



Technology, Culture, & the Future of the Architectural Firm

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Preface

Understanding the trends of technology adoption in architecture firms requires an end-to-end view into the business of design. Firm leaders can no longer assume that technology in practice refers to CAD, BIM, AR, VR, XR, drones, and project management/ERP systems. There's more to the story that must be considered for many firms to grow and thrive.

Sales and marketing are often missed as opportunities for leaders to embrace technology. Further, there is a general acceptance that the "tried and true" technology available to manage projects is good enough, or can't be improved. Yet the time of the architect in practice is at a premium; they lack the time to devote to areas of practice that could change the trajectory of a project, or even that of the firm itself.

The firm's pace of technology adoption also affects the rest of the design and construction ecosystem. When firms lag in the use of modern, efficient technology resources and tools, information flow suffers; collaboration becomes a struggle; and clients may choose to work with firms that are taking the lead in modernization through technology.

Most, if not all, large firms in the United States have the resources dedicated to ongoing development of technological capability. They also employ a large percentage of architects, so the perception may be that the "have nots" will continue to lag and fail to gain market share over bigger competitors. Technology, though, is the great leveler in terms of making small and mid-sized businesses in any industry take on the giants in their space. Finding a path to adoption of leading technologies that serve all aspects of the firm's business is something all architects should be seriously exploring.

This report was commissioned by the AIA Manufacturers Council, a group of companies dedicated to closing the knowledge gap between architects and the building products industry. It is this relationship that we believe holds the key to innovation in the built environment. As we work toward a more symbiotic relationship between these two vital communities in the construction ecosystem, AIA looks to these companies for leadership, insight, and support to help our members create a blueprint for a better world.

Objectives

Research objectives

Primary Goal

Provide a broad understanding of how technology impacts architectural firm culture and operations, both now and in the future.

Detailed objectives

- **Understanding what aspects of firm culture impact use and adoption of technology solutions**—e.g., identifying key drivers of and barriers to adoption, gauging attitudes toward new solutions and technologies.
- **Understanding how technology might impact culture and operations**—e.g., project efficiency and profitability, collaborations with clients and contractors.
- **Understanding how firms approach technology management and operations**—e.g., decision-makers for firm management versus technology adoption, approaches to managing IT internally versus externally.
- **Measuring current adoption and future intent to invest in different areas of technology and different solutions across firms**—e.g., communication and collaboration tools, project and firm management solutions, emerging technologies.
- **Identifying which technologies and solutions are most appealing to firm decision makers and how well firms are using current solutions.**

Key findings

Technology has a significant role to play in helping firms realize their strategic goals over the next 3 years

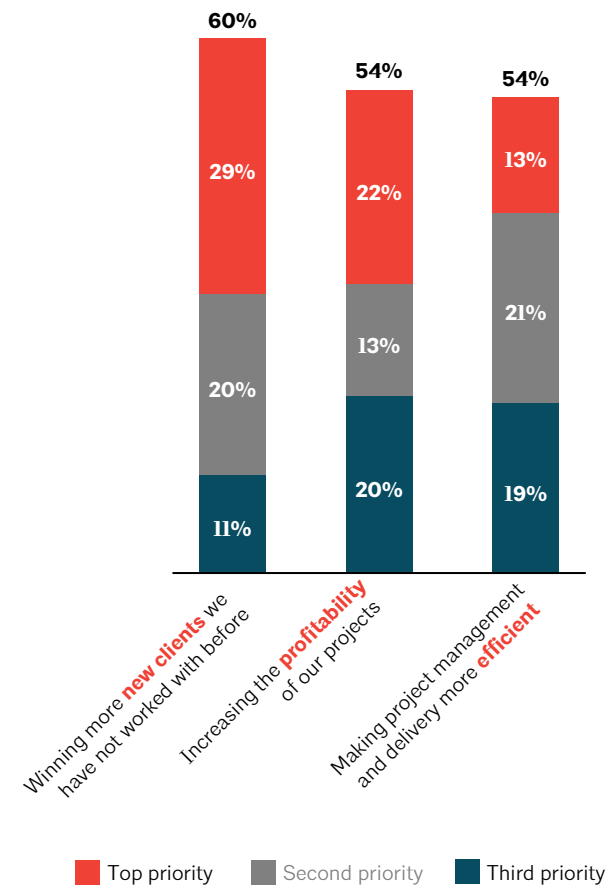
Architecture firms are reliant on organic growth and referrals from clients, and many are seeking to win new client accounts. This suggests a need for technology solutions such as customer relationship management (CRM), marketing operations, etc.

Over half of firms are focused on growing profitability of projects by delivering them more efficiently. Managing specifications (including specification changes) is a particular pain point.

Accelerating digital maturity among firms

Technology solutions like project management/enterprise resource planning (ERP) systems are proving successful for firms that use them. A key strategic priority for driving digital maturity and helping firms realize these aspirations is to increase adoption of these solutions. Increased awareness of these technology solutions and their benefits, as well as available training and trials, would help accelerate adoption in these areas.

Top firm priorities over the next 3 years



Digital maturity (DM) is correlated with firm size

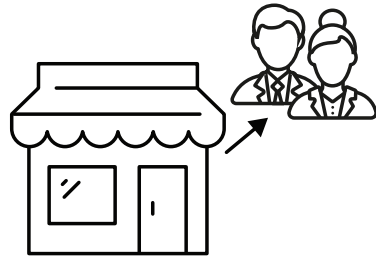


1-10 employees
In-house ad hoc

Overall approach: IT maintenance is handled in-house with ad hoc support from third parties but no management contracts.

DM: Partner/architect

Need: Simple, low-cost, cloud solutions, basic social media usage/guidance

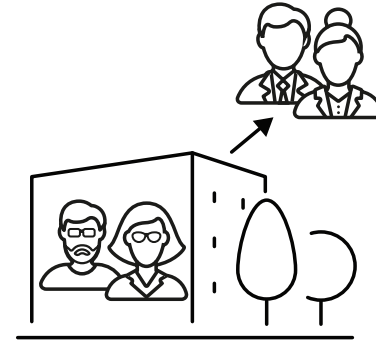


10-49 employees
Outsourced solution

Overall approach: 83% of these firms outsource to a third party, with 51% under retained contract. Only 33% have in-house IT people.

DM: Partner/architect; to third-party influence

Need: Peace of mind, better project management (PM) solutions

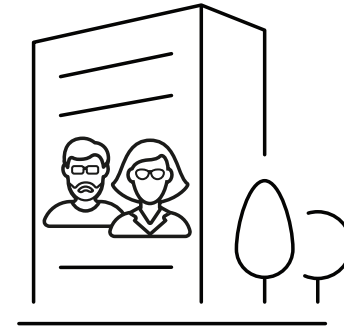


50-99 employees
IT pros & outsourcing

Overall approach: 68% of these firms have dedicated IT people who are not architects. Contracted third parties are still used.

DM: IT Pro, third party influence

Need: Operational efficiency, better PM solutions, cloud migration



100+ employees
In-house pros

Overall approach: 94% of these have in-house IT people and rarely outsource. 72% are fully migrated to the cloud.

DM: Senior IT pro

Need: Marketing operations, efficiency, emerging technologies

Small firms (fewer than 10 employees) tend to manage IT maintenance in-house without specialists. Some rely on ad-hoc support from third parties. Small firms need low-cost IT management solutions that help set them up for growth. Transition to cloud solutions, especially for newer firms, is an easy-to-implement way to increase collaboration capabilities. Smaller firms should take advantage of social media. **Mid-sized firms** (10-49) tend to outsource IT maintenance to a third party (e.g., management service provider (MSP)). Only half of mid-sized firms have an MSP

under contract. These firms' operations may benefit from a more stable contracted maintenance solution. Firms with **50-99 employees** tend to employ IT professionals, who are likely decision makers for IT solutions. They retain the services of third parties, who may be influencers. A key need for firms of this size is cloud migration. When firms reach **100 or more employees**, they tend to manage IT in-house through dedicated professionals. They are interested in emerging technologies and need better marketing solutions.

Business development & marketing remain underutilized in an industry focused on relationships & organic growth

Architects expect future firm growth to come from the same sources as past growth. Only a minority consider proactive sales/business development efforts or digital marketing important. This is a big opportunity for firms.

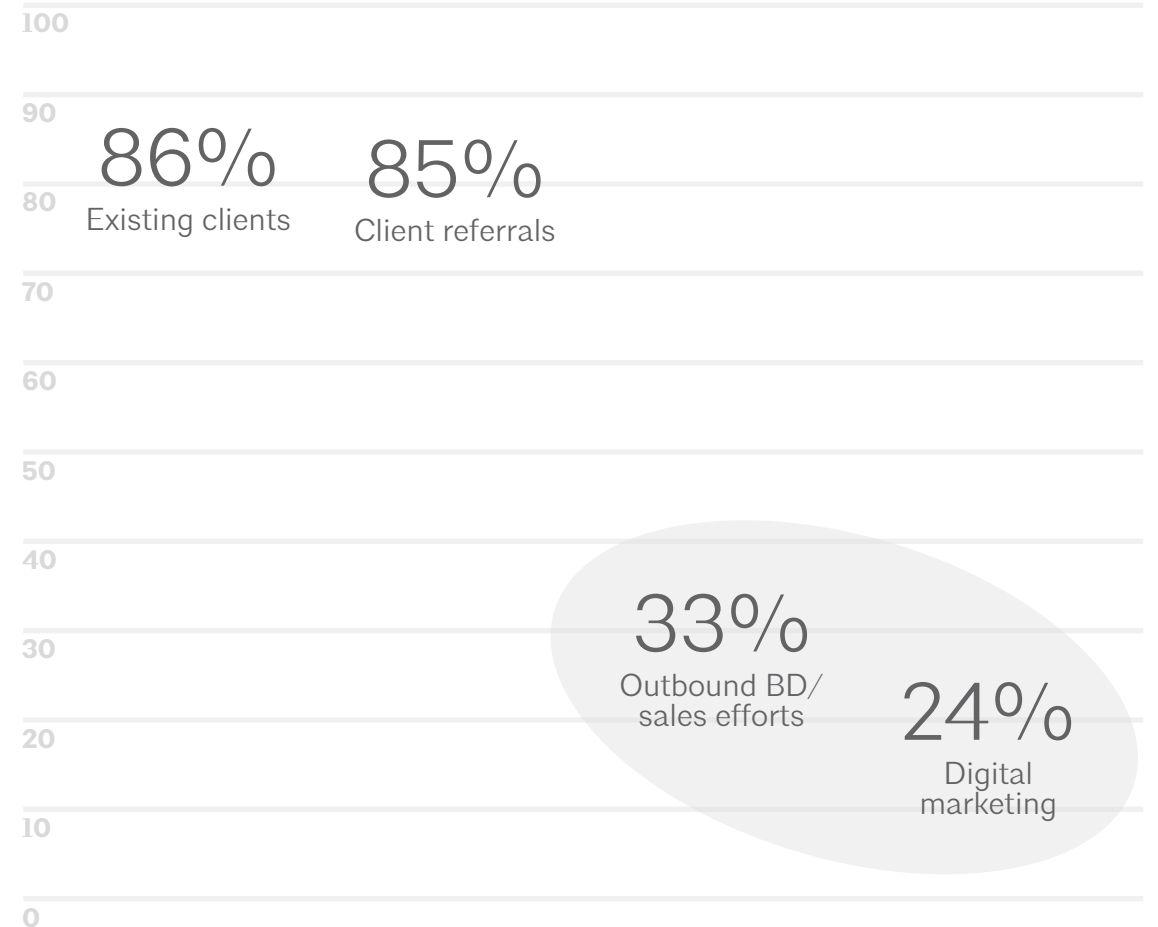
The cultural barrier

Part of the reason for a lack of digital marketing is cultural: 89% of respondents agree that relationships matter more than marketing for winning new business, and only 43% agree that digital/social marketing is important to them. However, firms that use social media are successful at driving leads through these channels. Case studies and training/courses that help firms fully use social media could help open up this revenue opportunity to more firms. Small firms (under 5 employees) especially underutilize social media: a quarter are on Facebook, and fewer than one in five are on Instagram.

The technology barrier

Fewer than one in five architecture firms have CRM or ERP systems, making it difficult to enable sales/business development (BD) efforts and orchestrate digital marketing. Architects at firms that have adopted these solutions perform significantly better in terms of project management. They also feel more confident about future growth. Making cost-effective ERP/CRM solutions, as well as case studies and training, available to firms of all sizes could close the gap on this technology barrier since architects and firm leaders are interested in new technology and innovation.

What firms expect to drive their growth in the next 3 years (% very important)



A strong specification management process & real-time project insights are key differentiators for meeting client needs



Architects at firms with strong capabilities for managing specification and project changes, and those with real-time insights into projects, are significantly more confident about their future success.

These are key differentiators that fewer than half of respondents perform strongly on. They should be a core focus for technology adoption strategies and for product development among solutions providers. Solutions with these capabilities can help firms address their top priorities: profitability and efficiency.

- B** Staying top-of-mind with our customers and prospects
- C** Clear process for reviewing and approving changes to projects or specs
- D** Completing design and spec reviews quickly and efficiently
- E** Making accurate projections for projects and budgets
- F** Keeping track of project and spec changes
- K** Real-time visibility into project costs, budgets, and profitability
- L** Identifying failing projects requiring attention

Firms need a better way to share files and collaborate on project documents with external stakeholders

Top focus areas for improving communication & collaboration

Effectively collaborating on shared files externally

Architects feel confident about managing internal collaboration on projects, but many of those at firms with fewer than 100 people struggle to collaborate on files with external stakeholders.

Recommendation

Greater use of software that enables collaboration on shared files would help. It is important that the solution is known and used by many stakeholders including clients and contractors.

Increased migration to the cloud, including file sharing services (e.g., Dropbox), could also help improve collaboration.

Effectively sharing firm updates & announcements internally

While all respondents, except those at the smallest firms (1-4), have good solutions in place for virtual meetings and internal collaboration, many are challenged with effectively communicating top-down within the firm.

Recommendation

Enterprise collaboration software (e.g., Yammer, Basecamp) is only used by 16% of respondents (primarily those working at the largest firms). However, half don't feel that these solutions meet their needs. Internal top-down communication could be improved with guidance on how best to drive usage of these solutions or by finding alternative solutions for internal communication.

Handling specification/project changes is the primary pain point affecting project management & firm efficiency

Top focus areas for improving project management

Keeping track of project and specification changes

Architects lack a good way to track their firms' project changes, including swaps/subs.

Completing design & specification reviews quickly & efficiently

The process for reviewing and finalizing specification and construction documents has long been a pain point for architects.

A clear process for reviewing and approving project & spec changes

The ad-hoc nature of many changes to specifications and design can make it difficult for architects and firm leaders to plan and manage time effectively.

Recommendation

Greater adoption of construction management software (60% today) would help smoothen the process and drive efficiency. Less than half of respondents from firms with 1-19 employees use such software today. Demonstrating the need for these solutions is key to increasing consideration, as many architects may not recognize the value of these solutions.

Increasing adoption of specification software (45% today) will also improve these processes. Fewer than one in five architects at small firms (1-4) use such software today. While firms of this size tend to focus more on single-family residential projects where the software may not be needed, there is still a need for cost-effective ways of utilizing this type of solution for many firms.

Large firms are leading the way in using technology to improve firm management, marketing, and client CX

Top focus areas for improving project management

Making accurate projections for projects and budgets

Architects can struggle with projections and budgeting. Many of their firms do not have solutions in place.

Recommendation

As with project management, improvement relies in part on greater adoption of project management systems/ERP systems. Beyond the largest firms, these are still under-utilized. Demonstrating the need and proving ROI are key priorities.

Understanding the holistic pipeline of potential projects

Many firms lack a structured way to track inquiries and opportunities.

Tracking touchpoints and interactions with clients/prospects

Business development is often localized to key individuals and not tracked centrally. Therefore, architects at some firms find it difficult to provide a consistent CX. Those at large firms (100+) especially struggle to provide strong CX regardless of the project team.

Recommendation

CRM adoption (currently used by 16% of all respondents, 40% of those working at large firms) would help track interactions with clients and prospects. It would also enable digital marketing campaigns. Large firm leaders should prioritize this investment and formulate a CX strategy with CSAT tracking for continuous improvement.

Using digital marketing to drive new leads and more business

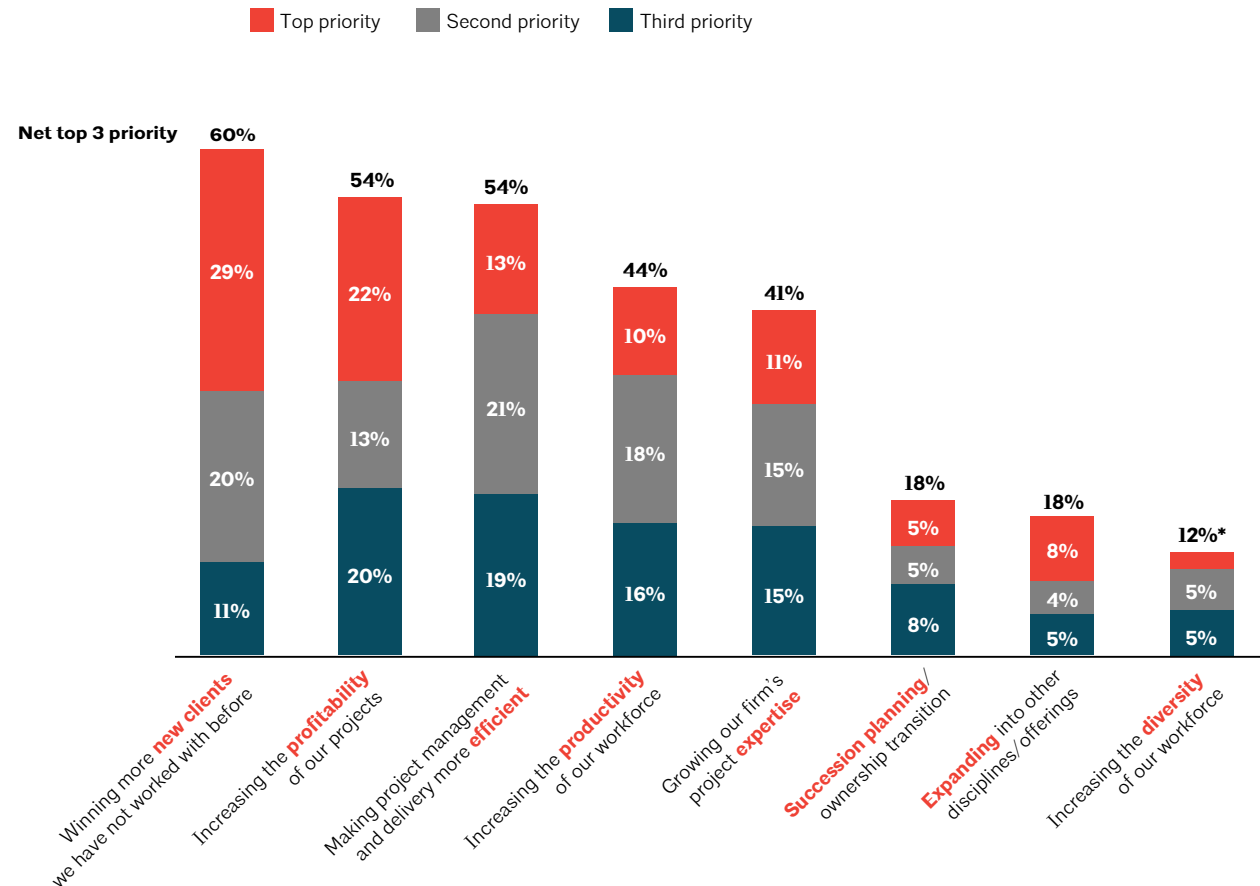
Digital marketing is not a priority at many architecture firms. The lack of top-of-funnel efforts means that winning new clients is a key challenge facing firms.

The interplay between technology & culture

Winning new clients and increasing profitability & efficiency are top priorities for firm decision makers over the next three years

Overall, just over 1 in 10 firm decision makers rank increasing diversity as a top three priority. However, this becomes a significantly higher priority for those working at firms with 250 or more employees, with just over 3 out of 10 of those firm decision makers ranking it a top three priority, ahead of growing their firm’s project expertise and succession planning.

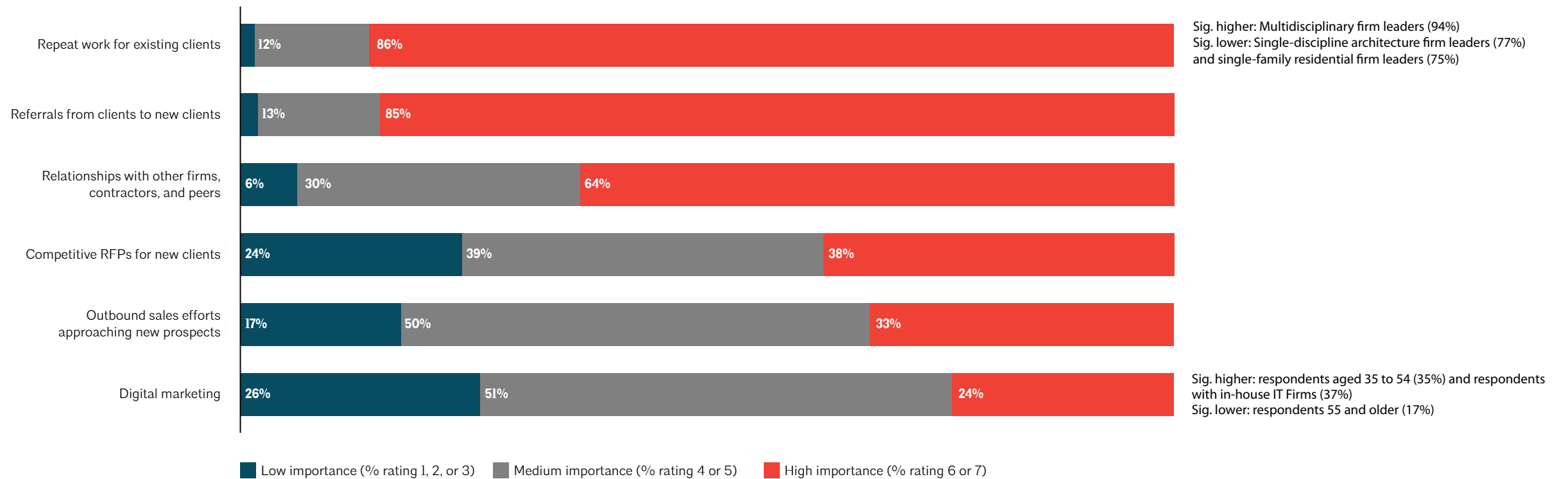
Top three ranked priorities firms are focusing on over the next three years



Firm decision makers focus on organic growth but not on business development or marketing

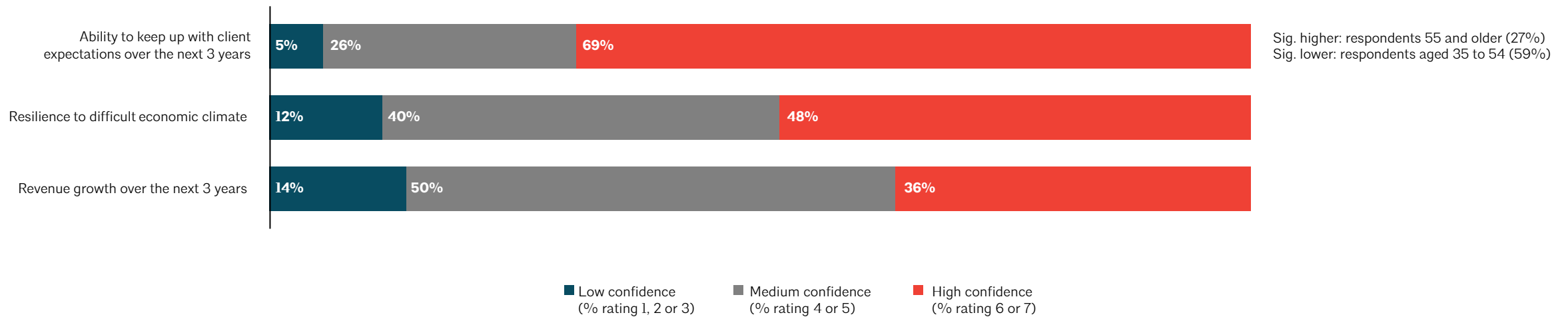
Firm decision makers at multidisciplinary firms are even more likely to say that repeat work for existing clients is the most important success factor over the next three years, with 94% of this group considering it highly important. By contrast, they generally see competitive RFPs and outbound sales/marketing efforts as far less important.

Importance of the following factors for firm growth & success over the next three years (% of firm decision makers)



While most firms feel highly confident about keeping up with client expectations, significantly fewer expect revenue growth

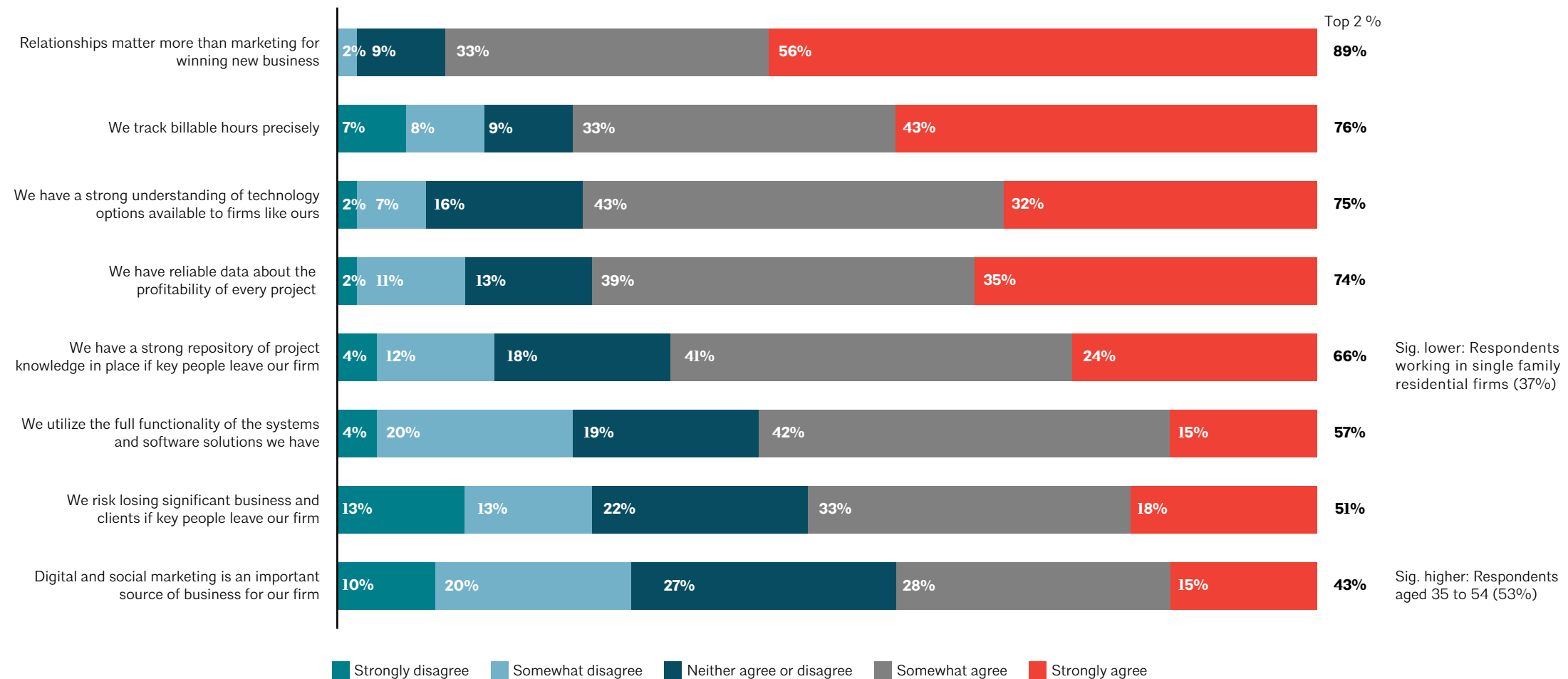
Level of confidence (% of respondents)



Nearly 9 out of 10 AIA members agree that relationships matter more than marketing for winning new business

Although a large majority (75%) agree that they have a strong understanding of available technology options, significantly fewer AIA members (57%) agree that they utilize the full functionality of the systems and software solutions they have.

Views on various aspects of business conditions at their firms (% of respondents)



Small firms are less likely to track projects precisely and more apt to rely mainly on relationships to drive new business

Agreement with various aspects of business conditions at their firms (% of respondents)

	% agree (Strongly agree or somewhat agree)	1 to 4 employees	5 to 19 employees	20 to 99 employees	100+ employees
Relationships matter more than marketing for winning new business	89%	92%	93%	92%	79%
We track billable hours precisely	76%	60%	78%	88%	79%
We have a strong understanding of technology options available to firms like ours	75%	71%	74%	78%	79%
We have reliable data about the profitability of every project	74%	59%	72%	84%	81%
We have a strong repository of project knowledge in place if key people leave our firm	66%	54%	66%	73%	70%
We utilize the full functionality of the systems and software solutions we have	57%	61%	51%	51%	65%
We risk losing significant business and clients if key people leave our firm	51%	39%	52%	62%	52%
Digital and social marketing is an important source of business for our firm	43%	28%	42%	47%	56%

Significantly higher Significantly lower

Most firms are focused on new technology and innovation

Most architects tend to think of themselves as ahead of, versus behind, those at other firms in adopting new technologies. Additionally, most respondents describe themselves as making decisions using top-down decision making and tend to value centralized expert/leadership opinions. Those at the largest firms (100+) are more focused on technology and feel ahead of others.

Placement of firm across different various dimensions

Specialized in key disciplines or industries	12%	Generalized across a wide variety of disciplines and industries
Looks to centralized expert/leadership opinion	13%	Looks to de-centralized , differing viewpoints
Behind other firms in adopting new technologies	8%	Ahead of other firms in adopting new technologies
Younger workforce (average 20s–30s)	16%	Older workforce (average 40s–50s)
Makes decisions by consensus across the organization	33%	Makes decisions with top-down decision making
Homogenous workforce (experience, gender, age, ethnicity)	36%	Diverse workforce (experience, gender, age, ethnicity)
Not focused on new technology and innovation	52%	Focused on new technology and innovation

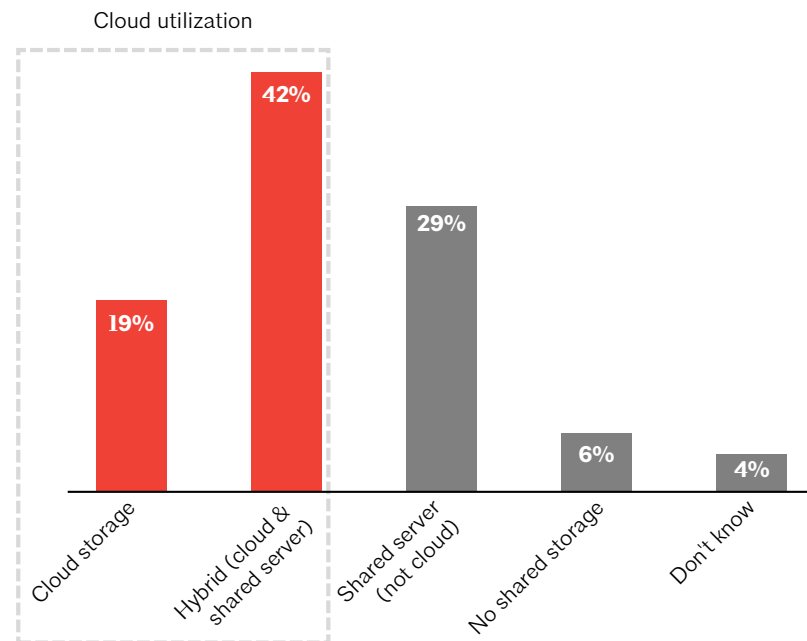
■ Agree more with statements on left
 ■ Agree more with statements on right

Digital maturity of firms

While most firms use cloud storage, few are fully migrated

Around three in five firm technology decision makers report that they store files in the cloud today. As remote work increases and digital collaboration both internally and with clients/contractors increases, more firms may look to cloud hosting. The most common method for storage is hybrid rather than full cloud migration.

Storage and access of digital files at firms (% of technology decision makers)



The largest firms tend to manage their files using both a shared server and cloud hosting

Small to mid-sized firms are more likely to use a shared server only, while the smallest firms are more likely to use cloud storage only. The largest firms are the most likely to use a hybrid setup.

Storage and access of digital files at firms (% of technology decision makers by firm size)

	Overall	Firm size			
		1 to 4 employees	5 to 19 employees	20 to 99 employees	100+ employees
Hybrid (shared server and cloud)	42%	21%	38%	52%	69%
Shared server (not cloud)	29%	15%	42%	41%	16%
Cloud storage	19%	43%	16%	2%	7%
No shared storage	6%	16%	1%	0%	4%

■ Significantly higher
 ■ Significantly lower

Managing IT in-house is most common among the largest firms

The largest firms are much more likely to use in-house IT professionals than smaller firms. The smallest firms are more likely to have their architects wear multiple hats or outsource IT. Multi-disciplinary and non-core firms are also more likely to use in-house IT professionals for their IT management.

Party responsible for managing IT in firms (% of respondents by firm size)

	Overall	Firm size			
		1 to 4 employees	5 to 19 employees	20 to 99 employees	100+ employees
In-house IT professionals manage IT	47%	11%	31%	50%	95%
Practicing architects manage IT	32%	65%	37%	23%	5%
Outsource IT management	21%	24%	32%	27%	0%

■ Significantly higher
 ■ Significantly lower

IT maintenance is ad-hoc for small firms; outsourced for mid-sized firms and in-house for large firms

The large majority of firms with over 100 employees manage their IT in-house and are significantly less likely to use a third party. Of those firms that use a third party, small to mid-sized firms are more likely to use one (MSP or similar) on a contract basis, while the smallest firms are more likely to use one on an ad-hoc basis.

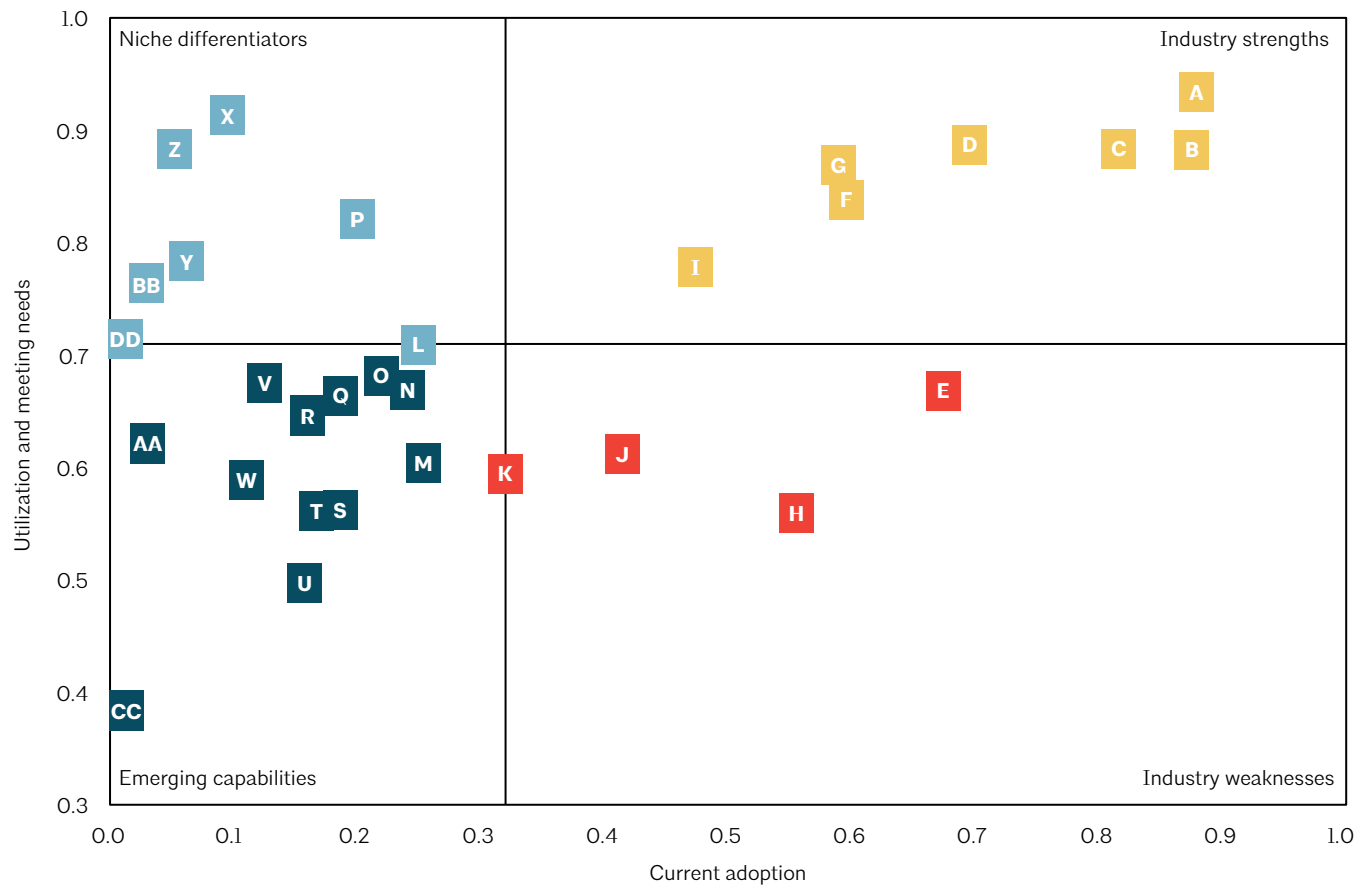
Party responsible for managing IT in firms (% of respondents by firm size)

	Overall	Firm size			
		1 to 4 employees	5 to 19 employees	20 to 99 employees	100+ employees
In-house IT maintenance	41%	43%	26%	24%	82%
Contracted third party	27%	10%	40%	52%	9%
Ad-Hoc third party	27%	40%	31%	20%	5%
Retailer support	1%	3%	1%	0%	0%

■ Significantly higher
 ■ Significantly lower

The impact of technology on firm success

Social media capabilities are lacking, but firms using emerging technologies feel assured



- A Paid "office suite" (e.g., Microsoft Office 365)
- B BIM/CAD software (e.g., Autodesk Revit)
- C File editing software (e.g., Adobe)
- D Live communication platform (e.g., Slack)
- E A LinkedIn profile for our firm
- F Construction management software (e.g., BlueBeam Revu)
- G Accounting-only solution (QuickBooks)
- H A Facebook page for our firm
- I Specification software (e.g., MasterSpec)
- J An Instagram profile for our firm
- K A Twitter handle/profile for our firm
- L Parametric design
- M Augmented reality (AR) or virtual reality (VR)
- N Parametric design tools (e.g., Grasshopper)
- O 3D printing
- P Hazard risk and climate projection tools (e.g., FEMA Firmette)
- Q CRM system (e.g., Salesforce)
- R Geolocation
- S ERP system (e.g., Netsuite)
- T Enterprise collaboration software (e.g., Basecamp)
- U A YouTube channel for our firm
- V Building performance simulation software (e.g., eQUEST)
- W Wearable technology
- X The Internet of Things (IOT)
- Y Embodied carbon calculators (e.g., Tally)
- Z Procurement system (e.g., Ariba)
- AA Artificial intelligence (AI) or machine learning
- BB Robotic process automation
- CC Holograms
- DD Blockchain

Fewer firms excel at managing specs and utilizing live project data— but those that do feel ready to keep up with changing client expectations



The strengths & weaknesses of architecture firms' capabilities varies significantly

Overall strengths

Communication & collaboration

- Quickly responding to client or partner inquiries/issues

Project management

- Sharing files with clients and contractors in formats they can use
- Ability of architects to work with external partners seamlessly
- Ability of architects to work together seamlessly (on the same project at the same time)

Firm management

- Issuing accurate and timely invoices
- Tracking and following up on invoices
- Providing an excellent customer experience regardless of the specific project team

Overall areas for improvement

Collaborating externally & communicating (broadly) internally

- Effectively collaborating on shared files externally (clients and contractors)
- Effectively sharing firm updates and announcements internally

Efficiently completing reviews & tracking changes

- Keeping track of project and specification changes (substitutions, etc.)
- Completing design and specification reviews quickly and efficiently
- Having a clear process for reviewing and approving project and specification changes

Digital marketing/CRM, pipeline tracking, & budget forecasting

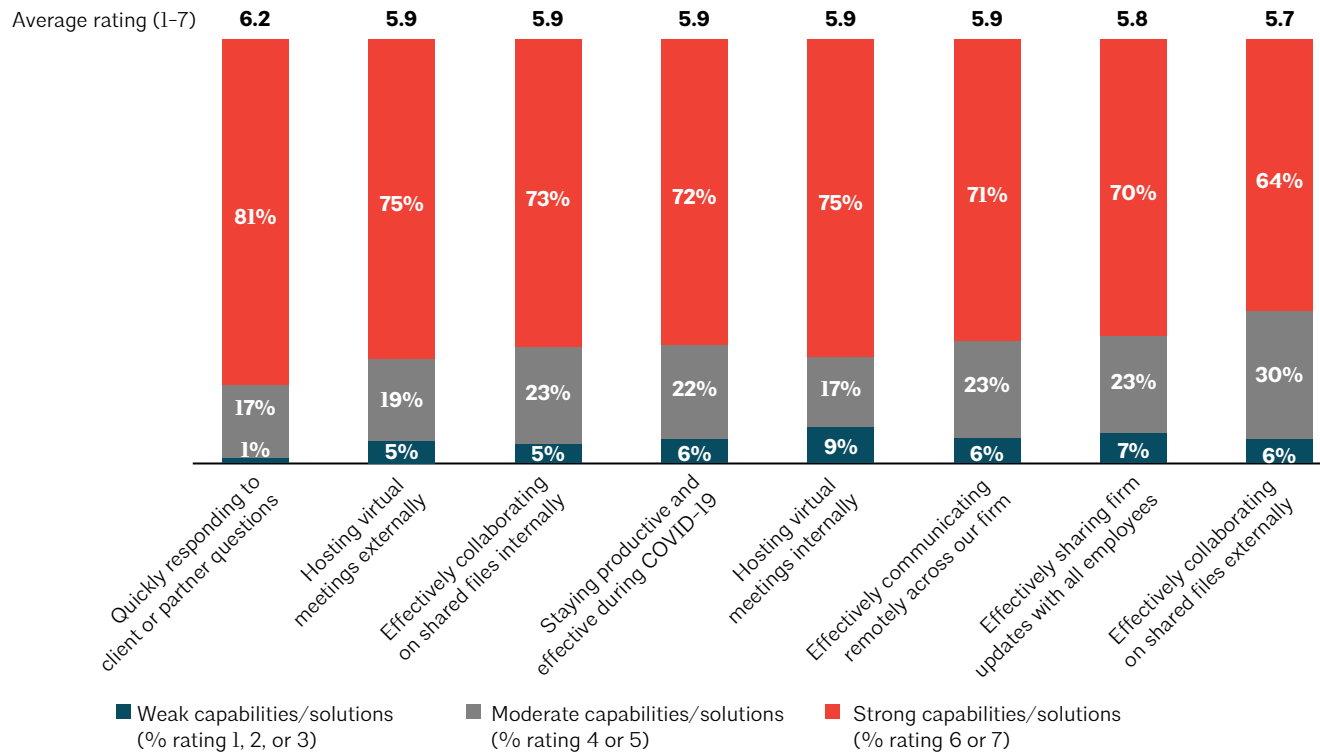
- Using digital marketing to drive new leads and more business
- Tracking touchpoints and interactions with clients and prospects
- Understanding our holistic pipeline of potential projects
- Making accurate projections for projects and budgets

Capabilities & solutions for communication & collaboration

Internal collaboration capabilities are stronger than external capabilities

Around 7 in 10 respondents cite strong capabilities and solutions in place for internal communication (virtual meetings, sharing updates and announcements, etc.). External collaboration tools are significantly less robust, with over one third (36%) reporting weak or moderate capabilities and solutions in place.

Assessment of firm’s capability across areas of communication and collaboration (% of respondents)



Large firms & those with in-house IT teams are significantly better at communicating & collaborating internally

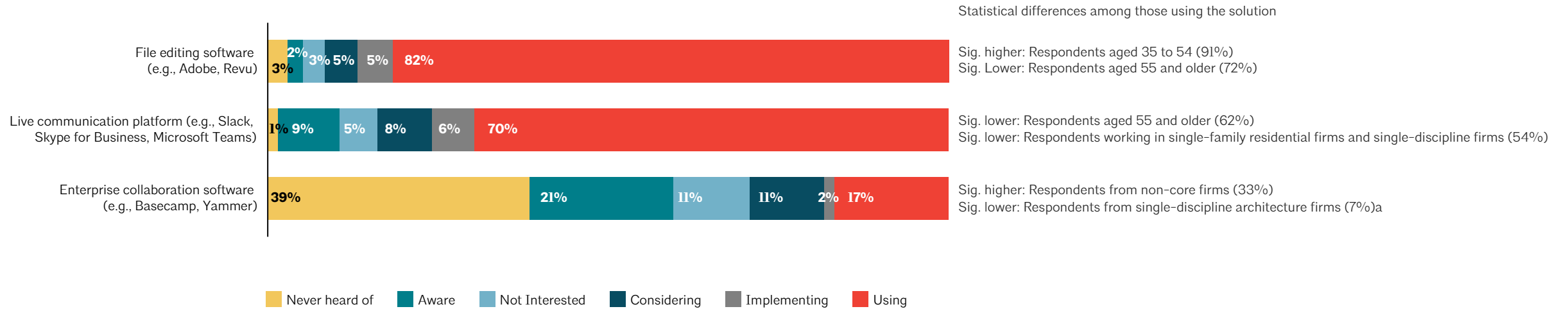
Assessment of firm’s capability across areas of communication and collaboration (% of respondents, by firm size and IT management approach)

Strong capabilities/solutions in place (% rating 6 or 7)	Overall	By firm size (number of employees)				By IT management approach		
		1 to 4	5 to 19	20 to 99	100+	In-house IT professionals	Architects manage IT	Outsource IT mgmt.
Quickly responding to client or partner questions	81%	86%	82%	82%	77%	81%	83%	81%
Hosting virtual meetings externally	75%	59%	78%	82%	83%	83%	67%	73%
Effectively collaborating on shared files internally	73%	70%	72%	74%	75%	73%	73%	73%
Staying productive and effective during COVID-19	72%	69%	64%	74%	83%	75%	72%	67%
Hosting virtual meetings internally	75%	52%	75%	86%	88%	84%	64%	73%
Effectively communicating remotely across our firm	71%	69%	70%	62%	84%	75%	70%	67%
Effectively sharing firm updates with all employees	70%	67%	66%	67%	79%	73%	73%	67%
Effectively collaborating on shared files externally	64%	60%	60%	56%	80%	68%	61%	62%

■ Significantly higher ■ Significantly lower

Use of live communication platforms & file editing software is prevalent, but few firms currently use enterprise collaboration software

Assessment of firm's consideration and implementation of various solutions (% of technology decision makers)



Larger firms & firms with in-house IT professionals are more likely to use all three types of platforms

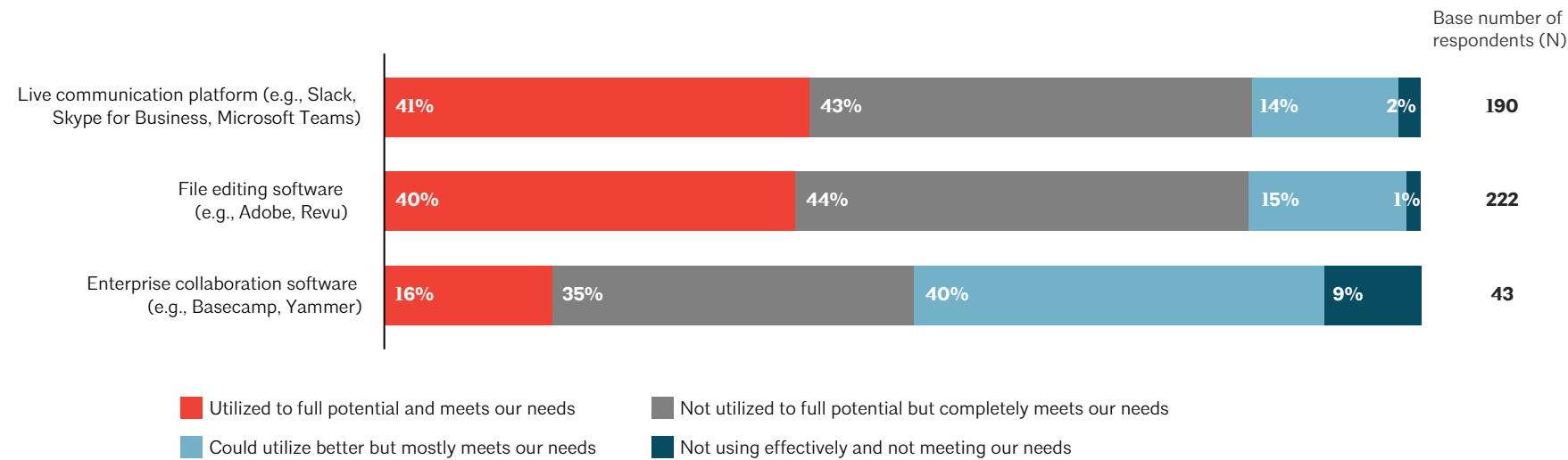
Current use of various solutions (% of technology decision makers, by firm size)

	Overall	By firm size (number of employees)				By IT management approach		
		1 to 4	5 to 19	20 to 99	100+	In-house IT professionals	Architects manage IT	Outsource IT mgmt.
File editing software (Adobe, Revu, etc.)	81%	58%	87%	89%	96%	93%	68%	88%
Live communication platform (Slack, Skype, Teams, etc.)	69%	40%	71%	81%	96%	85%	59%	65%
Enterprise collaboration software (Basecamp, Yammer, etc.)	16%	9%	12%	13%	35%	23%	11%	12%

■ Significantly higher
 ■ Significantly lower

Live communications & file editing software meets the needs of most firms

Extent to which firm is utilizing the potential of each solution (% of respondents that report their firm is using the solution)



Improved collaboration drives investment in live communications solutions & software

Improving collaboration is the top reason architecture firms use live communication platforms and enterprise collaboration software, while increasing productivity is the top reason they use file editing software.

Reasons behind consideration or implementation of technology solution (% of technology decision makers)

Solution	Top driver		Second driver		Third driver	
Live communication platform	Improving collaboration	72%	Improving design/project outcomes	38%	Increasing productivity	36%
Enterprise collaboration software	Improving collaboration	66%	Improving design/project outcomes	31%	Increasing productivity	28%
File editing software	Increasing productivity	70%	Improving collaboration	56%	Improving design/project outcomes	52%

For those not using communication & collaboration tools, lack of relevance to the firm is the leading reason

Lack of time or priority ranks second, while concerns with cost or implementation difficulty rank third.

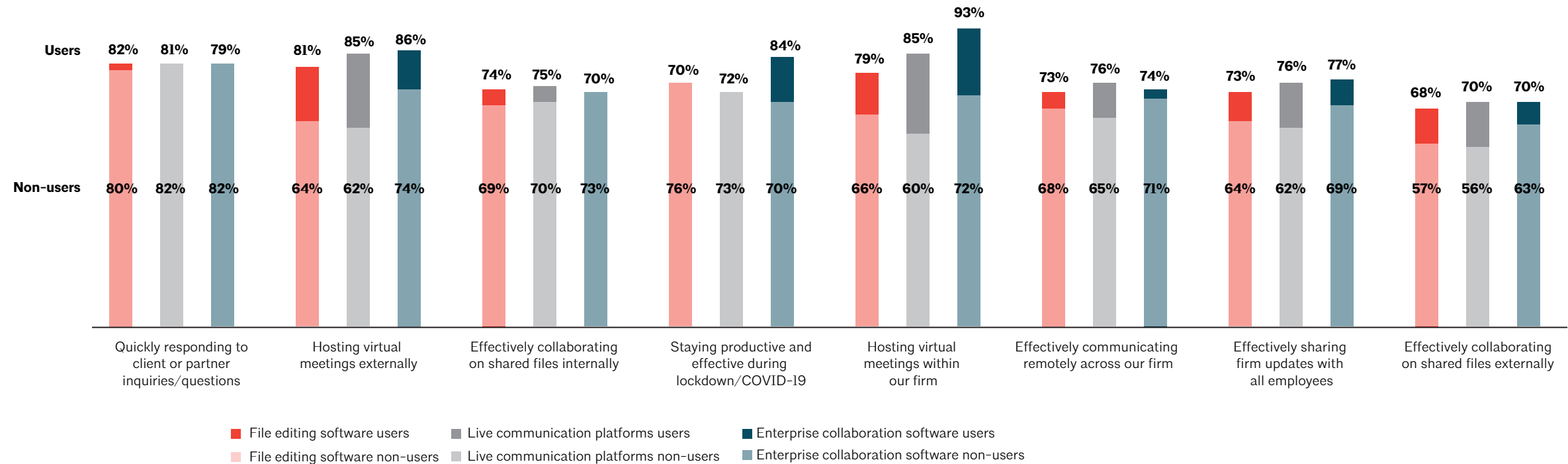
Reasons behind firm decision to not implement or stop using solution (% of technology decision makers)

Solution	N	Top barrier		Second barrier		Third barrier	
Live communication platform	15*	Not relevant to us	60%	Lack of time/priority	20%	Cost was too high	13%
Enterprise collaboration software	29*	Not relevant to us	69%	Lack of time/priority	24%	Too difficult to implement	17%

* Low base

Firms using live communication platforms have much stronger capabilities for hosting meetings & sharing information internally

Assessment of firm's capabilities (% of respondents reporting their firm at a 6/7, noting they are "very/extremely capable with strong solutions in place")

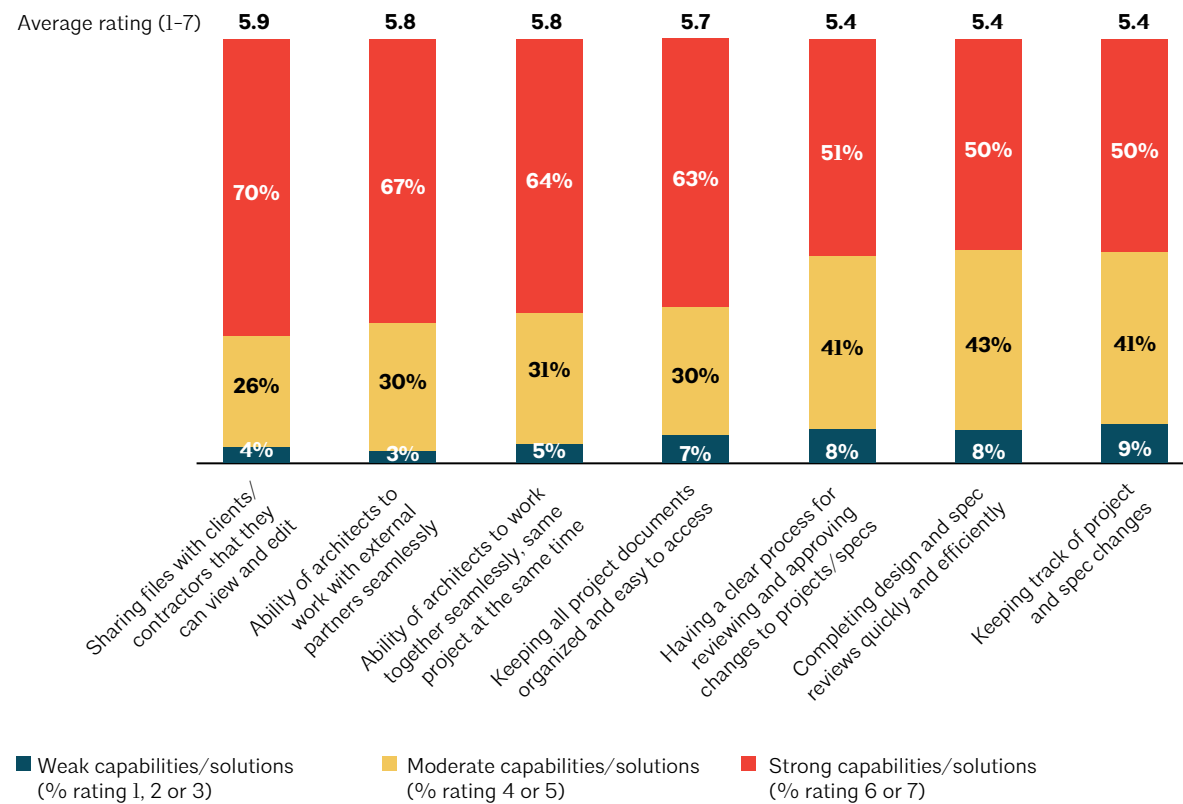


Capabilities & solutions for project management

Spec reviews & changes pose the most headaches for firms when it comes to project management

Firms show greatest need for project management tools and capabilities that empower them to better track and make changes and course corrections during projects, as well as to complete design and specification reviews more efficiently.

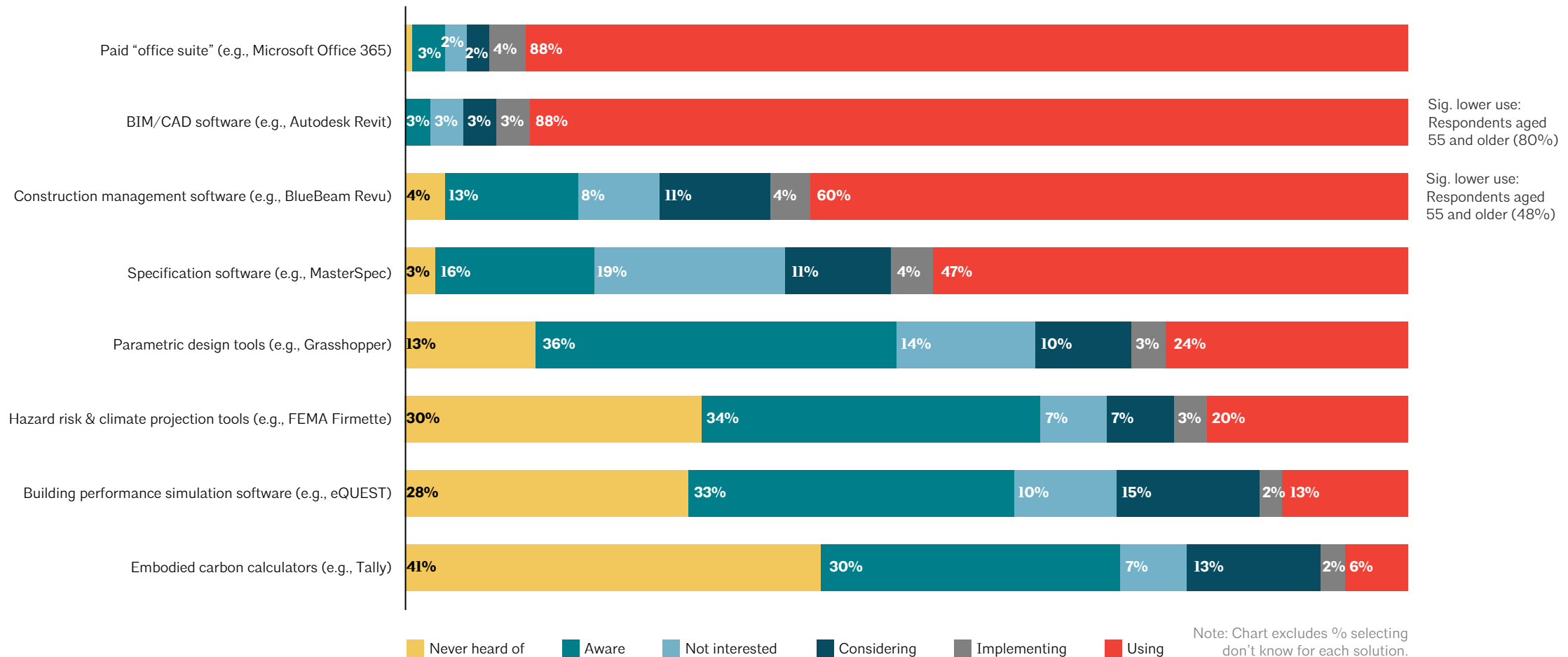
Rating of firm's capability around aspects of project management (% of respondents)



Half of firms use specification software; sustainability tools still emerging

Only 20%–25% of technology decision makers note that their firms use parametric design tools or hazard risk and climate projection tools, and even fewer use building performance simulators or embodied carbon calculators. In fact, architects are more likely to be unaware of these tools than they are to be using them.

Assessment of firm’s consideration and implementation of various solutions (% of technology decision makers)



Sig. lower use:
Respondents aged
55 and older (80%)

Sig. lower use:
Respondents aged
55 and older (48%)

Use of advanced project management solutions increases with firm size

Multidisciplinary architecture firms are far more likely to use construction management software, specification software, and parametric design tools versus single-discipline firms.

Current use of various solutions (% of technology decision makers, by firm size and firm type)

	Overall	By firm size (number of employees)				By firm type		
		1 to 4	5 to 19	20 to 99	100+	Multidisciplinary	Single-discipline	Non-core
Paid “office suite” (e.g., Microsoft Office 365/Pro [PPT, Word])	88%	75%	91%	94%	95%	89%	85%	88%
BIM/CAD software (e.g., Autodesk Revit, ArchiCAD, AutoCAD)	87%	70%	91%	98%	95%	91%	87%	74%
Construction management software (e.g., BlueBeam Revu, PlanGrid, Procore)	59%	25%	52%	85%	93%	69%	39%	67%
Specification software (e.g., MasterSpec, SpecLink)	45%	18%	47%	63%	67%	51%	39%	42%
Parametric design tools (e.g., Grasshopper, Ladybug, Rhino)	23%	3%	17%	24%	60%	35%	7%	19%
Hazard risk & climate projection tools (e.g., FEMA Firmette, Risk Map, US Climate Explorer)	17%	13%	21%	13%	24%	20%	15%	14%
Building performance simulation software (e.g., eQUEST, Open Studio, Sefaira)	12%	3%	2%	15%	36%	16%	5%	9%
Embodied carbon calculators (e.g., Tally, EC3, Athena)	5%	0%	2%	2%	22%	8%	2%	5%

■ Significantly higher ■ Significantly lower

Firms focused on institutional projects use more advanced project management tools

Similarly, firms with dedicated, in-house IT managers use more sophisticated project management solutions than those that rely on architects to manage IT or outsource it.

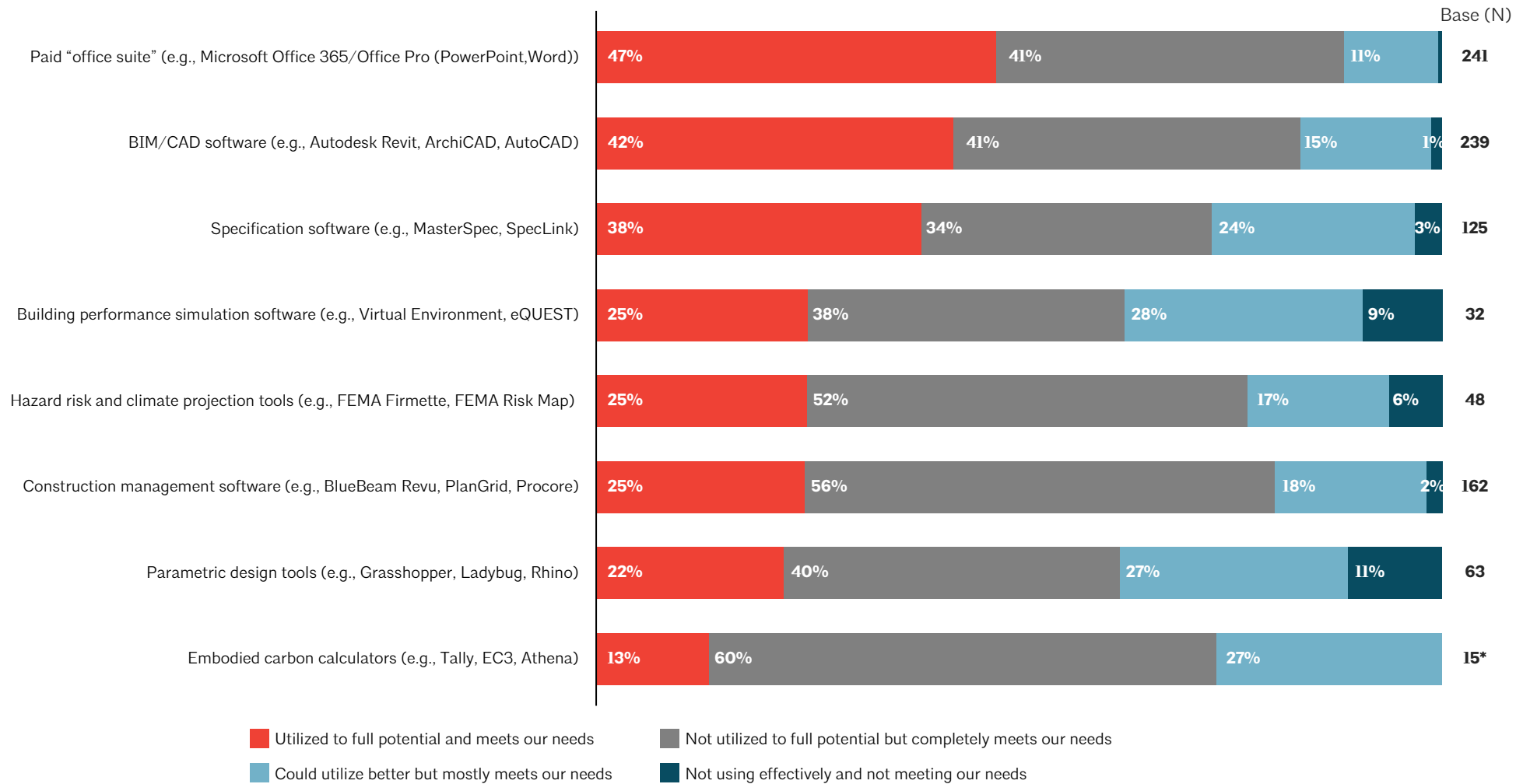
Current use of various solutions (% of technology decision makers, by sector and approach to IT management)

	Overall	By firm sector								By approach to IT mgmt.		
		Single-fam. residential	Multifamily residential	Office	Retail	Other commercial	Education	Healthcare	Other institutional	In-house IT team	Architects manage IT	Outsourced IT mgmt.
Base	275	107	119	147	86	165	99	76	141	109	87	57
Paid “office suite” (e.g., Microsoft Office 365/Pro [PPT, Word])	88%	83%	89%	90%	84%	88%	91%	88%	89%	91%	84%	91%
BIM/CAD software (e.g., Autodesk Revit, ArchiCAD, AutoCAD)	87%	82%	87%	87%	84%	87%	95%	89%	89%	91%	84%	88%
Construction management software (e.g., BlueBeam Revu, PlanGrid, Procore)	59%	40%	57%	64%	51%	61%	73%	76%	67%	78%	45%	51%
Specification software (e.g., MasterSpec, SpecLink)	45%	24%	38%	44%	38%	48%	65%	59%	52%	61%	37%	39%
Parametric design tools (e.g., Grasshopper, Ladybug, Rhino)	23%	12%	26%	23%	17%	23%	34%	29%	27%	38%	17%	7%
Hazard risk & climate projection tools (e.g., FEMA Firmette, Risk Map, US Climate Explorer)	17%	19%	21%	17%	17%	20%	16%	21%	16%	21%	20%	9%
Building performance simulation software (e.g., eQUEST, Open Studio, Sefaira)	12%	5%	13%	14%	8%	11%	21%	22%	18%	23%	3%	5%
Embodied carbon calculators (e.g., Tally, EC3, Athena)	5%	2%	8%	7%	6%	5%	9%	11%	8%	13%	1%	0%

Significantly higher Significantly lower

Office Suite, BIM/CAD solutions are most used among firms

Extent to which firm is utilizing the potential of each solution (% of respondents that report their firm is using the solution)



Improving outcomes & increasing productivity are the top reasons firms are considering project management & delivery tools

Reasons behind consideration or implementation of technology solution (% of technology decision makers)

Solution	Top driver		Second driver		Third driver	
	Driver	%	Driver	%	Driver	%
Construction management software	Increasing productivity	76%	Improving collaboration	66%	Improving design/project outcomes	56%
Specification software	Improving design/project outcomes	85%	Increasing productivity	59%	Client/partner demand	31%
BIM/CAD software	Improving design/project outcomes	67%	Increasing productivity	50%	Improving collaboration	50%
Paid "office suite"	Increasing productivity	56%	Improving design/project outcomes	50%	Architect/employee demand	31%
Building performance simulation software	Improving design/project outcomes	76%	Keeping up with competitors	33%	Architect/employee demand	24%
Parametric design tools	Improving design/project outcomes	74%	Increasing productivity	41%	Keeping up with competitors	38%
Embodied carbon calculators	Improving design/project outcomes	92%	Client/partner demand	39%	Architect/employee demand	34%
Hazard risk and climate projection tools	Improving design/project outcomes	83%	Improving collaboration	29%	Increasing productivity	25%

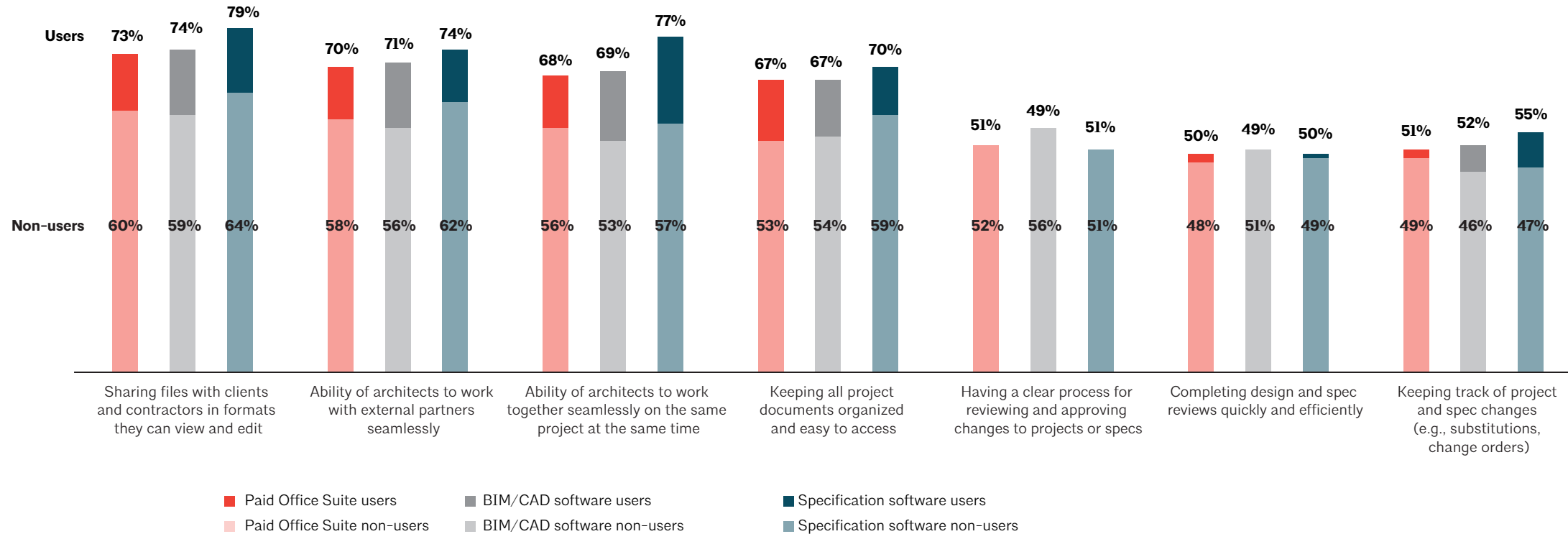
Lack of relevance and resources are the main reasons firms are not using project management and delivery tools

Reasons behind firm decision to not implement or stop using solution (% of technology decision makers)

Solution	Top barrier		Second barrier		Third barrier	
Construction management software	Not relevant to us	45%	Cost was too high	32%	Too difficult to implement	27%
Specification software	Not relevant to us	42%	Cost was too high	32%	Lack of time/expertise to re-train staff	18%
Building performance simulation software	Not relevant to us	65%	Lack of time/priority	35%	Could not find the right solution/provider	15%
Parametric design tools	Not relevant to us	44%	Lack of time/expertise to re-train staff	33%	Lack of time/priority	28%
Embodied carbon calculators	Lack of time/priority	56%	Not relevant to us	50%	Lack of time/expertise to re-train staff	31%
Hazard risk and climate projection tools	Not relevant to us	75%	Lack of time/priority	38%	Cost was too high	13%

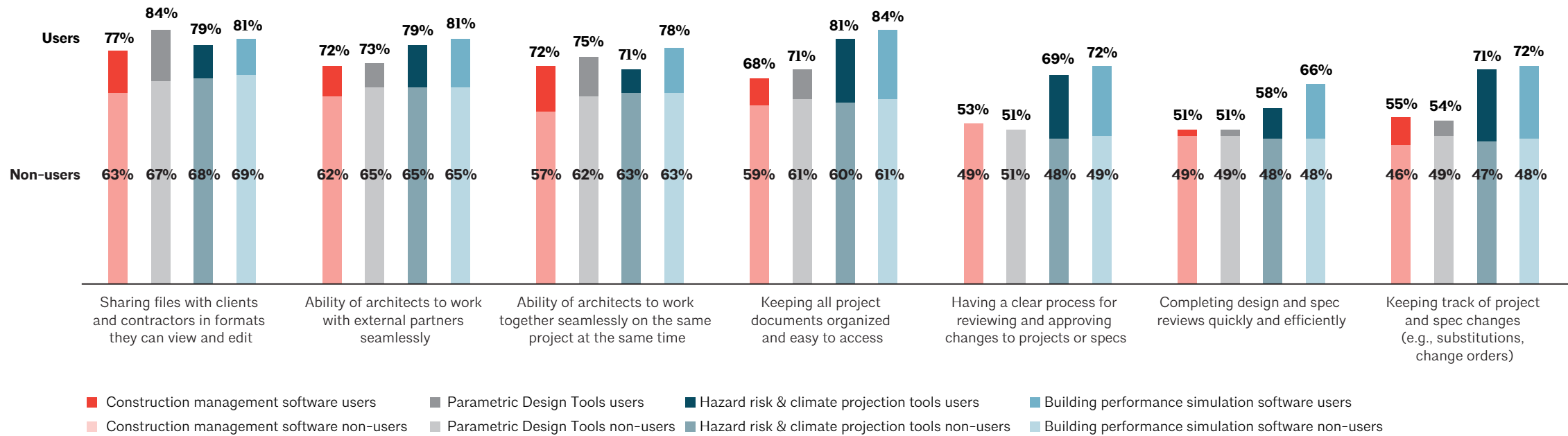
Spec software drives better collaboration within the firm

Assessment of firm's capabilities (% of respondents reporting their firm at a 6/7, noting they are "very/extremely capable with strong solutions in place")



Firms using advanced project management solutions report directionally stronger capabilities across the board

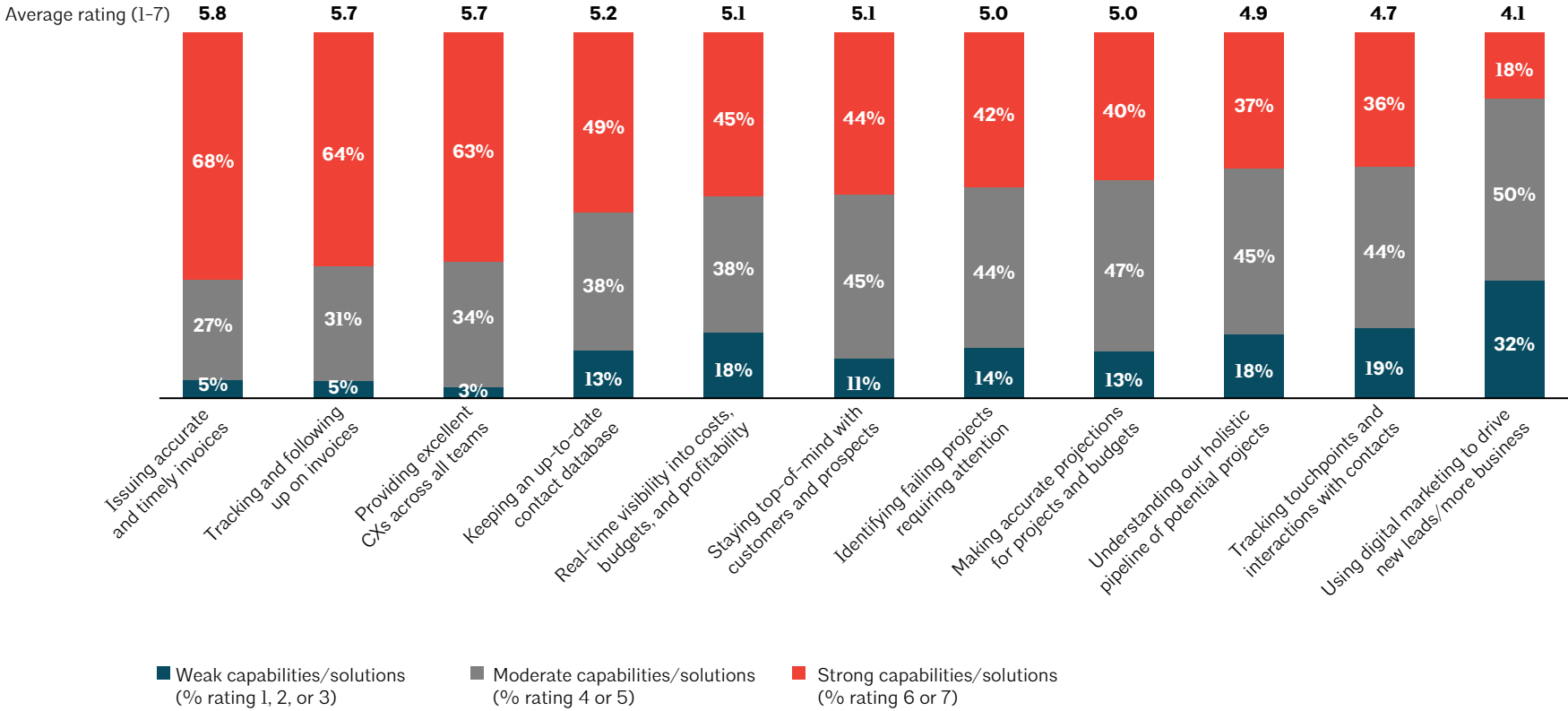
Assessment of firm’s capabilities (% of respondents reporting their firm at a 6/7, noting they are “very/extremely capable with strong solutions in place”)



Capabilities & solutions for firm management

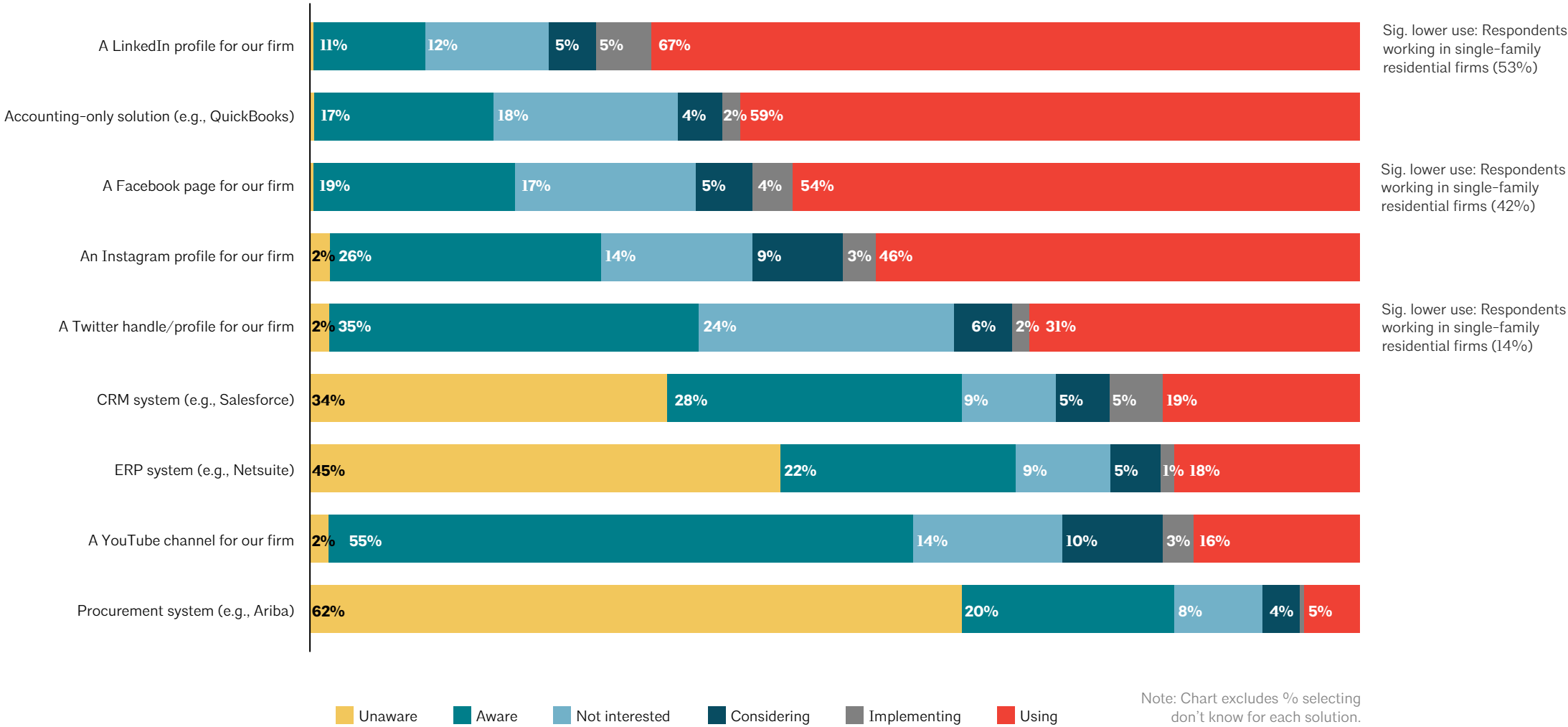
Digital marketing is a low priority for firms, resulting in low capabilities

Rating of firm's capability around aspects of firm management (% of firm and technology decision makers)



Most firms are relying on simple accounting systems instead of using advanced ERP systems

Assessment of firm's consideration and implementation of various solutions (% of technology decision makers)



Use of social media & firm management platforms increases with firm size

Multidisciplinary firms use social media more than single-discipline firms, while the latter use accounting-only software significantly more than the former. Accounting-only solutions are also used by less than a third of the largest firms, versus more than half of smaller firms. Non-core firms show greater use of CRM systems & YouTube channels.

Current use of various solutions (% of technology decision makers, by firm size and firm type)

	Overall	By firm size (number of employees)				By firm type		
		1 to 4	5 to 19	20 to 99	100+	Multidisciplinary	Single-discipline	Non-core
A LinkedIn profile for our firm	65%	38%	62%	78%	96%	74%	43%	79%
A Facebook page for our firm	51%	25%	51%	65%	76%	60%	39%	49%
Accounting-only solution (e.g., QuickBooks)	50%	53%	65%	44%	29%	46%	63%	37%
An Instagram profile for our firm	43%	18%	41%	56%	71%	54%	32%	33%
A Twitter handle/profile for our firm	29%	8%	14%	35%	76%	38%	14%	30%
CRM system (e.g., Salesforce, Monday, Vantagepoint CRM)	16%	3%	10%	20%	40%	17%	7%	33%
ERP system (e.g., Netsuite, SAP, Sage, Ajera)	15%	1%	15%	31%	18%	19%	10%	14%
A YouTube channel for our firm	14%	1%	10%	13%	38%	13%	7%	33%
Procurement system (e.g., Ariba, Paprika, Coupa)	4%	1%	1%	6%	13%	5%	0%	12%

■ Significantly higher ■ Significantly lower

Younger decision makers are driving greater use of social media

Use of social media platforms is significantly greater among technical decision makers under age 55.

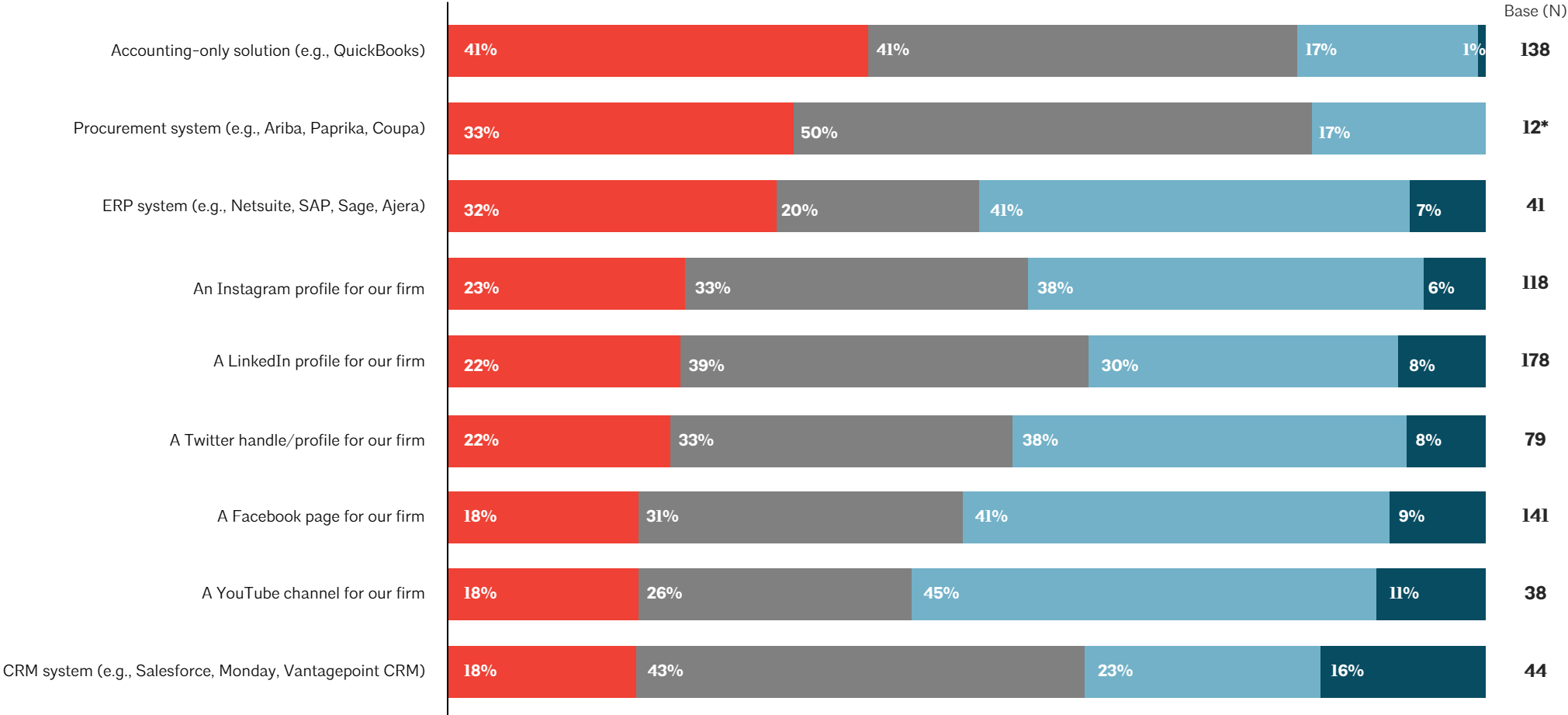
Current use of various solutions (% of technology decision makers, by age and approach to IT management)

	Overall	By age group (years old)			By approach to IT mgmt.		
		18 to 34	35 to 54	55+	In-house IT professionals	Architects manage IT	Outsource IT mgmt.
A LinkedIn profile for our firm	65%	83%	68%	59%	76%	54%	63%
A Facebook page for our firm	51%	62%	61%	42%	67%	40%	46%
Accounting-only solution (e.g., QuickBooks)	50%	31%	54%	51%	39%	62%	58%
An Instagram profile for our firm	43%	69%	62%	24%	56%	32%	40%
A Twitter handle/profile for our firm	29%	31%	41%	19%	49%	17%	14%
CRM system (e.g., Salesforce, Monday, Vantagepoint CRM)	16%	10%	23%	13%	22%	11%	14%
ERP system (e.g., Netsuite, SAP, Sage, Ajera)	15%	31%	19%	9%	23%	8%	11%
A YouTube channel for our firm	14%	14%	21%	9%	26%	7%	5%
Procurement system (e.g., Ariba, Paprika, Coupa)	4%	0%	5%	5%	10%	1%	0%

■ Significantly higher ■ Significantly lower

Most firms report room for improvement in use of firm management solutions and social media channels

Extent to which firm is utilizing the potential of each solution (% of respondents that report their firm is using the solution)



■ Utilized to full potential and meets our needs
 ■ Not utilized to full potential but completely meets our needs
■ Could utilize better but mostly meets our needs
 ■ Not using effectively and not meeting our needs

* Low base

Keeping up with competitors is the top reason firms are considering or implementing social media channels

Reasons behind consideration or implementation of technology solution (% of technology decision makers)

Solution	Top driver		Second driver		Third driver	
	Driver	%	Driver	%	Driver	%
Accounting-only solution (e.g., QuickBooks)	Increasing productivity	57%	Cutting costs	36%	Architect/employee demand	29%
ERP system	Improving design/project outcomes	64%	Increasing productivity	50%	Keeping up with competitors	50%
CRM system	Increasing productivity	54%	Keeping up with competitors	38%	Improving collaboration	33%
A LinkedIn profile for our firm	Keeping up with competitors	52%	Client/partner demand	26%	Marketing (unprompted)	26%
A Twitter handle/profile for our firm	Keeping up with competitors	61%	Improving collaboration	22%	Improving design/project outcomes	17%
A Facebook page for our firm	Keeping up with competitors	75%	Marketing (unprompted)	25%	Improving collaboration	13%
An Instagram profile for our firm	Keeping up with competitors	70%	Improving collaboration	20%	Architect/employee demand	20%
A YouTube channel for our firm	Keeping up with competitors	57%	Improving collaboration	30%	Client/partner demand	23%

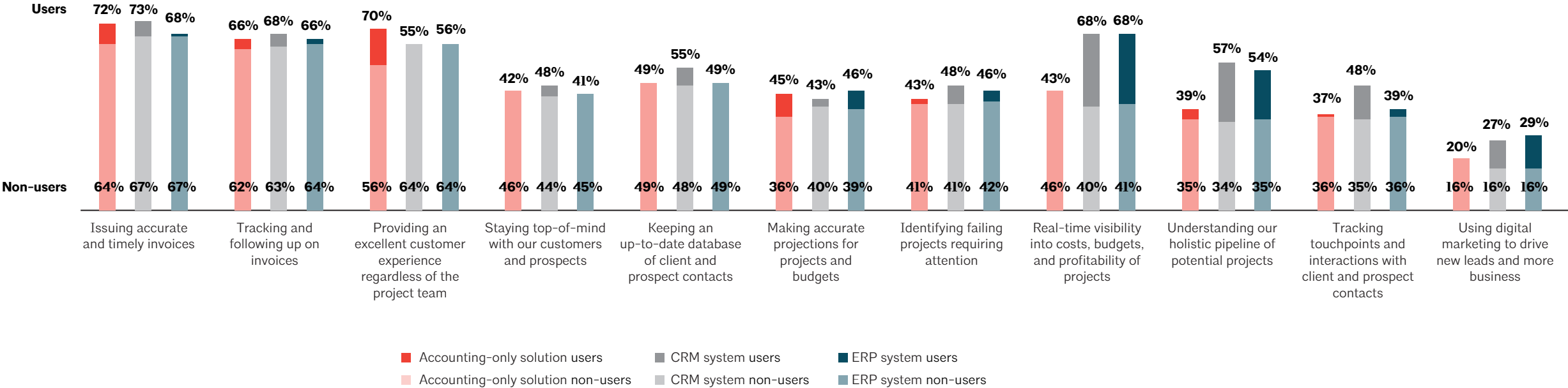
Lack of relevance, resources, and buy-in are the main reasons firms are not using social media and firm management solutions

Reasons behind firm decision to not implement or stop using solution (% of technology decision makers)

Solution	Top barrier		Second barrier		Third barrier	
	Barrier	%	Barrier	%	Barrier	%
Procurement system	Not relevant to us	79%	Lack of time / priority	16%	Too difficult to implement	5%
Accounting-only solution (e.g., QuickBooks)	Not relevant to us	41%	Lack of time/expertise to re-train staff	22%	Switched to different / multi-solution software (unprompted)	20%
ERP system	Not relevant to us	52%	Cost was too high	29%	Too difficult to implement	24%
CRM system	Not relevant to us	71%	Lack of time / priority	29%	Cost was too high	14%
A LinkedIn profile for our firm	Lack of time / priority	58%	Not relevant to us	32%	Lack of buy-in internally	16%
A Twitter handle/profile for our firm	Not relevant to us	54%	Lack of time / priority	49%	Lack of buy-in internally	16%
A Facebook page for our firm	Not relevant to us	58%	Lack of time / priority	40%	Lack of buy-in internally	20%
An Instagram profile for our firm	Not relevant to us	57%	Lack of time / priority	43%	Lack of buy-in internally	19%
A YouTube channel for our firm	Not relevant to us	71%	Lack of time / priority	38%	Too difficult to implement	12%

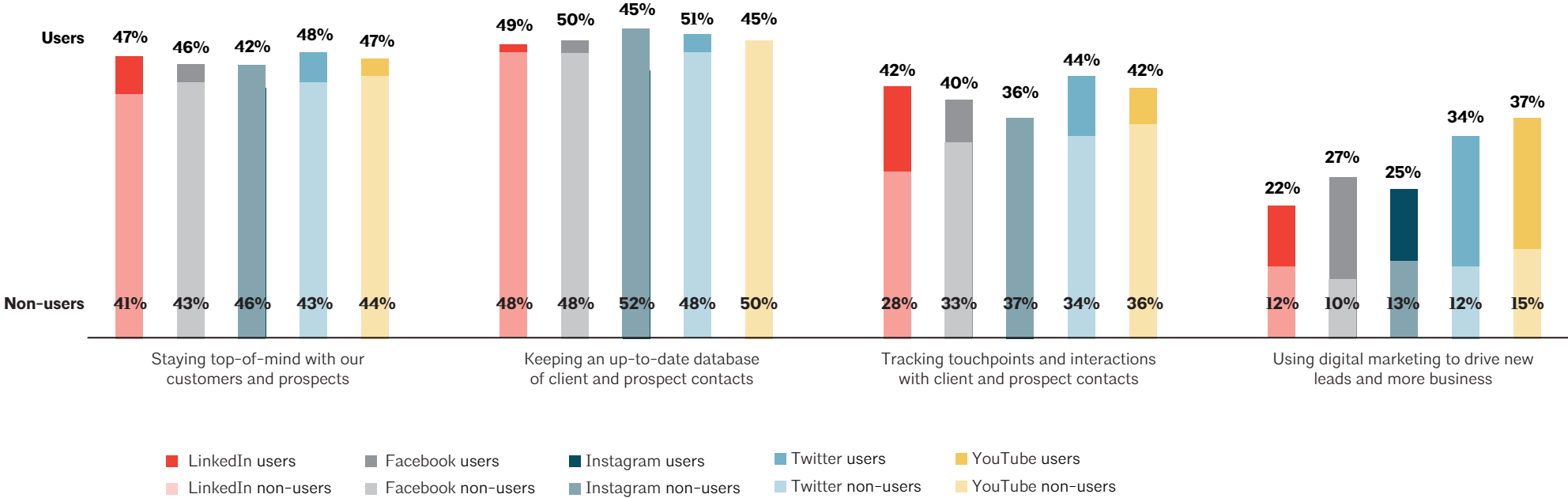
Users of CRM & ERP systems have stronger visibility into project financials, pipelines & customer touchpoint interactions

Assessment of firm’s capabilities (% of respondents reporting their firm at a 6/7, noting they are “very/extremely capable with strong solutions in place”)



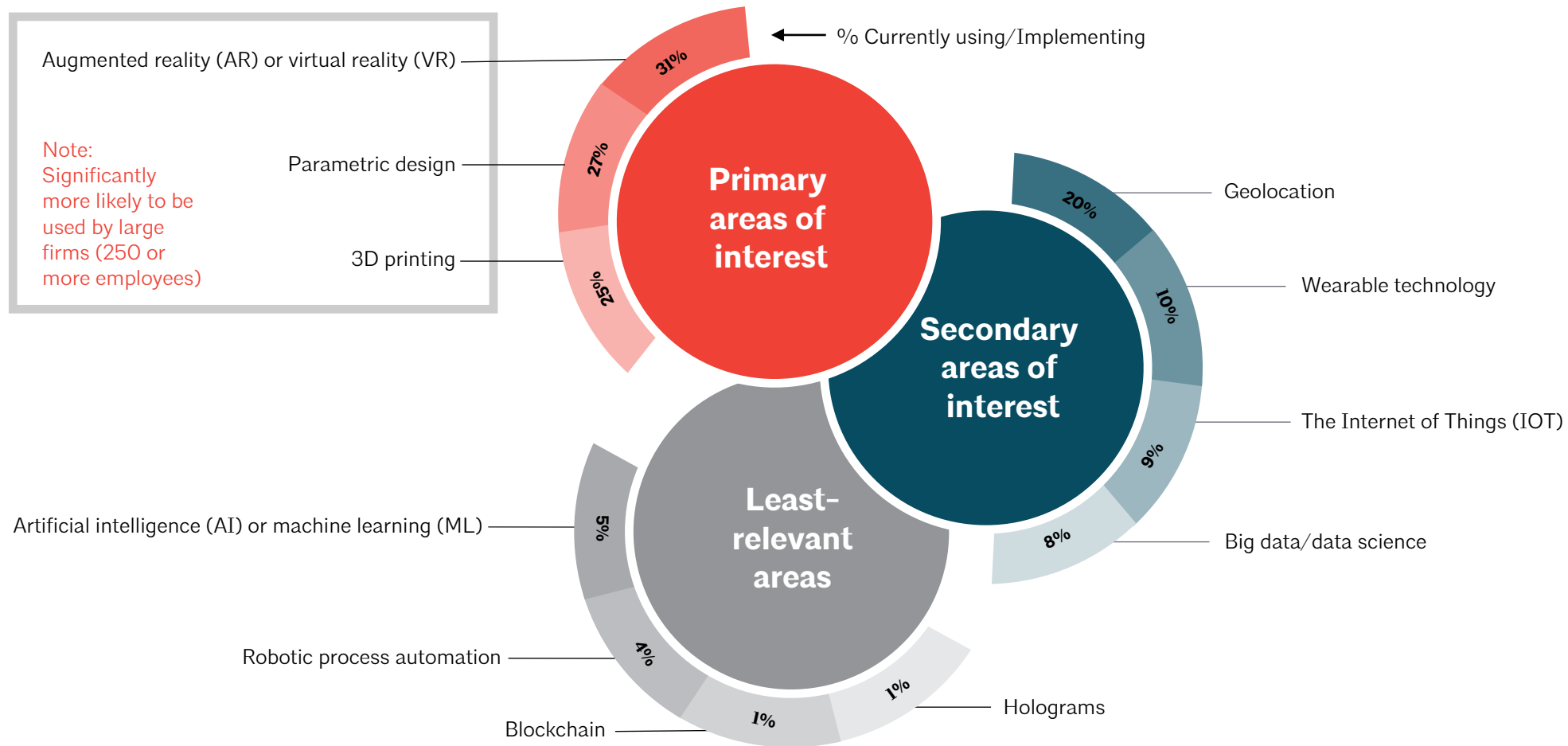
Firms that use social media platforms are significantly better at using digital marketing to drive new leads

Assessment of firm’s capabilities (% of respondents reporting their firm at a 6/7, noting they are “very/extremely capable with strong solutions in place”)



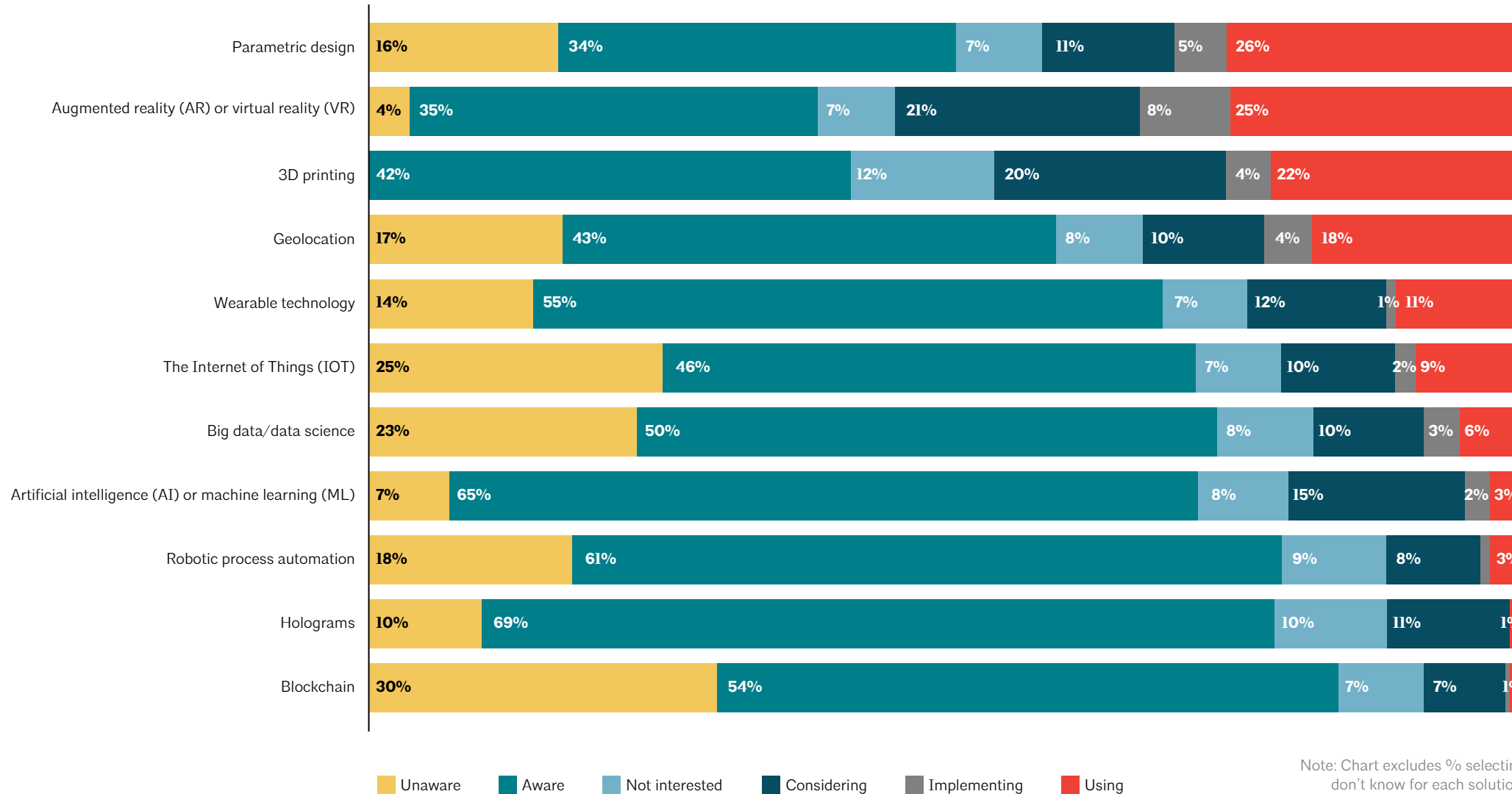
Capabilities & solutions for emerging technologies

Piloting & adopting new tools built on emerging technologies is a third avenue to future success that all firms should actively explore



3 in 10 firms are using or implementing parametric design as well as AR & VR technologies

Assessment of firm's consideration and implementation of various solutions (% of technology decision makers)



Sig. lower use: Respondents working in single-family residential firms (13%)

Note: Chart excludes % selecting don't know for each solution.

Large firms are driving adoption of new technologies

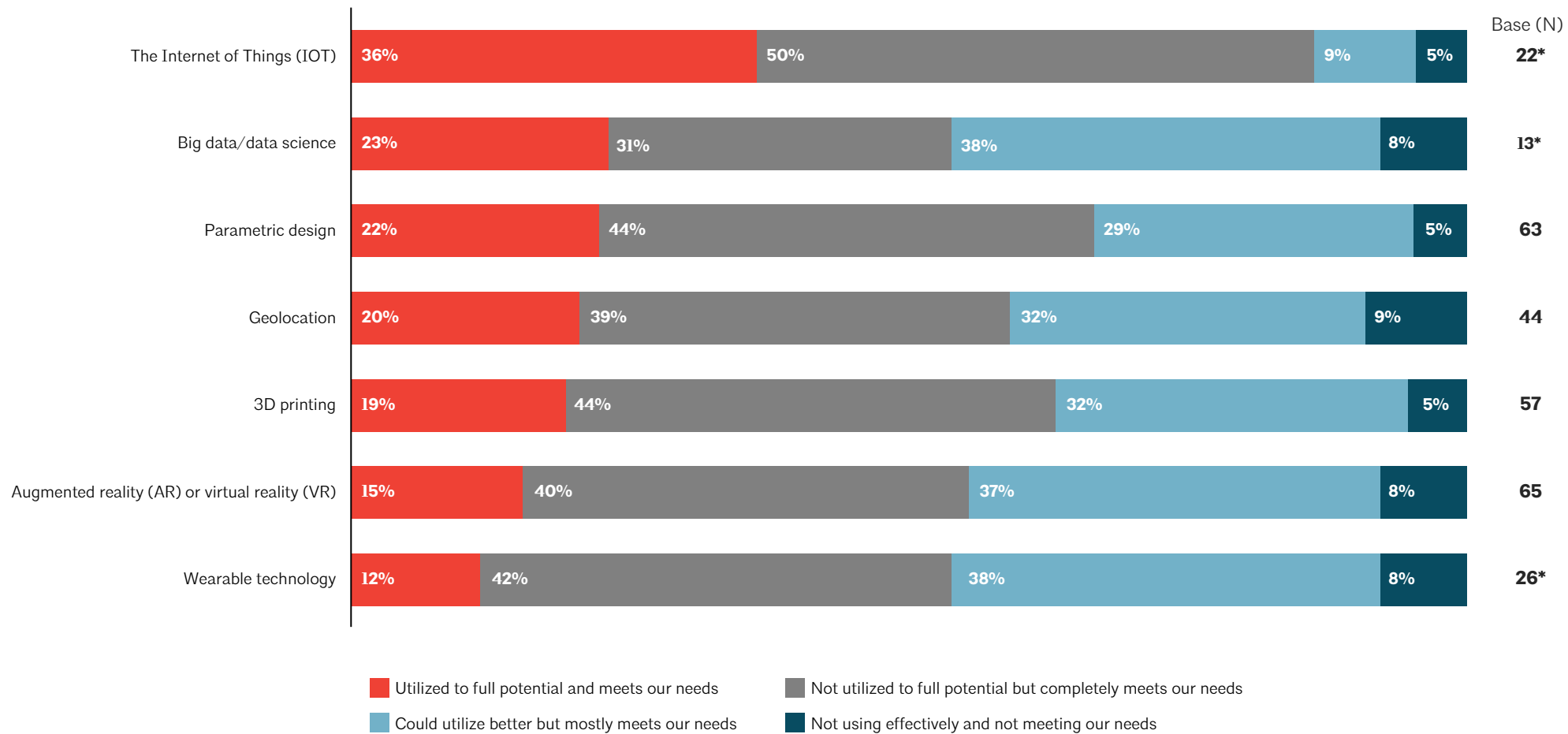
Current use of various solutions (% of technology decision makers, by firm size and firm type)

	Overall	By firm size (number of employees)				By firm type		
		1 to 4	5 to 19	20 to 99	100+	Multidisciplinary	Single-discipline	Non-core
Augmented reality (AR) or virtual reality (VR)	24%	6%	15%	28%	58%	29%	13%	28%
Parametric design	23%	11%	14%	24%	53%	26%	15%	30%
3D printing	21%	5%	8%	28%	56%	27%	11%	21%
Geolocation	16%	10%	6%	15%	42%	17%	9%	28%
Wearable technology	9%	4%	5%	13%	22%	12%	2%	16%
The Internet of Things (IOT)	8%	8%	7%	4%	15%	8%	7%	12%
Big data/data science	5%	0%	0%	4%	20%	6%	0%	9%
Artificial intelligence (AI) or machine learning	3%	0%	0%	2%	11%	1%	0%	12%
Robotic process automation	3%	1%	0%	0%	11%	3%	0%	7%
Blockchain	1%	3%	1%	0%	0%	1%	1%	0%
Holograms	1%	0%	0%	2%	4%	1%	0%	2%

■ Significantly higher ■ Significantly lower

Early adopters of emerging technologies generally report robust utilization although 30%–40% think each could be used more effectively

Extent to which firm is utilizing the potential of each solution (% of respondents that report their firm is using the solution)



Note: Chart shows solutions used by 10 or more firms.

Improving design/project outcomes is unanimously the top reason for adopting emerging technologies

Reasons behind consideration or implementation of technology solution (% of technology decision makers)

Solution	Top driver		Second driver		Third driver	
The Internet of Things (IOT)	Improving design/project outcomes	56%	Improving collaboration	52%	Increasing productivity	33%
Geolocation	Improving design/project outcomes	66%	Increasing productivity	40%	Improving collaboration	34%
Augmented reality (AR) or virtual reality (VR)	Improving design/project outcomes	64%	Improving collaboration	39%	Keeping up with competitors	34%
Artificial intelligence or machine learning	Improving design/project outcomes	73%	Increasing productivity	58%	Improving collaboration	38%
Wearable technology	Improving design/project outcomes	67%	Increasing productivity	33%	Improving collaboration	33%
Robotic process automation	Improving design/project outcomes	67%	Increasing productivity	38%	Keeping up with competitors	29%
Blockchain	Improving design/project outcomes	47%	Increasing productivity	35%	Keeping up with competitors	35%
3D printing	Improving design/project outcomes	77%	Architect/employee demand	32%	Improving collaboration	31%
Holograms	Improving design/project outcomes	63%	Improving collaboration	33%	Keeping up with competitors	25%
Parametric design	Improving design/project outcomes	77%	Increasing productivity	41%	Keeping up with competitors	31%
Big data/data science	Improving design/project outcomes	69%	Improving collaboration	34%	Increasing productivity	31%

Lack of relevance is unanimously the top reason for not adopting emerging technologies, followed by a lack of time or priority

Reasons behind firm decision to not implement or stop using solution (% of technology decision makers)

Solution	Top barrier		Second barrier		Third barrier	
The Internet of Things (IOT)	Not relevant to us	71%	Lack of buy-in internally	24%	Too difficult to implement	12%
Geolocation	Not relevant to us	67%	Lack of time/priority	17%	Lack of time/expertise to re-train staff	11%
Augmented reality (AR) or virtual reality (VR)	Not relevant to us	59%	Lack of time/priority	47%	Cost was too high	18%
Artificial intelligence or machine learning	Not relevant to us	61%	Lack of time/priority	28%	Lack of buy-in internally	17%
Wearable technology	Not relevant to us	82%	Lack of time/priority	12%	Cost was too high	6%
Robotic process automation	Not relevant to us	90%	Lack of time/priority	24%	Too difficult to implement	19%
Blockchain	Not relevant to us	82%	Lack of time/priority	18%	Lack of time/expertise to re-train staff	12%
3D printing	Not relevant to us	53%	Lack of time/priority	34%	Cost was too high	28%
Holograms	Not relevant to us	68%	Lack of time/priority	18%	Cost was too high	14%
Parametric design	Not relevant to us	61%	Lack of buy-in internally	17%	Lack of time/priority	17%
Big data/data science	Not relevant to us	68%	Cost was too high	16%	Lack of buy-in internally	11%

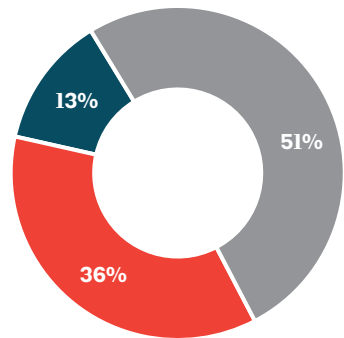
Methodology

Respondent profiling: Demographics & decision-making role

Online survey completed by 329 AIA members (Dec. 14, 2020–Jan. 13, 2021)

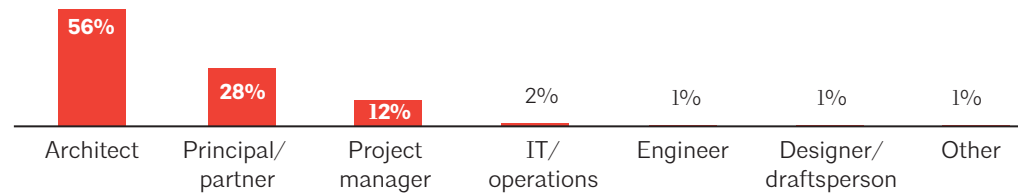
Age

Average age: 53 years

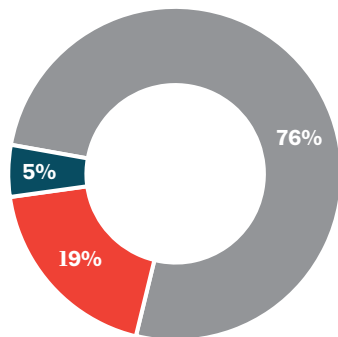


■ 55+ ■ 35 to 54 ■ 18 to 34

Job role

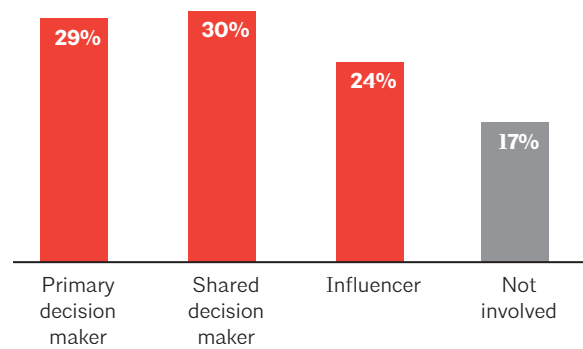


Gender

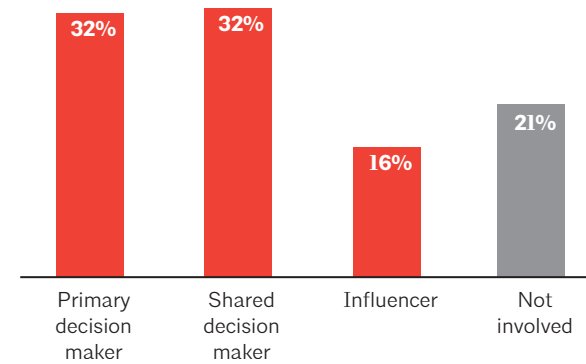


■ Male ■ Female ■ Prefer not to say

Decision-making role: Technology/solution & software

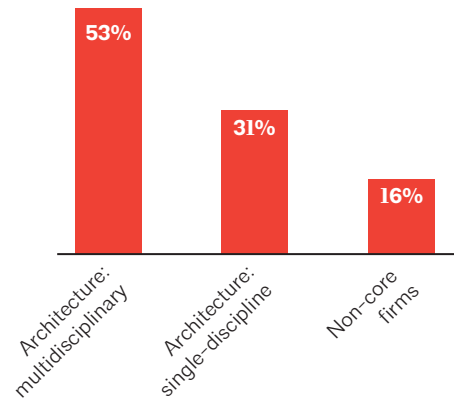


Decision-making role: Software leadership & sales

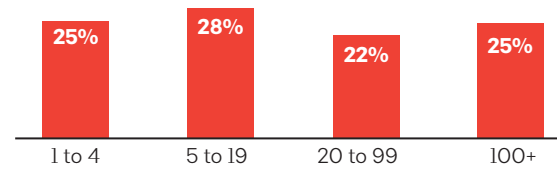


Respondent profiling: Firmographics

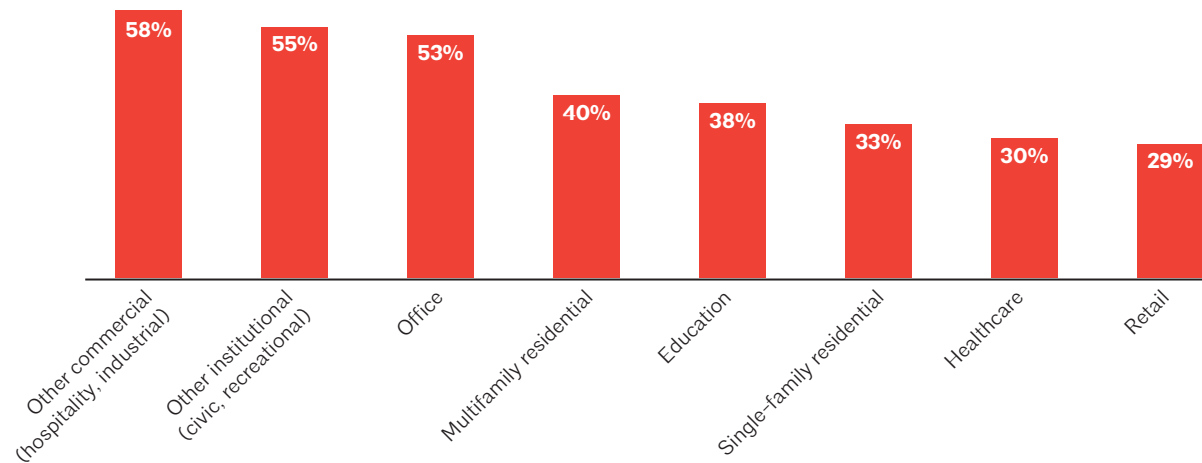
Firm type



Number of employees



Primary project types
(ranked top 3)



*Non-core firms include: consulting, engineering, interior design, planning, and other

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