Nash Squared

Nash Squared **Digital Leadership Report**

25TH ANNIVERSARY

25 YEARS – LOOKING FORWARD, LOOKING BACK

25 years – looking forward, looking back

Bev White
CEO
Nash Squared

When we launched our first report all those years ago, we saw a world increasingly defined by technology. But even we couldn't have predicted the incredible growth in influence tech has subsequently had on our lives.

We've witnessed the birth of smartphones and the explosive uptake of social media. We've seen the exponential growth of the cloud revolutionising how and where software is developed. And we've seen artificial intelligence (AI), automation and data analytics fundamentally impact organisations' decision-making and operations.

And the Digital Leadership Report has been there to capture it all.

It's been an incredible journey, and thank you so much to everyone (50,000 and counting) who has contributed to our research over the years. The report has been, and always will be, driven by digital leaders, and will always be freely accessible to those who take part.

But what of the future?

As you will read in the report we are stepping into a future dominated by AI, data analytics and even smarter, connected devices.
A world where the concept and location of 'work' is fundamentally changing. A world where business, culture, geopolitics and the environment become increasingly entwined.
A world where it becomes even more important for organisations to understand, adapt and respond to the changing environment.

Opportunity? Threat? It depends of course on how you respond.

But one thing is for sure: the Nash Squared DLR will be there to help on your journey.

5 THINGS TO DO WITH THIS REPORT

Reminisce over the last 25 years

Review our technology timeline on page 11

Use tech to get ahead

Learn what tech is helping your peers make money on page 20

Prepare for artificial intelligence

Find out what tech leaders think about AI on page 24

Compare your working in the office policy

Find out how often your peers are in the office on page 30

Think about the biggest surprises in tech

Find out if our panel mentioned anything you'd forgotten about on page 36

CONTENTS

ABOUT THE SURVEY

2,104
respondents

160,000
data points

86
countries

25
years of data

About this Report

The 2023 Nash Squared Digital Leadership Report is the world's largest and longest-running survey of senior technology decision-makers. Launched in 1998 and previously called the CIO Survey, it has been an influential and respected indicator of major trends in technology and digital for over two decades. This year a survey of 2,104 technology/digital leaders globally took place between 22 June 2023 and 18 September 2023, across 86 countries.

What You Need to Know

Budget caution, but investment remains

Budget growth expectations have dropped significantly from last year. But after the hyper growth that we saw both during and coming out of the pandemic, technology spend and investment in people could be seen as returning to more 'normal' levels.

Almost half of digital leaders expect their overall technology budget to increase during the next 12 months – a figure that's broadly in line with pre-pandemic years.

AI – a new Wild West?

The arrival of large-scale generative AI has led many to believe we are at a tipping point. But four in ten are unprepared for the implications of generative AI, and there are clear concerns on regulating it, as well as issues with data privacy and data accuracy.

Our respondents wholly acknowledge that AI requires heavier regulation. Nine in ten assert this, but most believe that regulation will not solve the issue.

Cyber issues down, but for how long?

Major cyberattacks appear to be declining. This may be surprising news for some, however many digital leaders are beginning to view cybercrime as a 'cost of doing business'.

Also, the nature of attack is changing, with the biggest jumps in threats coming from well-resourced foreign powers and competitors. Many digital leaders are concerned that generative AI, with its ability to mimic humans at scale, will open up a whole new line of attack in the future.

Skills shortage less intense

This year sees headcount growth expectations decline, jumping from an all-time peak during the pandemic to something more in line with the decade prior to the pandemic.

The focus for organisations has moved from growing headcount, to retaining, engaging and building the effectiveness of their existing teams.

The most scarce skills are data engineers, enterprise architects, software engineers and technical architects.

Hybrid working improves diversity

Six in ten organisations now have a policy for employees to be in the office at least one day per week. Larger organisations are more likely to have such policies.

Hybrid working improves diversity. Digital leaders who mandate one to two days are hiring 27% more women than their peers with five-day mandates. Great news for those with caring responsibilities, and one day this might benefit as many men as women.

Net zero - almost half have no plans

If you are looking for good news on sustainability, look away. Just under half of digital leaders said that their organisation had no plan to reach net zero.

Where plans are in place, almost half set their sights on 2030 and beyond, and here's some good news: six in ten expect to deliver on their plan, with almost everyone else expecting to get close.

Digital leaders (re)gaining influence

In 2017 we began to see a decline in executive committee membership, as technology became increasingly owned and operated from outside the traditional technology team.

More recently, membership has climbed up again – to seven in ten, and close to its highest recorded level. The influence of the digital leader tends to grow when there are new technology challenges and right now, with the proliferation of new technologies, digital leaders can offer an invaluable perspective.

25 years – what have we learnt?

Back at the start of 1998 we had yet to experience a smartphone, or search Google, or post an update to friends on Facebook. The only thing you could buy on Amazon were books.

Today we have smartphones that back to 1998 would be in the world's top 500 most powerful computers.

The potential for technology is incredible. But also, so is the potential of the digital leader. One thing is for sure: it has never been a more exciting time to be in technology.

DIGITAL LEADERSHIP REPORT AT A GLANCE

2,104 digital leaders responded

14% female digital leaders

86 countries

MANAGING THE TECH TEAM

54% report talent shortage

SKILLS SOUGHT

Top 4

1. Data engineers
2. Enterprise architects
3. Software engineers
4. Technical architects

17% think government immigration policies help talent pipeline

71% average proportion of directly employed team members

Direct hiring is the primary way of securing talent

BUDGETS & OUTLOOK

AIMS FOR TECHNOLOGY TO ADDRESS

Top 3

1. Improving operational efficiency
2. Developing new products & services
3. Improving customer experience & accessibility

66% of CEOs expect tech to make them money

45% expect a budget increase

10% typical budget increase

50% expect a headcount increase

CYBERSECURITY

23% experienced major attack in last two years

45% fear attack from foreign powers

11% fear attack from competitors

ROLE OF CIO

20% digital leaders have joined their organisation in last 12 months

68% of CIOs on the executive committee

38% had a pay freeze last year

30% average bonus/benefits is 30% of salary

REMOTE WORKING

mandated office days down

remote policies down

20% more females **in tech teams** & **27%** more female hires **with a minimal in-office policy** than those with a mandate for a full week

BUSINESS PERFORMANCE & TECH

37% identify as Digitally Excellent

25% identify as Data Excellent

TOP TECH DELIVERING ROI

Cloud · Big Data · AI

NET ZERO

47% recognise tech has an extensive role to play

59% with net zero target expect to meet it

46% have no plans to reach net zero

ARTIFICIAL INTELLIGENCE

88% think it needs more regulation

BUT

61% of them think it won't work

15% feel well prepared for generative AI

21% have an AI policy

Respondents expect **17%** of **jobs to be lost to automation** over the next five years

WHAT TECHNOLOGY HAD THE BIGGEST IMPACT IN THE LAST 25 YEARS?

Sadia Hasan
Director of Product Management
Meta

The advent of social media has reshaped how people interact, share information, and create and consume content. It has created platforms to amplify voices, accelerate global community building and causes, and market your brand via influencer marketing. This new economy has proliferated e-commerce and small businesses globally, brought new audiences and dollars online, and shifted traditional media and marketing channels to more individualistic and local methods.

Matt Pilcer
EVP, Technology Unified

The amount of data being generated by advertising infrastructure and platforms has exponentially grown over the past 25 years. The big data revolution has empowered marketers to analyse vast amounts of marketplace signals to optimise business outcomes to full industry agnostic economic growth.

Bryan Glick
Editor-in-Chief
Computer Weekly

No technology has driven social, cultural and economic change like the smartphone. Of course, smartphones wouldn't have reached such ubiquity without the internet – but it's the former that has made the digital revolution real for people of every background worldwide.

Marcus Hunter
Chief Technology Officer
EVRi

The smart device and the mobile technology revolution have reshaped how people interact, driving transformative change in areas such as healthcare, logistics and social aspects.

Claus T. Jensen, PHD
Chief Innovation Officer
Teladoc Health

Society today would be completely different without the combination of ubiquitous connectivity and smart connected devices. No matter how powerful your solutions, if they could not be deployed seamlessly to billions of people, they would not have nearly the same effect. Sometimes it is the basic things that drive the most fundamental changes.

Chris Ballance
CEO & Co-Founder
Oxford Ionics

The "dontcareification" of tech. Whether it be "I don't care where my processors are" of cloud computing, or "I don't care how it gets the right answer" of deep learning - this shift has completely changed our relationship with tech and how we think about compute.

Stephanie L. Woerner
Director
MIT Center for Information Systems Research

The internet has had the biggest impact on business in the last 25 years. There has been an explosion of business models, and companies are finding value in their ecosystems in addition to value from their customers and operations.

Gary Shapiro
President & CEO
Consumer Technology Association (the producer of CES)

Clearly the internet has changed business and society, especially as we've gone more wireless with Wi-Fi and silent portability too. The more broadband the greater it is for everybody to do anything you want anywhere you want in a way that's hopefully making us better as people.

Allan Cockriel
CIO GF/CISO
Shell

Global availability and adoption of internet and low-cost compute: it has digitally connected the globe, democratised data, disrupted most business models, and fundamentally impacted most aspects of our lives. In an increasingly digital-centric work, it will drive down the marginal costs to scale toward net zero, and be foundational to the acceleration of generative AI.

Professor Dame Wendy Hall
Member of the UK Government's AI Council

The internet has had the biggest impact on business and society over the last 25 years. Amongst other things, it has enabled us to generate all the data that very powerful computers are using to train the machine learning algorithms and generative AI technology we see today.

WHAT TECHNOLOGY WILL HAVE THE BIGGEST IMPACT IN THE NEXT DECADE?

Allan Cockriel
CIO GF/CISO
Shell

The integration of AI as a co-pilot in our day-to-day lives. AI will disrupt businesses in a similar way to the advent of the internet. The level of acceleration and automation will be unprecedented.

Gary Shapiro
President & CEO
Consumer Technology Association (the producer of CES)

It sounds so common as an answer, but generative AI is making a huge difference. That will change things from how we drive our cars, to robots that help us out to improving health care, education and the advancement of people.

Sadia Hasan
Director of Product Management
Meta

Our biggest opportunity in the next decade is to truly harness artificial intelligence. The accelerated proliferation and adoption in the past few years has already begun transforming industries from healthcare and finance to manufacturing and customer service.

Professor Dame Wendy Hall
Member of the UK Government's AI Council

AI will have the biggest influence on the advancement of technology over the next decade, but we need to ensure it's a force for good.

Stephanie L. Woerner
Director
MIT Center for Information Systems Research

Customer expectations are driving tech changes now. Companies will need to really identify the problems/desires their customers are trying to solve and then assemble partners to create solutions to address them.

Matt Pilcer
EVP, Technology
Unified

The most promising tech advancement in the next decade will likely be the continued evolution of visual and audio Augmented Reality (AR). I believe it will be the interface on how most consumers and professionals interact with AI.

Chris Ballance
CEO & Co-Founder
Oxford Ionics

I'm biased, but I think it's going to be Quantum Computing.

Bryan Glick
Editor-in-Chief
Computer Weekly

Every major advancement in tech comes from the same cause – reaching the point of commoditisation, where a technology jumps from tech-industry expectation to mass market. We're on the cusp of that happening with AI – but perhaps not quite as quickly as some predict.

Claus T. Jensen, PHD
Chief Innovation Officer
Teladoc Health

The next fundamental shift is going to be ambient solutions. Building intelligence into connected software and devices all around us means they can be our awareness of good and bad, popping up to help at the exact moment help is needed. This is certainly a big deal in healthcare, but I believe will ultimately transform all industries in fundamental ways.

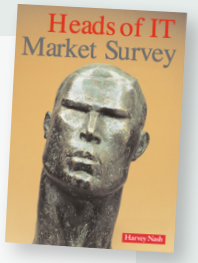
Marcus Hunter
Chief Technology Officer
EVRi

I think we will see an explosion in biotechnology and genomics, with the explosion of AI supporting this development. Personalised medicine could lead to significant breakthroughs in future healthcare.

25 YEARS OF THE DIGITAL LEADERSHIP REPORT

	1998	2023
WORLD POPULATION	5.9BN	8BN
% OF WORLD POPULATION WITH ACCESS TO THE INTERNET	3.6%	64%
CO2 EMISSIONS	24BN METRIC TONNES	37BN METRIC TONNES
# OF TOP TEN GLOBAL COMPANIES THAT ARE TECH	3/10	7/10
NUMBER OF DEVICES CONNECTED TO THE INTERNET	500M	15.1BN
MOST POWERFUL COMPUTER	INTEL ASCI RED/9152 1.3 TRILLION OPERATIONS PER SECOND	HP ENTERPRISE FRONTIER 1.102 QUINTILLION OPERATIONS PER SECOND
INFLUENTIAL TECHNOLOGY	MOBILE PHONE CLIENT SERVER DOTCOM BOOM MANAGEMENT INFORMATION BUSINESS PROCESS DESIGN VIDEO CONFERENCING OFFICE WORK CORPORATE VISION INTELLIGENCE EMAIL	SMARTPHONE SOFTWARE-AS-A-SERVICE DIGITAL TRANSFORMATION DATA ANALYTICS AUTOMATION/AI TEAMS / ZOOM HOME WORK CORPORATE PURPOSE ARTIFICIAL INTELLIGENCE EMAIL

25 YEARS IN TECHNOLOGY



1998 to 2002

1998 Nash Squared launch Heads of IT Survey, which becomes the DLR
1998 First Quantum computer (2-qubit)
1998 Google – the future front door to the web for many
1999 Napster - music sharing for free, but proves to be illegal
1999 BlackBerry email pager - paves way for the smartphone
1999 Salesforce – promotes widespread adoption of SaaS
2000 Y2K worries – January 1st comes and goes without disaster
2001 Apple iPod - music on the go, and paid for

1998 to 2002

2003 to 2008

2009 to 2017

2018 to 2023

2009 to 2017

2009 Bitcoin – excitement as people get rich, and poor, quick
2011 IBM Watson wins Jeopardy – AI outsmarts humans
2013 Oculus Rift – VR for the masses
2014 Number of websites reaches 1bn
2014 Alibaba on NYSE – at the time the largest IPO in world history
2015 Amazon Echo and Alexa – voice-activated homes
2015 Paris Agreement – a promise to keep global temperature rise < 2°C
2017 TikTok – shortform video proves surprisingly influential

2003 to 2008

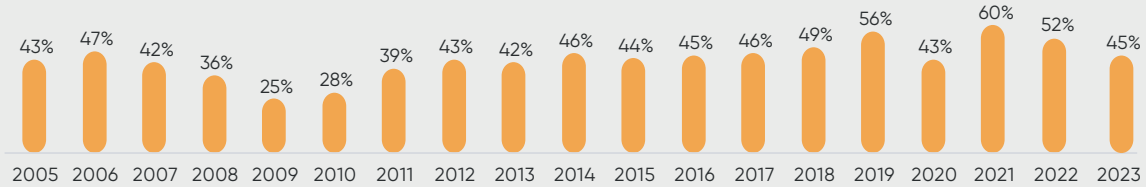
2004 Facebook - like it, or not
2005 YouTube - everyone can be a film star
2007 Apple iPhone - the power of the internet in your pocket
2008 Google Android - open source software boosts mobile adoption
2008 4G - things speed up
2008 Tesla Roadster – electrifying EV car sales
2008 One quarter of the world's population are internet users

2018 to 2023

2019 5G - things really speed up
2021 RockYou2021 leaks 8.4 billion passwords
2021 Hybrid working – pandemic changes work patterns forever
2023 OpenAI releases GPT-4 – GenAI goes mainstream
2023 Thumbs up emoji 👍 found legally binding in disputed contract
2023 Satellite 5G – promise of 5G in remotest places
2023 Nash Squared celebrates 25 years of the DLR

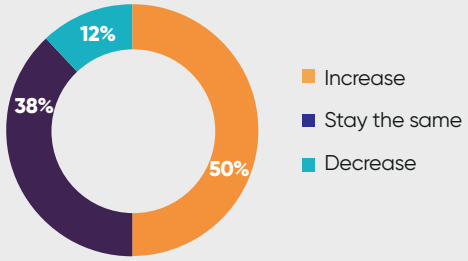
1. BOARD PRIORITIES AND INVESTMENT

Expecting technology budget increases



Organisations expecting tech budget increases in next 12 months.

Organisations plan for headcount



How do you expect your headcount to change in next 12 months?

What type of project appeals to your CEO?

34%

One that SAVES money.

66%

One that MAKES money.

Budgets and headcount

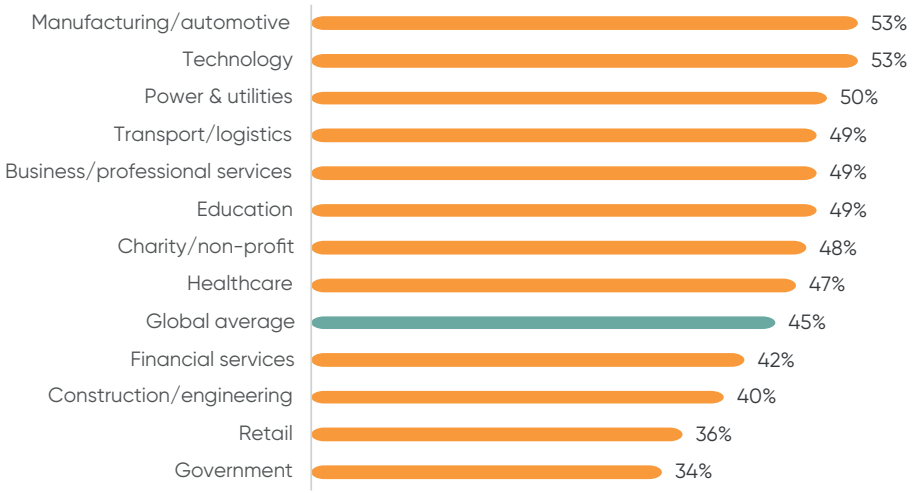
Last year digital leaders highlighted the risk of global economic headwinds. This year we see those winds pick up and technology spend and recruitment squeezed, but not everywhere; some sectors are enjoying significant growth.

Last year we predicted that in the coming 12 months there would be more caution with spend on technology and its people. At the tail end of 2022 we saw the initial signs of this restraint, and as we entered 2023 it seemed like a day couldn't pass without another announcement of workforce reductions and headcount freezes from the biggest names in tech.

During the pandemic we experienced hypergrowth on technology spend as organisations worked to pivot and transform in response to remote work and changing customer needs. Without a doubt some of this cutting back has been due to global economic crises, but digital leaders also say that during the pandemic many organisations overinvested in technology and people, and this year they have returned to 'normal' levels.

And these *are* 'normal' levels, similar to what we experienced immediately prior to the pandemic. The last global recession was from 2008 to 2009 where the tech budget increase expectations languished at 25% – levels are nowhere near that right now.

Organisations expecting a budget increase by sector



Looking forward, over the next 12 months, do you expect your overall IT/technology budget to…? 'Increase'.

Of course, headwinds are only headwinds because of the direction you are travelling in. Dig deeper into the data and there are big differences in budget expectations across sectors as organisations take their technology in different directions. IT budgets continue to flow in the manufacturing/automotive sector with more than half (53%) expecting an increase. Digital leaders say that this is in part driven by the continued digitisation of their supply networks in order to increase their resilience; a fragility that was highlighted first by the pandemic then exacerbated by increased global instability. Sustainability is another priority for the heavier 'energy-hungry' industries, and in particular for the automotive sector the transition to electric and self-drive vehicles has attracted significant technology investment.

The technology and power & utilities industries take positions two and three in our budget growth chart. Both have traditionally attracted higher than average investment in technology. And technology has long been a disruptive sector where tech investment is key. Power & utilities have remained resilient during our recent economic turbulence – even in hard times our cups of coffee still need kettles and we still need heating and running water – and geopolitical forces have boosted profits for these industries.

Like manufacturing, power & utilities are also attracting investment in green technologies.

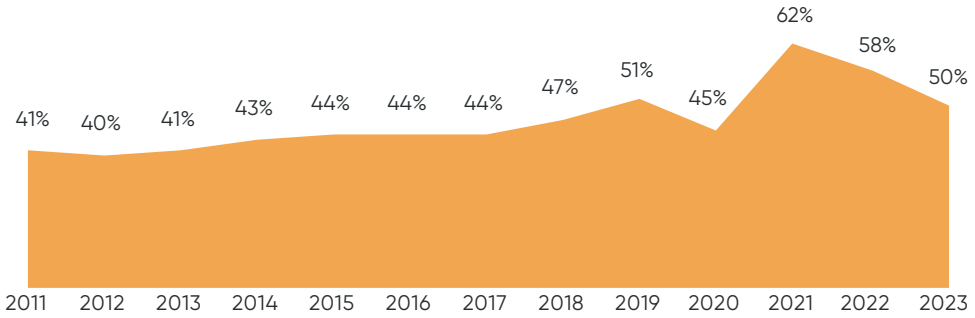
Amount of expected budget increase

Budget increase	Proportion of respondents
0-4%	2%
5-9%	12%
10%	32%
20%	27%
30%	10%
40%	3%
50+	11%

According to our research, if you are lucky enough to have a budget increase, the most likely amount is 10%, although there are plenty getting twice that amount. If your budget is being cut, the most likely amount is also 10%.

Headcount

Expecting technology headcount increases



Over the next year how do you expect your IT/technology headcount to change? 'Increase'.

This year sees headcount growth expectations decline, continuing a downward trend from the all-time high in 2021, and bringing growth more in line with the decade prior to the pandemic. The focus for organisations has moved from growing headcount, to retaining, engaging and building the effectiveness of their existing teams. That said, we shouldn't forget it still means that half of companies expect to grow their headcount, and that this is the second-highest reading in the last decade outside the pandemic peak. Talent remains a key priority, and is often a headache, for digital leaders.

Board priorities

The next year will see digital leaders continue to be tasked with finding ways to do more with less.

Top business priorities for technology to address

1. Improving operational efficiency
2. Developing new products and services
3. Improving customer experience and accessibility
4. Enabling workforce productivity
5. Gaining actionable insights from data
6. Delivering stable and consistent IT performance
7. Improving agility and speed to market
8. Improving customer engagement
9. Improving security and trust
10. Improving sustainability
11. Dealing with instability, risk and major change
12. Entering new geographical markets
13. Improving employee engagement

If we look at how priorities have changed over the years, we see an increasing focus on the customer, whether that's using technology to create new products and services to generate new revenue streams or using technology to improve the customer experience and engagement to gain a greater share of their wallet. Traditional priorities like 'delivering stable and consistent IT' have dropped down the table as technology platforms become increasingly robust.

As priorities have changed, so have the talent needs, with an increasing focus on customer experience and data and business skills – moving away from pure technical skills.

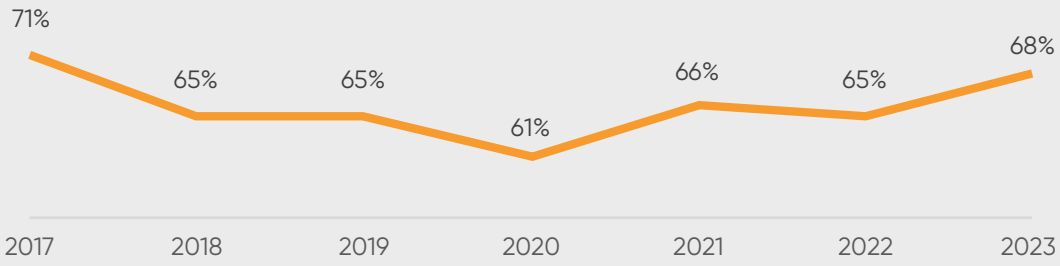
5 years ago	Today
Delivering consistent and stable IT performance	Improving operational efficiency
Improving business processes	Developing new products and services
Increasing operational efficiencies	Improving customer experience and accessibility

However, no matter how far technology is externalised towards the customer, inward-looking 'improving operational efficiency' remains a top priority; simplifying processes and automating those that no longer need human input is a key requirement for digital leaders. 'Enabling the workforce to be more productive' remains a top 5 priority as automation grows, operational systems like customer relationship management are developed, and hybrid working embeds itself into labour practices.

What hasn't changed over the last five years is that two-thirds of our respondents state that their CEO wants technology to 'make' rather than 'save' them money. This might seem at odds with the 'save money' priority of 'improving operational efficiency'. Technology is the answer to many of the challenges businesses face, and it won't be a surprise for most digital leaders that demanding CEOs want both!

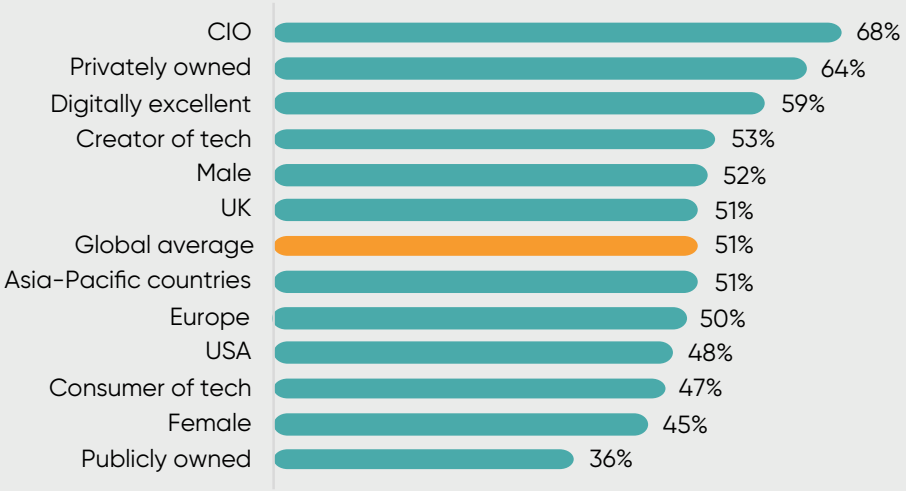
2. THE ROLE OF THE CIO AND DIGITAL LEADER

CIO/IT Director membership of the operational board/executive management team



Are you a member of the operational board/executive management team of your organisation?

Respondents who are on the operational board/executive management team



Are you a member of the operational board/executive management team? 'Yes'. (all respondents)

The role of the digital champion

Digital leaders have a critical role to play in their organisation's strategy. Quite how critical depends on their ability to add value to an increasingly tech-literate executive team. In times of great technological change, the digital leader has a particularly important role to play.

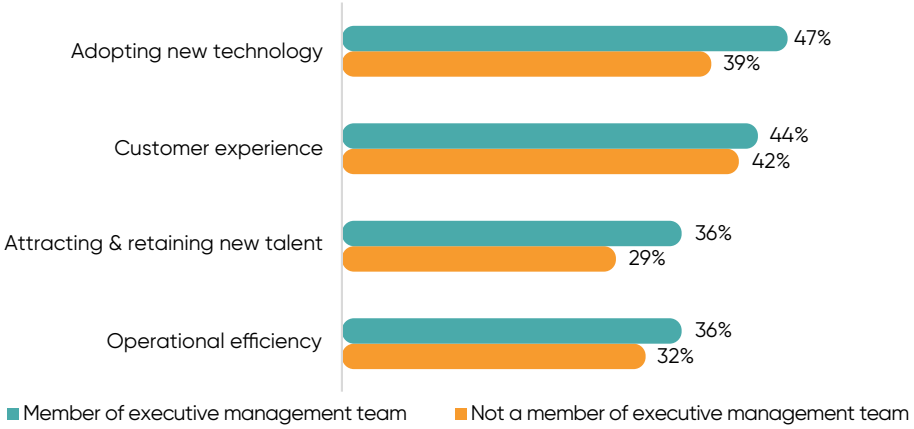
Albert Einstein said, "The source of all knowledge is experience". The skill of learning through doing has never been more relevant to today's digital leader who year-on-year needs to be more flexible, adaptable and ready to experiment in order to effectively support the wider business.

Almost three-quarters (72%) of this year's Digital Leadership Survey respondents consider themselves to be 'creators' rather than 'consumers' of technology. However, taking advantage of advancing technology requires courage, creativeness and cooperation. These are skills and capabilities that digital leaders have honed over years of leading change. Their leadership has become increasingly embedded and critical to the business - broadening their remit from functional, operational roles into something more strategic and collaborative.

One thing is without question: the board recognises the value and potential of technology. In the past this value was inextricably entwined with the value of the digital leader, but in 2017 we began to see a decline in executive management team membership. This was a period that saw technology increasingly owned and operated from outside the traditional technology team.

More recently membership has climbed up again. Technology leader influence tends to grow when there are new technology challenges emerging, or new opportunities that require a technologist's viewpoint from the outset. Right now, with the proliferation of new technologies like generative artificial intelligence - the poster child technology of 2023 - digital leaders can offer a unique and valuable perspective. Our research shows that they are most likely to have a seat on the executive management team if they are a male CIO working for a digitally excellent, privately owned company and they are a 'creator' rather than a 'consumer' of tech.

Digital leaders outperforming the competition



Digital leaders indicating their organisation is outperforming competition.

Our research shows that when digital leaders are given a seat at the top table this delivers advantages when it comes to outperforming the competition across many metrics, including a 20% uplift in adopting new technology and a 24% advantage in attracting and retaining talent.

Of particular note is that last year, after the changes demanded by customers throughout the pandemic, being on the executive management team gave a reported 24% uplift to outperforming on customer experience. This year it delivers only a 5% advantage. This highlights that when business change is at its most dramatic, sitting alongside the primary decision-makers is incredibly beneficial.

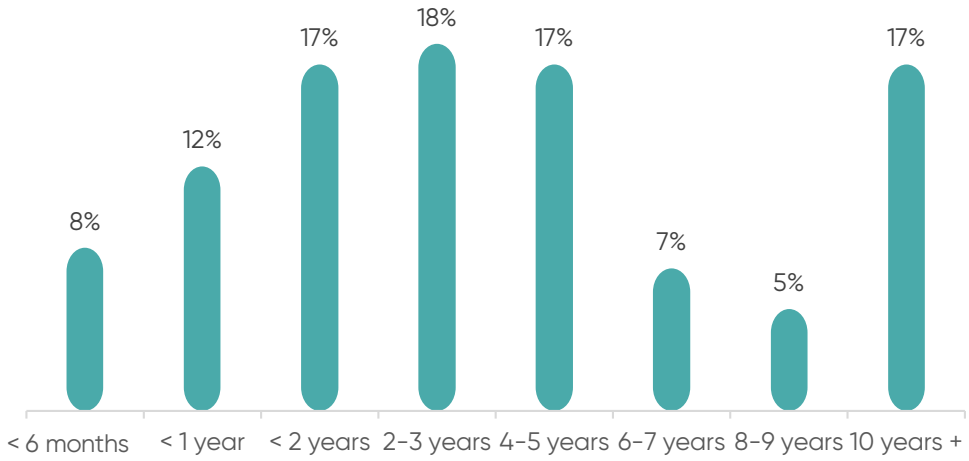
When it comes to tenure, 37% of our respondents have been with their organisations for less than two years and 20% have joined within the last 12 months.

As shown on page 15 digital leader membership of the executive committee has recently grown; organisations are increasingly looking to the digital leader to drive strategic change, and this has generated an influx of new executives.

Up to 29% have been in a role at their company for more than five years. The most typical time a digital leader has been in their job is two to three years. Many digital leaders join organisations to bring transformation, which typically might occur in a two-to-four-year period, and then move on. It's unsurprising there is a peak of people whose tenure matches this.

We also see a band of leaders with longevity of tenure; 17% have spent in excess of a decade within the organisation. These leaders we can assume are operationally excellent, embedded and grow and change along with the business. Digital leaders in the construction/engineering sector are the most likely to fit into this category.

Time with current employer



How long have you been with your current organisation?

WHAT WERE YOU DOING IN 1998?

We asked digital leaders what they were up to when we launched the first Digital Leadership Report.

Being a typical teenager.
Allan Cockriel, CIO GF/CISO, Shell

Losing my job as an only occasionally successful IT sales rep, and embarking on a career change into journalism!
Bryan Glick, Editor-in-Chief, Computer Weekly

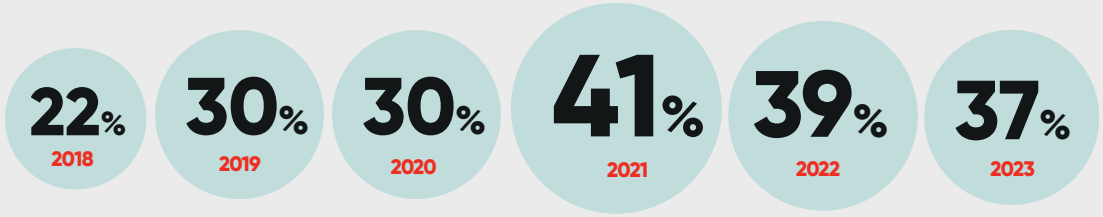
In 1998 we had just finished deploying a web-based cash management system for corporate banking customers. Adding a web frontend to a main frame was a big deal, and we wrote quite a bit of HTML by hand! Pretty cool system, if I may say so, and it was using digital signatures based on asymmetric keys for authentication. Unfortunately, US export restrictions did not allow for more than 40-bit encryption keys in the web browser clients. The world has changed a lot since then.
Claus T. Jensen, PHD, Chief Innovation Officer, Teladoc Health

I was researching the careers of start-up founders.
Stephanie L. Woerner, Director, MIT Center for Information Systems Research

I had just changed careers from civil engineering to providing IT support services in the NHS.
Marcus Hunter, CTO, EVRi

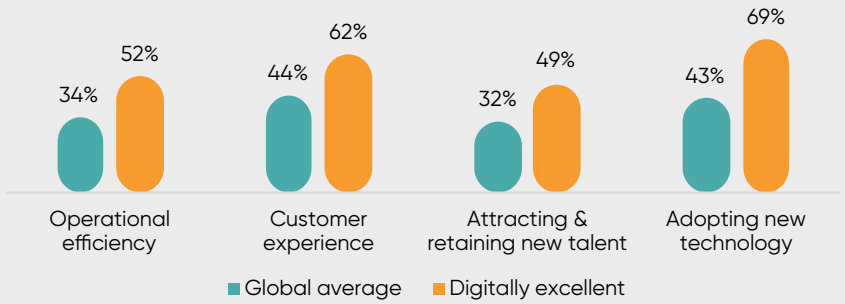
3. DRIVING BUSINESS PERFORMANCE THROUGH TECHNOLOGY

Leaders identifying as digitally excellent



'Very' and 'extremely effective' at using digital technologies to advance their business strategy.

Performing better than the competition



Currently, how does your organisation perform relative to its competitors on the following?

Digital excellence

Technology is increasingly providing a basis for growth, innovation and differentiation. But implementing it effectively is no small task, and some of the 'big shots' in emerging tech – data and artificial intelligence (AI) – are proving difficult for some organisations to scale. The challenge around tech isn't tech; it is people and culture.

From 2018 we have seen a steady progress of organisations that consider themselves digitally excellent ('very' or 'extremely effective' at using digital technologies to advance business strategy). But in 2021 progress stalled.

This stall coincided with budget-growth cuts, but despite that growth returning in subsequent years, digital excellence has plateaued – the doors have closed on this exclusive club of which 37% are members.

Digital doesn't stand still, and nor does the definition of excellence. What was cutting edge and winning new customers five years ago may be seen as humdrum today. Moreover, one casualty of the pandemic that still seems to remain, is that investment in emerging tech is being held back with the exception of pilots in AI, quantum and the metaverse.

The discussion around digital excellence isn't theoretical. In the real world those leaders who identify as digitally excellent also report being twice as likely to be beating competitors on a whole series of CEO-pleasing metrics, from operational efficiency to retaining new talent.

The value in data

Creating data is the easy bit. The harder bit is turning it into valuable business intelligence. Some organisations are succeeding in this task – one in four digital leaders are 'very' or 'extremely effective' at using data insights to generate more revenue. And many more can see the potential; almost half of digital leaders see data analytics as one of the top 2 deliverers of return on investment (ROI).

But for four in ten – those who are 'slightly effective' or worse – it's clear there is still a mountain to climb. The fact is that many organisations are drowning in data, and for some it is only getting worse.

Our research suggests that it is not necessarily a question of volume, as small organisations are using their data as effectively as their larger peers. Simply put, regardless of their size, some organisations appear to be stuck at the stage of refining a basic data strategy, while others are surging forward.

The challenge for many organisations is the operating model. Data may have the answers, but if an organisation isn't in the habit of asking the right questions, it's hard to make it work.

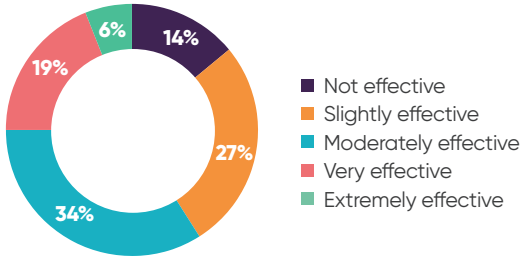
For instance, if organisations already have regular trading forums where they look at top customers and spot opportunities for growth, then data has a natural role to play in answering important questions. If organisations don't, then no matter how many answers data gives, it is likely to fall on closed ears.

There is also a challenge around skills and knowledge. Not just the 'data literacy' skills of bringing vast data sets together, but the skills of bringing multiple stakeholders together across operations, marketing and finance.

No CEO would say data is unimportant, but – like many technology investments – there is a need to line up many things to make it work, such as the operating model, culture, technology strategy, people and the data itself. No small task.

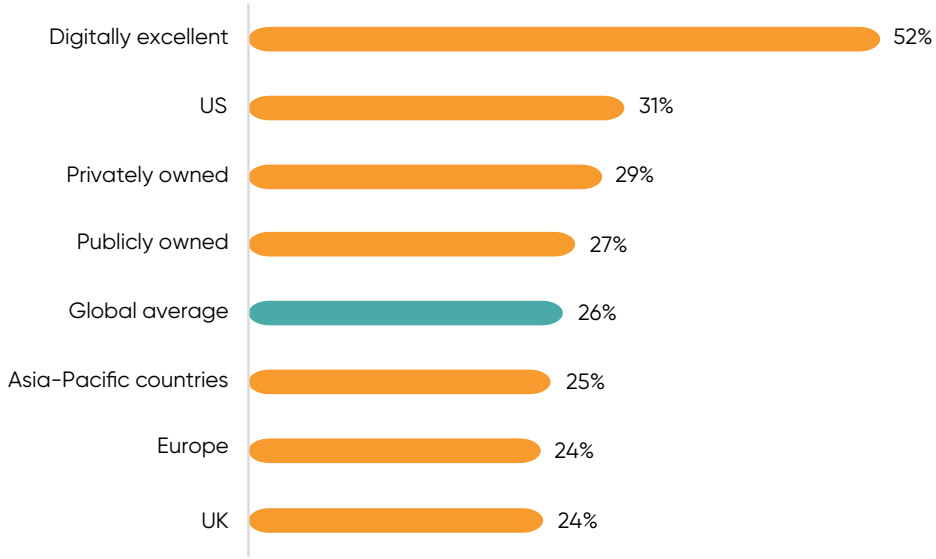
Unsurprisingly, digitally excellent organisations perform best on data. The US also performs above average. Digital leaders in retail, arguably a data-rich sector, rate themselves relatively poorly. Clearly there are exceptions to this, you only need to log onto a leading online retailer and see the eerily accurate way it can predict your needs. But our research suggests that there are also many in this sector with much work to do, and it may be the case that the more data you have, the harder it is to make headway.

Success at using data insights to generate revenue



How effective is your organisation at using data insights to generate more revenue?

Organisations that are data excellent



How effective is your organisation at using data insights to generate more revenue? 'Very' and 'Extremely effective'.

Return on investment

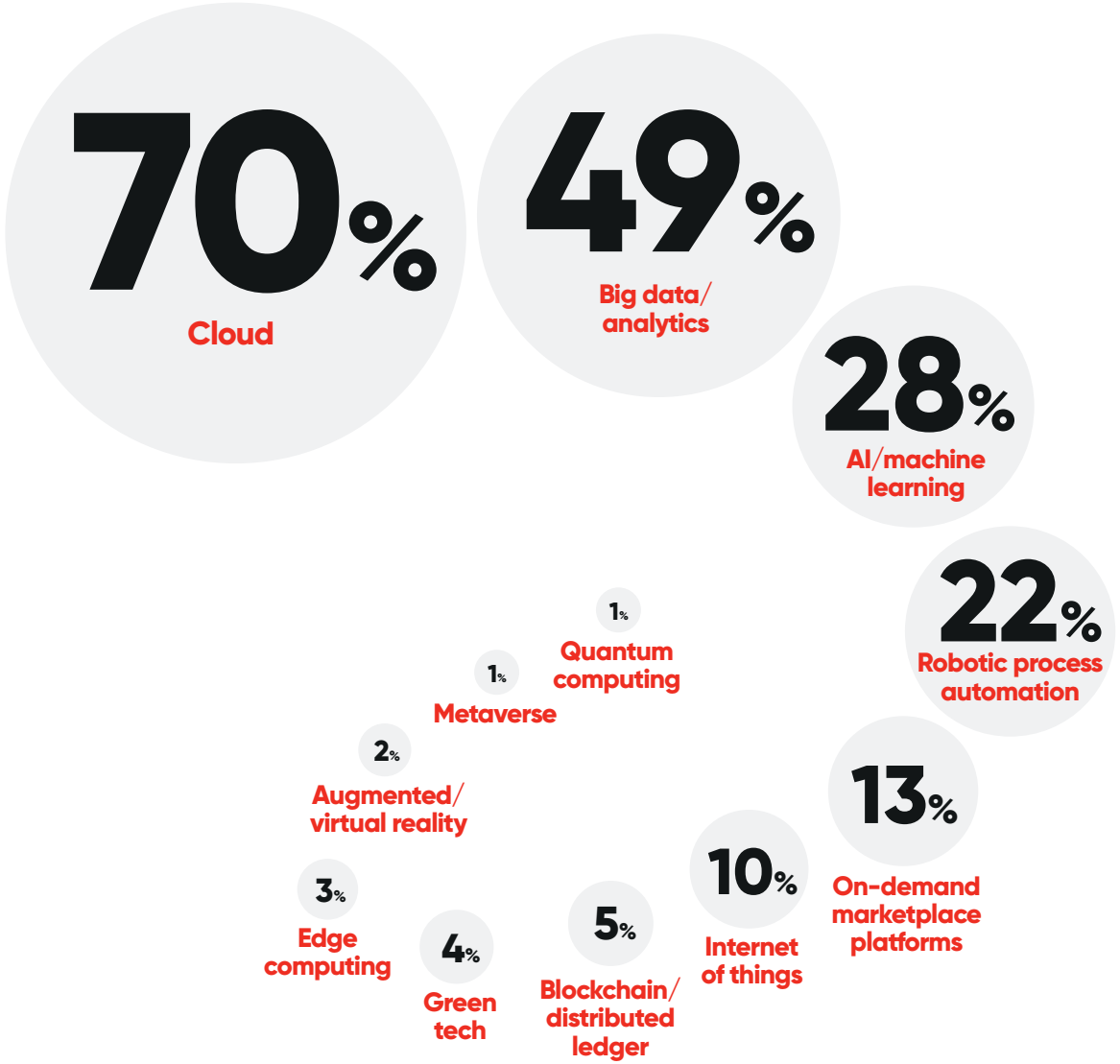
Asking our digital leaders about the tech investment that has delivered the best returns over the last three years has an obvious answer. Perhaps the most significant value of cloud technology is its ability to make a business more agile and responsive, it is unlikely to be cost savings, although they sometimes occur. There is a popular conception that the pandemic resulted in a mad scramble for cloud computing, but our data from previous surveys shows that momentum had been gathering in the years prior to Covid. Up to 70% of respondents place it in their top 2.

Just over a quarter (28%) of respondents list AI/machine learning in their top 2, which is remarkable given only one in ten digital leaders has a large-scale implementation at this point in time. Is this an enthusiastic response from the digital pioneers or a genuine acknowledgement of the resources it saves and the insights it delivers? One respondent cited how simply using AI for document creation and office tasks has transformed their business, allowing it to be more nimble, less resource hungry and freer to focus on getting closer to their customers – so perhaps it is the small things that can make a difference?

Our respondents are qualitatively less enthusiastic about the benefits of technologies such as virtual reality and blockchain – "while there is still potential in shared ledgers, blockchain is a solution in search of a problem" stated one.

One respondent quoted Microsoft's Clippy assistant as the single most disappointing tech available in the last 25 years (if you are under 40 years old you'll probably need to Google it).

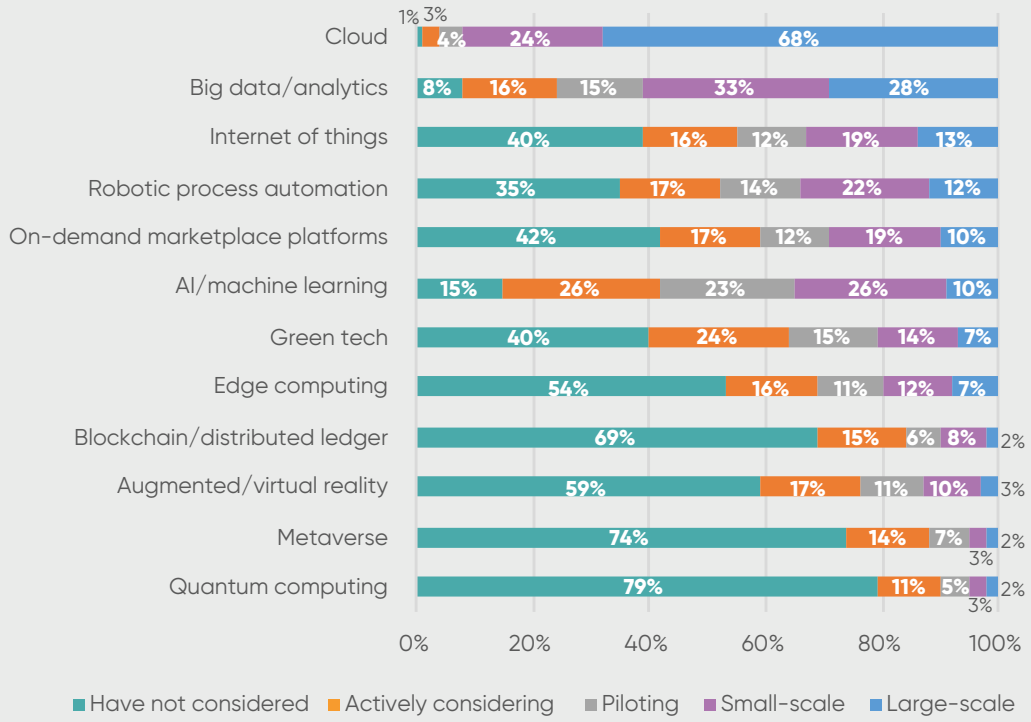
Technologies generating most ROI over three years



Which technology implementations have generated the most ROI in the past three years? Select top 2.

4. MANAGING TECHNOLOGY

The technology maturity matrix



How would you characterise your organisation's usage of the following technologies?

Technology investment

Investment in emerging tech remains as cautious as last year. The economic outlook is making digital leaders think carefully about where they put their increasingly hard-won budget. Despite the hype around artificial intelligence (AI), it is far from a reality and the majority of implementations are experimental or small-scale. Quantum computing is showing increased interest, although its mass market adoption is a long way off.

Last year we noted how digital leaders were scaling back on investing in emerging technologies and this year we see a similar story. AI, quantum and the metaverse are the only technologies to see a positive move in piloting projects. Just over a quarter of organisations have a large-scale implementation around big data/analytics, which seems surprising given a climate that is forcing digital leaders to bring value from the resources they already have.

This year we debated whether the cloud rightfully belongs on our emerging technology list given it is now ubiquitous, but for now it serves as a useful comparison of trajectory and maturity for its digital cousins like AI and big data.

Quantum computing seems to be sparking interest with just over one in ten digital leaders actively considering its use, and more than 100 (mainly in the technology and banking sectors) are currently implementing a project.

Much of the current excitement in quantum computing involves 'quantum-as-a-service', known in short as QaaS.

Worldwide investments in quantum technology start-ups reached their highest levels in 2022, at $2.35 billion according to McKinsey Digital.[1] There is a strong argument that programmers should be readying themselves now. Google, IBM and Microsoft have all released open-source tools to help coders familiarise themselves with writing programs for quantum hardware.

1. McKinsey Digital, 'Quantum technology sees record investments progress on talent gap', 2023.

As last year, we have looked at the ratio of 'small' to 'large implementations' as a useful way to see where emerging tech may be hitting the mainstream.

There are no surprises with the top 2 technologies in our table. The internet of things (IoT) is often lauded for its immense potential but despite emerging 40 years ago can hardly be considered a riotous success with only 13% of digital leaders having a large-scale implementation today. However, the mainstream adoption of 5G is accelerating innovation in IoT and enabling new use cases, so it could be one to watch and may explain its appearance in the number three slot.

Robotic process automation (RPA) appears to be making slow progress; over the last year the proportion of organisations with large-scale implementations has moved from ten to 11%. This may be an underestimate. For those organisations making a success of it, RPA may be moving from 'emerging technology' investment to an embedded or business-as-usual cost.

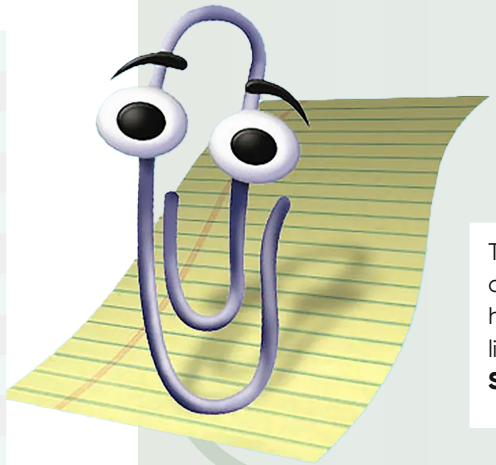
As a consequence RPA projects are often led from outside the tech team, for instance the CFO looking to automate credit control, so it may not be on the radar of a digital leader. That said, there is no doubt that many are still struggling to make it work. If the world stood still then digital leaders could automate it, but it doesn't, it is in perpetual motion and flux.

	Small to large implementation ratio
Cloud	0.33
Big data/analytics	1.22
Metaverse	1.50
Quantum computing	1.50
Internet of things	1.53
Edge computing	1.85
Robotic process automation	2.00
On-demand marketplace platforms	2.14
Green tech	2.14
AI/machine learning	2.60
Blockchain/distributed ledger	2.67
Augmented/virtual reality	3.33

BIGGEST DISAPPOINTMENT IN TECH

We asked digital leaders what has been the most disappointing tech in the last 25 years.

Top 5 from digital leadership report participants:
1. Blockchain (166 mentions)
2. Virtual reality (102)
3. Metaverse (91)
4. Social media (47)
5. 3D devices (26)



The adverse impacts of social media, such as the spread of (dis/mis)information and the negative psychological impact on individuals and communities.
Allan Cockriel, CIO GF/CISO, Shell

The biggest worry for me is that some communities are still unable to access technology due to availability and cost. In business terms I believe that we haven't seen the significant strides and achievement in Virtual Reality and Augmented Reality that we expected.
Marcus Hunter, CTO, EVRi

The way that society and business continually fail to anticipate the unintended consequences of new technologies until it's too late. Get excited about new innovations by all means, but let's learn to mitigate against the downsides a lot sooner.
Bryan Glick, Editor-in-Chief, Computer Weekly

The failure to achieve the widespread progress and adoption of self-driving vehicles. Implementation has been hampered by safety, regulatory hurdles and resistance, labour issues, and marginal profitability in industries like ridesharing that support and precede self-driving options.
Sadia Hasan, Director of Product Management, Meta

Cybersecurity

Our data shows that the proportion of digital leaders reporting a major attack in the last two years continues to fall away; less than a quarter (23%) in this year's survey. The rate increases to 44% of digital leaders from large organisations (those with tech budgets greater than $250 million) and while this higher figure is likely due to a wider perimeter to defend and stricter governance around reporting, it is down considerably from 56% last year.

This appears contradictory to well reported cyber infringements happening all over the world and illustrates how complex this topic is, as well as how our view of cyber risk is changing.

Overall, organisations have a broader awareness of cybersecurity and have invested heavily over recent years in strategies to address the risks. Cyberattacks are almost seen as a cost of doing business today, and the responsibility for protecting the organisation has become more diffuse; HR, legal, marketing and all manner of departments outside traditional IT will have their own awareness of the threats and strategies for minimising them.

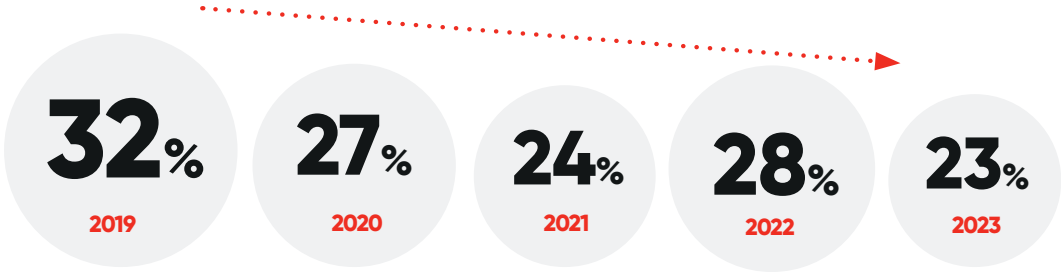
Also, the definition of what might have constituted a major attack has changed with time. It takes something bigger than a short DDoS (distributed denial of service) attack to make it worth calling the CEO on their day off. Most cyberattacks today have lost their novelty.

While insider threats are only seen as a major concern for one-third of digital leaders, improving education and internal controls remains a focus for many digital leaders. Security starts at home, and the potential damage caused from the inside can be significant.

What is clear is that the shape of attacks is changing. The biggest jumps in perceived threats now come from foreign powers and competitors. Placed alongside the omnipresent threat from organised crime it's clear that cybercriminals have significant resources and sophistication.

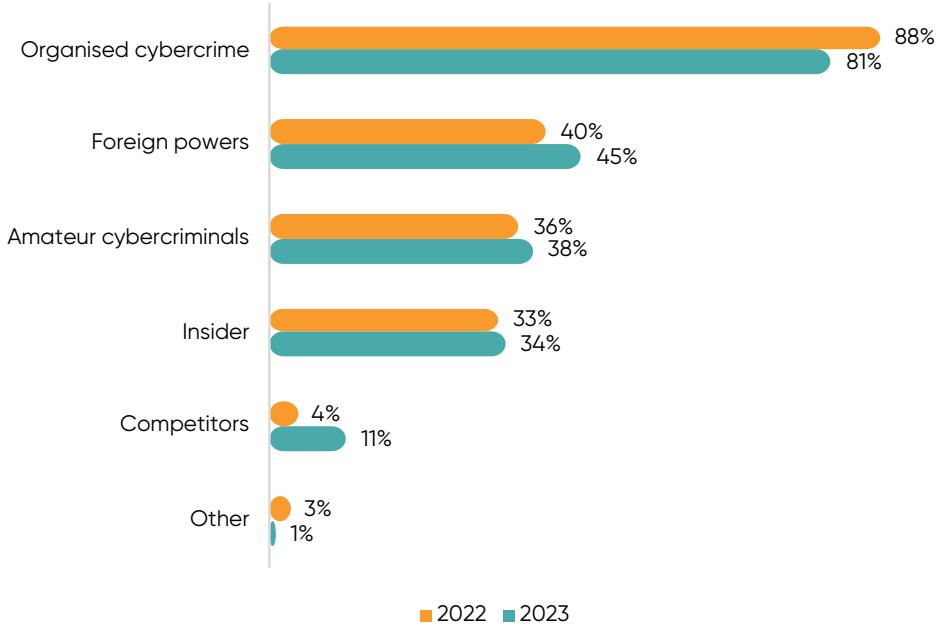
As you'll see in the next section of this report, we also stand on the precipice of a giant leap in technology with the arrival of generative AI. The success of cyberattacks is often dependent on their ability to scale and to mimic real humans. Generative AI has the potential to take cybercrime to a whole new, very dark, level, and attacks will be novel again.

Major attacks experienced in the last two years



Has your organisation been subjected to any major IT security or cyberattacks in the last two years?

Threats causing concern



Which type of threats give you most cause for concern in terms of cyberattack? Select all that apply.

Digital labour/artificial intelligence

AI has been with us for some time, but in the last 12 months with the large-scale advent of generative AI, it has really grabbed the attention of digital leaders globally. It promises great benefits to organisations if it can be tamed and harnessed, and right now it feels like we have reached a tipping point, causing excitement, confusion and concern in apparently equal measure.

Our respondents acknowledge that the AI arena requires heavier regulation; 88% agree on this, but 61% believe that regulation will not solve the issue regardless of its presence – the horse has bolted and there won't be a fence strong enough to contain it.

Only 15% of digital leaders feel 'very' or 'extremely well prepared' for the demands of generative AI; 42% feel unprepared. AI excellence – those who are 'very' or 'extremely well prepared' for the demands of generative AI will surely be a category that we will monitor in future reports to see whether these early adopters gain an advantage as those with the cloud did.

Plenty of research shows how rapid growth is. Grand View Research reports that "the global generative AI market size was valued at $10.14 billion in 2022 and is expected to grow at a compound annual growth rate of 35.6% from 2023 to 2030."[2]

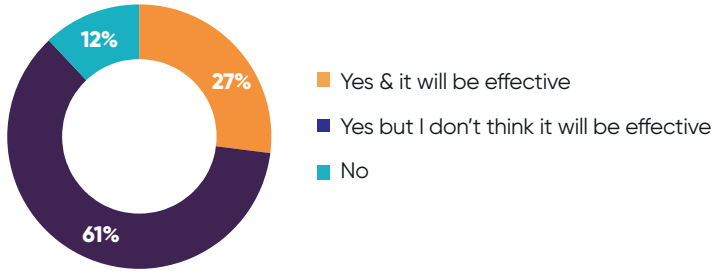
Despite this impressive predicted market growth, the actual use of AI inside organisations is relatively low. Only 10% of organisations report having large-scale implementations of AI, and this figure has remained the same over the last five years. This compares unfavourably to the cloud which, during that same period, has doubled large-scale implementations from 34% to 68%.

So, will AI continue its modest growth path moving forward? There is no doubt the addition of generative AI might be the trigger that sees it follow a path similar to cloud investment.

Just over two in ten (21%) survey respondents have an AI policy in place within their organisation. More than a third (36%) have no plans to even attempt such a policy at this time.

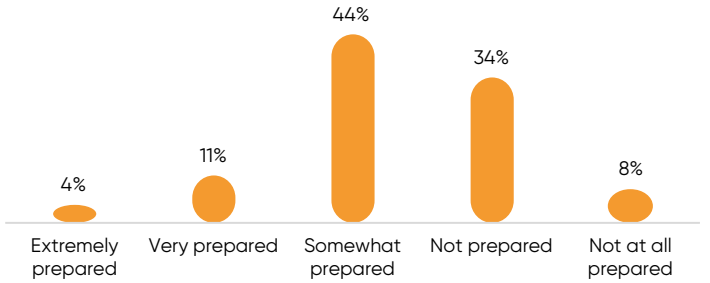
2. Grand View Research, 'Generative AI market report', 2023.

AI needs heavier regulation



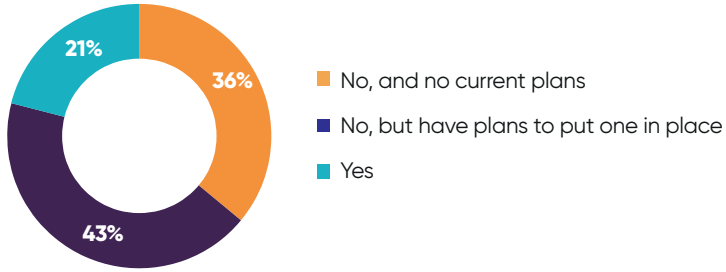
Do you think that governments should regulate the AI market more heavily?

How prepared for generative AI



To what extent is your organisation prepared for generative AI?

Do you have an AI policy in place?



Do you have an AI/generative AI policy for your organisation?

While generative AI has been in development for a while, its recent spurt of growth has been the result of massive leaps in hardware processing power and clever refinement of algorithms. No technology has arrived, been adopted or had such an immediate effect so quickly.

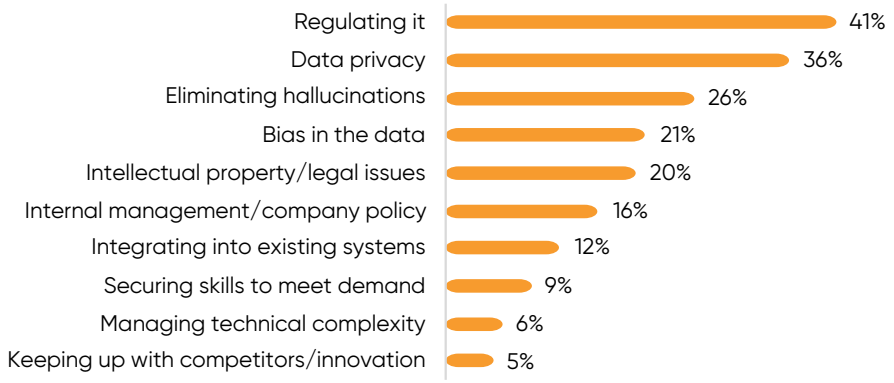
This rapid arrival has left digital leaders thinking hard. Some see it as no more than a sophisticated virtual assistant, others see it as a more fundamental shift in what technology can do for, and maybe in place of, humans.

In fact, more than a quarter predict AI will have some degree of human level 'sentience' in the next five years (also nervously referred to as artificial general intelligence). Whether that's a well-founded belief or not, it is clear the expectations are very high. One thing that most can agree on is that it presents significant challenges and opportunities.

More than a third (36%) of digital leaders are concerned about data privacy as an issue for implementing generative AI. While AI itself is not fundamentally insecure, when new technology arrives it tends to open up new areas of exposure. Among all of this highly sophisticated technology it's sometimes easy to forget that cutting and pasting a confidential business strategy into a generative AI tool to summarise it or change the tone, is a potential data breach. Education and awareness will be key to mitigating against this.

More than a quarter are concerned about eliminating hallucinations in the data, where the large language model (LLM) generates false information. Hallucinations can range from minor inconsistencies to completely fabricated or contradictory information.

Top 2 issues facing generative AI



What are the most significant concerns with generative AI? Select top 2.

As we might expect with a maturing technology, large-scale implementations of generative AI are currently few and far between, but in general around a third of our respondents have some form of implementation across a number of its applications. Similar numbers are either in the planning stages or have not yet considered it at all. Anecdotally, some other areas where our digital leaders are planning on the potential deployment of AI include creating sales-call scripts, writing job descriptions and data analytics.

Very soon, and given the current trajectory, we will be witnessing generative AI that makes its own decisions, requiring no input, sanction or approval from a human. This will bring a whole raft of ethical and cultural arguments into play. The potential for proliferating small errors and misinformation into 'global fact' will be huge, a potential outcome we also discuss within our section on cybersecurity. An unregulated Wild West or not - more than seven in ten digital leaders think that the benefits of AI outweigh the risks.

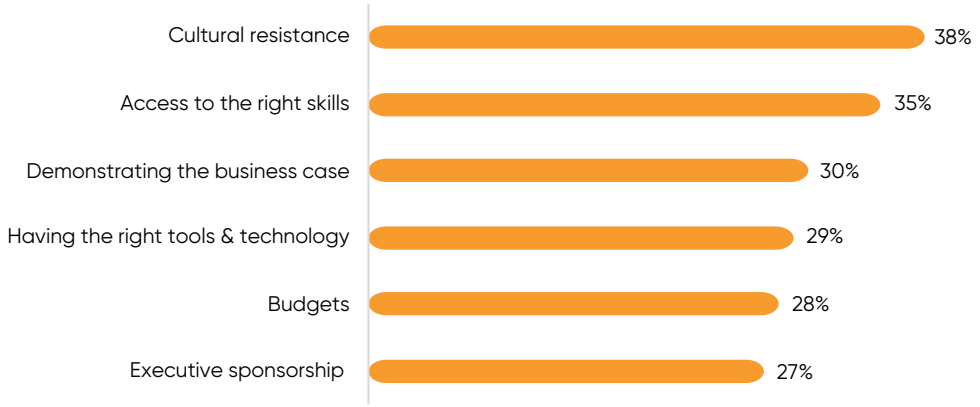
Applications of generative AI

	Have not considered	Actively considering	Piloting	Small-scale implementation	Large-scale implementation
Automating customer interactions (ChatBot)	31%	32%	17%	15%	5%
Automating internal interactions (HR/helpdesk)	35%	30%	17%	14%	5%
Creating or testing code	34%	24%	21%	16%	5%
Researching/authoring internal documents	32%	27%	19%	18%	4%
Authoring marketing documents	39%	26%	18%	14%	4%
Creating graphics/images	47%	23%	15%	12%	3%

AI often goes hand-in-hand with automation, and we asked digital leaders about the hurdles they are facing. Cultural resistance tops the leader board of hurdles to achieving an effective automation strategy. This, along with executive sponsorship and business case justification illustrate how difficult the change management element of automation can be, and is often made more difficult by past investments not delivering ROI. The digital leader has an important role as an agent of change.

There is certainly a sense that automation will have a significant impact on jobs; respondents predict that 17% of jobs will become automated in the next five years. That said, automation also has the potential to generate jobs too, new roles and job titles being created on a regular basis.

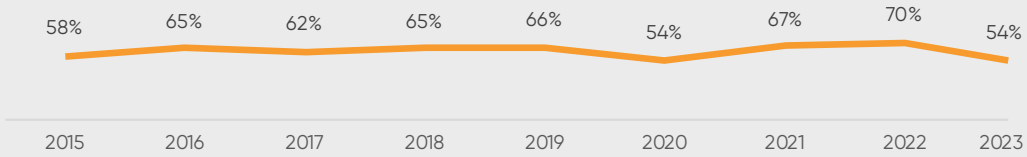
Top 2 hurdles for effective automation strategy



What are the most significant hurdles in achieving an effective automation strategy? Select top 2.

5. MANAGING THE TECH TEAM

Skills shortages continue to hamper change



Does a skills shortage prevent your organisation from keeping up with the pace of change? 'Yes'.

Top 10 most scarce skills

1 Big data/ analytics/data engineering	**2** Enterprise/ solution architecture	**3** Technical architecture	**4** Software engineering/ development	**5** AI
6 Cybersecurity	**7** Business analysis	**8** IT project management	**9** Cloud/platform engineers	**10** DevOps

Talent shortage

As technology investment slows, the talent shortage becomes less pronounced. After three years of a mostly 'do what you want' approach to remote and flexible working, employers begin to establish policies that work for them.

This year's research indicates that alongside reduced budget growth this year, recruitment is also down. This has taken the pressure off the need for talent, and although 54% of digital leaders say skills shortages prevent them from keeping up with the pace of change, this is down from 70% last year.

For many organisations, especially in the technology sector, headcount hyper-expanded over the Covid years. In 2023, many global tech giants found themselves overstaffed for the current economic climate and announced plans to cut employees from their collective ranks, a stunning reversal from the early days of the pandemic when they were rapidly growing to meet surging demand from countless households living, shopping and online working.

Scarcity of top skills for every type of technology professional has fallen year-on-year, but there still remains a shortage, with the most scarce skills being data engineers, enterprise architects, software engineers and technical architects.

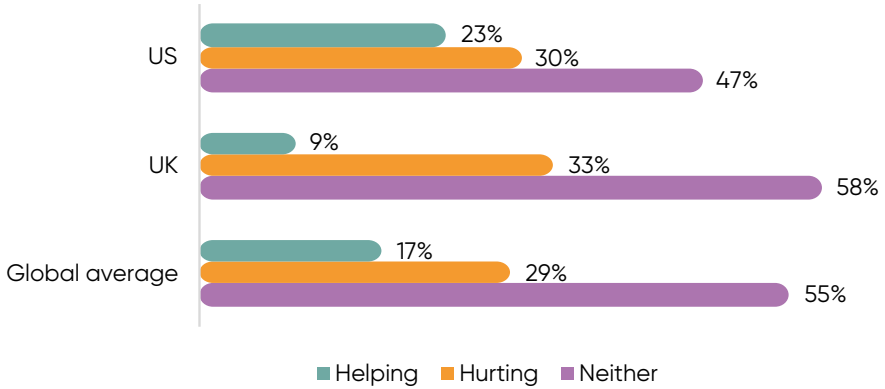
In previous reports cybersecurity skills have occupied the top 3 most scarce skills, but this year has seen one of the largest falls in demand (down 37%). Digital leaders are having to focus limited budgets on completing their transformation ambitions and revenue generation rather than shoring up security. In addition, as cybersecurity becomes more embedded in organisations other roles are picking it up as an additional skillset.

That said, one quarter of digital leaders still struggle to find the right cybersecurity skills, and this may become more of an issue in the future. If AI does contribute to a massive leap in the volume and impact of cybercrime, then cyber specialists may once again top our league table of scarce skills.

Economies are feeling the pressure, and in a slight increase on last year's figure, almost two-thirds (65%) of respondents say that the rising cost of living is making salary demands unsustainable. The problem is particularly acute for our Asia-Pacific country respondents where 78% of digital leaders reported this.

When it comes to being helped by the state there is clear ambivalence around skilled foreign labour policies. More than half of respondents (55%) stated that government policies have no effect on their talent strategy. Only 9% of UK digital leaders think the government's plans are helping, compared to 23% of their US peers.

Assessment of government's immigration policy



Do you think your government's approach to skilled foreign labour (visas, targeted migration, and so on) is helping or hurting your access to skills?

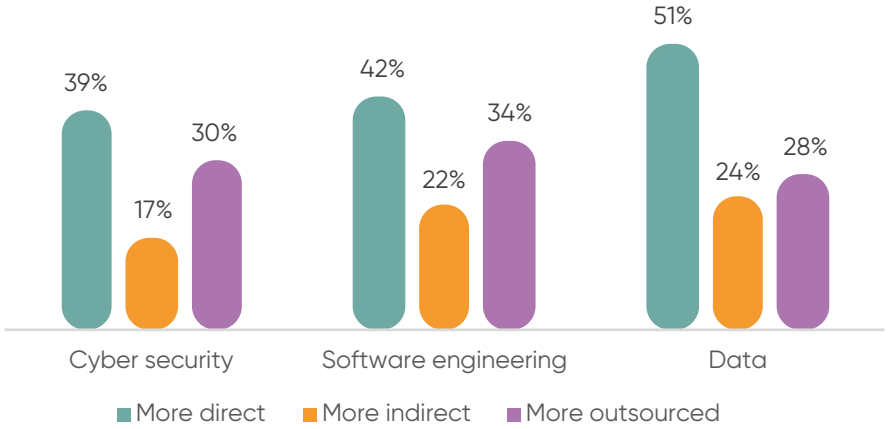
Sourcing the technology team

Choosing between contracting and direct hire for a tech role often boils down to how quickly a role needs filling, whether a project has a clearly defined timeline and the cost benefits of securing long-term talent and the skillset requirements. So how do digital leaders commonly resource their teams? By far the most common way is through direct employment. On average, just under three-quarters (71%) of tech talent is directly employed by digital leaders. Larger organisations (those with an IT budget above $250 million) employ fewer people directly (65%). The technology, construction and business/service sectors are the most likely to have a direct employment model.

We asked digital leaders how they plan to resource three key areas in their business: cyber security, software engineering and data. In all three areas direct hiring was the primary way of securing talent, with at least four in ten digital leaders looking to increase their permanent hiring in these areas.

The second most popular route was outsourcing with broadly three in ten digital leaders increasing their investment across all three areas. Indirect labour (for instance consultants or contractors) was the least popular route, often used to fill in the gaps left by direct hiring and outsourcing.

Plans for increasing headcount in next 12 months



Remote and hybrid working

Last year we reported for many employees how remote working was good for productivity, and for many it added valuable flexibility in their life, not to mention more money in their pocket through saved commute trips. But it wasn't all good news. Remote working also seemed to be having a negative impact on people's ability to collaborate and innovate, and there were growing concerns over mental health. This was especially the case for younger employees.

Digital leaders also commented to us that people were beginning to suffer from inertia. They were used to working from home, and what began as a good thing was becoming rather like staying in a bath too long; you lose the energy to get out, even if you want to.

Many organisations have responded strongly. Some of the biggest names in technology have mandated time in the office, with the CEO of one going as far as to say that 'it's probably not going to work out for you' if employees don't return. Some organisations have even mandated five days a week in the office.

How many days a week do you require that employees be physically present in the office?

	Small orgs	Medium orgs	Large orgs	All
1 day	12%	11%	11%	12%
2 days	36%	40%	29%	36%
3 days	35%	39%	48%	37%
4 days	6%	5%	4%	6%
5 days	11%	5%	8%	9%
Typical	2 days	2 days	3 days	3 days

While these big companies paint one picture, our research – which covers a much wider spectrum of organisations – paints a more nuanced view. One where the digital leader treads a fine line between providing an attractive, supportive work environment while trying to maintain innovation and collaboration, which appears to be negatively affected by remote working.

This year our research shows that digital leaders are pulling back from making people return to the office. On average, 58% of our respondents have an in-office policy (in other words, one that asks employees to work in the office for one day a week or more).

Larger organisations (those with a tech budget of over $250 million) are more likely to have an in-office policy (69% do). Where there is a policy, they typically ask employees to be in the office three days a week, as opposed to two days a week for smaller organisations.

Almost two-thirds (64%) of our respondents agree that having such a policy is a good idea. Are these policies working? On average only a quarter of those with a policy think that it is working 'extremely well' but a further 57% think it's working 'quite well'.

Working in the office drives strong opinions. One mandated day seems to attract the largest proportion of respondents reporting it working at least 'quite well'. Four mandated days follow closely behind and appear to be favoured by larger companies.

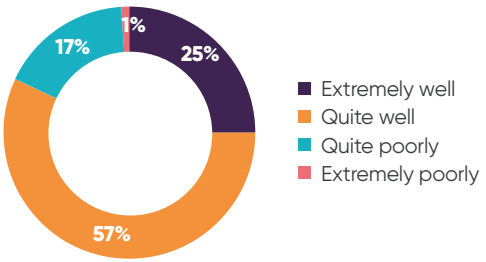
Those organisations mandating five days seem to be the most likely to have it working 'extremely well', although this is a relatively small number and they tend to be larger organisations.

The biggest objection to spending more time in the office is the time spent commuting. Almost a third cite difficulty with caring responsibilities. What is becoming apparent is that employees' expectations of work have changed during the pandemic. Simply returning to office life without recognising these changes is a difficult transition.

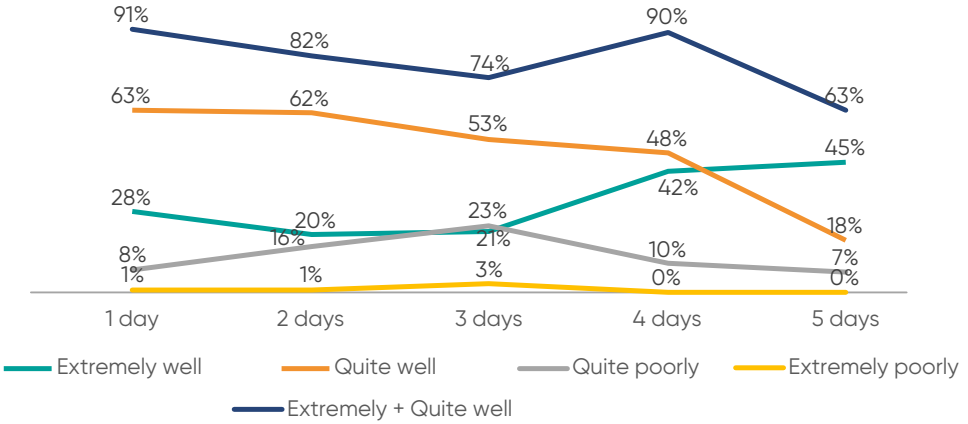
According to the International Workplace Group, 53% of female office workers are also caregivers. Among those aged 35-44 years that figure jumps to 64%. The home may also be a better equipped place for a disabled person.

Allowing people to work around their personal constraints and preferences is vital for shifting the needle on diversity and inclusion in the workplace as we examine later in this report.

How well is the policy working?



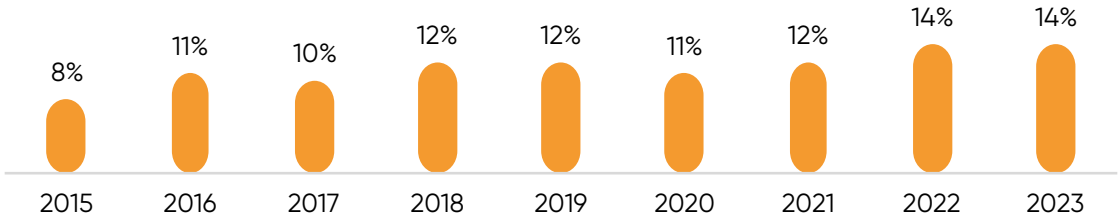
To what degree is your in-office policy working well?



Two biggest objections to spending more time in the office

If there have been objections from employees to spending more time in the office, what have been the two biggest objections? Select top 2.

Female tech leaders



What is your gender? Female

Proportion of tech team is female

What proportion of your technology team is female?

Equity, diversity and inclusion

Everyone deserves to work in a place where they can truly be themselves and feel like they belong. Increasingly technology talent is viewing employers and potential employers through the lens of equity, diversity and inclusion (EDI).

EDI policies may have a tendency to be deprioritised during an economic downturn,[4] however, a large majority of our respondents (71%) believe that their current approach to diversity and inclusion is improving the quality of hires they are making, so to lose sight of EDI goals would make little sense.

The average proportion of ethnic minorities on the tech team is a quarter, rising to 33% in the US and dropping to 23% in Europe. The lower figures for European contributors may well be explained by a rather loose definition of what is considered an ethnic minority across such a wide network of disparate regions.

This year 14% of our digital leaders identify as female, identical to last year and in line with the painfully slow and shallow trend upwards.

The global average proportion of female members on the tech team is just under a quarter (23%) with the US doing marginally better (27%) and European businesses slightly worse at 22%. These statistics match the findings of the National Center for Women & Information Technology, for professional computing jobs across the US which further cites that female representation continues to decrease across technical and leadership roles.

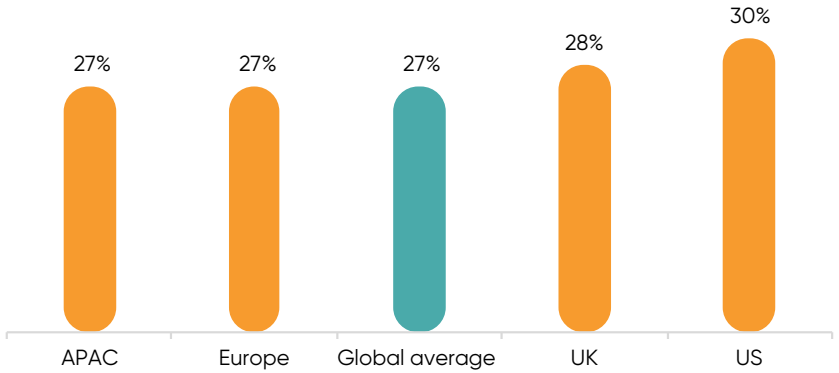
4. McKinsey & Company, 'Diversity still matters', 2020.

Figures from the UK's Office for National Statistics have shown an increase in IT workers throughout the country, although increases in male employment continue to outstrip those of women. On average 28% of our respondents hired in the UK in the last two years were female, in Asia-Pacific countries it was 27% while in the US it was 30%.

When we cross reference the gender stats with remote-working policies, we can see that hybrid work flexibility correlates with better female representation on the tech team. There are 20% more females in tech teams with a minimal in-office policy than those with a mandate for a full week.

Additionally, our research shows that a policy that mandates one or two days in the office correlates with 27% more female hires than a policy that mandates a full five days in the office. Interestingly, attending an office setting at least once a week is marginally more attractive to women than zero days, which indicates the desirability of at least some time away from the home office. In conclusion, having fewer mandated days in the office will go some way to closing the gender gap while the world waits for all genders to have equal responsibility for caring duties.

Proportion of female hires in the last two years



What proportion of new hires into your technology team were female in the last two years?

Female representation by number of days required to be physically in office

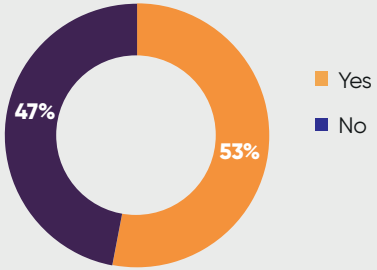
What number of mandated office days do female employees do?

Proportion of female new hires by number of days required to be physically in office

What proportion of new hires in your technology team were female in the last two years?

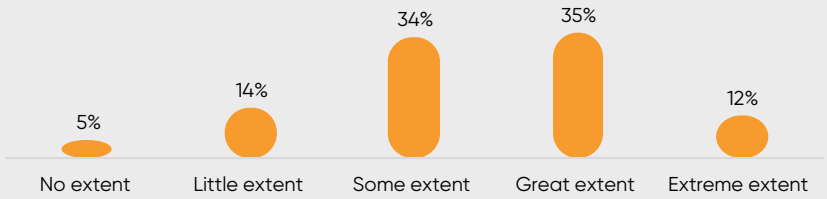
6. NET ZERO

Over half have a net-zero target



Does your organisation have a net-zero target?

Board recognition for technology as crucial to improving sustainability



To what extent does the board value/recognise technology as crucial to improving your organisation's sustainability/carbon footprint?

Much more work to do

Arguably new technologies are key to achieving one of the greatest challenges for humankind, the transition to net zero. By harnessing the power of predictive modelling, real-time data analysis and artificial intelligence (AI), organisations can access unique insights, make smarter decisions, reduce emissions and enhance safety.

Technology plays a paradoxical role in the history of climate change: as both a problem and solution. Data centres (often housing hundreds of thousands of servers) and cloud services are electricity hungry, and that power needs to come from somewhere. Emissions from end-user devices are even worse. According to the UN's Environment Programme, the global technology industry produced around 3% of the world's carbon emissions in 2021 – a volume comparable to that of the global aviation industry.[5] At the time of writing, there were a reported 5,375 data centres in the US, the most of any country worldwide. A further 522 were located in Germany, while 517 were located in the UK[6] – and that number is only heading upwards. Looking at a granular level, the collective email usage worldwide produces as much CO2 as having an additional seven million cars on the roads.

Tech giants, such as Google and Meta, are already starting to commit significant financial resources towards carbon removal – pledging $925 million to zero out emissions as part of a wider industry collaboration. For all its carbon spew, technology also has a massive part to play in delivering sustainability. It can reduce the need for travel and deliver data insights to improve performance.

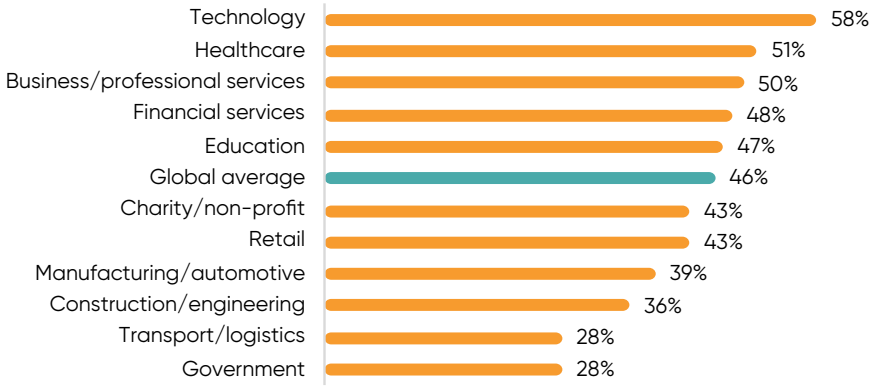
Some of the change depends on people, their engagement, behaviours and choices. But given that change often begins at the top – through national and bilateral government policies, and the world's largest companies leading the way – we asked our digital leaders how their board saw technology's role in achieving a greener business and a reduced carbon footprint. Worryingly, less than half (47%) recognise that tech has an extensive role to play.

5. United Nations Development Programme, 'Emissions Gap Report 2022', 2022

6. Statista, 'Data centers worldwide by country', 2023.

So, with relatively low levels of acknowledgement from the boardroom it is unsurprising that just under half (47%) of all the digital leaders we surveyed said that their organisation had no plan in place to reach net zero. This includes 27% of digital leaders answering on behalf of publicly owned companies.

With more than 6.5 billion smartphones and 1.2 billion tablet devices estimated to be in current circulation, it is no surprise that technology companies are major creators of CO2. It's surprising then that technology organisations were the worst offenders with a pretty huge 58% lacking any net-zero ambition. The 'heavier' sectors such as construction, transport and manufacturing appear to be more prepared. It begs the question of how correctly different sectors estimate their impact on the environment. It would seem that digital leaders need to alter their opinion that it is just certain sectors creating the fumes and chemicals that are impacting the planet.



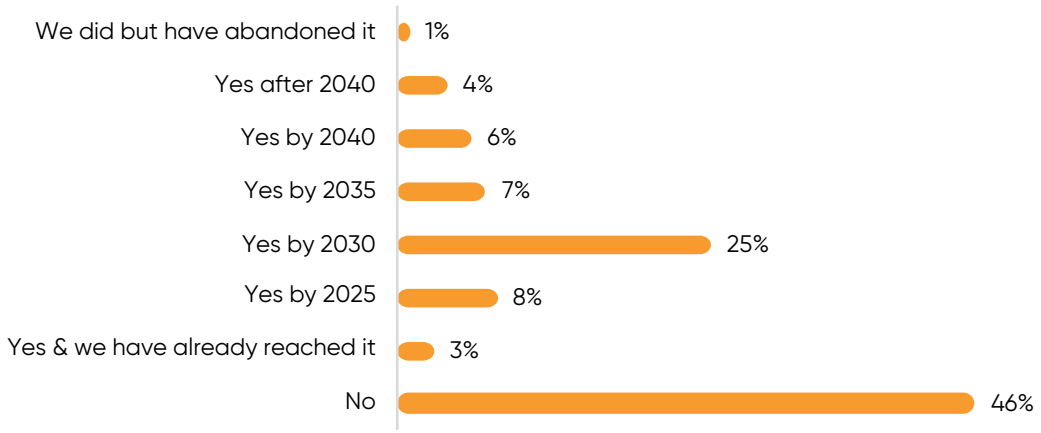
Does your organisation have a net-zero target? 'No' by sector.

Where digital leaders do have plans in place, a third are due to be met by 2030 with a further 18% setting their sights further into the future. For those who have set themselves a target, there is a degree of optimism around being able to meet it with 59% expecting to do so.

One thing is certain, a miracle solution isn't just over the horizon. Digital leaders will need to find the right way to use technology if they are committing to a more sustainable industry. Take one small fact: the average carbon footprint of an email is 0.3g CO2e, or if it's got one image or an attachment (50g CO2e).[10] Organisations will need to embrace incremental developments, the little and large steps that lead to real change. Just leaving your logo off a company email could make a small difference.

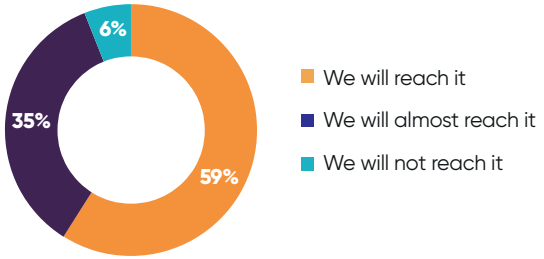
10. Mike Berners-Lee, 'How Bad Are Bananas?: The carbon footprint of everything'.

Net-zero targets



Does your organisation have a net-zero target?

On track to meet net zero



If you have a plan for net zero, to what extent are you on track to achieve this target?

MOST SURPRISING TECHNOLOGY

What has been the biggest positive surprise in technology in the last 25 years?

Some say it's not as rapid as needed, but I would say clean energy and renewable technologies, they have started to demonstrate our adaptability when dealing with our efforts on climate change.
Marcus Hunter, CTO, EVRi

I don't know if it is really a surprise, as this has always been my belief. It is reassuring to know that no matter how much technology advances, at the heart of any great solutions is always people – the people who build it, and the people it is built for. It is more important to be human than to be perfect!
Claus T. Jensen, PHD, Chief Innovation Officer, Teladoc Health

Seeing technology become "cool"! If I tell someone I meet that I work in something to do with tech, they want to know more these days – it was the complete opposite 25 years ago.
Bryan Glick, Editor-in-Chief, Computer Weekly

The widescale adoption and democratisation of the internet, closely followed by the technical ecosystem created for mobile devices.
Allan Cockriel, CIO GF/CISO, Shell

Technology's response to the pandemic. Many people were able to keep doing their jobs; it improved us in terms of getting us a vaccine relatively quickly. It changed the way we did business and even how we look at each other and treat each other. Technology was the great saviour, if we had the same pandemic 30 years ago, the economic disaster would have been much, much bigger.
Gary Shapiro, President & CEO, Consumer Technology Association

One of the most notable positive surprises in technology has been the rapid proliferation and adoption of telemedicine and remote healthcare. These technologies saved lives during the Covid-19 pandemic, at a time when care required minimal physical contact yet inundated our healthcare system.
Sadia Hasan, Director of Product Management, Meta

Regional league tables

Expecting an increase in IT/tech headcount in next 12 months	
Asia	62%
Australasia	51%
Global average	50%
Europe	50%
North America	46%

Expecting a budget increase in next 12 months	
Asia	55%
Australasia	49%
Global average	45%
North America	45%
Europe	44%

Organisation has a policy for working in the office	
Australasia	71%
Asia	64%
Global average	58%
Europe	57%
North America	49%

Skills shortage prevents organisation from keeping up with pace of change	
Asia	66%
Europe	55%
Global average	54%
North America	44%
Australasia	43%

Proportion of tech team that is female	
North America	27%
Global average	23%
Europe	22%
Australasia	22%
Asia	20%

Organisation has an AI policy	
Asia	25%
Global average	21%
Europe	21%
Australasia	21%
North America	17%

The rising cost of living has made salary demands unsustainable	
Asia	84%
Australasia	71%
Global average	65%
Europe	63%
North America	60%

Organisation has a net-zero target	
Asia	58%
Europe	56%
Global average	53%
Australasia	38%
North America	37%

Sector league tables

Expecting an increase in IT/tech headcount	
Technology	62%
Business/professional services	56%
Construction/engineering	56%
Manufacturing/automotive	56%
Power & utilities	55%
Global average	50%
Charity/non-profit	49%
Healthcare	47%
Education	46%
Transport/logistics	46%
Financial services	44%
Broadcast media	40%
Retail	37%
Telecommunications	37%
Government	36%

Expecting a budget increase in next 12 months	
Manufacturing/automotive	53%
Technology	53%
Power & utilities	50%
Business/professional services	49%
Education	49%
Transport/logistics	49%
Broadcast/media	48%
Charity/non-profit	48%
Healthcare	47%
Global average	45%
Financial services	42%
Construction/engineering	40%
Retail	36%
Government	34%
Telecommunications	30%

Organisation has a policy for working in the office	
Broadcast/media	76%
Retail	73%
Manufacturing/automotive	72%
Financial services	64%
Charity/non-profit	62%
Transport/logistics	62%
Construction/engineering	59%
Education	59%
Global average	58%
Power & utilities	57%
Government	51%
Telecommunications	48%
Technology	45%
Business/professional services	44%
Healthcare	44%

Skills shortage prevents organisation from keeping up with pace of change	
Government	71%
Charity/non-profit	67%
Education	66%
Manufacturing/automotive	66%
Broadcast/media	64%
Transport/logistics	63%
Construction/engineering	62%
Power & utilities	62%
Healthcare	59%
Global average	54%
Business/professional services	51%
Financial services	50%
Telecommunications	48%
Retail	46%
Technology	45%

Proportion of tech team that is female	
Education	28%
Government	28%
Charity/non-profit	25%
Healthcare	25%
Global average	23%
Financial services	23%
Retail	23%
Business/professional services	22%
Technology	22%
Broadcast/media	20%
Manufacturing/automotive	20%
Power & utilities	20%
Transport/logistics	20%
Construction/engineering	19%
Telecommunications	14%

Organisation has an AI policy	
Broadcast/media	32%
Business /professional services	29%
Telecommunications	29%
Transport/logistics	29%
Construction/engineering	25%
Technology	25%
Financial services	22%
Global average	21%
Education	21%
Manufacturing/automotive	15%
Retail	14%
Power & utilities	13%
Charity/non-profit	9%
Government	8%
Healthcare	8%

The benefits of AI outweigh the risks	
Broadcast/media	80%
Government	80%
Construction/engineering	78%
Business/professional services	77%
Technology	76%
Manufacturing/automotive	73%
Power & utilities	73%
Global average	72%
Transport/logistics	72%
Education	71%
Financial services	70%
Retail	65%
Healthcare	64%
Charity/non-profit	63%
Telecommunications	56%

Organisation has a net-zero target	
Power & utilities	76%
Government	72%
Transport/logistics	72%
Construction/engineering	64%
Manufacturing/automotive	60%
Retail	55%
Broadcast/media	54%
Global average	53%
Education	53%
Charity/non-profit	52%
Financial services	51%
Business/professional services	48%
Healthcare	47%
Technology	41%
Telecommunications	38%

Where technology and talent meet

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We're equipped with a unique network, that realises the potential where people and technology meet.

For over three decades we've been helping clients solve broad and complex problems, building and scaling their technology and digital capability:

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- We identify and develop the best global leaders
- We build your capabilities and technology capacity

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