avanade

The EmTech Index

5 insights to help you separate hype from hope in emerging technologies

Overview

When the pandemic hit in early 2020, technology development and deployment accelerated to help us adjust. Back then, we surveyed business leaders as part of our Trendlines research to get a first look at what was happening. The results were exciting — and illuminating.

We asked the same questions (and others) in 2021, and the results have only become more interesting. This report details those year-over-year findings, along with new insights and recommendations for how best to navigate the road ahead.

With so much happening and the sheer number of technologies in play, it's easy to get overwhelmed. This report is designed to help you cut through the hype and see what organizations are testing, what value they're receiving and what's holding them back.

What follows are highlights from our 2021 survey of 700 C-level and senior leaders.

Our respondent base included six industries (consumer goods and services, financial services, healthcare, manufacturing, oil/energy and retail) in seven countries (Australia, Canada, France, Germany, Japan, UK and United States).

We asked them about 12 technology categories: next-generation connectivity, IoT/edge, AI recognition, blockchain, extended reality, wearables, quantum computing, advances in machine learning, conversational AI, robotics, augmented humans and digital twin.
In this report, we primarily focus on the most interesting patterns we found in what changed from 2020 to 2021 — from early pandemic responses to more recent efforts to rethink and renew.

As you'll see in the findings that follow, there are both opportunities and challenges when you consider the emerging technologies that make sense for your business and your people. We hope that with the right context and perspective, you can feel more confident than cautious as you consider the promise of emerging tech.

The pandemic has driven more testing in emerging technologies — and that shows no sign of slowing

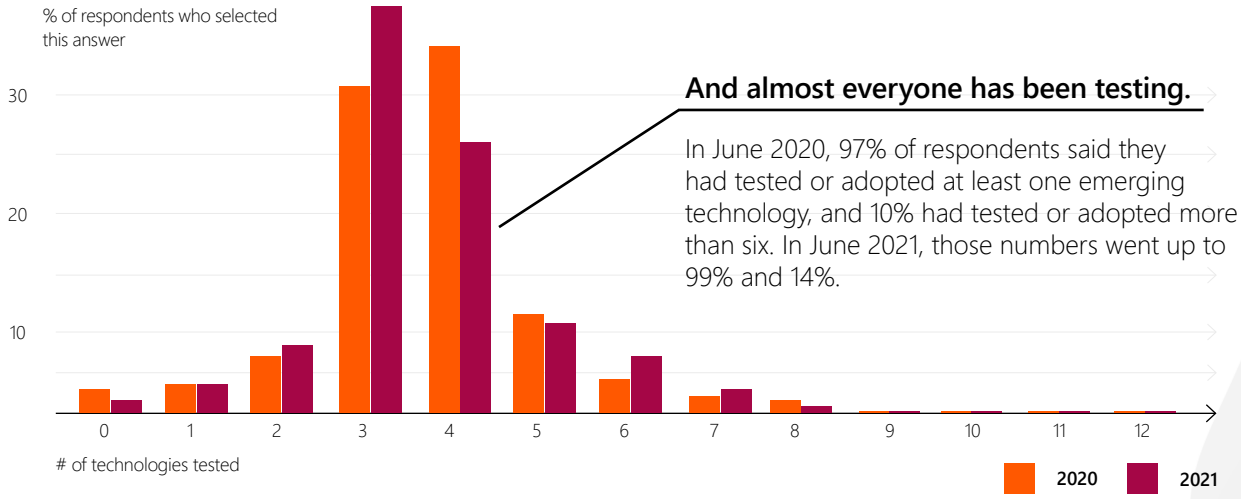
Even back in June 2020, testing of emerging technologies was on the rise. Many companies (45% on average) said they were planning to test or adopt new technologies faster than they would have otherwise. Many also predicted an increase in spending on emerging technologies — by an average of 1.8%. The most digitally advanced companies planned to spend even more.

By 2021? That spending doubled.

The share of technology budget devoted to testing and adoption of emerging technologies went from 15.9% in 2020 to 30.1% in 2021.

2x

spending on emerging technologies in 2021



And almost everyone has been testing.

In June 2020, 97% of respondents said they had tested or adopted at least one emerging technology, and 10% had tested or adopted more than six. In June 2021, those numbers went up to 99% and 14%.

What's the takeaway?

This dramatic rise in emerging technology investment likely has many causes. Companies were looking for new ways to cut costs in the face of uncertainty, and the novel challenges of the pandemic inspired more experimentation.

Whatever the causes, the increase bears watching. We anticipate organizations reaching a ceiling — perhaps between 35% and 45% of their technology spend — even as more technologies emerge. Organizations appear to be winnowing their testing assertively, down to just those technologies that meet their most important needs. And that makes sense. Given the multiyear maturity curve, starting broad and pruning along the way helps conserve resources over the time it takes for a technology to achieve its potential.

As with so many trends in the wake of the pandemic, the landscape continues to shift. The current environment rewards organizations that can embrace continual change and adapt at speed.

Industries vary in how they approach emerging technologies, but blockchain and IoT/edge are among the most tested

Emerging technologies are not one size fits all. Different industries have taken different approaches, with variation in everything from budgeting to top technologies to management perceptions.

What technologies have been most popular?

IoT/edge computing were among the most tested across industries, followed by blockchain.

	Top technology tested	Top value(s)
Consumer Goods and Services	IoT and edge computing	Improved efficiencies
Energy/Utilities	IoT and edge computing	Improved efficiencies
Financial Services (Banking)	Blockchain (e.g., Ethereum, Corda)	Improved customer experience*
Financial Services (Other)	Blockchain (e.g., Ethereum, Corda)	Improved efficiencies*
Financial Services (Banking and other combined)	Blockchain (e.g., Ethereum, Corda)	Improved efficiencies
Healthcare	IoT and edge computing	Created a competitive advantage
Manufacturing	IoT and edge computing	Improved customer experience
Retail	IoT and edge computing	Improved efficiencies

* Note: Due to a smaller sample size, these results should be considered directional only.

What else is happening in your industry?
Dig into more industry-specific data in the appendix on pages 9-12

Most tested emerging technologies

#1. IoT and edge computing
#2. Blockchain
#3. AI recognition

What's the takeaway?

When considering what technologies to test, stay aware of what your peers are pursuing — but keep in mind that the value derived might vary, for your industry and your organization.

See the appendix for more data on which emerging technologies might be most promising.

Most technologies delivered business value that justified the investment

Most companies reported receiving at least some — and often significant — value from testing and adoption of emerging technologies. This was true across all technologies and industries.

Emerging technologies are a good bet — both from the start and over the long term.

It can be difficult to make an initial business case for emerging technologies. But we often see benefits early on in testing, even if they're less tangible — such as better customer experiences, new ways of thinking or an innovation halo effect that helps with talent attraction and retention. Those sometimes-unexpected "intangibles" are typically followed later by more quantifiable (and financial) results, like improving operational efficiencies.

This evolution in benefits is another good argument for planning to iterate and learn as you test, and then using those results to inform how you scale.

Many organizations saw their 2020 testing investments pay off in 2021, with many technologies becoming more likely to deliver more value. Companies further along in digital transformation reported receiving more value from testing than those less far along.

	IoT/edge	Blockchain	AI recognition
% of respondents who tested	52%	41%	45%
Most tested subcategory (% of all respondents)	IoT sensors (e.g., temperature) (31%)	Multi-party systems (19%)	Facial recognition (22%)
Top reason	To improve operational efficiencies (42%)	To improve operational efficiencies (42%)	To improve operational efficiencies (41%)
Most common maturity	Adopted across multiple business units (38%)	Adopted across multiple business units (44%)	Adopted across multiple business units (34%)
Top obstacle	Concerns with security or data privacy (24%)	Concerns with security or data privacy (23%)	Concerns with cost (18%) Concerns with security or data privacy (18%)
% of respondents who received "some" or "significant" value	91%	87%	85%
Top value	Improved efficiencies (45%)	Improved efficiencies (36%)	Improved efficiencies (43%)

Want to learn more about a specific technology?
Check out more technology-specific data in the appendix on pages 13-18

What's the takeaway?

You don't have to be digitally mature or spend a significant part of your budget on emerging technologies to get value.

Depending on the technology, between 80% and 93% of all respondents are receiving at least enough value to make the investment worthwhile, and over half are getting significant value from at least one of the technologies they've tested. It's never too early (or too late) to start testing.

Obstacles have gotten more varied, but security and lack of maturity in data tools remain top concerns

Some obstacles to implementation still hold companies back. We asked respondents what they thought were the top three obstacles for each technology they tested. Two obstacles were tied for the #1 spot in 2020, and four were tied in 2021.

2021 most common top obstacles	# of technologies for which obstacle ranked in the top three
Concerns with security/data privacy	8 out of 12
Data management/tools not mature enough	8 out of 12
Concerns with accessing talent	8 out of 12
Concerns with cost	8 out of 12
Legacy tech/tech debt	6 out of 12
Concerns about length of time before receiving value	5 out of 12

2020 most common top obstacles	# of technologies for which obstacle ranked in the top three
Concerns with security/data privacy	10 out of 12
Data management/tools not mature enough	10 out of 12
Legacy tech/tech debt	9 out of 12
Issues with legislation/regulation	7 out of 12
Concerns about length of time before receiving value	7 out of 12

What's the takeaway?

Start by knowing the top obstacles for your industry and the technologies you're testing, so you can better navigate challenges.

For security and privacy concerns, consider an assessment to make sure you have a clear (and shared) view of the risks. Some concerns may feel insurmountable and that's OK. But seek out ways to address the concerns you can — for example, by doing smaller, more targeted tests or by learning from the success of similar companies.

For concerns around maturity of data management and tools, look for ways to make up for shortcomings. These challenges are often related to logging or reporting, so consider augmenting the technology with new eporting and monitoring tools.

Twice as many companies are now testing technologies in combination

In the past, companies have typically tested new technologies in isolation. We're now seeing a growing trend: testing technologies in combination. For example, testing 5G in combination with IoT sensors, rather than testing 5G on its own.

Testing in combination usually performs better.

In 2020, 29% of respondents found testing in combination had better results (e.g., broader adoption, more value returned, etc.) compared to solo tests more than half the time. In 2021, that shot up to 51%.

29% → 51%

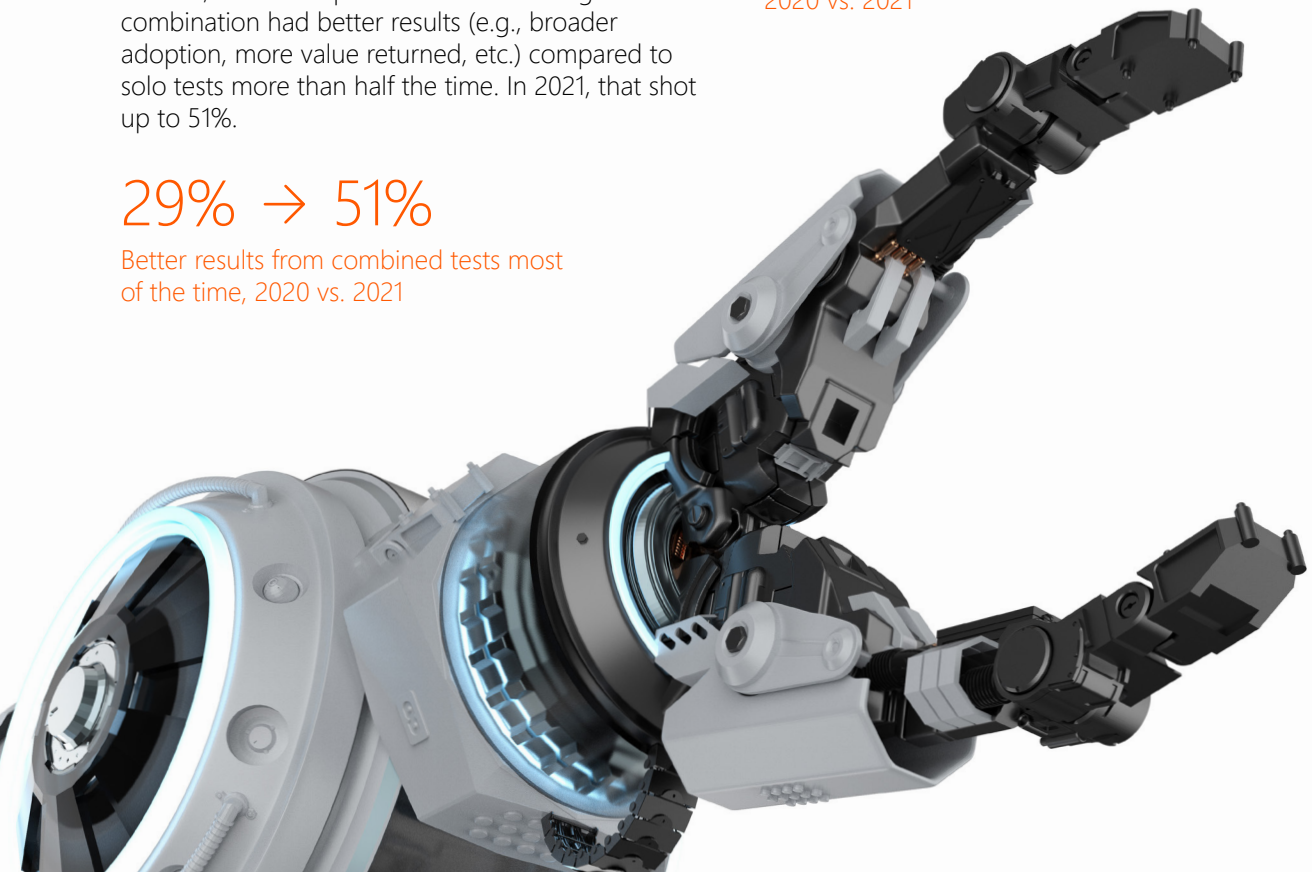
Better results from combined tests most of the time, 2020 vs. 2021

So it's no surprise that more companies are testing this way.

The percentage of companies that test in combination most of the time has doubled (44% vs. 22%) since 2020.

22% → 44%

2x as many companies are testing in combination, 2020 vs. 2021



What about the companies that receive significant value from *all* tested technologies?

There are twice as many of these "top performers" now — from 7% of respondents in 2020 to 18% in 2021.

2.5x more "top performers" in 2021

90% of top performers adopted technologies across multiple business units

What's the takeaway?

Don't just follow trends. Look for technology combinations that have the potential to play well together in your organization, especially across silos.

Start testing to find what works and follow the results. (Don't miss finding #3 for ideas on which technologies show promise for your industry.)

What's next? Keep on testing and learning

We hope these takeaways can provide helpful grounding as you navigate how to put emerging technologies to work for your organization.
If nothing else, remember to:

1. **Be confident that testing consistently delivers results.**
2. **Test technologies in combination to get the most value.**
3. **Don't get discouraged by obstacles, use them to collaborate, problem-solve and keep learning.**

If you'd like to join our future research and learn more about how your organization compares to others in your industry, drop us a line at emtech@avanade.com.

In the meantime, check back on our Trendlines often. We'll be publishing more on specific technologies and trends over the coming year, in addition to reporting on the third year of EmTech Index research in the fall.

Appendix

Consumer Goods and Services	
Average % of digital transformation complete	52%
Average % confident in management's handling of transformation	83%
Average % of previous year's tech budget on testing	31%
Average % of next year's tech budget on testing	35%
Change	4 percentage points
Most common cloud environment	Some on-prem, mostly cloud (51%)
Top technology tested	**IoT and edge computing**
Top reason(s)	To improve operational efficiencies
Top value(s)	Improved efficiencies
Top obstacle(s)	Data management and tools were not mature enough
Second top tech*	**AI recognition**
Top reason(s)	To create or validate a new business model
Top value(s)	Improved efficiencies
Top obstacle(s)	Concerns with cost
Tech that delivered most significant value	IoT and edge computing

Oil/Energy	
Average % of digital transformation complete	48%
Average % confident in management's handling of transformation	90%
Average % of previous year's tech budget on testing	29%
Average % of next year's tech budget on testing	33%
Change	4 percentage points
Most common cloud environment	Some on-prem, mostly cloud (55%)
Top technology tested	**IoT and edge computing**
Top reason(s)	To improve operational efficiencies
Top value(s)	Improved efficiencies
Top obstacle(s)	Concerns with security or data privacy
Second top tech*	**AI recognition**
Top reason(s)	To improve operational efficiencies
Top value(s)	Improved efficiencies, Improved understanding of the technology
Top obstacle(s)	Lack of management buy-in
Tech that delivered most significant value	AI recognition

* Note: Due to smaller sample size, these results should be considered directional only.

Appendix

Financial Services (Banking)	
Average % of digital transformation complete	63%
Average % confident in management's handling of transformation	74%
Average % of previous year's tech budget on testing	43%
Average % of next year's tech budget on testing	42%
Change	-1 percentage point
Most common cloud environment	Some cloud, mostly on-prem (42%)
Top technology tested	**Blockchain (e.g., Ethereum, Corda)**
Top reason(s)	To create or validate a new business model*
Top value(s)	Improved customer experience*
Top obstacle(s)	Cloud adoption/capabilities were not mature enough*
Second top tech*	**AI recognition***
Top reason(s)	To save costs, To create a competitive advantage, To improve the customer experience*
Top value(s)	(Insufficient data)
Top obstacle(s)	(Insufficient data)
Tech that delivered most significant value	(Insufficient data)

Financial Services (Other)	
Average % of digital transformation complete	51%
Average % confident in management's handling of transformation	80%
Average % of previous year's tech budget on testing	24%
Average % of next year's tech budget on testing	27%
Change	3 percentage points
Most common cloud environment	Some on-prem, mostly cloud (54%)
Top technology tested	**Blockchain (e.g., Ethereum, Corda)**
Top reason(s)	To improve the customer experience*
Top value(s)	Improved efficiencies*
Top obstacle(s)	Data management and tools were not mature enough*
Second top tech*	**IoT and edge computing***
Top reason(s)	To improve our understanding of the technology*
Top value(s)	(Insufficient data)
Top obstacle(s)	(Insufficient data)
Tech that delivered most significant value	(Insufficient data)

* Note: Due to smaller sample size, these results should be considered directional only.

Appendix

Financial Services (Banking and other combined)	
Average % of digital transformation complete	57%
Average % confident in management's handling of transformation	77%
Average % of previous year's tech budget on testing	33%
Average % of next year's tech budget on testing	34%
Change	1 percentage point
Most common cloud environment	Some on-prem, mostly cloud (43%)
Top technology tested	**Blockchain (e.g., Ethereum, Corda)**
Top reason(s)	To improve the customer experience
Top value(s)	Improved efficiencies
Top obstacle(s)	Concerns with security or data privacy, Data management and tools were not mature enough
Second top tech*	**AI recognition**
Top reason(s)	To improve the customer experience
Top value(s)	Improved cybersecurity, Created a competitive advantage
Top obstacle(s)	Concerns with security or data privacy
Tech that delivered most significant value	(Insufficient data)

Healthcare	
Average % of digital transformation complete	40%
Average % confident in management's handling of transformation	87%
Average % of previous year's tech budget on testing	24%
Average % of next year's tech budget on testing	27%
Change	3 percentage points
Most common cloud environment	Some on-prem, mostly cloud (58%)
Top technology tested	**IoT and edge computing**
Top reason(s)	To improve the customer experience
Top value(s)	Created a competitive advantage
Top obstacle(s)	Data management and tools were not mature enough
Second top tech*	**Advances in machine learning/training**
Top reason(s)	To improve the customer experience
Top value(s)	Improved cybersecurity
Top obstacle(s)	Data management and tools were not mature enough
Tech that delivered most significant value	**AI recognition**

* Note: Due to smaller sample size, these results should be considered directional only.

Appendix

Manufacturing	
Average % of digital transformation complete	53%
Average % confident in management's handling of transformation	75%
Average % of previous year's tech budget on testing	33%
Average % of next year's tech budget on testing	35%
Change	2 percentage points
Most common cloud environment	Some on-prem, mostly cloud (52%)
Top technology tested	**IoT and edge computing**
Top reason(s)	To improve operational efficiencies
Top value(s)	Improved customer experience
Top obstacle(s)	Concerns with security or data privacy
Second top tech*	**AI recognition**
Top reason(s)	To improve operational efficiencies, To improve our understanding of the technology
Top value(s)	Improved efficiencies
Top obstacle(s)	Concerns with security or data privacy
Tech that delivered most significant value	Robotics

Retail	
Average % of digital transformation complete	52%
Average % confident in management's handling of transformation	72%
Average % of previous year's tech budget on testing	32%
Average % of next year's tech budget on testing	33%
Change	1 percentage point
Most common cloud environment	Some on-prem, mostly cloud (49%)
Top technology tested	**IoT and edge computing**
Top reason(s)	To improve operational efficiencies
Top value(s)	Improved efficiencies
Top obstacle(s)	Concerns with security or data privacy
Second top tech*	**AI recognition**
Top reason(s)	To improve operational efficiencies
Top value(s)	Improved customer experience
Top obstacle(s)	Cloud adoption/capabilities were not mature enough
Tech that delivered most significant value	IoT and edge computing

* Note: Due to smaller sample size, these results should be considered directional only.

Appendix

Next generation connectivity	2021	2020
% of respondents who tested	32%	36%
Most tested subcategory (% of all respondents)	5G networks (24%)	5G networks (30%)
Top reason	To improve operational efficiencies (48%)	To improve operational efficiencies (48%)
Most common maturity	Adopted across multiple business units (34%)	Adopted in one business unit (51%)
Top obstacle	Legacy tech/tech debt created obstacles to further implementation (21%)	Concerns with security or data privacy (26%)
% of respondents who received "some" or "significant" value	80%	91%
Top value	Improved efficiencies (41%) Improved understanding of the technology (41%)	Improved customer experience (45%)

IoT/edge	2021	2020
% of respondents who tested	52%	59%
Most tested subcategory (% of all respondents)	IoT sensors (e.g., temperature) (31%)	IoT sensors (e.g., temperature) (42%)
Top reason	To improve operational efficiencies (42%)	To improve operational efficiencies (46%)
Most common maturity	Adopted across multiple business units (38%)	Adopted in one business unit (43%)
Top obstacle	Concerns with security or data privacy (24%)	Data management and tools were not mature enough (19%) Lack of management buy-in (19%)
% of respondents who received "some" or "significant" value	91%	91%
Top value	Improved efficiencies (45%)	Improved understanding of the technology (40%)

Appendix

Extended reality	2021	2020
% of respondents who tested	22%	21%
Most tested subcategory (% of all respondents)	Augmented/assisted reality (10%)	Virtual reality (10%)
Top reason	To improve operational efficiencies (41%)	To improve the customer experience (41%)
Most common maturity	Adopted across multiple business units (40%)	Adopted in one business unit (53%)
Top obstacle	Legacy tech/tech debt created obstacles to further implementation (22%)	Legacy tech/tech debt created obstacles to further implementation (21%)
% of respondents who received "some" or "significant" value	91%	88%
Top value	Created or validated a new business model (49%)	Improved customer experience (43%) Became more attractive to talent (43%)

Quantum computing	2021	2020
% of respondents who tested	31%	46%
Most tested subcategory (% of all respondents)	Quantum-inspired algorithms (18%)	Quantum-inspired algorithms (32%)
Top reason	To improve the customer experience (37%)	To create a competitive advantage (42%)
Most common maturity	Adopted across multiple business units (48%)	Adopted in one business unit (47%)
Top obstacle	Lack of clear strategic value (19%)	Concerns about length of time before receiving value (19%)
% of respondents who received "some" or "significant" value	93%	88%
Top value	Improved cybersecurity (40%)	Improved understanding of the technology (43%)

Appendix

Blockchain	2021	2020
% of respondents who tested	41%	45%
Most tested subcategory (% of all respondents)	Multi-party systems (19%)	Distributed ledger/database (26%)
Top reason	To improve operational efficiencies (42%)	To improve operational efficiencies (39%)
Most common maturity	Adopted across multiple business units (44%)	Adopted in one business unit (46)
Top obstacle	Concerns with security or data privacy (23%)	Concerns with accessing the appropriate talent (cost or availability) (19%) Concerns with security or data privacy (19%)
% of respondents who received "some" or "significant" value	87%	84%
Top value	Improved efficiencies (36%)	Improved understanding of the technology (41%)

Digital twin	2021	2020
% of respondents who tested	23%	15%
Most tested subcategory (% of all respondents)	Assets (e.g., machines) (11%)	Manufacturing, Building management and maintenance (8%)
Top reason	To improve operational efficiencies (39%)	To improve the employee experience (42%) To improve operational efficiencies (42%)
Most common maturity	Adopted across multiple business units (44%)	Adopted in one business unit (47%)
Top obstacle	Issues with legislation/ regulation (21%)	Legacy tech/tech debt created obstacles to further implementation (19%) Concerns with security or data privacy (19%)
% of respondents who received "some" or "significant" value	86%	84%
Top value	Improved understanding of the technology (39%)	Improved understanding of the technology (47%)

Appendix

Robotics	2021	2020
% of respondents who tested	27%	35%
Most tested subcategory (% of all respondents)	Autonomous mobile robots (e.g., warehouse pickers, floor scrubbers) (12%)	Industrial robotics (21%)
Top reason	To improve operational efficiencies (49%)	To improve operational efficiencies (48%)
Most common maturity	Adopted across multiple business units (42%)	Adopted in one business unit (42%)
Top obstacle	Concerns with cost (21%)	Concerns with cost (20%)
% of respondents who received "some" or "significant" value	90%	87%
Top value	Improved efficiencies (41%)	Improved efficiencies (41%) Improved understanding of the technology (41%)

Conversational AI	2021	2020
% of respondents who tested	29%	39%
Most tested subcategory (% of all respondents)	Multi-modal – some combination of graphic, text, and/or voice (15%)	Multi-modal – some combination of graphic, text, and/or voice (26%)
Top reason	To improve the customer experience (43%)	To create or validate a new business model (40%)
Most common maturity	Adopted across multiple business units (42%)	Adopted in one business unit (40%)
Top obstacle	Concerns with security or data privacy (20%)	Concerns with security or data privacy (21%)
% of respondents who received "some" or "significant" value	83%	87%
Top value	Improved efficiencies (45%)	Improved customer experience (44%)

Appendix

Augmented humans	2021	2020
% of respondents who tested	21%	13%
Most tested subcategory (% of all respondents)	Biometrics (e.g., heart rate, temperature, fingerprint) (12%)	Biometrics (e.g. heart rate, temperature, fingerprint), Brain-computer interfaces (6%)
Top reason	To improve the employee experience (36%)	To improve operational efficiencies (43%)
Most common maturity	Adopted across multiple business units (43%)	Adopted in one business unit (58%)
Top obstacle	Lack of clear strategic value (19%) Lack of management buy-in (19%)	Legacy tech/tech debt created obstacles to further implementation (21%) Issues with legislation/regulation (21%)
% of respondents who received "some" or "significant" value	83%	89%
Top value	Improved employee experience (35%)	Became more attractive to talent (43%)

AI recognition	2021	2020
% of respondents who tested	45%	51%
Most tested subcategory (% of all respondents)	Facial recognition (22%)	Facial recognition (35%)
Top reason	To improve operational efficiencies (41%)	To improve operational efficiencies (41%)
Most common maturity	Adopted across multiple business units (34%)	Adopted in one business unit (42%)
Top obstacle	Concerns with cost (18%) Concerns with security or data privacy (18%)	Concerns about length of time before receiving value (18%) Issues with legislation/ regulation (18%)
% of respondents who received "some" or "significant" value	85%	86%
Top value	Improved efficiencies (43%)	Created a competitive advantage (39%)

Appendix

Wearables	2021	2020
% of respondents who tested	22%	16%
Most tested subcategory (% of all respondents)	Bracelet/watch (11%)	Bracelet/watch (9%)
Top reason	To improve operational efficiencies (38%)	To improve operational efficiencies (46%)
Most common maturity	Adopted across multiple business units (39%)	Adopted across multiple business units (30%)
Top obstacle	Concerns with cost (27%)	Concerns with cost (21%)
% of respondents who received "some" or "significant" value	90%	77%
Top value	Improved efficiencies (40%)	Improved employee experience (44%)

Advances in AI/ML*	2021
% of respondents who tested	38%
Most tested subcategory (% of all respondents)	Machine teaching (17%)
Top reason	To improve operational efficiencies (48%)
Most common maturity	Adopted across multiple business units (41%)
Top obstacle	Data management and tools were not mature enough (19%) Concerns about length of time before receiving value (19%)
% of respondents who received "some" or "significant" value	82%
Top value	Improved efficiencies (43%)

*This technology category was introduced in our 2021 survey so no data is available for 2020.

About Avanade

Avanade is the leading provider of innovative digital, cloud and advisory services, industry solutions and design-led experiences across the Microsoft ecosystem. Every day, our 56,000 professionals in 26 countries make a genuine human impact for our clients, their employees and their customers. Avanade was founded in 2000 by Accenture LLP and Microsoft Corporation. Learn more at www.avanade.com

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