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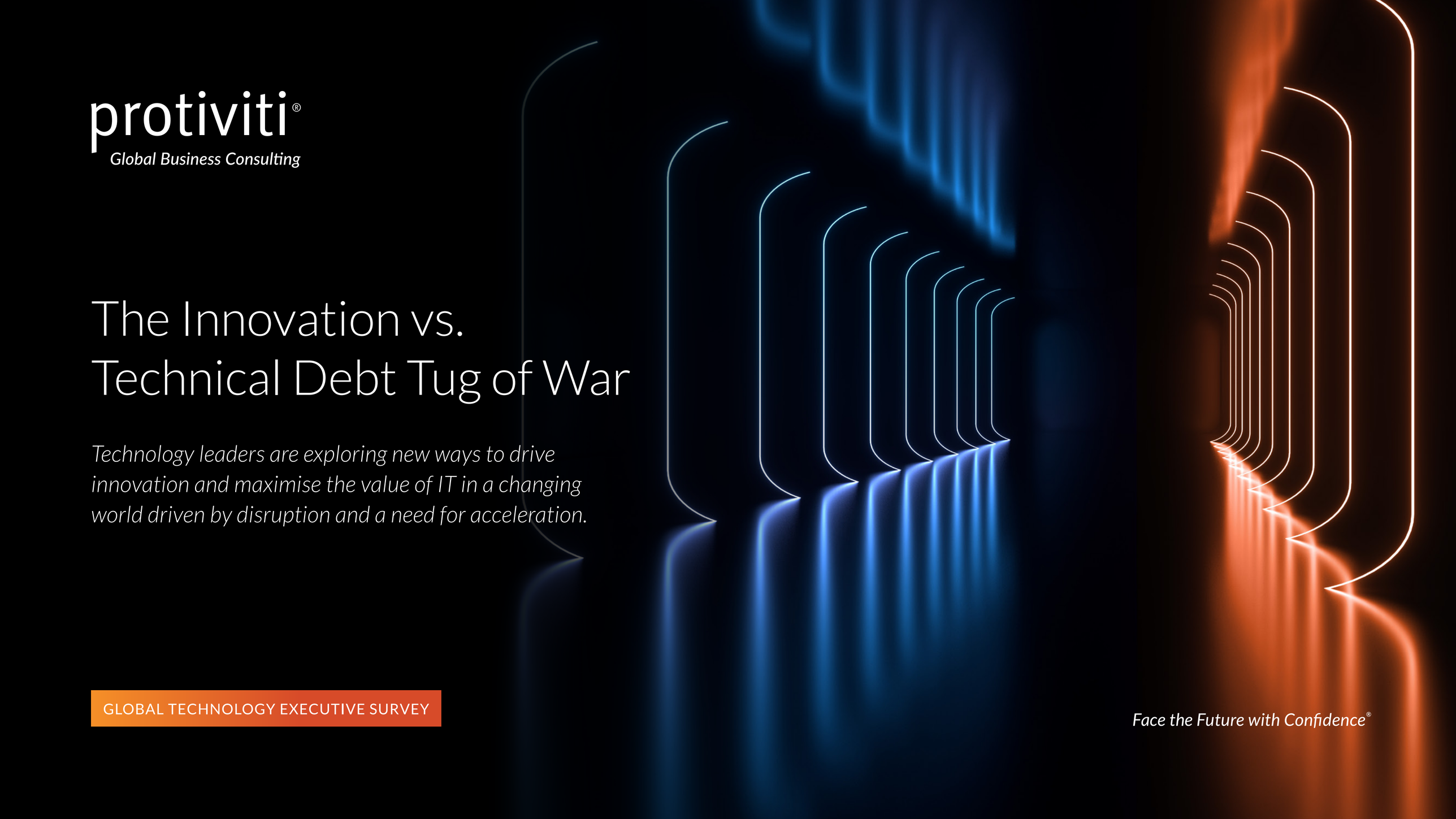
Global Business Consulting

The Innovation vs. Technical Debt Tug of War

Technology leaders are exploring new ways to drive innovation and maximise the value of IT in a changing world driven by disruption and a need for acceleration.

GLOBAL TECHNOLOGY EXECUTIVE SURVEY



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Executive summary

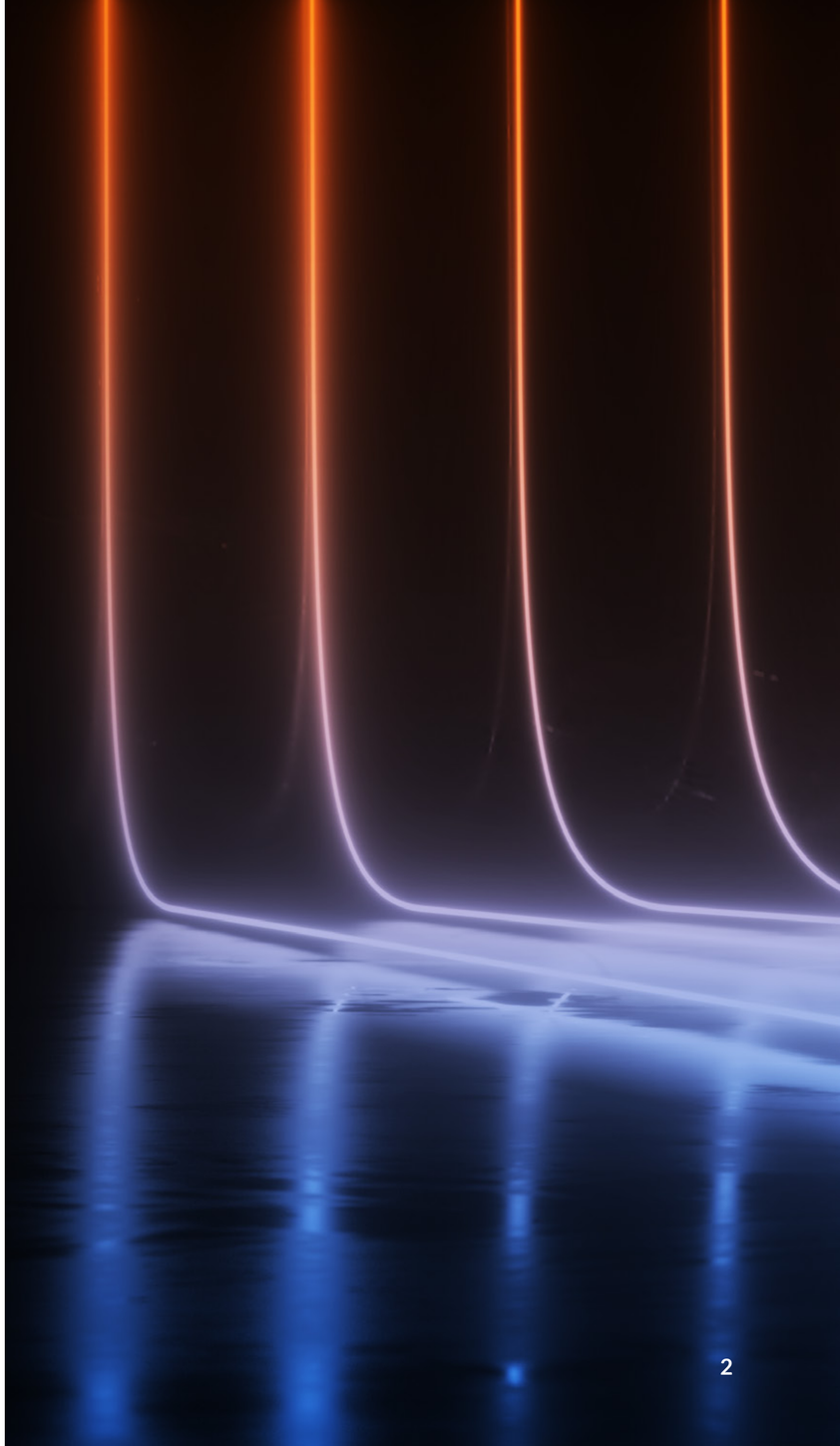
Innovation is the name of the game in today's global market. Recognising this new reality, CIOs, CTOs, CISOs and other technology executives and leaders are exploring new ways to fuel innovation throughout their organisations. However, there are many roadblocks on this path.

Take, for example, the spectre of technical debt, which is hampering a business's ability to innovate and grow. Our research indicates that organisations spend nearly one-third of their IT budgets and invest a fifth of their resources in technical debt management.

For this global survey of more than 1,000 CIOs, CTOs, CISOs and other technology executives and leaders, Protiviti set out to understand how organisations are tackling their current and future technology needs — specifically, how they are pursuing innovation initiatives that will fuel long-term value while also addressing the burden of managing their organisation's technical debt. We also explore the types of emerging technologies in use today or that organisations are planning to implement, as well as challenges related to skills, talent and collaboration.

Analysis of this research exposes a number of trends and themes that should be of great interest to technology leaders seeking to help their organisations achieve competitive advantage and grow their capabilities and offerings.

Organisations are spending an average of 30% of their IT budgets on technical debt management.



Key findings

01 Technical debt remains a critical burden

On average, an organisation invests more than 30% of its IT budget and more than 20% of its IT human resources to manage and address technical debt. Further, nearly seven out of 10 organisations believe technical debt has a high level of impact on their ability to innovate. For the most part, companies that are pursuing modernisation to actively reduce technical debt are finding that innovation is a key methodology to get the most out of the process. Innovation brings with it new insights and ways to use collected data, as well as service customers better.

02 Goals do not equate to strategy

Most organisations indicate they have clearly defined innovation goals; however, nearly half of organisations report they have not fully created a strategy to define that innovation.

03 The priority is optimisation

The area in which organisations focus their innovation efforts more than any other is optimisation of current systems and processes. By comparison, there is less focus on resilience and growth.

04 Regulatory compliance and cybersecurity represent significant concerns

When it comes to innovation, IT leaders view regulatory and compliance requirements as the top challenge their organisations must address. Security is also top of mind: Four out of five organisations have a high level of concern about security risks related to the implementation of innovative new technologies. Regardless of organisation size, there remain significant questions and uncertainty when it comes to balancing innovation with protecting critical systems and data.

05 Access to talent, culture, budgeting and agile processes are the keys

They are the foundational elements to fuel innovation, alleviate technical debt and deal with competitive challenges.

06 Labs and think tanks are deployed often but not always

While a majority of organisations have created a dedicated lab or think tank that is focused on innovation, two out of five have not. Of note, as company size grows, so does the percentage of those leveraging these approaches.

Nearly seven out of 10 organisations believe technical debt has a high level of impact on their ability to innovate.

Innovation is a clear goal for most — strategies and approaches are still works in progress

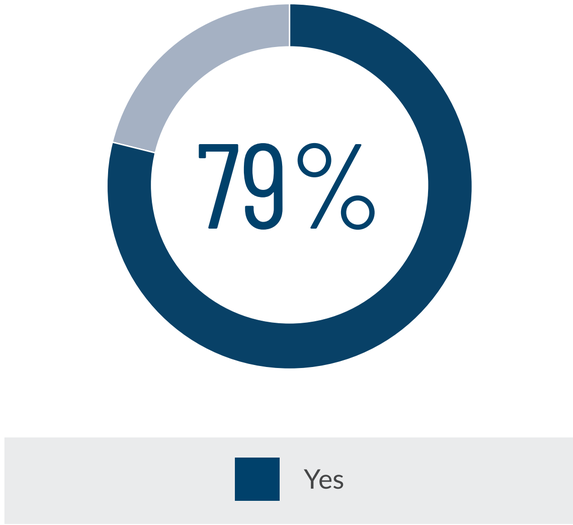
Innovation is critical in an ever-changing business environment. Organisations that fail to prioritise innovation are more likely to fail — in fact, in a separate global survey of board members and C-suite executives, the rapid speed of disruptive innovation is ranked among the top risk issues for organisations over the next decade.

Even with long-term objectives in mind, innovation in the IT realm must also focus on specific near-term goals, such as improved efficiencies, cost savings, new business models and customer satisfaction. Otherwise, innovation initiatives are doomed to fail.

The good news is that a majority of organisations have clearly defined innovation goals. This is a strong indicator that IT executives, together with the board and C-suite, recognise the critical need for having an innovation plan and mindset — certainly on the IT side.

Strategy does not have to be the catalyst for innovation.

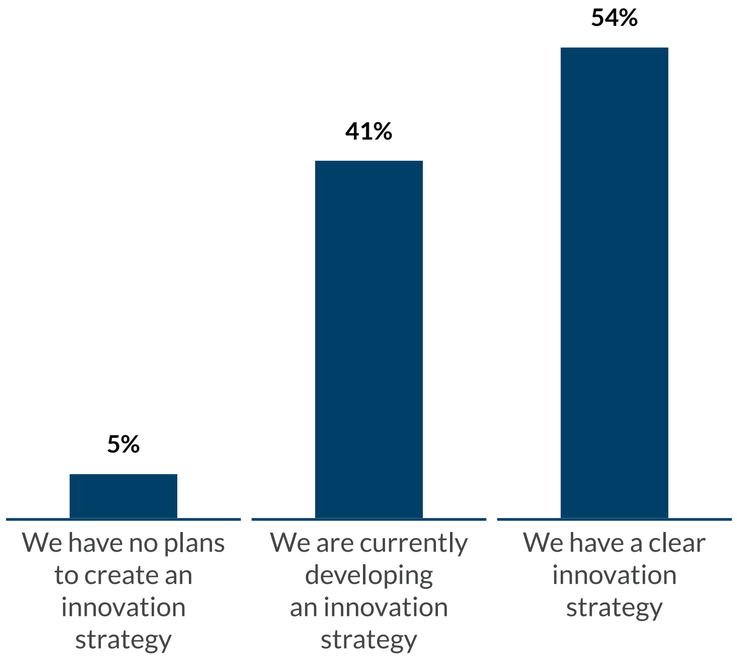
Does your company have clearly defined innovation goals?



As expected, the percentage of organisations with innovation goals varies by size. Nearly all (95%) large organisations (more than $10 billion in net revenue) have clearly defined goals, while just 50% of smaller organisations ($500 million to $999.99 million) currently have such goals.

Goals are only part of the innovation formula. To achieve near- and long-term success, there must be a strategy to achieve those goals. Here, on average and as expected, the numbers fall off a bit. Overall, 54% of organisations have a perceived clear innovation strategy and just over 40% are currently developing one. This is not surprising — innovation should be viewed as reimagining the business and creating potential new processes and opportunities until the focus shifts to drive business value. Strategy does not have to be the catalyst for innovation.

Which of the following best describes the status of your company's technology innovation strategy?



The numbers vary by organisation size, with 76% of large companies having a clear innovation strategy, yet only 26% of smaller organisations having one.

The key takeaway: Organisations must differentiate between goals and strategy, and better define what those two categories mean to the business, since achieving goals (what you would like to achieve) is often confused with developing a strategy (how you will achieve it).

Innovation should be viewed as reimagining the business and creating potential new processes and opportunities until the focus shifts to drive business value.

When it comes to the areas of innovation on which companies are focusing, efforts are geared more toward the optimisation of current systems, products and processes. However, a significant amount of their efforts are also dedicated to building resilience and generating growth in revenue and new markets.

CIOs, CTOs and IT leaders should collaborate with the board and their C-suite colleagues to define how and where innovation activities should be engaged as well as the desired goals, as part of the organisation's broader business strategy.

Innovation breaks down to creating and reimagining products, services, solutions and operations. However, innovation without a defined strategy can be risky in any number of ways — for example, outcomes not achieved, budget overruns or lack of executive buy in. Although 79% of organisations have clear innovation goals and 54% have a clear innovation strategy, there is the possibility that most organisations only have notional objectives of what they want as opposed to a fully developed and actionable strategy.

What percentage of your company's current innovation activity is focused on each of the following areas?

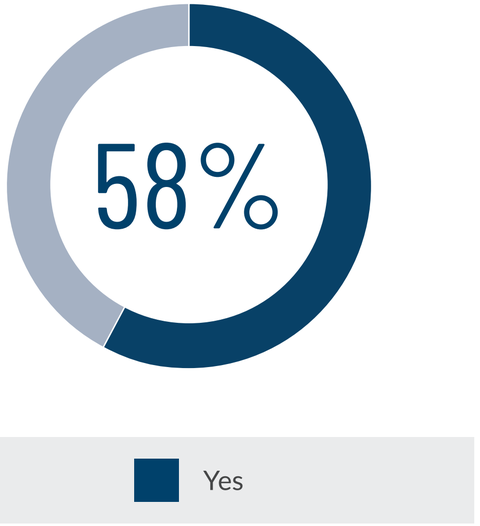
	Optimisation (of current systems, products, processes, etc.)	Building Resilience (against disruption)	Growth (new markets, revenue, etc.)
0%	0%	0%	1%
1% - 10%	0%	4%	4%
11% - 20%	3%	25%	19%
21% - 30%	15%	30%	34%
31% - 40%	39%	32%	31%
41% - 50%	27%	8%	10%
51% - 60%	10%	1%	1%
61% - 70%	5%	0%	0%
71% - 80%	1%	0%	0%
81% - 90%	0%	0%	0%
91% - 100%	0%	0%	0%
Mean	**42%**	**29%**	**29%**

Research, exploration and testing are important parts of driving innovation. For many organisations, that translates to either creating a test environment (a lab) or putting together a group of experts (a think tank) to investigate innovation. Most large organisations (86%) are pursuing those options, while only one in five smaller organisations are doing so.

There are several factors that have an impact here, including budgets, staffing and the level of innovation required. That said, organisations should not innovate blindly. Instead, they should consider pilot projects, testing and applying the appropriate expertise (either from inside or outside the organisation). Organisations should also consider implementing new concepts and ideologies such as design thinking and agile or lean methodologies to accelerate the potential of innovation.

As important as innovation is, companies are still facing challenges moving ahead with these projects. The most significant of these challenges is regulatory and compliance requirements, by a notable margin. Security risks are among the top challenges as well.

Does your company have a dedicated lab or think tank that focuses on innovation?



Notable Observations — Industry and Region

Industry

- Overall, financial services organisations are more likely to have a dedicated lab or think tank that focuses on innovation.
- As expected, a strong majority of organisations in the technology and consumer packaged goods industries — 87% and 86%, respectively — have clearly defined innovation goals.
- Similarly, financial services (69%), consumer packaged goods (69%) and technology (60%) organisations are significantly more likely to have clear innovation strategies.
- Insurance (85%) and consumer packaged goods organisations (79%) lead the way in having a dedicated lab or think tank that focuses on innovation.
- 93% of manufacturing organisations have clearly defined innovation goals, while only 63% of organisations in the chemicals and materials industry have clearly defined their innovation goals.

Region

- 81% of U.S.-based organisations have clearly defined innovation goals, compared with 79% of European-based organisations and 79% of Asia-Pacific organisations.
- When it comes to dedicated labs and think tanks, countries where organisations have a greater likelihood of having these include Japan (78%), China (62%), Germany (66%), United Arab Emirates (64%), and France (64%).
- Regionally, 54% of North America-based organisations have a clear innovation strategy, while 56% of European organisations say the same.

Organisations must differentiate between goals and strategy, and better define what those two categories mean to the business.

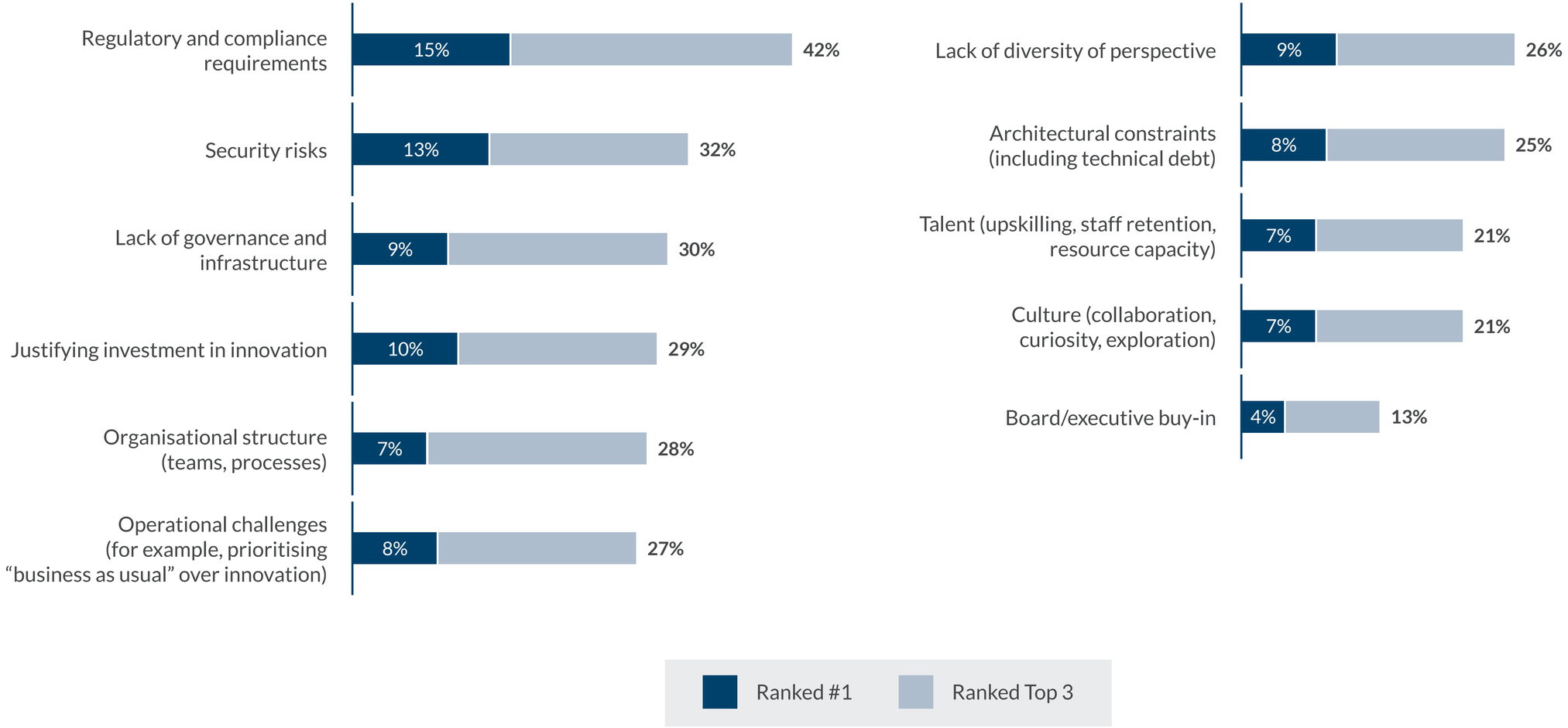
Strategies to organise for innovation and address roadblocks vary

Technology initiatives need someone to champion the project. That champion can be an executive sponsor or accountable executive whose goal is to garner buy-in and move projects forward. In nearly half of organisations, that person is the chief innovation/strategy officer, while in close to one in three organisations these responsibilities fall to the chief technology officer (or equivalent).

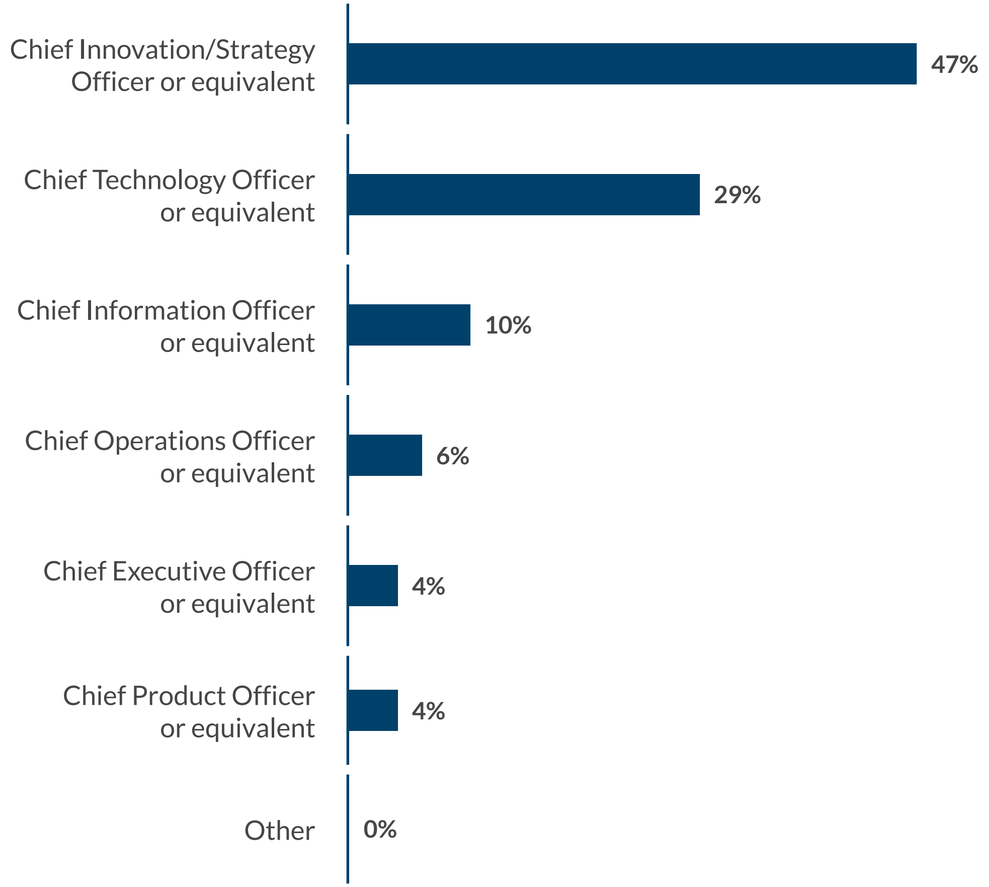
Innovation cannot happen without building a business culture that fosters innovation and extending that culture takes people, skills and agility. For one in three organisations, the most important element for maintaining an innovative organisation is fostering an innovative culture, while for one in four organisations the top considerations include leveraging agile concepts and creating the right processes and activities.

However, there may be a disconnect between processes, culture and people: Only 16% of organisations indicated that hiring the right talent is the most important consideration. These findings raise an important question: Do you believe your IT organisation has the right processes, talent and culture to focus appropriately on innovation and transformation efforts?

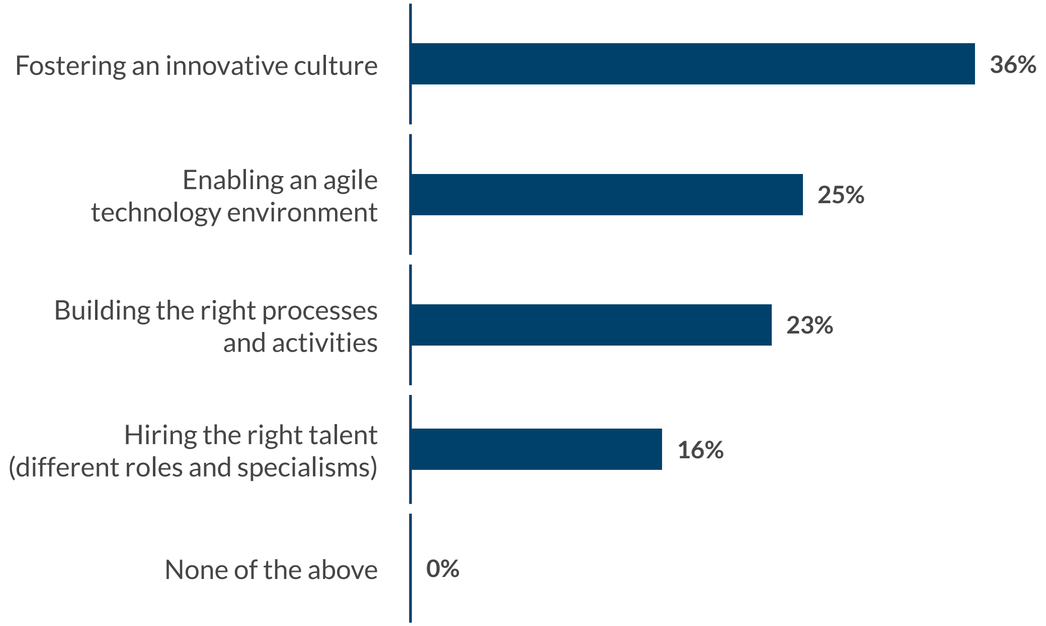
Which of the following best describes your organisation's top three challenges when it comes to innovation?



Who is the key person responsible for driving innovation at your company?



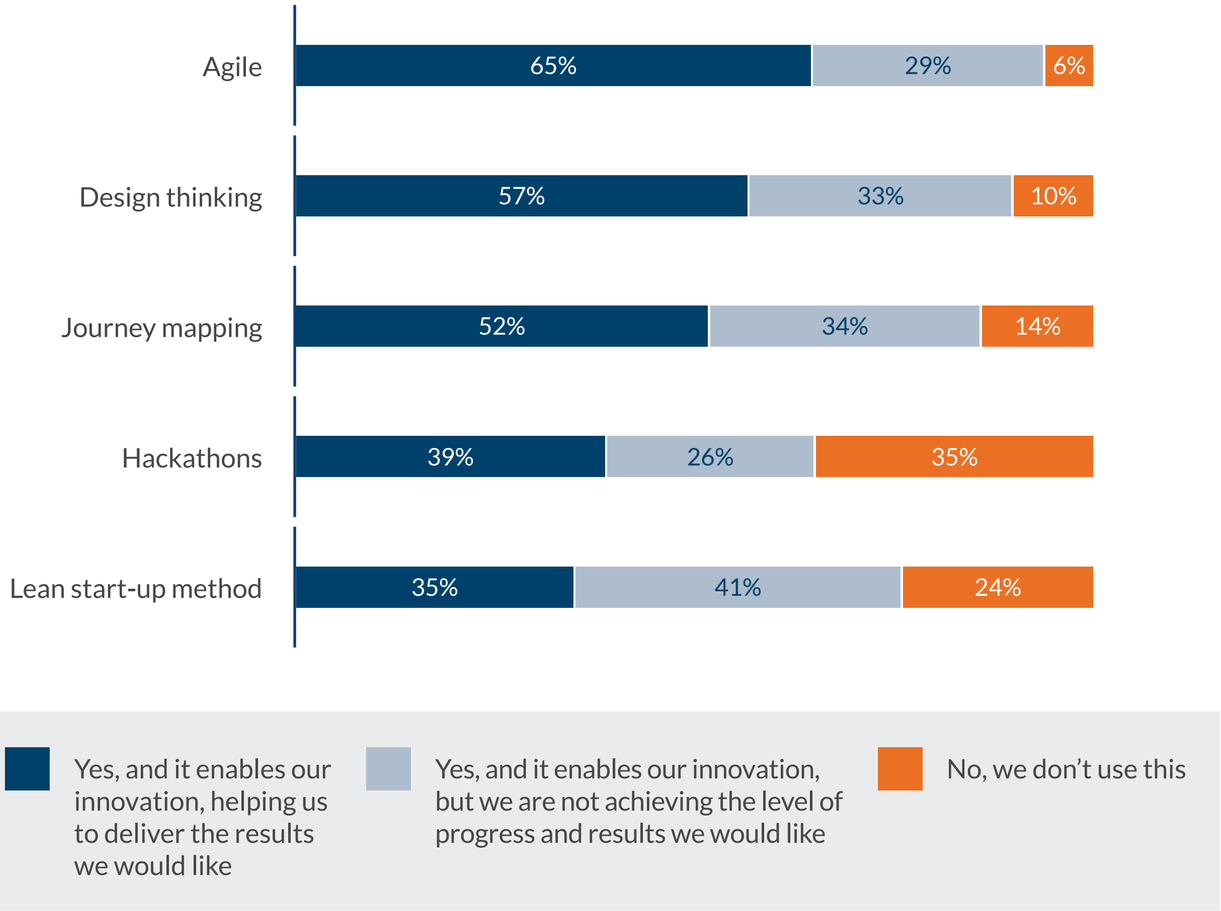
Which of the following areas do you consider the *most* important for maintaining an innovative organisation?



In regard to the top approaches organisations are using to help drive innovation and achieve the desired results, two out of three are turning to agile and more than half are employing design thinking. This is a positive sign showing that newer ideologies are being adopted by organisations to fuel innovation.

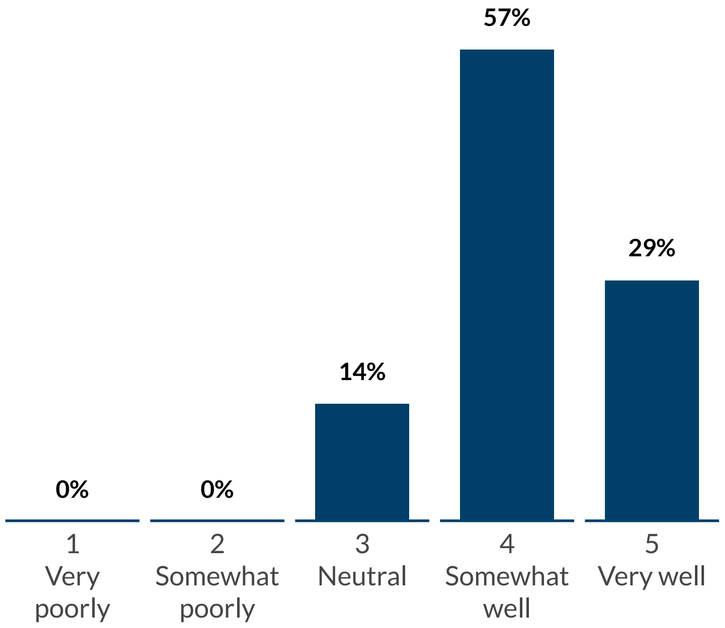
Newer ideologies are being adopted by organisations to fuel innovation.

Approaches being used to help drive innovation*



Question: Are you using any of the following approaches to help drive innovation at your company?

How well do innovation leaders bridge the gap between technology and business needs at your company?



Organisations have a relatively positive view when it comes to their ability to bridge the gap between technology and business needs. That said, less than one in three organisations self-report doing “very well” in this area, suggesting there is more work to be done when it comes to understanding innovation goals and their alignment to the business.

There are more positive signs when it comes to IT partnering with the business, with high levels of collaboration reported in areas including innovation strategy, strategic leadership and knowledge sharing. But an estimated one in three organisations indicated collaboration levels are relatively low in areas such as innovation culture and processes as well as talent upskilling and retention.

Of particular note, business and technology leaders in two out of five organisations are not collaborating effectively when it comes to educating non-technical board members on the benefits of innovation investments. Obtaining executive buy-in, particularly at the board level, is critical to driving successful innovation programs.

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Notable Observations — Industry and Region

Industry

- As expected, regulatory and compliance requirements represent the top innovation challenges for financial services organisations (16%), though they appear to be more significant for numerous other industry groups.
- Talent management, including upskilling, staff retention and resource capacity, are of greater concern to technology organisations compared to those in most other industries.
- For consumer packaged goods, financial services and technology organisations, fostering an innovative culture is considered to be of greater importance to them compared to other organisations.
- 24% of organisations in the biotechnology/medical devices industry indicate that regulations and compliance requirements are a key challenge for innovation activities.

Region

- For North America, the top three challenges for pursuing innovation are regulatory and compliance requirements, security risks, and lack of diversity of perspective.
- European-based enterprises say that regulatory and compliance requirements are the top challenge for innovation.
- Regardless of region, respondents claimed that a chief innovation/strategy officer was the key person for driving innovation.

Regulatory and compliance requirements are the top innovation challenges for financial services organisations.

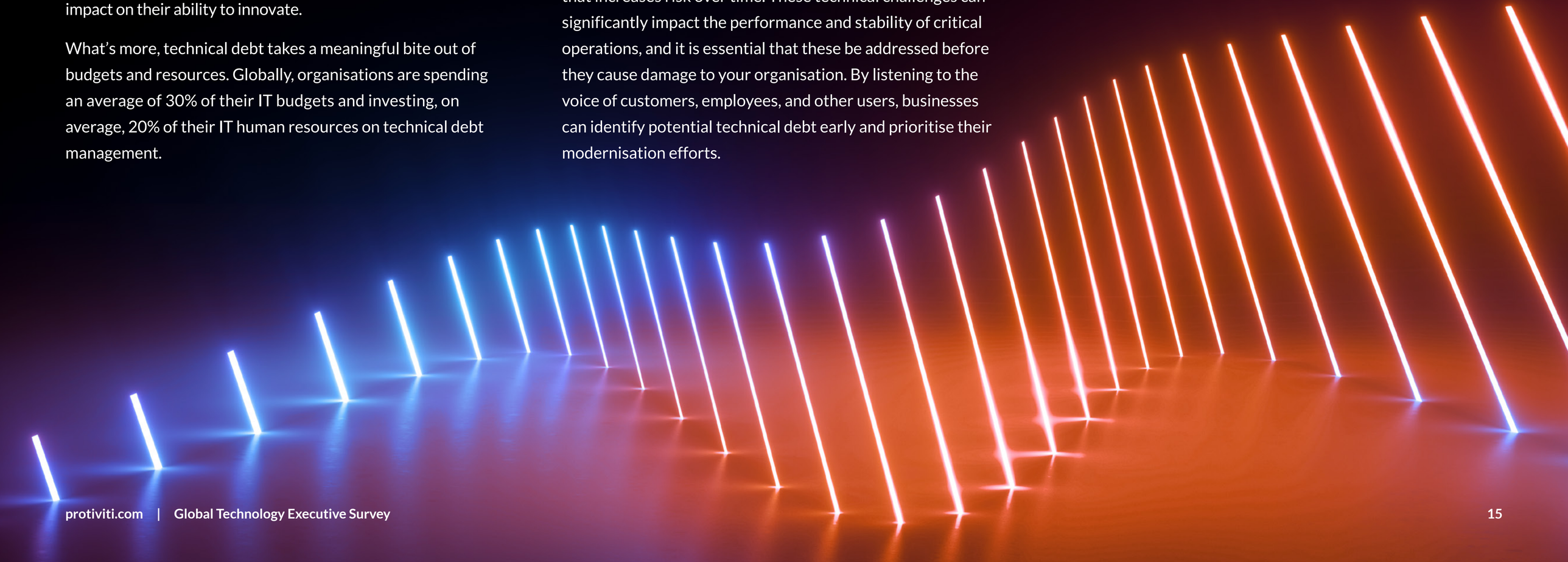
Technical debt remains a major burden

As organisations strive to increase their focus, and time and resources, on innovation, technical debt becomes a significant concern and burden that can lead to decreased productivity as well as increased costs and risk. On average, nearly 70% of organisations view technical debt as having a high level of impact on their ability to innovate.

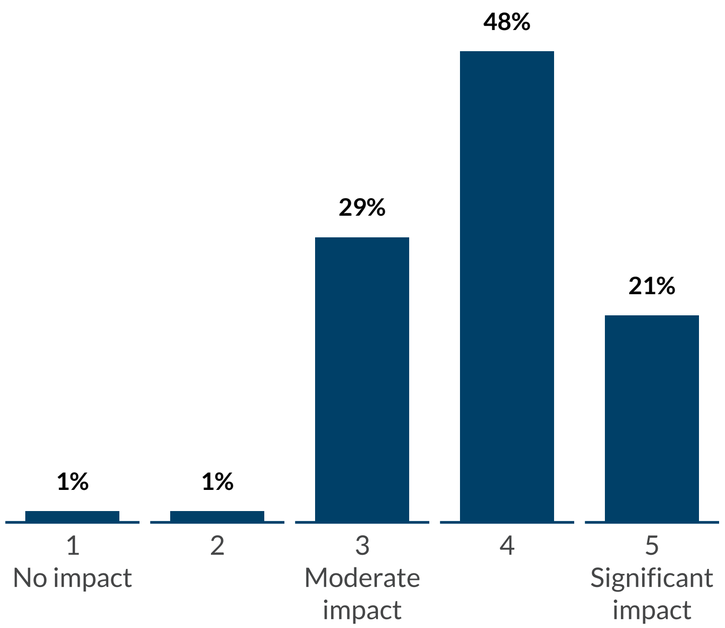
What's more, technical debt takes a meaningful bite out of budgets and resources. Globally, organisations are spending an average of 30% of their IT budgets and investing, on average, 20% of their IT human resources on technical debt management.

What is technical debt?

Technical debt can be defined as the accumulation of legacy systems and applications that are difficult to maintain and support, as well as poorly written or hastily implemented code that increases risk over time. These technical challenges can significantly impact the performance and stability of critical operations, and it is essential that these be addressed before they cause damage to your organisation. By listening to the voice of customers, employees, and other users, businesses can identify potential technical debt early and prioritise their modernisation efforts.



What impact is technical debt having on your ability to innovate?

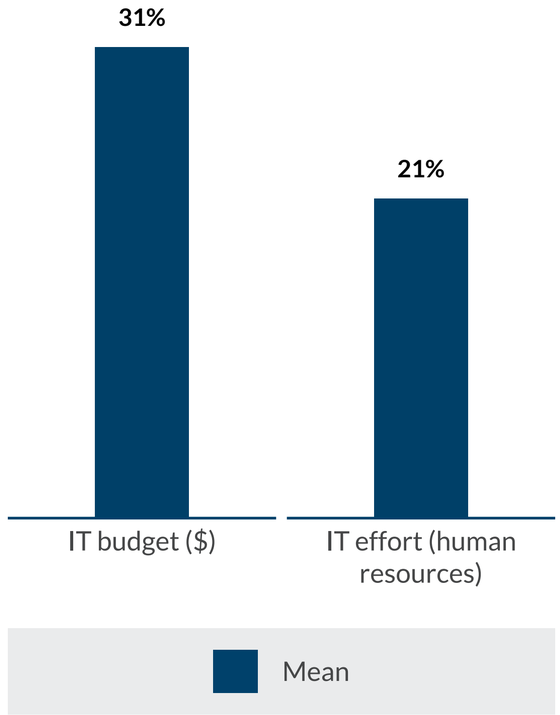


Technical debt is the antithesis of innovation. Organisations that don't account for technical debt are increasing their level of risk significantly and are inhibiting the ability for the business to grow and become agile.

Resolving these issues starts with understanding how technical debt impacts an organisation. In many cases, this debt results from the need to support legacy systems. Over time, businesses run the risk that technical debt becomes so extreme that they can no longer innovate or migrate to newer solutions. In our view, the rush to build new services and solutions can create more technical debt, which becomes a bad investment of time and resources.

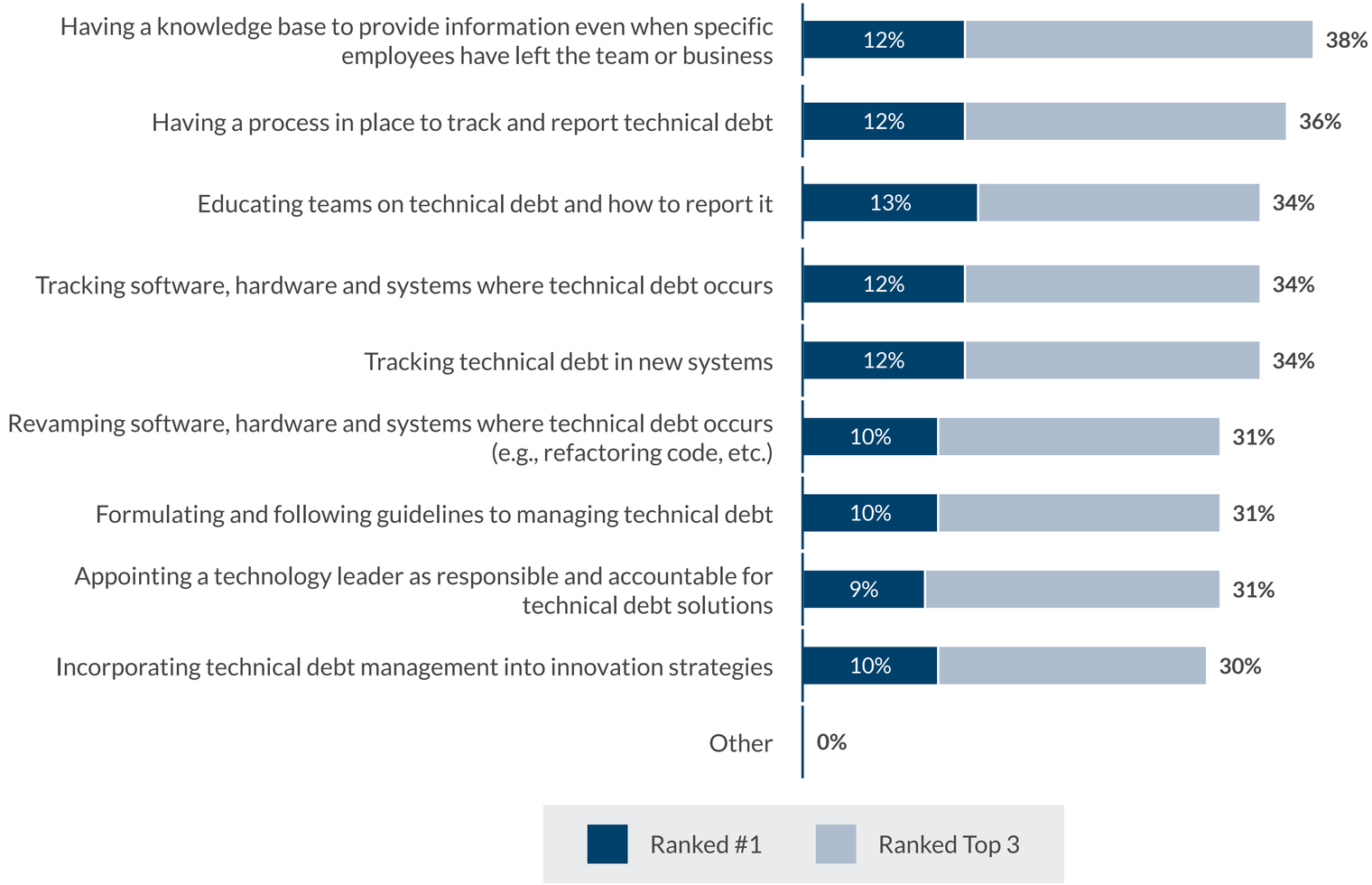
Nearly 70% of organisations view technical debt as having a high level of impact on their ability to innovate.

What percentage of the resources below would you estimate is dedicated to resolving technical debt?



Technical debt is an expense that should be minimised over time. Achieving that requires planning and budgeting, along with determining the value of eliminating legacy systems. That comes down to identifying what a replacement system or process can offer. For example, Nucleus Research reports that the cloud can offer four times as much ROI as an on-premises solution, which proves to be a good indicator as to why organisations should be looking at their investments and the return on them.

What are the top three strategies that your company prioritises when dealing with technical debt?



Of course, dealing with technical debt means having the right people and skills in place. In terms of strategies organisations prioritise to address technical debt, the most cited one is having a knowledge base to provide information even when specific employees leave the team or company. This underscores the importance of effective succession planning as well as strong knowledge management.

This illustrates that technical debt typically proves to be as much a “people” problem as a technology problem. Organisations are finding that maintaining the legacy technology that creates technical debt requires having people in place that are using older skill sets, which in turn limits the time available to upskill those staffers to transition to newer systems. In addition, new or junior employees want to work on the latest technology and not the oldest, so it can impact your ability to attract and keep junior employees.

Easing technical debt also involves educating experienced and accountable IT executives and managers on how to liberate the organisation from older, problematic systems and platforms using a systematic process that fuels a start and works its way throughout the enterprise. Additionally, today's latest technologies have the potential to become tomorrow's unloved debt. This issue can potentially be mitigated by developing and implementing built-in processes that guard against the obsolescence that increases technical debt.

Most enterprises view technology assets depreciating over a four-year time span, which in turn prompts technology vendors to sell those enterprises the latest and greatest technologies. However, companies often have a hard time moving off their older platforms, which are too big and complicated to ditch. Understanding the lifecycle of products and services, as well as the potential for obsolescence, goes a long way toward minimising future technical debt.

Ultimately, organisations must seek a balance where technical debt can be reduced while also bringing staff up to speed on newer, more innovative technology.

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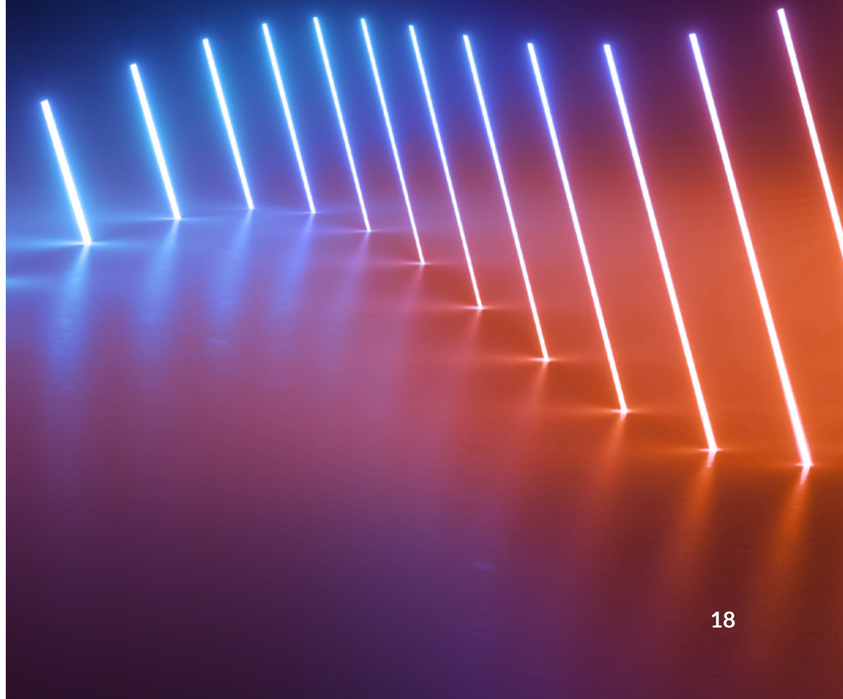


Notable Observations — Industry and Region

Industry

- As expected, financial services organisations expressed greater concern about the impact of technical debt on innovation (78%) compared to the overall survey response.
- Interestingly, technology organisations are significantly less likely to have a process in place to track and report technical debt (6%) compared with organisations in every other industry.
- For the most part, all organisations understand technical debt can put a damper on innovation. However, compared with other organisations, those in the biotechnology/ medical devices (82%), telecommunications (81%), and financial services (78%) industries indicate that technical debt has a higher impact on their ability to innovate.
- 66% of healthcare providers state that technical debt is having a high impact on their ability to innovate.
- Organisations in the transportation and logistics industry spend a notable amount of their IT budget (39%) to service technical debt.

Region

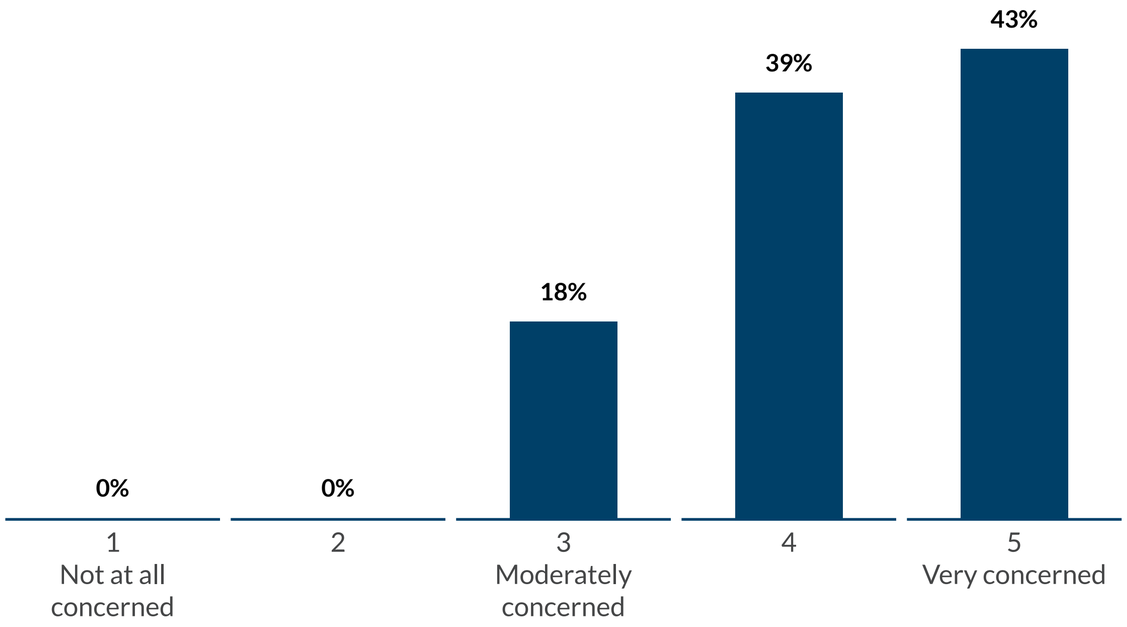
- From a regional standpoint, 78% of Japanese companies, 77% of UK businesses and 73% of U.S. organisations find that technical debt has a high impact on innovation.
- In North America, 19% of respondents claimed that technical debt was having a significant impact on their ability to innovate.
- In Europe, 28% of respondents offered that technical debt only had a moderate impact on their ability to innovate.
- In the UK, organisations are dedicating 38% of their IT budgets to control technical debt. However, German businesses claim that servicing technical debt only requires 19% of their non-financial resources.
- For U.S.-based organisations, the top strategies to deal with technical debt are revamping software, hardware and systems where technical debt occurs (e.g., refactoring code, etc.); educating teams on technical debt and how to report it; having a knowledge base to provide information even when specific employees have left the team or business; and having a process in place to track and report technical debt.

Technology organisations are less likely to have a process in place to track and report technical debt compared with organisations in other industries.

Innovation elevates security concerns

Not surprisingly, while many organisations are pursuing an innovation agenda, security risks are on the minds of many technology executives, especially when it comes to implementing new technologies.

How concerned are you about the security risks (for example, breaches, data loss, improper controls, poor access management) associated with implementing innovative new technologies?



Globally, a strong majority of organisations — 82% — have a high level of concern about security risks associated with implementing innovative new technologies. However, there is a significant gap between large and small organisations. For example, 70% of businesses with annual revenue under $1 billion are very concerned about the impact of innovative technologies creating security risks, while 90% of organisations with annual revenue of more than $10 billion are very concerned, indicating that larger organisations may be more risk averse than smaller organisations.

Pursuing innovation is a strategic priority for most businesses today, but such new activities can create uncertainty and doubt across the C-suite, especially with regard to security and risk management. Given these concerns, organisations should lean on dedicated labs and/or think tanks to focus on innovation activities, including but not limited to how to manage security- and privacy-related risks. Organisations should also embrace concepts such as DevOps, especially a DevSecOps ideology to bake in security during the development process.

Notable Observations — Industry and Region

Industry

- Financial services (88%) and telecommunications (87%) expressed greater concerns about security risks around innovation relative to many other organisations.
- A vast majority (81%) of technology companies have high levels of concern about these security risks.
- Other industries that express the greatest security concerns tied to innovation include healthcare providers, biotechnology and manufacturing.

Region

- Security concerns by region have little variance. 85% of U.S.-based organisations have a high level of concern, while 73% of UK businesses share that same level of concern.

Pursuing innovation is a strategic priority for most businesses today, but such new activities can create uncertainty and doubt across the C-suite, especially with regard to security and risk management.

Attracting and retaining top talent drives technology adoption and innovation

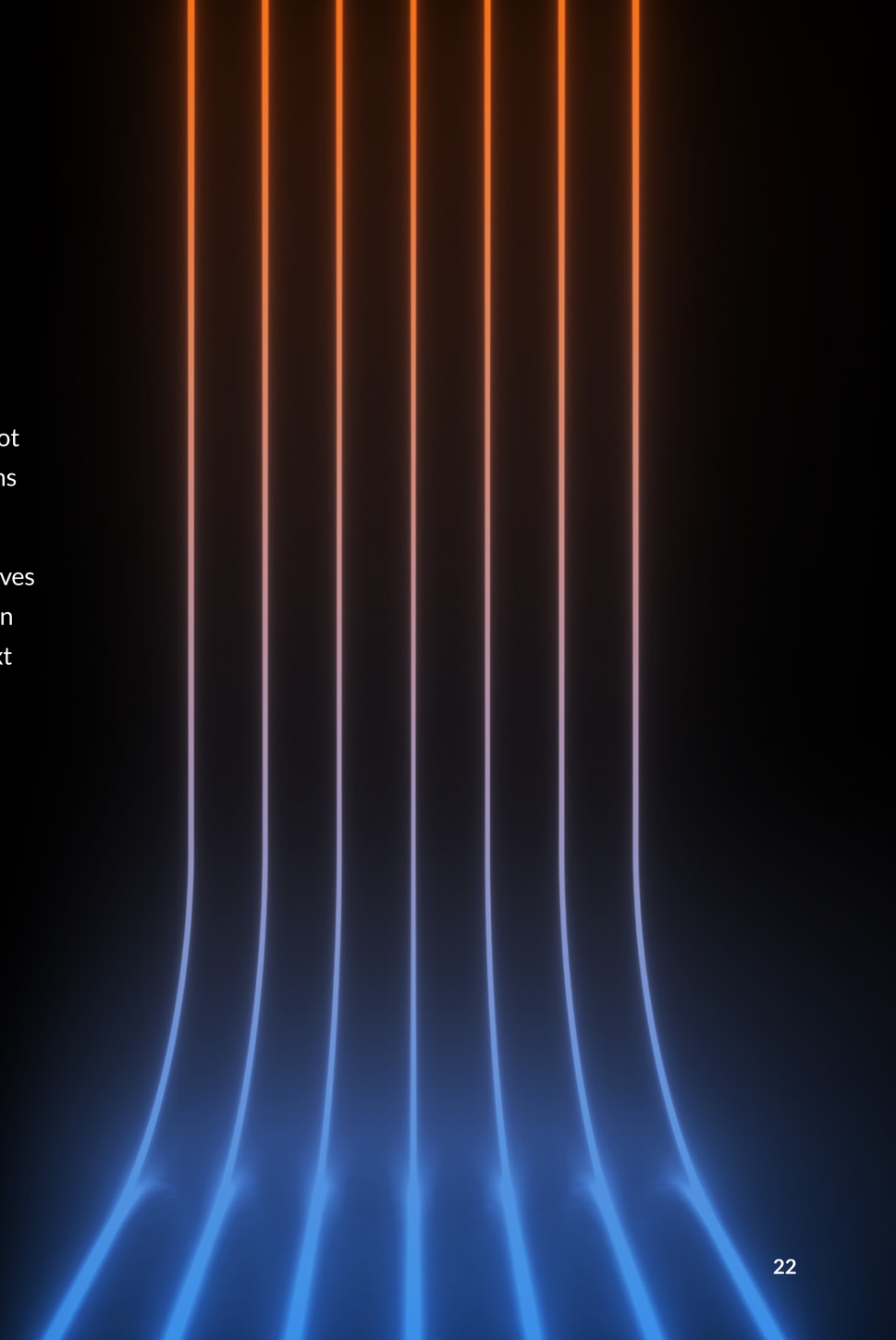
As expected, organisations are deploying a number of innovative and emerging technology tools, but there is significant disparity in the findings that seem to depend, in part, on the maturity and proven benefits of each technology.

For example, cloud and the Internet of Things are, predictably, used extensively by a majority of organisations globally. Virtually all of those businesses not using these technologies have plans to do so.

These rates of adoption demonstrate that organisations are willing to deploy established technologies to improve their operations and customer experiences. Although a technology like cloud is no longer in the “emerging” category, its capabilities are growing daily, demonstrating that even established technologies can be used to fuel innovation.

On the other end of the spectrum, technologies such as augmented reality/virtual reality, robotics, and Web3 are not widely used today, but a majority of organisations have plans to implement them, some within the next three years.

Interestingly, there are mixed perspectives among IT executives with regard to the metaverse. One in three organisations plan to implement metaverse-related technologies within the next three years. However, more than one in four organisations (28%) are not currently using it and have no plans to do so.



Which of the following type(s) of technologies, if any, does your company use? (Multiple responses permitted)

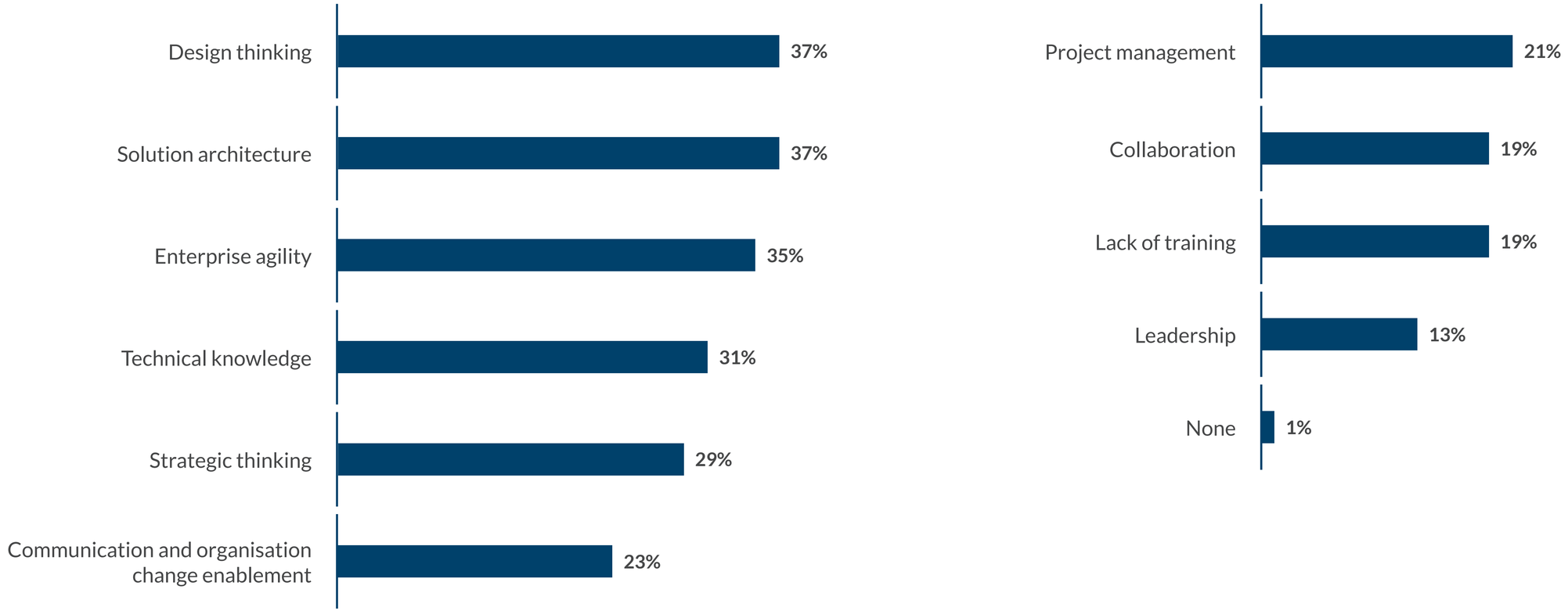
	Currently using	Not currently using but plan to implement within the next 3 years	Not currently using but plan to implement in 3+ years	Not currently using and no plans to implement
Cloud	75%	18%	7%	0%
Internet of Things	70%	19%	10%	1%
5G	53%	29%	12%	6%
Artificial intelligence/ machine learning	49%	27%	19%	5%
Edge computing	46%	29%	22%	3%
Blockchain	43%	34%	13%	10%
No code/Low code	34%	38%	19%	9%
Augmented reality and/ or virtual reality	29%	36%	23%	12%
Robotics	25%	38%	20%	17%
Web 3	24%	41%	23%	12%
Quantum computing	21%	42%	26%	11%
Metaverse	8%	34%	30%	28%

Use of AI/machine learning

49% *Using today*

27% *Will implement within 3 years*

What skills-related gaps, if any, impede innovation at your company?



Innovation can be impeded by a lack of the right skills. Interestingly, organisations cite design thinking, solution architecture and enterprise agility as areas in which skills-related gaps are most frequently impeding their innovation efforts.

Attracting and retaining top talent in technology-related areas that will fuel innovation in the near and long term will be an ongoing challenge for organisations, especially amid a talent war that shows no signs of ending any time soon. Or, put another way, a growing number of authorities are proclaiming that the war for talent is over … and talent has won.

This makes focusing on talent and addressing skills gaps in areas such as design thinking, solution architecture and even enterprise agility a strategic imperative. As part of these efforts, it's also vital to build the right culture — one that supports an innovation mindset and encourages risk-taking and exploring new ideas. Keep in mind that investments in people, talent and culture fuel innovation.

Notable Observations — Industry and Region

Industry

- Within financial services, there appear to be significant skills-related gaps in solution architecture (44%).
- For consumer packaged goods organisations, design thinking (52%) is a major skills gap.
- Within technology organisations, solution architecture (55%) and design thinking (40%) represent areas where there are significant skills gaps.
- 35% of the government sector believes that enabling an agile technology environment is critical for maintaining innovation.

Region

- Organisations based in China (42%), United Arab Emirates (40%) and Germany (40%) face more skills gaps in strategic thinking compared to the U.S. (28%) and India (30%).
- India (24%) and China (20%) face significant skills gaps in leadership.
- The UK has significant skills gaps in design thinking (43%) and solution architecture (45%).
- When it comes to agility, India, Italy, France and Hong Kong have a higher than average skills gap.
- Organisations based in India have a higher adoption rate of emerging technologies, such as AI, ML, VR and blockchain.
- The Netherlands, Singapore and Hong Kong are more likely to use no-code and low-code technologies.
- Organisations in the Asia-Pacific region tend to use AI and ML technologies more than other markets.

A call to action for technology leaders

Following are steps companies should undertake or continue over the near term to ensure they can increase their agility and sustain their innovation and transformation journey successfully over the long term:

Innovation and transformation

Modernising legacy applications to optimise growth, reduce technical debt and improve the user experiences.

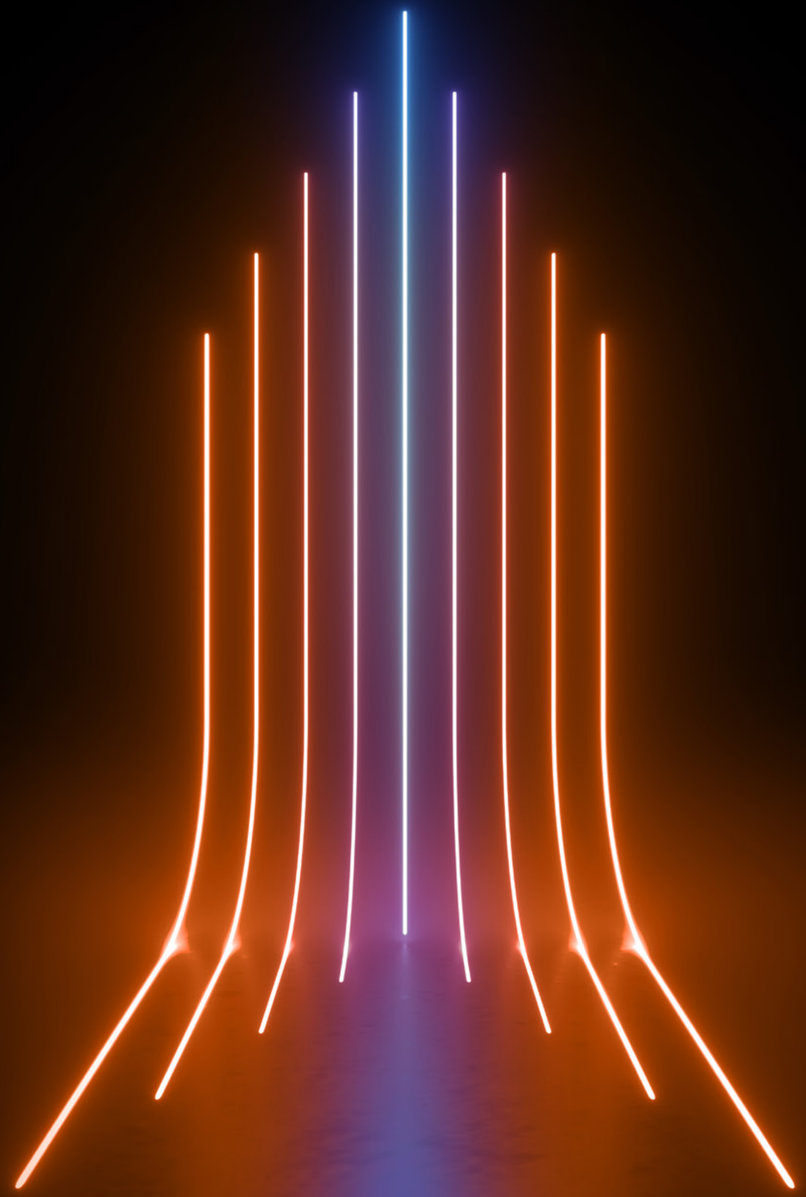
- Business leaders want engaging, intelligent and easy to use applications for their customers, employees and business partners. Modernising existing applications should significantly improve the user experiences and provide more functionality and insights to meet their user needs. In addition, modernising applications can lead to new insights that spur innovation and new digital services and product lines that create new revenue streams.
- IT leaders want to reduce technical debt that is time-consuming to manage and resource-intensive to support. In addition, outdated technology increases operational and cyber risks.
- Business and IT leaders are interested in moving to modern cloud platforms that provide new insights into their business, enhance decision-making capabilities across the hierarchy and function, and significantly improve their competitive position even with the new "born digital" competitors that are continuing to create new levels of competition for traditional companies.

— A discovery process is needed that considers each application's current environment, cloud readiness, resiliency, performance requirements, criticality to the business, and the ideal time to move to a modern platform. In addition, cost considerations should be evaluated to gain a perspective on where to make trade-offs.

— Applications should also be bucketed into retain, retire, or re-evaluate categories in the cloud to create a plan for moving forward with an understanding of current business benefits and considerations for the future.

— Once the discovery process is complete, an application modernisation strategy should be defined. This strategy should focus on what should move to the cloud first and what designated technical platform should be used, whether it is SaaS, Low Code, or Custom.

— The next step is to define the application processes and user experience needs to choose a platform based on business needs. For organisations that are



using mobile and social engagement, we recommend a customer-driven process design to ensure the customer's current and future needs are architected to include real-time personalisation with intuitive interactions.

- A leading application modernisation industry approach like the 6 R's (Rehosting, Replatforming, Redesigning, Refactoring, Rearchitecting, and Replacing) should be leveraged to understand the pros and cons of how each application should be modernised and moved to the cloud.
  - **Rehosting** or "lift-and-shift" is the easiest way to move your applications and systems as is. If faced with a hardware refresh, many companies will find the elastic pricing model and provider-based management attractive, making it easier to optimise or re-architect later.
  - **Replatforming** leverages high-value cloud platform capabilities and very little code changes.
  - **Redesigning** applications provides the enterprise with the most flexibility in terms of application functionality although it may be a heavier lift. It becomes essential if an existing application has limited functionality and is nearing its end of life.
  - **Refactoring** prioritises productivity and speed by embracing new approaches such as microservices and serverless. It takes aging applications written with rigid architectural patterns such as three-tier and embraces new architecture patterns.
  - **Rearchitecting** is needed when an application needs scalability and agility, and apps are fully redesigned to leverage the scale in the cloud. This provides the ability to create a serverless version of a legacy application.
  - **Replacing** an application completely with a new SaaS application offers speed and frees up internal development resources for other projects, but it could result in risk given potential business process changes, limitations to customisations, and cultural adaptation to new software.
- In summary, we recommend developing an application modernisation program to manage the intake process, modernisation application criteria, governance, technical architecture, DevOps, and end-to-end development. The program will focus on reducing technical debt and risks, leading change and driving adoption, and measuring success. The result will be engaging and intuitive customer, partner and employee experiences.

Improve agility through rapid response and strong operational resilience. Become a resilient and compliant organisation that can readily respond to outages, crises and other threats to running the business. Organisations must consider several aspects to build resilience across their enterprise, orchestrating across existing domains such as business continuity, disaster recovery, technical recovery, cyber resilience and management of third-party assets.

Develop proof of concept test beds. Flesh out potential failure points by piloting proof of concept implementations.

Capitalise on the emergence of advanced technology platforms and capabilities. Invest in leveraging new platforms and architectures for building and running business applications to enable better access to data, provide flexibility and faster time to market, and support digital capabilities to deliver differentiated experiences. Deploy greater process automation and intelligent technologies such as AI, machine learning and augmented reality/virtual reality to reimagine existing processes and alleviate risks from the inevitable shifts in labour availability and costs.

Decisions based on insightful customer and user analytics are more likely to achieve business success.

Leverage insights and analytics from data. Employ advanced analytics and AI-based reporting to evolve the organisation, drive strategic decision-making, accelerate the achievement of business goals and be more competitive in the market.

Maximise customer engagement. Focus on the experiences of users and consumers (both positive and negative) to drive interaction through a modern, innovative operating model. Decisions based on insightful customer and user analytics are more likely to achieve business success. Invest in an event-streaming platform that facilitates smart apps that can react to events as they happen by developing tailored and immediate experiences customers are expecting.

Security and Privacy

Prioritise cybersecurity and data privacy. Harness the power of effective cybersecurity frameworks to combat a constantly changing threat environment. Balance identity and access management to ensure maximum speed of user access while managing risk. Ensure proper management of sensitive customer data while complying with applicable legal and regulatory requirements for collecting, storing, securing, processing and using sensitive data.

- **Embed security throughout innovation activities —** Proper cyber "hygiene" is foundational to managing security risks and maintaining resilience of business services.
- **Consider implementing security practices that align with agility —** There are several methodologies that incorporate cyber hygiene into the development and deployment process. Ideologies such as DevSecOps can enhance cybersecurity without disrupting innovation.
- **Assess current cybersecurity maturity —** Organisations should have a clear maturity assessment of their current cybersecurity protection, with the target maturity level agreed on by both the CIO/CISO and top executives or the board. This will allow the CIO/CISO to plan for future improvement.
- **Avoid being a bottleneck —** Companies must mitigate cybersecurity risk without slowing down innovation and should search for opportunities to boost enterprise value with novel tools such as greenfield cloud environments.
- **Maintain an enterprisewide focus —** CIOs and CISOs should evaluate the extent of cybersecurity implementations with an eye on enterprise transformation, carefully determining the measures required for minimally viable products or services and adding greater cybersecurity complexity where needed.
- **Think long-term —** With cyber threats expected to be among the top 10 risks for organisations across the next decade, CIOs must ensure their organisations have effective cybersecurity programming to mitigate risk and protect their company's valuable assets during and after digital transformation.

Leverage re-usable assets. By choosing easily reused software, hardware and other assets, organisations can accelerate transformation by providing a framework that can be adapted to drive new services, processes and needs.

Determine the capabilities needed to manage, secure and govern APIs. The growing use of application programming interfaces (APIs) in today's digital economy ("the API economy") has brought about new business models, risks and opportunities. As the organisation adopts architecture for providing standards enabling computer systems to communicate with each other, leaders must manage the exposure of the organisation's digital services and assets through APIs.

Organisations should have a clear maturity assessment of their current cybersecurity protection.

Talent and Skills

Make your talent your customer. The organisation's focus on the customer experience should extend to its own people and talent. Many companies can slice and dice data to understand their customers, but fewer do this with regard to the talent in their enterprise. This is an opportunity for positive change and growth. As part of these efforts, position an advocate for the preservation of talent and culture at the decision-making table as the organisation focuses on sustaining its financial health.

Be prudent and thoughtful in decision-making. Should a recession inhibit growth:

- Pursue all appropriate measures to preserve operating margin before moving forward with talent cuts. For example, reduce other SG&A costs, consider outsourcing noncore activities, sell noncore assets, adjust base and incentive compensation and benefits, etc.
- Focus on retaining "A" players by designing and deploying repeatable assessments of the organisational talent and skills needed to exit a recession in a strong position to capitalise on market opportunities.
- Be mindful of the employee experience and employee well-being by aligning these areas with the customer experience in ways that, to the extent possible, reflect the organisation's unique employee value proposition. Also, maximise the flexibility of work arrangements.

Treat people like people. Should workforce reductions and changes to hiring practices (e.g., a hiring freeze) become necessary, make decisions objectively and approach them smartly. There is a right way and wrong way to approach these matters.

- Communicate thoughtfully and frequently.
- Understand the talent and skills required for the organisation to achieve its strategy as the economy recovers.
- Focus on workforce reductions that eliminate overlaps in skills and capabilities.
- Consider third-party resources to provide certain skills.
- Explore opportunities to eliminate jobs that can be displaced by technology with the attendant workforce reskilling and upskilling.
- Create opportunities where new skills and learnings can be applied to further enhance employee contributions and incorporate new ideas into processes.

Build a resilient culture. Inculcate a philosophy of embracing change.

Integrate upskilling and retention strategies. Ensure the organisation's investments in upskilling employees are fully realised.

Make succession planning a strategic priority. This needs to happen beyond the senior executive suite. Devise and test knowledge transfer processes and leadership development plans to increase flexibility and reduce the high costs and stress associated with reassigning roles and responsibilities in a reactive manner. Consider how the organisation is going to retain its key people and keep them engaged long-term to increase the strength of the executive bench.

Keep DEI and ESG top of mind. Monitor employee sentiment on DEI and other ESG matters to identify and assess the broad range of human capital risks to inform decision-making processes on taking corporate stances on contentious issues.

The organisation's focus on the customer experience should extend to its own people and talent.

Survey Methodology and Demographics

Protiviti surveyed more than 1,000 CIOs, CTOs, CISOs and other technology executives and leaders (n = 1,050) to ascertain the status of several concepts around innovation and technical debt across numerous regions, business types, revenue classes and management roles.

The respondents answered 18 survey questions which were collated and then transferred into reportable elements with totals, averages, and divisions based upon the size of the organisation, the location of the organisation, the industry and the role the respondent played within the organisation.

POSITION

Chief Information Officer	17%
Chief Information Security Officer	15%
Chief Technology Officer	17%
Senior Vice President of Information Technology	14%
Vice President of Information Technology	15%
Director of Information Technology	22%

INDUSTRY

Government	12%
Consumer Packaged Goods	8%
Retail	8%
Technology (Software/High-Tech/Electronics)	5%
Media and Entertainment	5%
Telecommunications and Data Infrastructure	5%
Healthcare — Integrated Delivery Systems (Provider & Payer)	5%
Healthcare Payer/Insurance	5%
Healthcare Provider/Services	5%
Financial Services — Banking & Capital Markets	4%
Financial Services — Asset & Wealth Management	3%
Manufacturing (other than Technology)	3%
Mining	3%
Oil and Gas	3%
Power and Utilities	3%
Renewables	3%
Financial Services — Mortgage & Consumer Lending	2%
Financial Services — Payments	2%
Financial Services — Private Equity	2%
Insurance (other than Healthcare Payer)	2%
Automotive	2%
Biotechnology/Medical Devices	2%
Chemicals and Materials	2%
Pharmaceuticals and Life Sciences	2%
Transportation and Logistics	2%
Warehousing/Distribution	2%

ORGANISATION TYPE

Publicly held, for profit entity	49%
Privately held, for profit entity — preparing to become publicly held	12%
Privately held, for profit entity — no current plans to become publicly held	26%
Government agency	12%
Non-profit organisation	1%

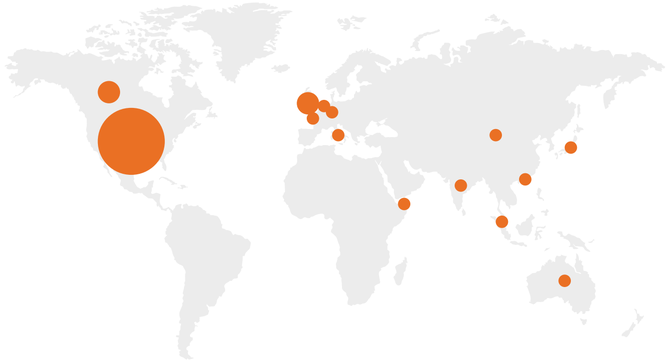
SIZE OF ORGANISATION (OUTSIDE OF FINANCIAL SERVICES) — BY GROSS ANNUAL REVENUE IN U.S. DOLLARS

$10 billion or more	28%
$5 billion - $9.99 billion	24%
$1 billion - $4.99 billion	26%
$500 million - $999.99 million	22%

SIZE OF ORGANISATION (WITHIN FINANCIAL SERVICES) — BY ASSETS UNDER MANAGEMENT IN U.S. DOLLARS

$50 billion or more	29%
$25 billion - $49.99 billion	22%
$10 billion - $24.99 billion	22%
$5 billion - $9.99 billion	27%

ORGANISATION HEADQUARTERS



United States	27%	Singapore	5%
United Kingdom	9%	France	5%
Canada	9%	Germany	5%
China	5%	Italy	5%
India	5%	Netherlands	5%
Japan	5%	United Arab Emirates	5%
Australia	5%	Hong Kong	5%

About Protiviti

Protiviti (www.protiviti.com) is a global consulting firm that delivers deep expertise, objective insights, a tailored approach, and unparalleled collaboration to help leaders confidently face the future. Protiviti and our independent and locally owned Member Firms provide clients with consulting and managed solutions in finance, technology, operations, data, analytics, digital, legal, HR, governance, risk and internal audit through our network of more than 85 offices in over 25 countries.

Named to the 2023 *Fortune* 100 Best Companies to Work For® list, Protiviti has served more than 80 percent of *Fortune* 100 and nearly 80 percent of *Fortune* 500 companies. The firm also works with smaller, growing companies, including those looking to go public, as well as with government agencies. Protiviti is a wholly owned subsidiary of Robert Half (NYSE: RHI). Founded in 1948, Robert Half is a member of the S&P 500 index.

About Our Technology Consulting Solutions

Whether you are looking to automate, modernise, or embark on an end-to-end transformation journey, our technology consulting solutions can help. Our services range from strategy, design, and development through implementation, risk management, and managed services. Every business is becoming a technology business. Let us help you transform.

Our professionals become your trusted advisers, providing insight and strategic vision through innovative actions. Innovation is embedded in everything we do. And it all starts with design thinking. From the C-suite to the newest consultant, our professionals are trained in design thinking to deliver unique solutions that solve today's business problems. Our experts leverage agile processes and are certified in the latest technologies and platforms, keeping you at the forefront of technology transformation.

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