



Keeping pace with emerging technologies

Companies know they need to adopt them, but many aren't ready

Findings from Avanade's global emerging technologies research

Harnessing the power of emerging technologies

Executives worldwide are well aware that technological changes are coming at them at an increasing pace.

And they know that the success of their businesses depends in part on wringing maximum competitive advantage from technologies like blockchain, quantum computing, conversational AI, immersive technology, internet of things (IoT) and security and privacy.

What they're less certain about is how to master that array of technologies and, in particular, if they have the right people and capabilities in place to do so. Muddying matters: They see the newest technologies as more interdependent and thus more challenging to adopt than the technologies of just a few years ago.

These were among the results from the recent Avanade survey of 1,200 executives around the world. Respondents were asked about the opportunities and challenges they see in adopting the most talked-about technologies. This executive summary provides a look at key findings, combined with our perspective and recommendations about how to make the most of these emerging technologies.

The research underpins our [Avanade Trendlines](#) program on emerging trends that impact the design, innovation and technology choices of large organizations.

90%+
of executives plan to integrate blockchain, quantum computing, conversational AI, immersive experiences, IoT and security and privacy technology into their operations.

50%+
expect to do so within three years.

What's worrying executives?

The pace of change, uncertainty and talent, talent, talent

Companies see urgency in adopting new technologies. Executives are nearly unanimous on the potential benefits of these emerging technologies and expect to integrate them into their operations. Some companies are already doing so:

- 24% are already adopting blockchain.
- 32% are adopting conversational AI.
- 47% are conducting trials for immersive experiences.

Uncertainty is holding some businesses back.

Despite the urgency to keep pace with these rapid changes, many executives are uncertain about whether they're prepared to move ahead. For example, eight out of 10 respondents aren't completely confident that they have the capabilities to fully leverage IoT for business impact. Similarly, 80% aren't completely confident they understand what quantum computing is about. Other factors holding back respondents: concerns over costs, security and data privacy, and a lack of strategy and vision.

Lack of talent is the biggest challenge. The most common thread: concerns about having the right talent to take advantage of these technologies. The lack of specialized talent was cited consistently among the top concerns across all the technologies studied.

To get the maximum benefit, these technologies must be implemented in combination. Executives see many of these technologies as interdependent, and envision deploying some in combination with

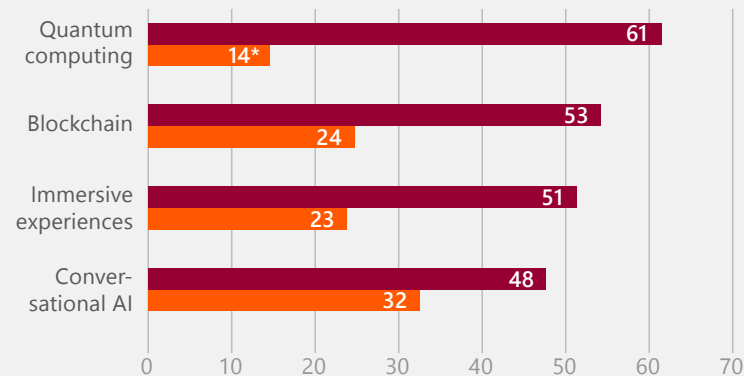
others, not just as standalone projects. For example, most see blockchain being used in combination with IoT and AI. This is a big contrast to the "emerging" technologies of just a few years ago – including cloud, social and mobile – which were initially adopted in less-interconnected ways.

On the pages that follow, you'll find a deep dive into the different technologies as well as recommendations about how to embrace them.

Integration levels vary, depending on the technology

% respondents saying

■ Planning to integrate within three years ■ Have already begun integrating/have fully integrated



Companies are at various stages of integration with these technologies. Conversational AI is the furthest along, with about one-third of respondents saying they're already implementing it. While more than 60% said they plan to implement quantum computing within three years, that timeline will be for very specific industry use cases given the fact that the technology is still being developed and is not in widespread use yet. But it may be an indication of the pressure executives feel to keep up with the hype around emerging technologies like quantum.

* % saying have already begun planning integration of quantum computing

NOTE: Question not asked for IoT and security

Source: Avanade

A person in a red jacket is running on a balcony at sunset. The sun is low on the horizon, creating a bright glow and lens flare. A dog is visible in the foreground, partially obscured by a white wavy graphic. The background is a clear sky transitioning from blue to yellow.

Taking the pulse on emerging technologies

From blockchain to quantum computing, from conversational AI to IoT, we look at specific findings for the individual technologies studied.

Blockchain: Full speed ahead

Momentum continues to build for blockchain, one form of distributed-ledger technology, with more than half of respondents expecting to integrate the technology within three years. Both their reasons and their approaches vary.

Respondents are almost evenly divided about how they're using or planning to use blockchain: to implement new business models, to improve inventory/asset tracking and management, and to enhance data security.

Most (58%) have built or will build their own blockchain infrastructure and applications; the rest will wait for the solutions they need to become available commercially. This last group may be influenced by concern about the lack of blockchain talent. The scarcity of specialist talent was cited as the leading challenge in implementing blockchain. Other hurdles include costs and investing too early. As previously

noted, most (54%) expect to adopt blockchain with technologies like IoT and AI, rather than by itself.

While the [momentum for blockchain](#) is growing, businesses still have questions about whether it's right for them and, if so, how they should proceed. Finding the right business scenario is the key to benefiting from blockchain. Early enterprise adopters are testing and proving the technology in their existing businesses. Initially, this will deliver smaller incremental gains in efficiency, while opening the door for disruptive change in business processes, such as disintermediating a complex, multiparty transaction.

In Avanade's work with clients, we've seen financial services firms benefit by using blockchain to eliminate clearinghouses and brokers and create new business models. And we've worked with consumer goods companies and retailers to improve supply chain management, tracking and logistics through blockchain applications.

54%
of executives see blockchain being used in combination with IoT and AI.

97%
believe that blockchain will deliver business benefits.

Quantum computing: Learn now

Quantum computing – computing that operates at the subatomic level – is shaping up to be one of the defining technologies over the next five to 10 years. Because of the growing buzz the technology has already generated, we included it in the research to help us understand how executives are thinking about quantum.

What we found was a big disconnect between the reality and perception around quantum computing. Nearly all respondents (94%) plan to adopt it and most (61%) plan to do so within three years, although 80% say they don't fully understand it or its potential uses and benefits. Some of that uncertainty stems from not having the right specialist talent in place. And that talent is in scarce supply.

But that doesn't mean companies should put quantum on the back burner. Its anticipated impact may cut across many areas, including data analytics, such as to solve larger-scale problems; forecasting,

for faster, more accurate prediction of business impacts; pattern recognition, which could help cut costs and increase time to market; and security, such as for cyberattack hunting.

Some of the early learnings coming from quantum computing research can be applied to today's algorithms, something we call "[quantum-inspired computing](#)." Quantum-inspired means that quantum algorithms are used to solve a problem through a simulator. This approach was necessary because until very recently the development kits for quantum to use real qubits (quantum bits) were not available to companies. For example, a pharmaceutical company uses quantum-inspired computing to speed the identification of new drugs. The technology can also be applied to more common business activities and processes. At Avanade, we're helping a client use quantum-inspired computing to optimize vehicle routing, resulting in faster deliveries.

80%

of executives say they don't fully understand quantum computing or its potential uses and benefits.

75%

believe that quantum computing will have a major impact on their business.

Conversational AI: Voice-driven technology gains ground

Nearly all executives (96%) have implemented or plan to implement conversational AI into their organizations. One-third have already done so. The enthusiasm is as deep as the uses are broad: from troubleshooting IT to customer and employee support.

Despite their enthusiasm for conversational AI, executives have concerns about the technology. Their top worry (35%) is security and data privacy. Other key hurdles include concerns about AI bias and lack of specialist talent. Companies implementing conversational AI want to ensure that voice-driven technology is not only functional but also has a personality that properly reflects their brand. And as with blockchain, executives cite the importance of integrating AI with their other systems.

To date, the bulk of conversational technology has been focused on fit-for-purpose chatbots; that is, single-purposed, siloed bots that each do the one thing they were designed to do – a helpdesk bot, for example. The next phase are digital assistants that are both more talented and more flexible. They not only do more, but the range of what they can do is user-defined and hence user-customized.

At Avanade, for example, we built a single, centralized bot with many skills contained in the [Bot Center](#). The centralized bot program ensures that all bots are secure, brand compliant and readily available across the business in various channels. Employees can customize the bot with the skills that are most relevant for them. With a quick inquiry to a single bot, employees can get immediate access to information and complete tasks more efficiently, improving their productivity.

48%
of executives expect to adopt conversational AI within three years.

43%
of companies are using or plan to use conversational AI technology to troubleshoot IT issues.

Immersive experiences: Faster and easier than ever

While nearly all executives (92%) expect to implement immersive experience technology, many are currently in the early stages, trialing it with a small group of customers (47%) or as an internal proof of concept (41%). And only 23% have either begun to actually integrate or have fully integrated the technology into their operations.

Key uses focus on the workplace experience, including remote collaboration (42%) and simulations of workflows and staffing (37%). Other uses include virtual tours (41%), immersive or augmented advertising such as interactive ads on mobile devices (40%) and in-store shopping (35%).

As with many of the other technologies, lack of specialist talent is a key concern in integrating immersive experiences. Executives also cite cost and a lack of understanding about the business value.

Our work with clients reflects the range of uses to which companies are putting immersive experiences. We have worked together with [XL Catlin](#), one of the world's largest insurance companies, to explore how emerging technologies, such as augmented reality, might be used to change the way the company serves customers and competes on the global stage. We created an AR experience that uses voice dictation, hand gestures, and a camera and screen on a 3D headset to automate and enrich a time-consuming process like risk assessments. It can speed the time it takes to create a risk-assessment report to a few days, compared with as long as four weeks previously.

And for [Sydney Cricket & Sports Ground Trust](#) we used augmented reality to create an immersive experience for fan engagement.

47%
of executives are trialing immersive experience technology with a small group of customers.

42%
have implemented or plan to implement immersive experience technology for employee remote collaboration.

Internet of things: Focus on the people

Early IoT initiatives focused largely on data and analytics. Now organizations are starting to integrate other key components to more fully leverage IoT for business impact. That involves [rethinking systems to extend to “the edge.”](#) Technically that refers to hardware devices that control flow at the boundary of two networks, but what it’s really about is bringing to life a seamless end-user experience that can start and finish anywhere, regardless of connectivity.

Executives see that impact potentially reaching across their businesses to include greater operational efficiencies and quality, workplace productivity and additional revenue streams such as new products and services.

However, achieving that impact will require the right capabilities, which most executives (79%) aren’t fully confident they have. Other key concerns are the lack of security, trusted data and talent (such as data scientists).

Valuable as IoT is, it isn’t – by itself – the game-changer that many executives anticipated just a few years ago. Exploiting the data generated by sensors and other hardware is a good start, but it’s not enough.

We advise clients to think beyond the data to the people – customers and employees – who can be empowered to use that data to create better experiences. That leads naturally to rethinking business processes in which people and systems interact, using IoT to minimize the friction in those interactions, and ensuring that IoT is part of an organization’s larger business transformation.

79%
of executives aren’t fully confident they have the right capabilities to leverage IoT for business impact.

39%
say their business is realizing increased operational efficiencies and quality from IoT.

Security and privacy: Take action right now

A growing topic in the security and privacy space is [digital ethics](#). Most of the executives we surveyed (81%) lack complete confidence that their organizations are adequately prepared to address ethical issues related to AI and similar emerging technologies. Just as security is on every boardroom agenda, digital ethics will get there too – and quickly. Organizations need to balance how they deal with both security and ethics to ensure they address threats and don't jeopardize the loyalty of their customers and employees.

In the race to counter new security threats with new security technologies, executives are almost evenly divided on the question of which one is in the lead: the threats (48%) or new securing technologies (52%).

They're also almost evenly divided on whether the bigger threats are coming from inside (51%) or outside (49%) of their organizations. Those inside threats are quite varied: unintentional actions, lack of operational processes, lack of knowledge or training, and malicious activities.

Given the high levels of concern and the broad awareness of potential issues, it's disheartening to learn that only half of executives say their organizations have basic security practices in place, such as password rules (like required resets and multifactor authentication). And just 33% of organizations are using single sign-on to secure and simplify user access. Many companies don't need new security technologies as much as they need to apply the technologies and best practices already available to them.

We recommend that organizations think about security not just to plug holes in infrastructure, but as a strategic asset to help power their overall business plans. We see a holistic, long-term, evolving security strategy as a key to business growth.

That includes [addressing key imperatives](#) such as making everything secure "by design," embracing emerging technologies like AI and machine learning, putting identity at the center of security, delivering a great user experience and simplifying the technology landscape.

Only
52%
of executives believe that
new security technologies
are keeping ahead of new
security threats.

50%
say their organizations
have password rules
in place.

Recommendations: Plan before you leap

Executives in our survey know they need to embrace these emerging technologies, despite the increasing complexities and interdependencies. There's no single way to do this, of course, but there are key principles for them – and you – to keep in mind:

Talent. You need the right talent and expertise to evaluate emerging technologies right now. It's in scarce supply, so don't wait. If you can't hire the right people, develop the capabilities in-house by retraining your existing talent. That's what [DBS Bank](#) did in Singapore to facilitate its digital transformation, cultivating its people to embrace start-up qualities for customer focus, data-driven decision-making, risk taking, agile and continual learning.

Research. There's a lot to learn. Get the facts before jumping in with any of these emerging technologies. Make informed decisions based on the use cases applicable to your industry and your business – not on the hype. Look for [tools that can help you](#) identify the right use cases for technologies like blockchain.

Experiment. Before diving in, pursue pilots and other fast-fail activities to see what works, rather than getting caught in expensive, long-term projects. Researchers at the [MIT Center for Information Systems Research](#) recommend creating a portfolio of experiments to maximize learning.

Strategy. Don't look at any of the emerging technologies in a vacuum. Develop a holistic, connected strategy that will generate maximum benefit for you. A common concern cited in our survey was uncertainty about having the right strategy and vision. Trusted partners can help you think through the best approach for your business and how to experiment with pilots and other early experiments.

Dig deeper

Learn more about today's emerging technologies at www.avanade.com/BeyondTheBuzzword.

Survey methodology

The emerging technologies survey was conducted for Avanade by Wakefield Research and focused on blockchain, quantum computing, conversational AI, immersive experiences, IoT and security and privacy. It included 1,200 C-level and senior business and IT decision-makers in mid-sized and large organizations across a range of industries. Companies and executives were located in Australia, Canada, Denmark, France, Germany, Italy, Japan, The Netherlands, Spain, Sweden, the United Kingdom and the United States.

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