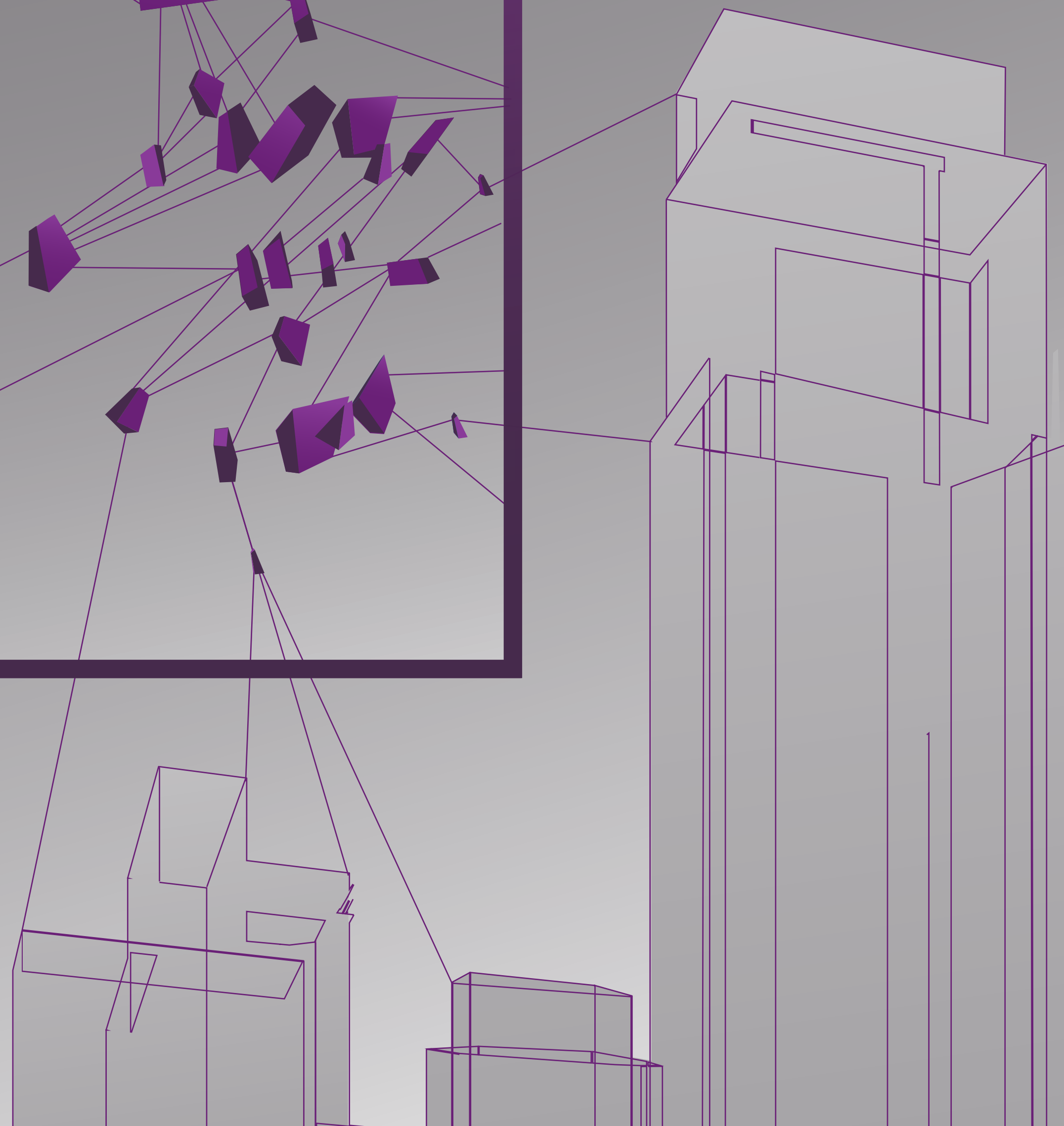
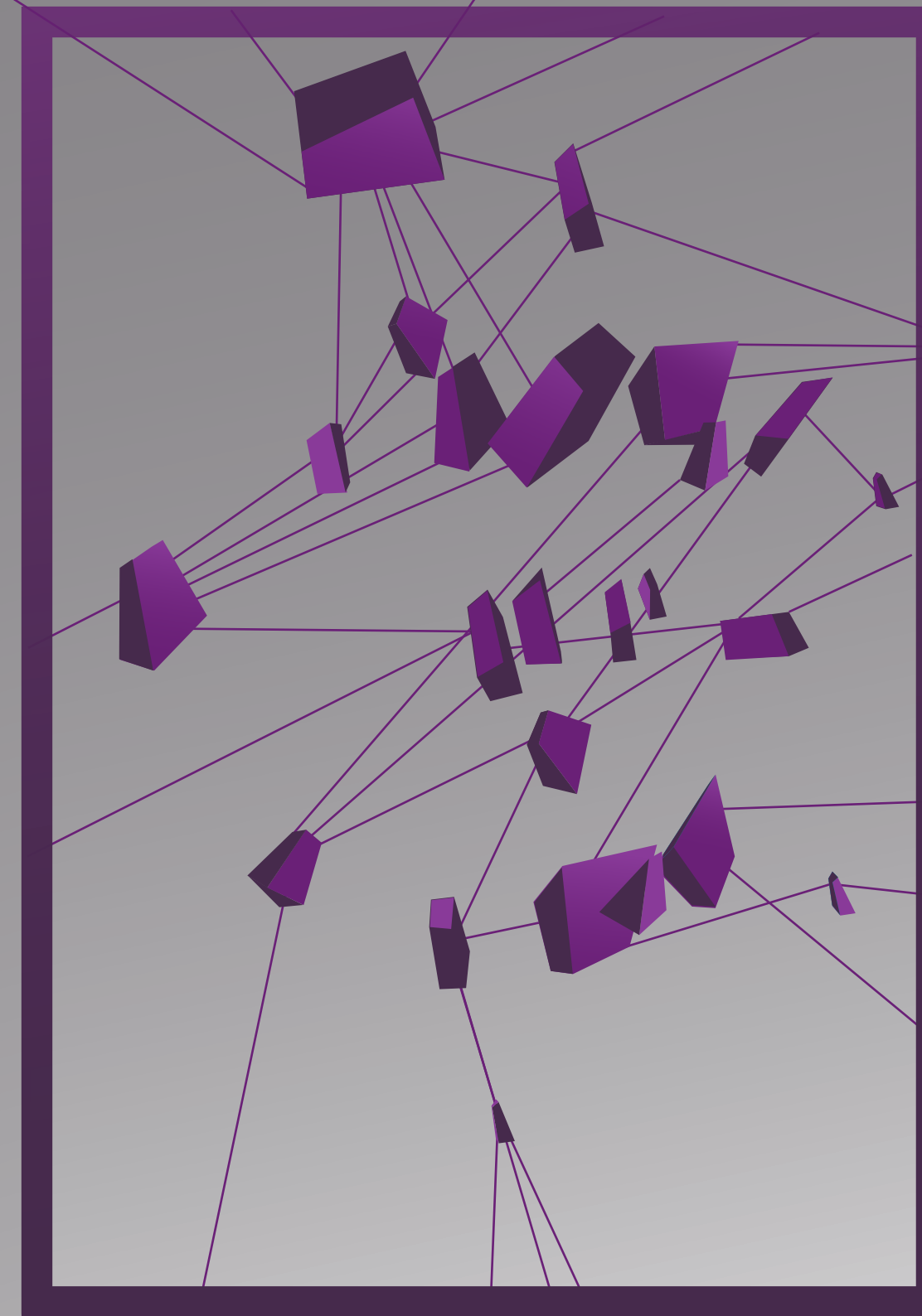


# Construction in a digital world

A deep dive into technological adoption in Canada's construction industry



# Introduction

We're long past calling digital transformation a trend. In almost every industry, digital technologies have accelerated productivity, increased efficiency, motivated employees and reduced costs – and new innovations are increasing those benefits every day. For years, however, innovation in construction has lagged compared to other industries, particularly when it comes to digital adoption.

## **Now is the time to catch up.**

New technologies are being developed every day to improve construction work, and a growing number of companies within the industry are integrating them into their businesses. Technology helps deliver more predictable results by integrating the value chain through analytics, IoT, automation and robotics. These, combined with innovations in commercial arrangements and project management techniques, are leading to a major shift in the way the industry delivers products and services.

Many construction firms have had little incentive to invest in technology, with current procurement practices placing much of the project risk and associated costs on the shoulders of contractors. The benefits, however, are becoming more apparent. With a workforce shortage, climate change realities and solutions reaching greater maturity, the industry is poised for significant transformation.

Companies that seize the digital opportunity and integrate with others in their ecosystem over the next decade stand to gain a significant competitive advantage.

In November 2020, [KPMG in Canada](#) partnered with the [Canadian Construction Association \(CCA\)](#) to survey construction companies across Canada to determine how far along they are in their digital innovation journeys.

## **Here's what we found.**

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**Many construction firms have had little incentive to invest in technology, with current procurement practices placing much of the project risk and associated costs on the shoulders of contractors.**

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**The current state:**

# Digital maturity in the construction industry

We asked companies to rate their digital capabilities in a number of areas, and in most cases, respondents gave themselves fairly low ratings. For example, only 25 percent of companies feel like they are in a considerable or great position relative to their competitors in terms of technology or digital implementation, and only 23 percent said their decisions are supported by and based on data to a considerable or great degree. The majority of respondents classified their adoption of several other technologies as merely experimental or said they were not leveraging them at all, namely in the areas of demand-driven supply chain (65%), big data (66%), additive manufacturing (73%) and robotics (82%).

That is not to say construction companies have completely avoided technological innovations. Selecting among the most popular new technologies, construction firms have increasingly adopted cloud and cyber security. Seventy-three percent indicate that they have already implemented or plan to implement cloud technologies, and 68 percent indicate that, to a moderate, considerable, or even great extent, they are connecting functional processes through cloud solutions of external providers. Sixty-two percent have implemented or have a plan to implement cyber security solutions.

## Construction companies rate their digital maturity as fairly low



say they are in a considerable or great digital-maturity position relative to competitors.



say they base decisions on data to a considerable or great degree.

# Getting the right people at the table

Support for digital transformation is somewhat mixed at the highest levels of most of the companies we surveyed. Sixty-four percent of respondents indicate that CEOs (41%), CFOs (14%) and CIO/CTOs (9%) are their companies' primary tech investment decision makers.

However, 59 percent of respondents say their organization needs to moderately or considerably adapt their digital strategy, suggesting that senior-level support for technology does not directly equate to having the right strategies in place to get there. While executive support is important, it is even more critical to hire leaders who know how to implement technology, and to make sure those leaders are at the table. Technology is not a project or an initiative; it must be intrinsically linked to the business's overall objectives, and to the business processes. A successful digital strategy needs executive sponsorship, financial commitment, engagement and integration with the business, a leader who has the authority to act, as well as the talent to both lead and implement a technological transformation.

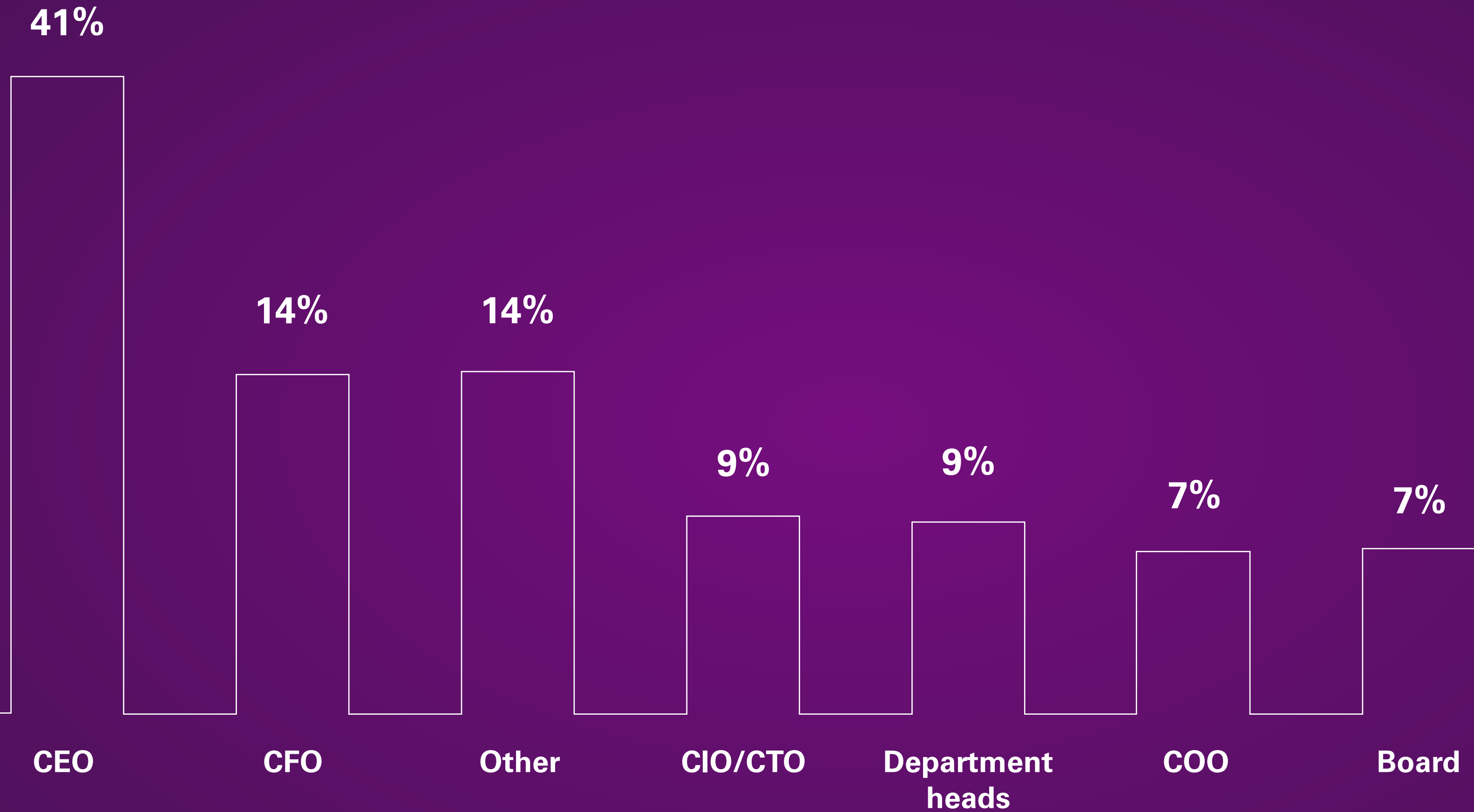
The size of an organization need not be a limiting factor, either. Small and medium-sized companies can consider partnering with specialized firms to give them access to a broader range of expertise and help drive their transformation. In fact, smaller companies are often in the enviable position of being more nimble than larger ones. For example, in the U.S., tier-2 construction firms are often the ones most able to innovate, as the business models embedded in tier-1 companies tend to restrict flexibility.



of respondents say their organization needs to moderately or considerably adapt their digital strategy another.

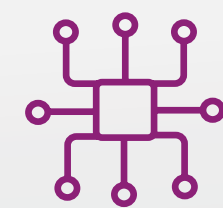


# At what level are technology-adoption decisions made in Canadian construction companies?



# Where are construction companies putting their digital investment dollars?

An ideal digital transformation strategy will clearly address three key areas:



Lifecycle supply chain integration



A future-enabled workforce



Data-driven project delivery

Our survey found that most companies have not implemented such a wide-reaching strategy.

In fact, companies' responses are quite mixed about which technologies and applications they believe will yield a competitive advantage. However, the industry is seeing a very broad range of technological innovations, presenting various opportunities for companies to extend their digital reach. The most common areas of investment are:



Integrating systems to reduce redundancies



Improving back-office support



Reducing back-office cost



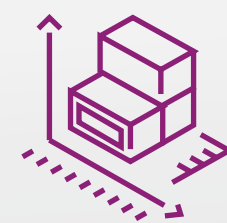
Improving the employee and customer experience

These findings are encouraging, as there is a considerable upside in digitizing these areas. That said, to see the biggest impacts on their day-to-day, construction firms need to also explore technologies that help improve productivity and safety, reduce lead time and reduce the cost of goods sold.

There is a very broad range of available technology applications that can enable such improvements, including:



Artificial intelligence and predictive analytics



Building information modeling (BIM)



Wireless monitoring and autonomous equipment



Augmented reality



Cloud and real-time collaboration

Cyber security and cloud technologies are the most commonly adopted solutions today. As COVID-19 spread, the 30 percent who had implemented cloud technologies, certainly saw tremendous benefits. Seeing the value, over half of the remaining companies are either planning to implement cloud-based systems or are considering them. As companies migrate to the cloud, cyber security technologies become even more critical, which likely explains why cyber security technologies have the same levels of adoption/planned implementation/discussion as cloud.

The other technologies that construction companies are either planning to implement or are in discussions about include: The Internet of Things (75%), intelligent automation (68%), big data (63%) and augmented decision support (61%). Conversely, more than half of respondents have not planned to implement blockchain (57%), additive manufacturing (61%) or robotics (66%), which is perhaps not surprising, given that the industry is primarily made up of small and medium-sized enterprises.

### Cloud and cyber security are the most widely adopted digital technologies in Canadian construction companies:

Technology	Already implemented	Planned or in discussions	Not planned
Cloud	30%	57%	14%
Cyber security	30%	50%	20%

When asked to what extent COVID-19 has been a factor in their technology investment efforts, 57 percent of respondents said only a little or not at all. With the many business challenges incited by the pandemic, and many industries struggling just to stay afloat, it is perhaps not a surprise that investing in new technology did not emerge at the top of construction companies' priority lists. However, as the economy begins to recover, there will be an opportunity for firms to seize an early competitive advantage by considering digital transformation.

Digital innovation is a continuing process, not an end game – and with changes happening across most industries, now is a good time to build a roadmap to prioritize the integration of technology. Most construction entities still rely on legacy systems, and those who want to remain competitive will use this time as an opportunity to integrate disparate systems and adopt new ways of operating.

### Many companies are discussing or planning to implement these technologies:

Technology	Already implemented	Planned or in discussions	Not planned
Internet of Things	7%	75%	18%
Intelligent automation	5%	68%	27%
Big data	5%	63%	32%
Augmented decision support	5%	61%	34%

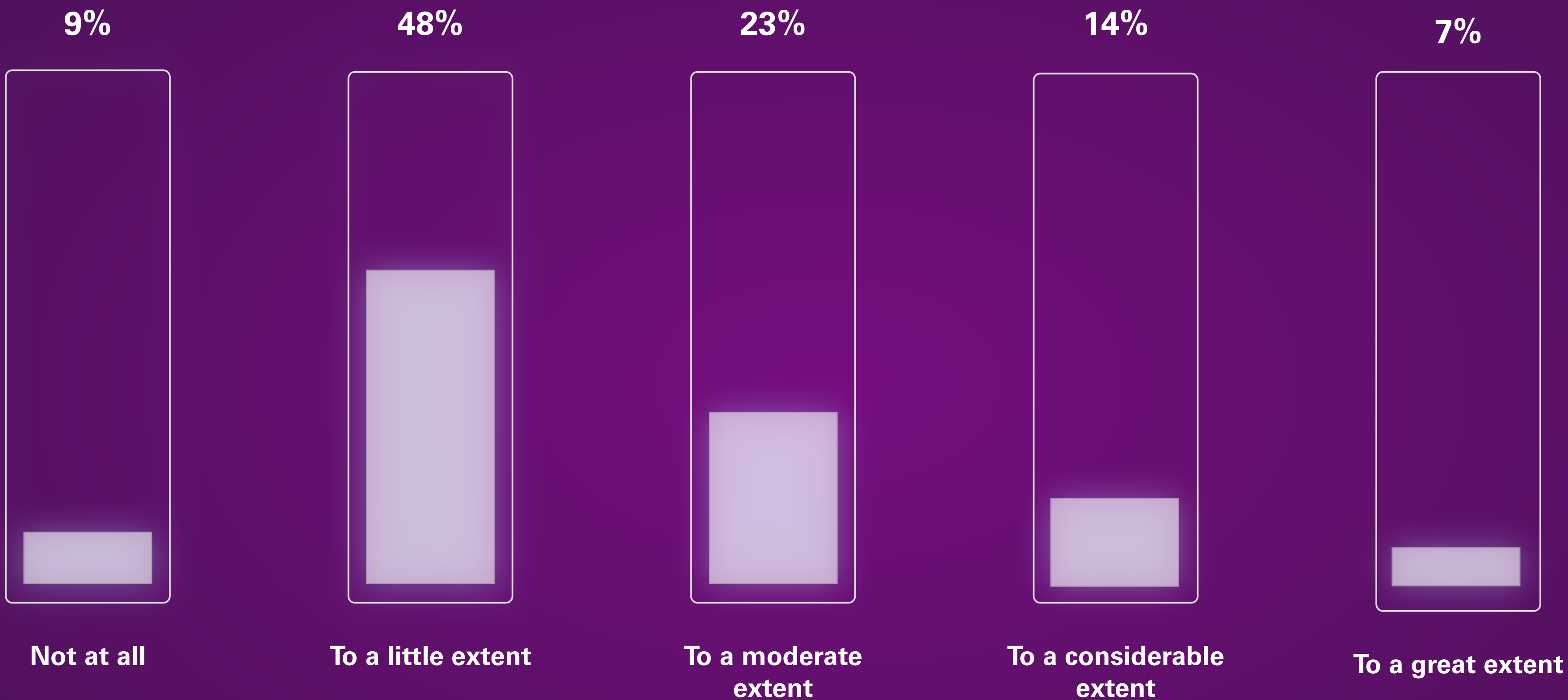
To help accelerate the outcomes of these innovations, construction firms need to come together with other industry players such as engineers, owners, suppliers and technology companies. It may be simpler to focus on business and back office advancements, because those are within a company's direct control, but connecting the broader ecosystem will drive more opportunities and help the industry embrace innovation faster.

### Most companies have not planned to implement these technologies:

Technology	Already implemented	Planned or in discussions	Not planned
Blockchain	5%	38%	57%
Additive manufacturing	5%	34%	61%
Robotics	2%	32%	66%



# Have companies invested in new technology as a result of the COVID-19 pandemic?



# Hiring, upskilling and building a separate digital team

Companies should heed Peter Drucker’s famous quote: “Talent eats strategy for breakfast.” Investment in digital technologies requires teams that can make it happen – teams that can move you past the unknown, because they understand the benefits of technology. Yet, 73 percent of companies say they only possess the necessary competencies for digital transformation to a little or moderate extent.

The ideal way to effect a transformation is to build a new, separate digital team to lead it, so it isn’t seen as extra work for which existing employees have to find time. This team should be empowered to challenge traditional internal thinking and create competition in planning, bidding and executing projects. The industries that have been successful in digitization have brought in non-traditional players to disrupt and scale innovation (great examples include the success of FinTech in the banking industry or PropTech in the real estate industry). And again, the ecosystem must work together to do this, so that innovation is never seen as a threat.

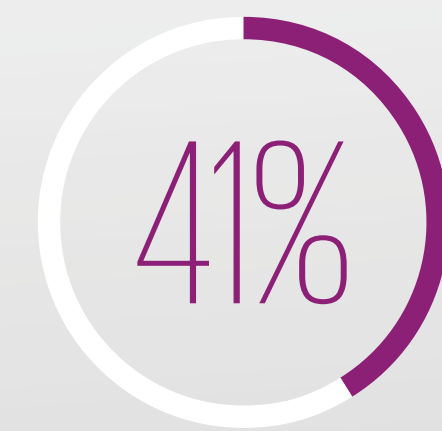
Building a separate digital transformation group can also help to attract younger, more digitally savvy team members, which will benefit companies in the long run, as the current workforce continues to age. The flip side is that, without adopting technology, companies will find that hiring younger workers will only get more difficult, as people who grew up in the digital age will grow increasingly reluctant to work for companies that don’t make optimal use of technology.

Upskilling current employees is critical too, as technical innovation brings change to existing roles. It’s important that as this happens, current employees continue to feel secure and buy into their new role within the changed organization.

**Do organizations feel they possess the necessary competencies to undergo a digital transformation?**



To a little extent



To a moderate extent



To a considerable extent



To a great extent

# Risk management: Threats and concerns

With digital technology comes a new world of risk, one that companies may not fully grasp. Seventy-three percent of construction companies believe that their total IT world is moderately or considerably secure. When asked whether they consider and quantify risks arising from the use of digital technologies, 65 percent said only a little or moderately. This is somewhat worrisome and perhaps attributable, at least in part, to a lack of senior, tech-risk-minded talent.

We encourage leaders to be brutally honest in assessing their risk – feeling secure is not always the same as being secure. Given the number of significant cyber breaches that have happened across multiple industries in recent years, we would expect a higher level of risk wariness.

Nevertheless, 66 percent of companies are moderately or considerably concerned about privacy breaches and potential risks associated with private data. Perhaps the conclusion here is that organizations are well aware of the risks and their own process deficiencies. Just as investing in digital technologies requires investment in people, it also requires an investment in processes, particularly surrounding risk assessment and security.



believe their total IT world is moderately or considerably secure.



only consider and quantify risks that arise through the use of digital technology.



are moderately or considerably concerned about privacy breaches and potential risks associated with private data.

# Can you afford to wait?

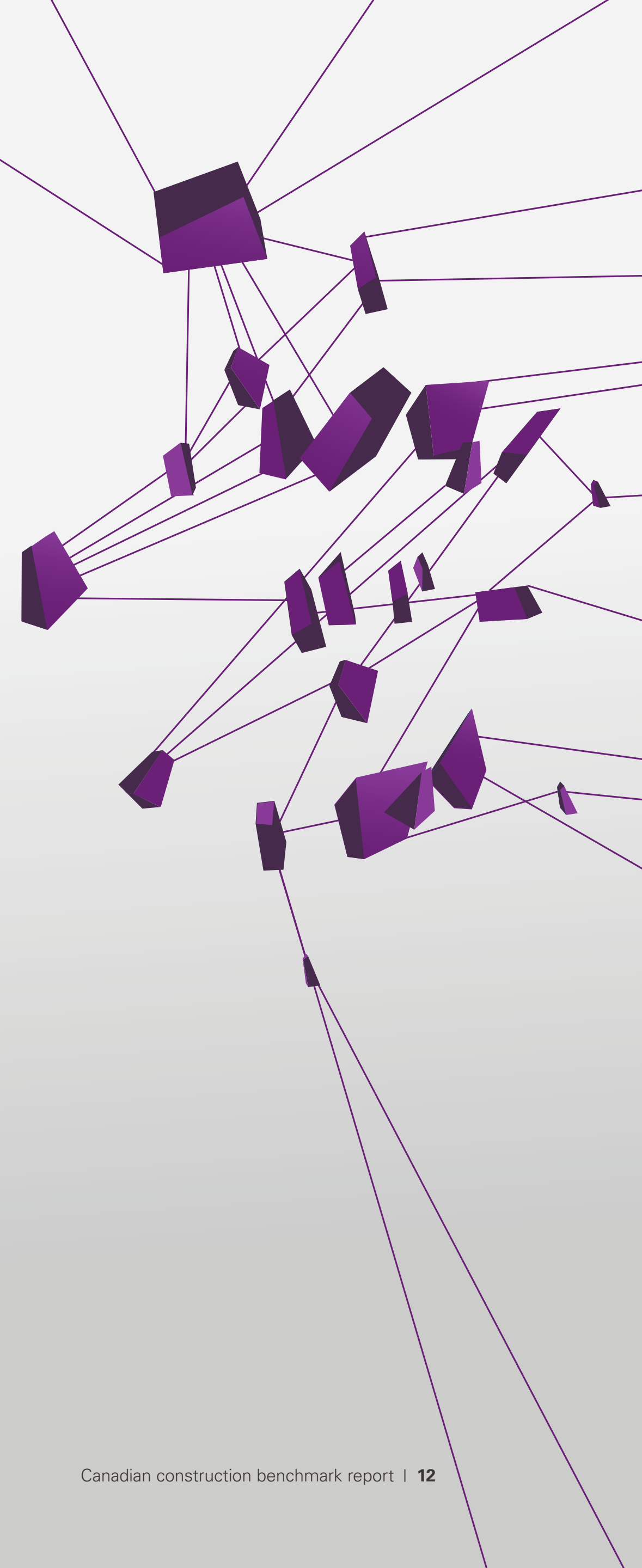
Margins are slim in construction, and public clients tend to drive prices down as much as they can, leaving limited ability to do things in new ways should it add to their upfront cost. This can leave what feels like little room for investment and innovation. There is, however, more opportunity to drive change with private sector clients, as they are more likely to incorporate innovation readily and quickly. The public sector will follow once they see the benefits and changes in productivity that come from innovation.

With all the progress happening across the construction supply chain today, it's becoming clearer that the companies who embrace technology and integrate it into their production will be the ones that get ahead. Other global markets are investing more than Canada is, and they're beginning to surpass us, putting our competitiveness on the world stage at risk.

It may mean reconsidering your financial models, or finding new avenues for investment money. Consider looking to different pockets of investors, to find those who are more future-minded and willing to take a bet on a company wanting to transform.

We must stress, however, that digital transformation must be implemented across the company – and that's something smart investors will look for as part of the strategy. Too often we've seen companies implement a technology concept or software package to reduce costs or get a quick payback on a single project, only to leave the tool with that project and never use it again. The issue is compounded when a company grows through a series of acquisitions, each with their own set of legacy technologies. The result is a series of disconnected networks with little coordination or oversight, and no sense of governance.

That's – obviously – the wrong way to do it. A better way is to get the right people to the table and build a strategy that extends to all key areas of your business. Once you see the tremendous benefits of integrated strategic digitization, you'll wonder why it took you so long to get started.



# The future is here

Construction companies are starting to see the competitive advantages made possible by technology, and we encourage them to keep working from this perspective. The companies that come out ahead will be those that don't wait: **Develop a vision, hire a team and get started.**

There's no question that change is here. A wave of technological disruption has started to transform construction firms around the world and propel the industry into new ways of operating, and the Canadian market is up next – cue construction 4.0. This evolution will enable efficiency gains, generate substantial enhancements in productivity, disrupt the workforce and modernize operating models. These productivity and efficiency gains can be used to transform the value chain and help close the increasing infrastructure gap, while maintaining workforce employment.

To help you assess the available technologies, determine which ones will be most impactful and understand their timelines for development. Consider engaging with [one of our construction professionals](#) or consulting with others in your ecosystem. Working together, the industry can build a roadmap to integrate the right technologies at the right time.

Get started today by taking this [15–20 minute assessment](#) to help you understand how far along your business is on its digital journey and how your efforts stack up against your peers.

It's time to embrace innovation. **Let's do this.**

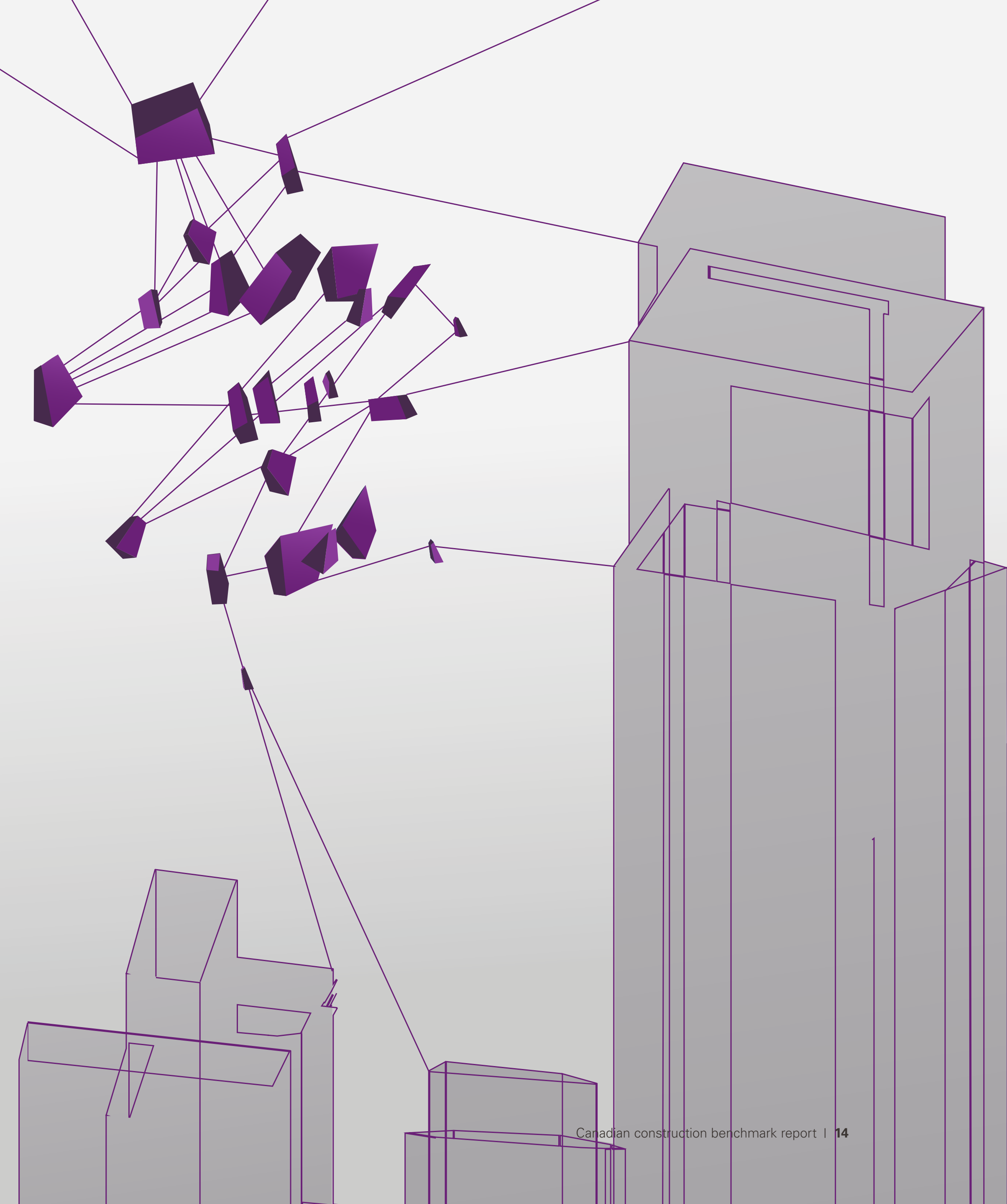
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# About the survey

In November 2020, KPMG partnered with the Canadian Construction Association (CCA) to create a benchmarking survey that would determine how far along Canadian construction companies are in their digital innovation journeys. Working together, we aim to help advance the industry's digital transformation agenda. The companies that participated provided valuable insights into various facets of their journeys to digital maturity, allowing us to analyze the construction sector's unique challenges, strategies and aspirations.



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