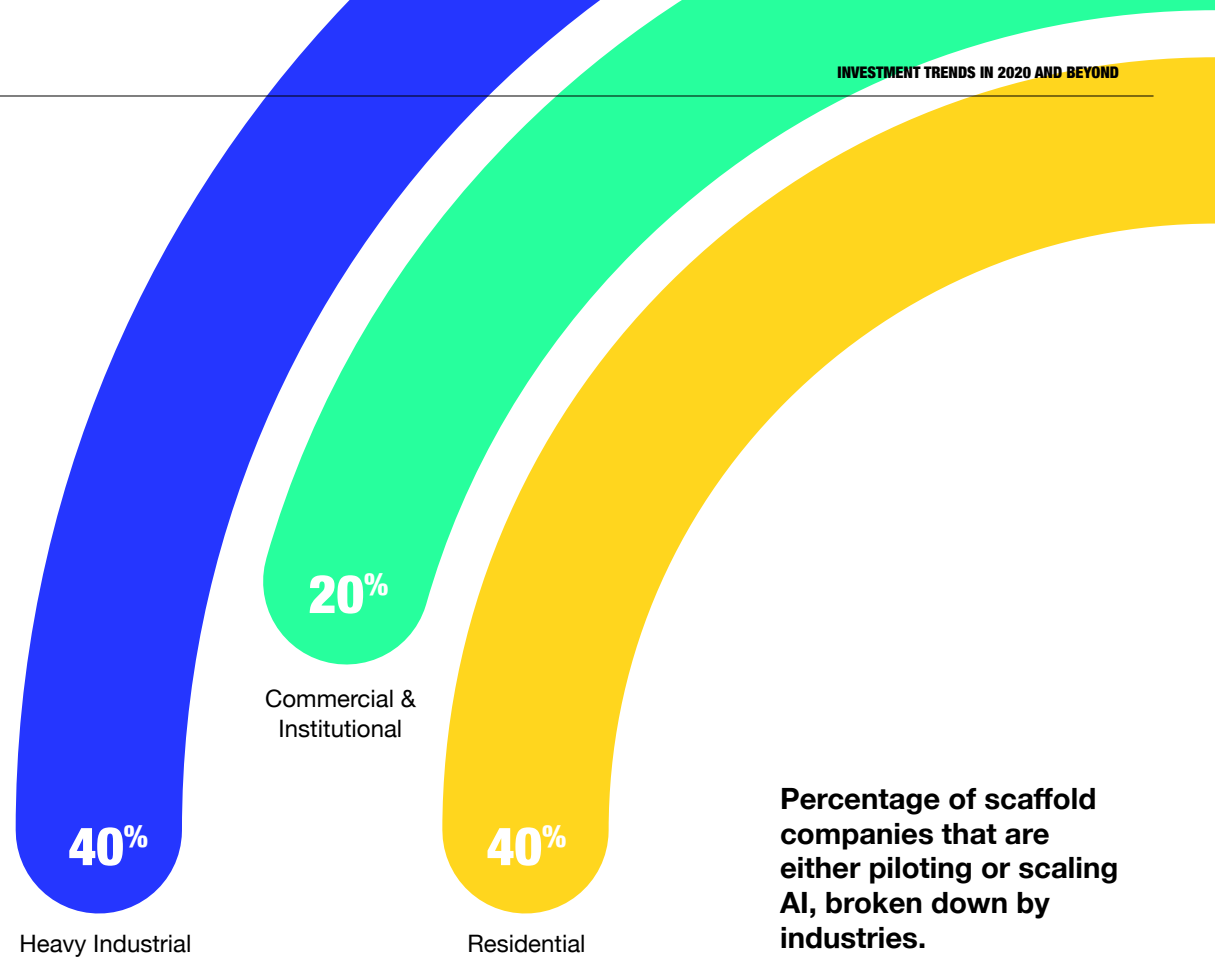
Percentage of scaffold companies that are either piloting or scaling AI, broken down by industries.

THINKING FORWARD:
TRANSFORMING THE SCAFFOLDING LIFECYCLE

Our findings reveal the accelerating pace of digital transformation in the scaffolding industry, from building new strengths in scaffold design and visualization to long-term improvements in operational efficiencies.

With insights into industry digitalization benchmarks, businesses are now equipped to better assess their own digital readiness, and pursue early wins from new technological capabilities.

The Scaffolding Digital Outlook survey revealed a mix of investment priorities across technology areas. While there are many promising areas of technology development, survey respondents indicated that they are achieving the most immediate value from scaffolding software. This is a good place to start, since today's cloud-based, subscription software solutions require little to no upfront capital expenditure, while providing immediate returns by reducing labor expenses.

For the best results, businesses should plan their digital adoption initiatives to cover the entire value chain, focusing on system and process integration to achieve end-to-end scaffolding management. At the same time, it's crucial to confront internal challenges, especially when it comes to upskilling and reskilling the workforce, while interweaving new digital solutions in the fabric of scaffolding operations.

Looking ahead, digitally mature organizations will prosper. With a clear vision and strategy for software implementation, businesses can transition from the traditional scaffolding life cycle to a digitized process that optimizes workflows, delivers high-value designs, and increases profits. (see Appendix)

A powerful industry-specific solution can revive your scaffolding company's efficiency rate and improve your profitability. Soar to greater heights using the Avontus solutions below:

AVONTUS DESIGNER

With its powerful scaffolding design capabilities, create accurate and safe designs for projects of all sizes. And then generate a bill of materials so you'll know exactly what you need to materialize your plan.

Learn More

AVONTUS VIEWER

Leverage its powerful 3D, VR, and AR features to visualize and walk through your scaffolding designs on your computer or phone. Virtual handovers couldn't be any easier.
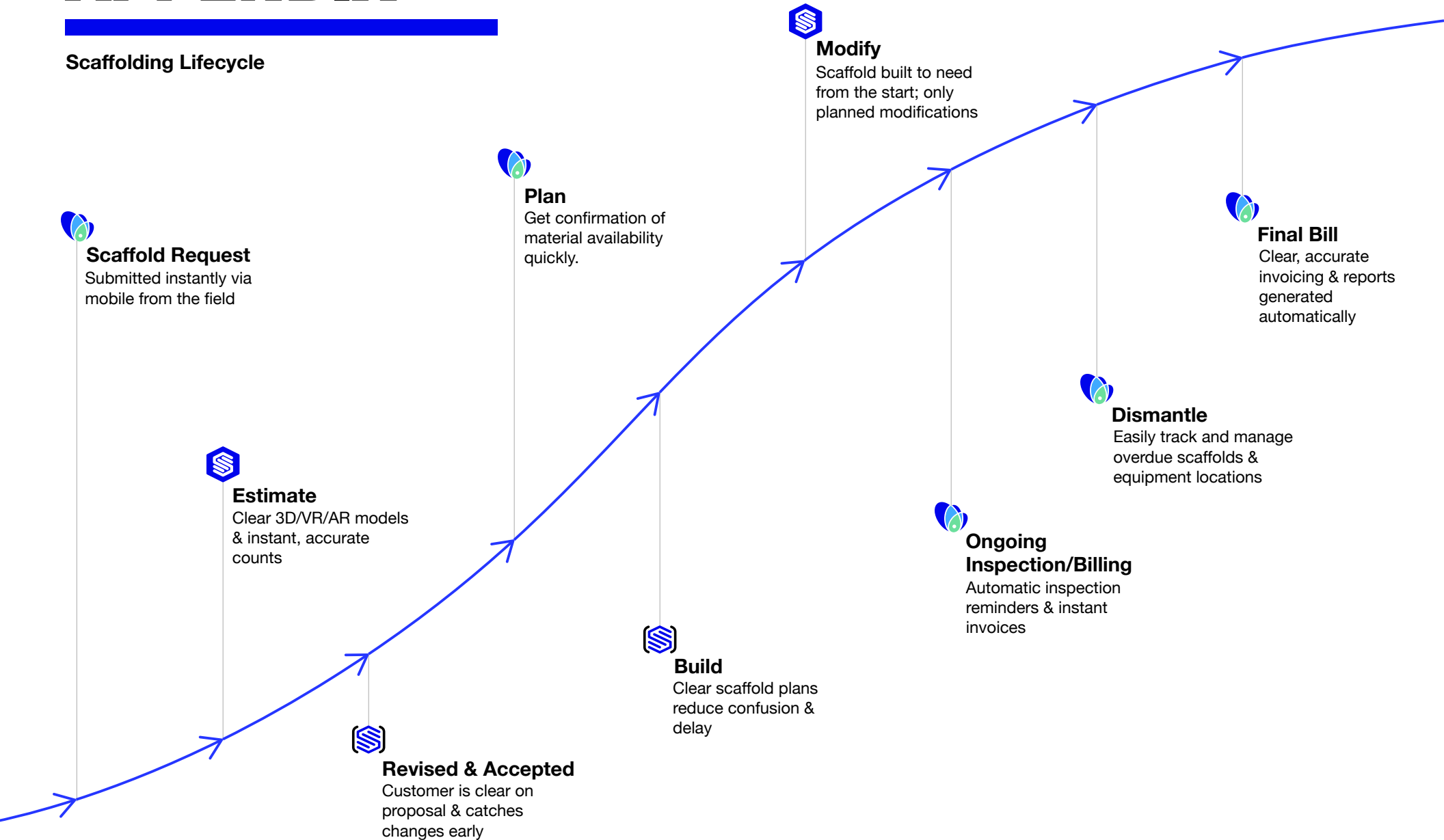
Learn More

AVONTUS QUANTIFY

Easily monitor inventory, ship materials, generate invoices, set reminders, manage re-rentals, and oversee all your scaffolding jobs within one user-friendly software.

Learn More

APPENDIX

Scaffolding Lifecycle

Modify
Scaffold built to need from the start; only planned modifications

Plan
Get confirmation of material availability quickly.

Scaffold Request
Submitted instantly via mobile from the field

Final Bill
Clear, accurate invoicing & reports generated automatically

Estimate
Clear 3D/VR/AR models & instant, accurate counts

Dismantle
Easily track and manage overdue scaffolds & equipment locations

Ongoing Inspection/Billing
Automatic inspection reminders & instant invoices

Build
Clear scaffold plans reduce confusion & delay

Revised & Accepted
Customer is clear on proposal & catches changes early

∧vontus®
SOFTWARE

Headquartered in Berkeley, California, Avontus has offices
in three continents to support the 4,000 scaffolding
businesses everywhere. Avontus Software brings efficiency,
predictability, and control to every stage of scaffold
projects. Discover powerful new ways of working, eliminate
uncertainty and guesswork, and transform your scaffold
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