The State of AI
and Machine
Learning

AI Industry Accelerates Rapidly Despite Pandemic,
Driven by Data Partnerships and Increasing Budgets

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Introduction

In our 7th edition of the annual State of AI report, we continue to explore the strategies employed by companies large and small in successfully deploying AI. We surveyed business leaders and technical practitioners (which we refer to as technologists) alike to understand their priorities, their successes, and their bottlenecks when it comes to implementing AI. Collectively, their answers enabled us to paint a picture of how the AI industry continues to evolve in a world that is more virtual, more tech-savvy, and more globalized than ever.

The AI industry is growing and we're seeing expanding budgets fueling this growth. AI initiatives continue to scale as we're seeing a shift in priorities to more organizations viewing deployment of practical AI as a core strategy and moving away from mere experimentation. This year, we investigated the usage of external data providers, examining how this growing trend impacts the delivery of AI. We discovered that partnering with an external data provider makes a significant difference in the successes of AI initiatives.

Like last year, we evaluated the effect that the COVID-19 pandemic has had on AI deployment, asking our respondents to project out how they expect the pandemic to continue to influence strategies in 2021. We again explored gaps between business leaders and technologists to contrast areas of alignment versus areas of disagreement.

The State of AI 2021 report is a cross-industry effort intended to provide a snapshot of the AI space through input from senior decision-makers. The report gives current AI practitioners an idea of how other organizations are thinking about AI—including which factors drive success and which factors remain significant hurdles. Understanding what to prioritize and how to address common challenges can help accelerate AI delivery for any readers who are endeavoring to launch their own AI initiatives.

This year, the results reflect the nature of a maturing industry, one that has experienced a rapid push for development given the conditions of the global pandemic, as well as a shift towards internal efficiencies and away from general AI solutions. The report highlights the prevailing approaches to data management and security, responsible AI, and the significant role played by external data providers in advancing progress. Companies may still face many of the same challenges in achieving deployment and scalability, but are learning to overcome these barriers through the acquisition of better resources.

For more details on the methodology of our survey, see **page 33**.

> "We're very happy to see that data diversity is increasingly top of mind for organizations and that ethical and fair AI practices are gaining traction. Seeing 67% of large companies focused on risk management followed by governance is a good sign for responsible AI that works for everyone. It's also great to see that working with a data partner makes companies be 1.4x more likely to value responsible AI. As a data partner who is committed to building responsible AI, we provide the technology, expertise, and people to assist in developing equitable and responsible AI models."
>
> **Mark Brayan**
> *Chief Executive Officer, Appen*

Key Takeaways

1 AI budgets have increased: Budgets from $500k to $5M have increased by 55% YoY, with only 26% reporting budgets under $500k, signaling broader market maturity.

2 An overwhelming majority of organizations have partnered with external training data providers to deploy and update AI projects at scale.

3 AI priorities vary by organization size, with scaling notably more important for larger enterprises while data diversity is more important among small and medium organizations.

4 Companies report a high commitment to data security and privacy, and are open to sharing their data with others.

5 While business leaders and technologists tend to agree more in 2021, there are still some core disconnects in areas like ethics and interpretability.

6 Enterprises of all sizes confirmed they accelerated their AI strategy as a result of COVID-19 in 2020 and will continue to do so in 2021.

AI budgets have increased:

Budgets from $500k to $5M have increased by 55% YoY, with only 26% reporting budgets under $500k, signaling broader market maturity.

Survey respondents indicated that allocated budgets for AI initiatives are increasing in 2021, with 53% of AI teams reporting budgets in the $500k to $5 million range (compared to about one third in 2020). This trend is a strong signal that the industry continues to grow and AI is becoming more critical to the success for companies large and small across all industries.

Figure 1: Does your company have a budget formally allocated for any AI initiatives and if so, how much?

2021 (n=501)

2020 (n=290)

Category	2021	2020
Unsure/Don't know	2%	18%
No formal budget – ad-hoc budgeting	5%	0%
Formal budget but unsure of amount	5%	0%
Less than $500k	26%	40%
$500k - $5M	53%	34%
Greater than $5M	9%	8%
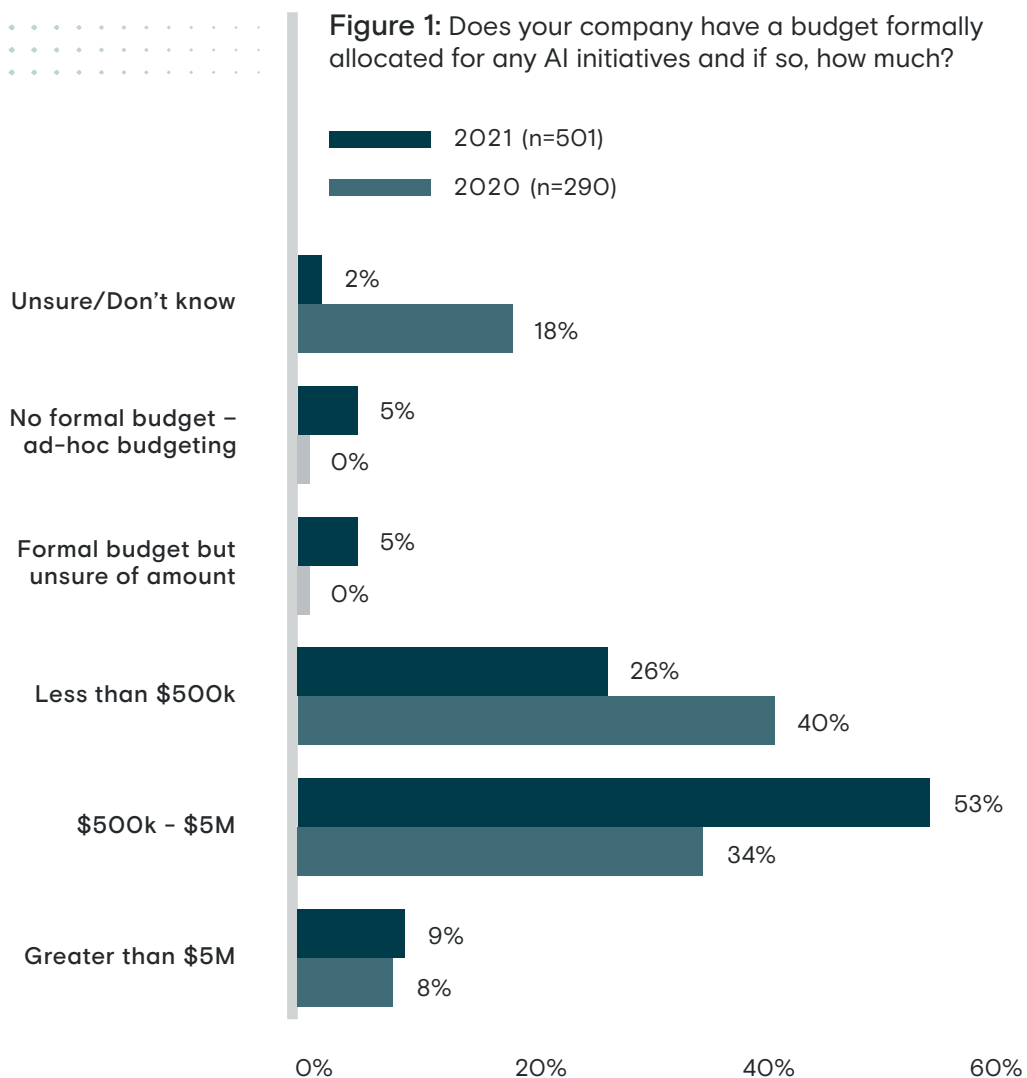
Not surprisingly, AI budget is highly-correlated with company size, with large organizations dominating the $5 million+ range. Notably, companies partnered with an external training data provider have larger budgets in the $500k to $5 million range compared to the ones that don't work with a data provider.

Figure 2: Which of the following best reflects your budget allocation for AI data related to vendors and/or services?

By Job Role

Less than $500k	43% / 50%
$500k - $5M	47% / 43%
Greater than $5M	4% / 5%

- Technologist (n=251)
- Business Leaders (n=250)

By Company Size

Less than $500k	64% / 43% / 30%
$500k - $5M	32% / 51% / 52%
Greater than $5M	3% / 3% / 10%

- Small Enterprise (n=159)
- Medium Enterprise (n=221)
- Large Enterprise (n=121)

By Use of External Data Vendors

Less than $500k	45% / 58%
$500k - $5M	49% / 21%
Greater than $5M	4% / 5%

- Use External Data Providers (n=449)
- Do Not Use External Data Providers (n=43)

We wanted to look at the correlation between budgets, market leadership perceptions and successful AI deployment rates. For this, we zoomed in and looked at organizations spending less than $500k, those spending between $500k and $1M, those spending between $1M and $3M and over $3M.

This is where we found a direct relationship between budget and market leadership perception, as companies with an annual budget of less than $500k were much less likely to describe themselves as a market leader. This suggests budget allocation is a limiting factor to gaining AI leadership.

Figure 3: When it comes to adopting AI, would you say that your organization is a market leader?

Less than $500K	$501K – $1M	$1M – $3M	Greater than $3M
58%	72%	74%	75%
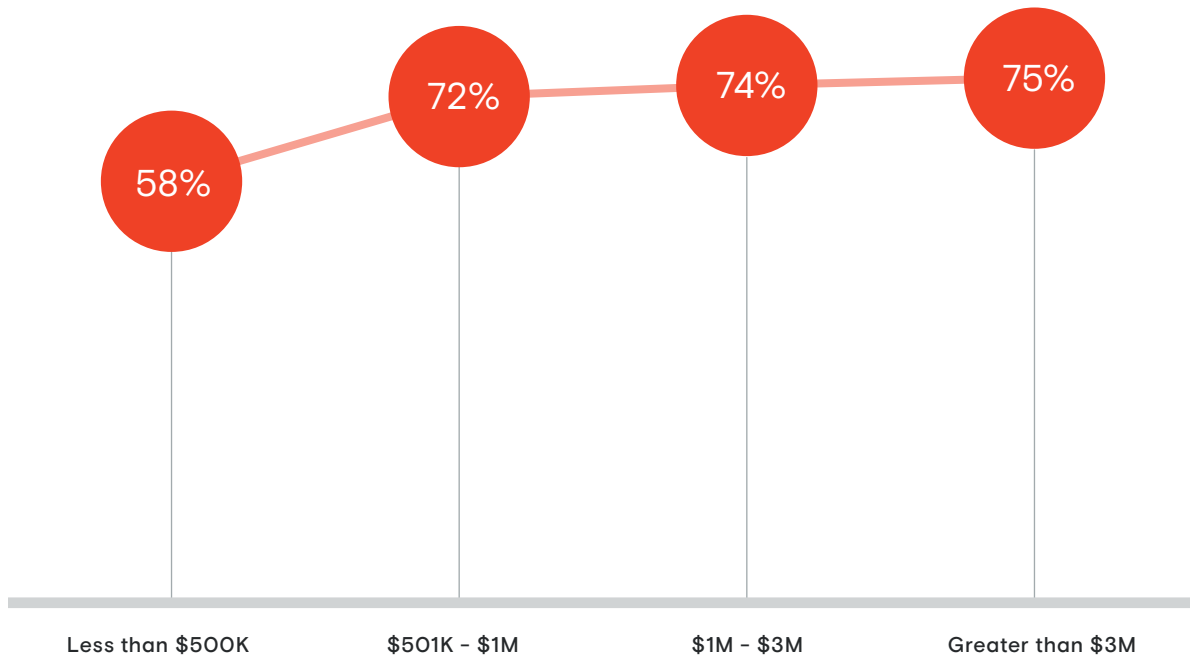
Based on Total Annual AI Budget Allocation

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We also found that companies with an annual AI budget of at least $1 million are more likely to reach deployment with their AI projects, and that budget allocations correlated well with obtaining ROI from AI deployments. We found that almost 48% of organizations that had budgets between $1M and $3M and 49% of organizations that had budgets greater than $3M experienced a deployment rate of 61 – 90%. This is significantly higher than those that reporter budgets under $1M.

Figure 4: Relationship between budget and deployment

% of AI projects that make it to 61-90% deployment by annual AI budget

BUDGET SIZE

Greater than $3M (N=110) — 49%
$1.1M – $3M (N=95) — 48%
$501K – $1M (N=108) — 36%
Less than $500K (N=130) — 33%

Based on Total Annual AI Budget Allocation
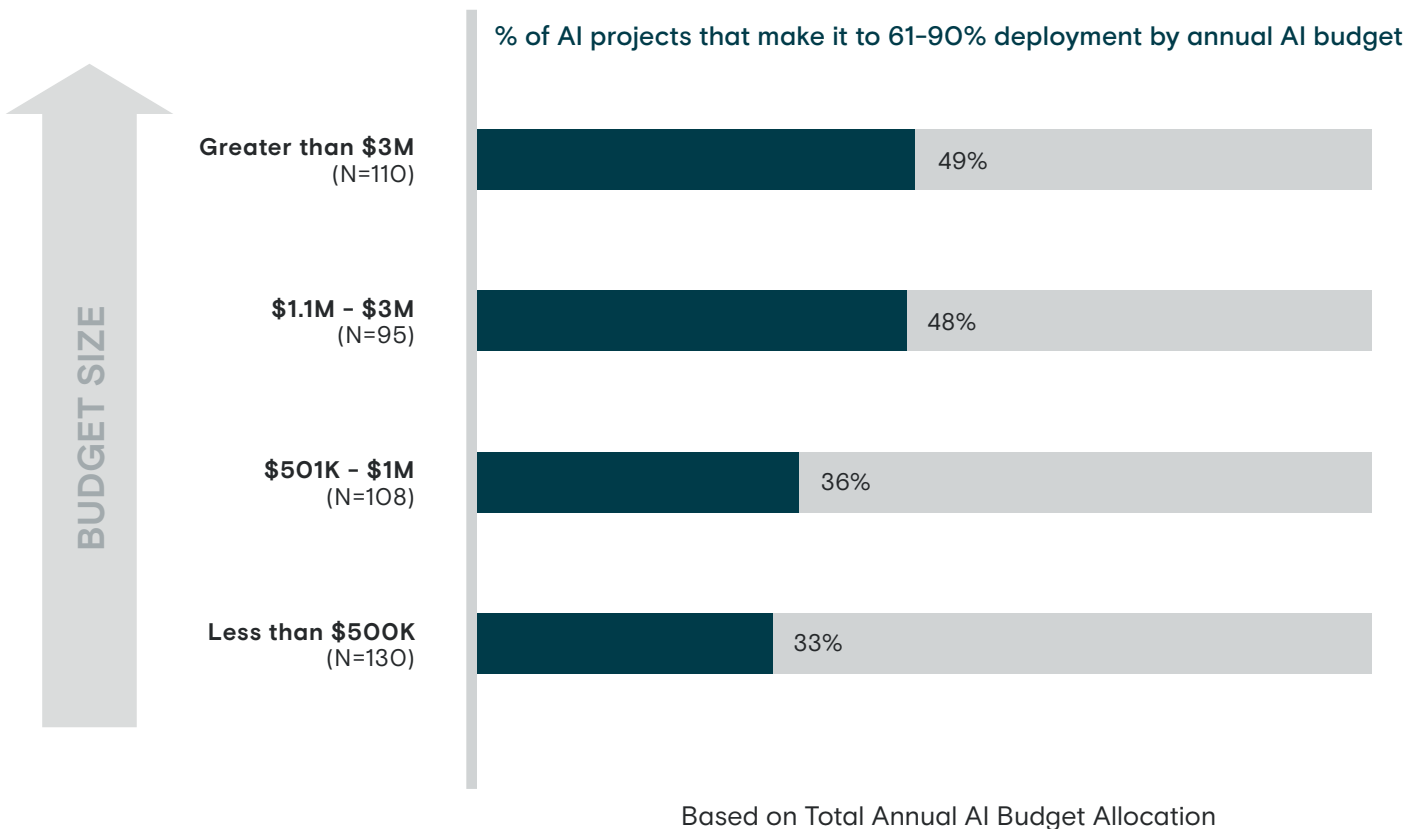
This year, we have seen a reverse of a trend from 2020. AI responsibility has trended away from the C-suite and into the rest of the organization, making AI projects more operational. C-level executives continue to be responsible for AI initiatives for 39% of the organizations but this is a drop from 71% in 2020. Large companies are delegating AI responsibilities to the VP-level (28%) and Director-level (25%), whereas smaller organizations are seeing managers (31%) be more responsible for AI.

Figure 5: Who is ultimately responsible for all the AI initiatives in your organization?

By Job Role

By Company Size

Manager-level	Technologist: 21%	Business Leaders: 19%
Director-level	Technologist: 26%	Business Leaders: 18%
VP-level	Technologist: 16%	Business Leaders: 21%
More than one C-level executive	Technologist: 12%	Business Leaders: 15%
C-level executive	Technologist: 25%	Business Leaders: 27%

Manager-level	Small Enterprise: 31%	Medium Enterprise: 19%	Large Enterprise: 7%
Director-level	Small Enterprise: 19%	Medium Enterprise: 23%	Large Enterprise: 25%
VP-level	Small Enterprise: 9%	Medium Enterprise: 20%	Large Enterprise: 28%
More than one C-level executive	Small Enterprise: 11%	Medium Enterprise: 15%	Large Enterprise: 13%
C-level executive	Small Enterprise: 28%	Medium Enterprise: 24%	Large Enterprise: 27%

Technologist (n=251)
Business Leaders (n=250)

Small Enterprise (n=159)
Medium Enterprise (n=221)
Large Enterprise (n=121)

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In 2021, large enterprises are much more focused on reducing business costs (rating them as the third highest use case) compared to smaller and medium-sized organizations. Very few (4%) of survey respondents reported that they are still in the researching and piloting phases.

We're seeing a shift away from the AI "silver bullet" and to a more fit for purpose and internal facing suite of applications—for IT operations, internal efficiency gains, and cost reduction, as well as understanding company data. AI-based features for products or services scored lower, signaling the migration of AI to internal use cases, which are less risky for their reputation.

Figure 6: Which of the following best describes the use of AI in your organization?

	TOTAL n=501	Small Enterprise n=159	Medium Enterprise n=221	Large Enterprise n=121
Support internal IT operations	62% #1	#1	#1	#1
Improve understanding of corporate data	55% #2	#2	#2	#2
Improve productivity and efficiency of internal business processes	54% #3	#3	#3	#3
Aid in the research and development of new products	49% #4	#4	#4	#4
Support manufacturing/ production operations	48% #5	#5	#5	#5
Support other business functions	48% #6	#6	#6	#6
Drive production applications	45% #7	#7	#7	#7
Reduce business costs	45% #8	#8	#8	#8
AI based features into products or services that we sell	43% #9	#9	#9	#9
Still researching/piloting	4% #10	#10	#10	#10

AI Use Cases in 2021

Appen Partner Spotlight

"

Right now, we're seeing a lot of companies dramatically increase their machine learning investments, with special focus on use cases surrounding process automation and customer experience. This makes a lot of sense because these use cases offer both cost savings and top-line business growth, which are both essential investments during times of economic uncertainty. But to unlock the full ROI in these use cases, businesses also need to invest in best-in-class tools for their ML and machine learning operations (MLOps)."

Diego Oppenheimer
CEO and Co-Founder, Algorithmia

"

A lot of what we've been seeing in the last year is focused on extracting value from unstructured data so that value can be derived from data without changing to an 'unnatural' systems-driven interaction. Whether that is through ambient listening devices in place of EMR data entry in healthcare, capturing intent and relevant data from emails in insurance, reading paper forms in the lending industry, or building intelligence into call centers, the common theme is using AI to make / keep the processes more human."

Ryan Gross
Vice President, Pariveda

"

We've worked with a device manufacturer to help them build ML for signal processing, an energy company in predicting energy prices and a retailer in implementing product recommendations, and in all we've also extended the cooperation to ML operations (MLOps)."

Peter Sarlin
CEO and Co-Founder, Silo AI

An overwhelming majority of organizations have partnered with external training data providers to deploy and update AI projects at scale.

Obtaining sufficient high-quality training data to deploy AI is a significant barrier to success for organizations of all sizes. It's unsurprising that the vast majority of companies have turned to external data providers at some level—a reflection of the fact that data acquisition, preparation and management are the top challenges AI practitioners face.

Figure 7: Do you use external providers for AI training data collection and/or annotation in your organization?

n=159	n=221	n=121	n=251	n=250
90%	92%	85%	90%	89%
Small Enterprise	Medium Enterprise	Large Enterprise	Technologists	Business Leaders
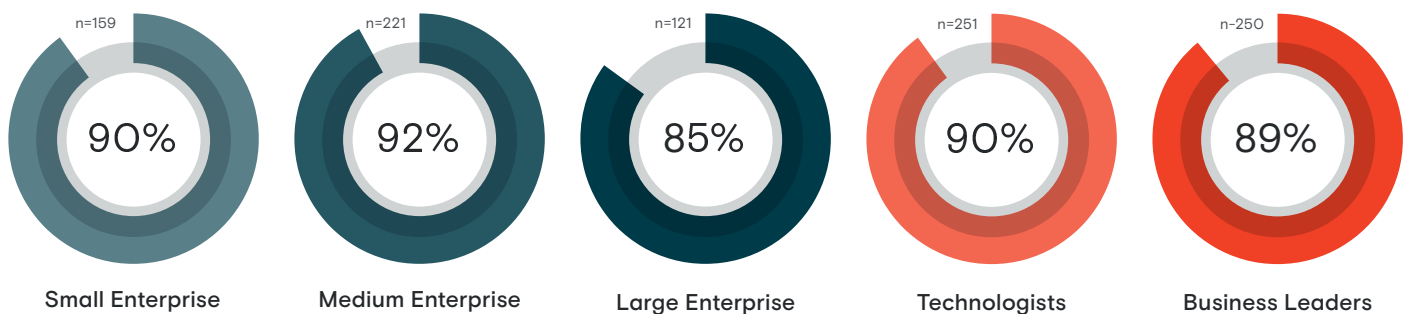
Companies who use external data providers are 1.5 times more likely to say their company is ahead of others in AI deployment, and 4 times less likely to say that they are lagging. This is likely tied with the fact that companies that use external data providers deploy substantially more projects than those that don't, as well as to achieving meaningful ROI.

Figure 8: When it comes to adopting AI, would you say that your organization is:

Ahead of others	Even with others	Behind others
69%	29%	2%

Use External Data Providers (n=449)

42%	49%	9%

Do Not Use External Data Providers (n=43)
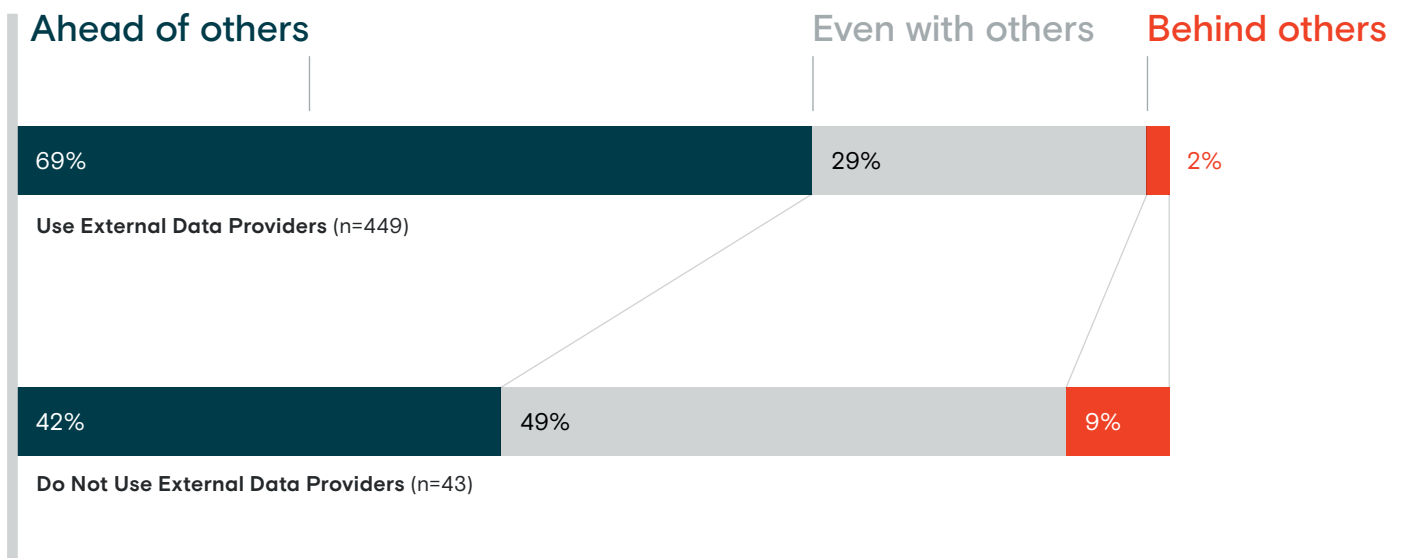
We have found that organizations using external data providers are significantly more likely to deploy their AI to production — with only 16% reporting deploying 0-30% of projects, versus 32% of organizations not using data providers deploying at the same 0-30% rate.

Not only does working with a data partner enable companies to deploy more, but it is also more likely for the AI to produce meaningful ROI. For organizations working with a data partner, it is much less likely to not achieve meaningful ROI, with only 14% of respondents reporting 0-30% meaningful ROI numbers, compared to 32% of respondents not working with a data partner. On the other end of the spectrum, 42% of companies deploying with a data provider reported ROI for 61-90% of their projects, versus only 32% of companies deploying without an external data provider.

Figure 9: AI project deployment and ROI

Percent of AI projects making it to deployment that **Use External Data Providers** (n=449)

Percent of AI projects making it to deployment that **Do Not Use External Data Providers** (n=43)
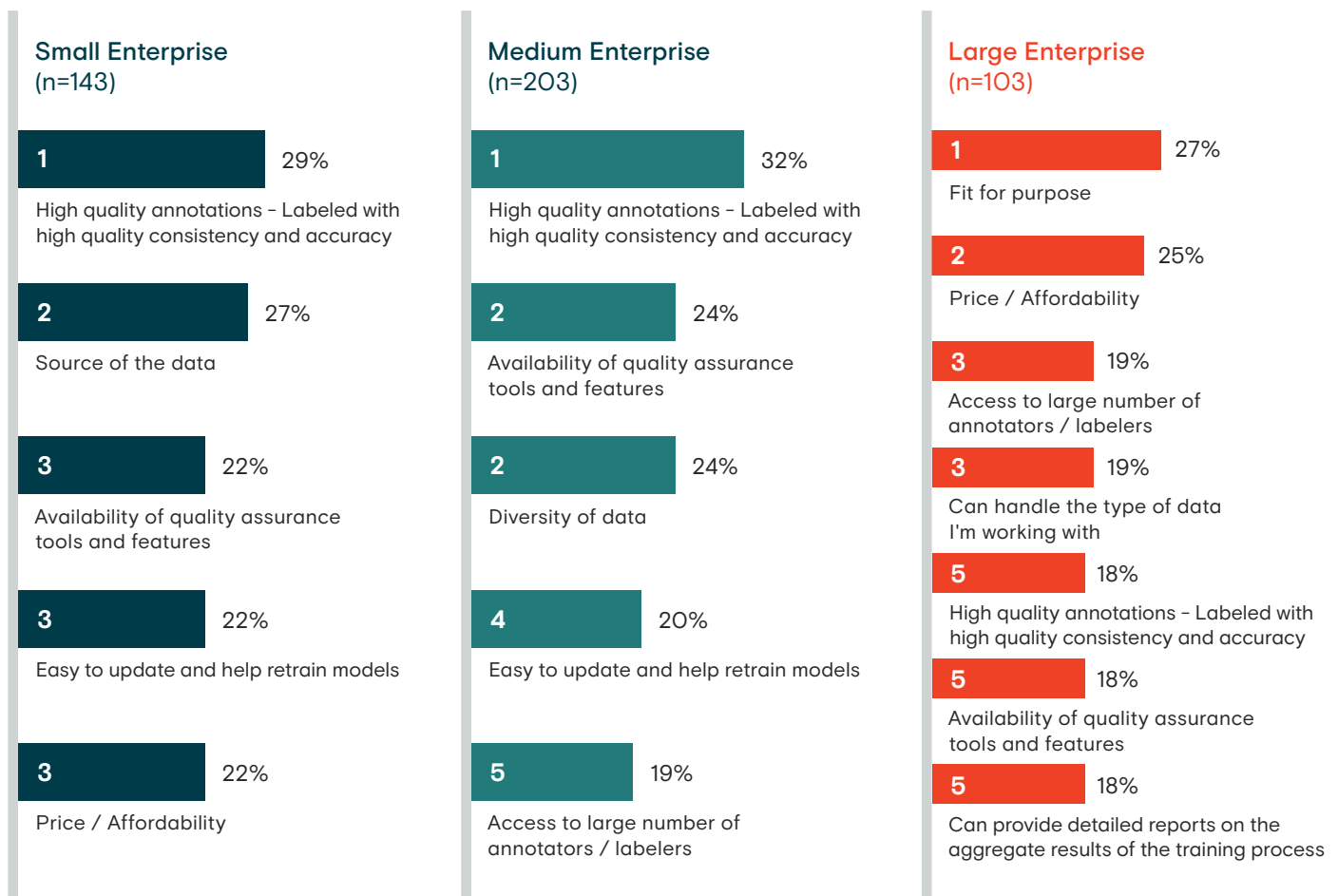
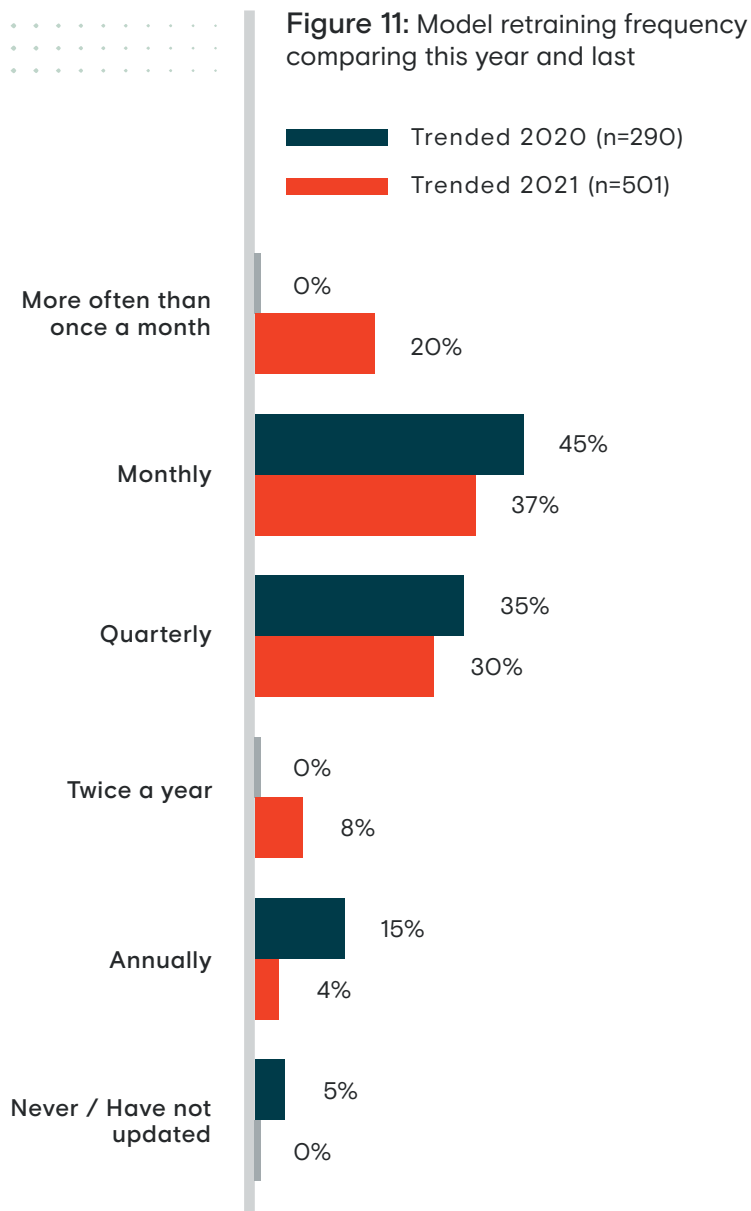Percent of deployed projects that have **shown meaningful ROI**
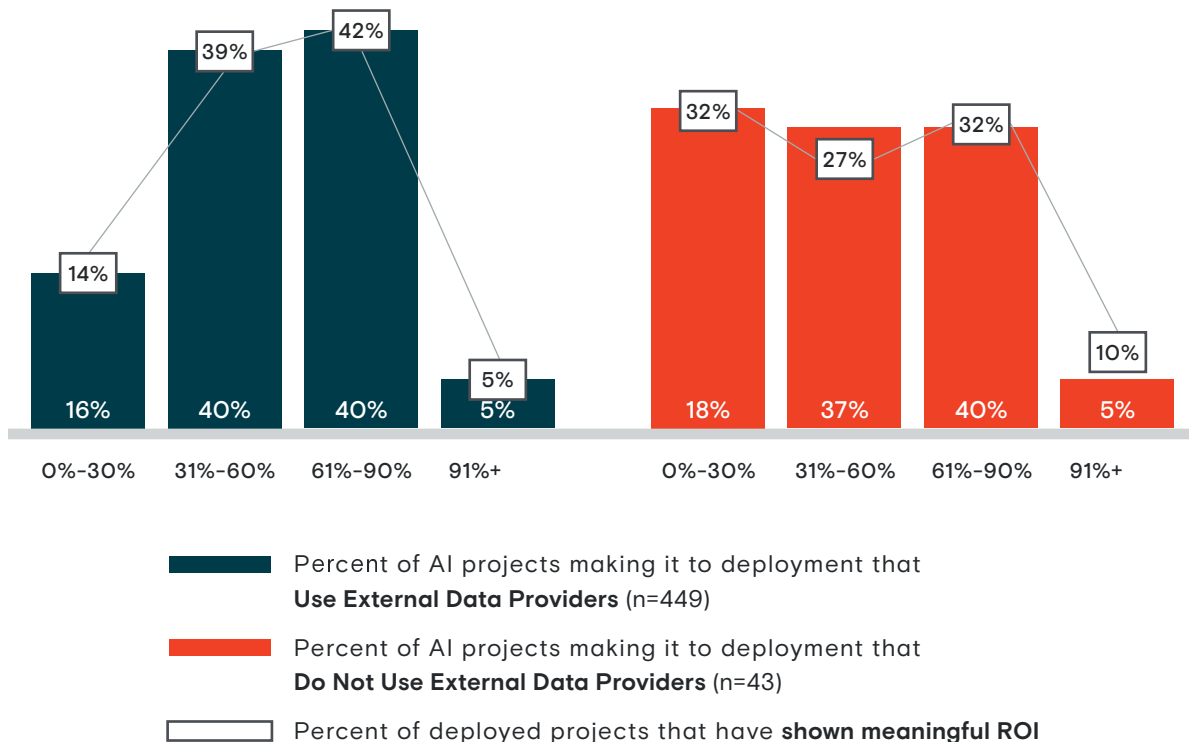
In looking for a data provider, organizations can evaluate based on a variety of factors: quality of annotations, price, quality assurance features, fit for purpose, reporting tools, and more. We found large organizations mainly consider whether the annotation platform fits their purpose and its level of affordability. We interpret "Fit for purpose" as the platform and data partner being flexible in matching the customer's use case. Smaller and medium-sized organizations instead look for high-quality annotations as their number one priority. Source of data is important for all organizations, and is a key priority for organizations under 10,000 employees.

Figure 10: What are the top 3 features you look for in a data annotation platform?

Small Enterprise
(n=143)

1	29%

High quality annotations - Labeled with high quality consistency and accuracy

2	27%

Source of the data

3	22%

Availability of quality assurance tools and features

3	22%

Easy to update and help retrain models

3	22%

Price / Affordability

Medium Enterprise
(n=203)

1	32%

High quality annotations - Labeled with high quality consistency and accuracy

2	24%

Availability of quality assurance tools and features

2	24%

Diversity of data

4	20%

Easy to update and help retrain models

5	19%

Access to large number of annotators / labelers

Large Enterprise
(n=103)

1	27%

Fit for purpose

2	25%

Price / Affordability

3	19%

Access to large number of annotators / labelers

3	19%

Can handle the type of data I'm working with

5	18%

High quality annotations - Labeled with high quality consistency and accuracy

5	18%

Availability of quality assurance tools and features

5	18%

Can provide detailed reports on the aggregate results of the training process
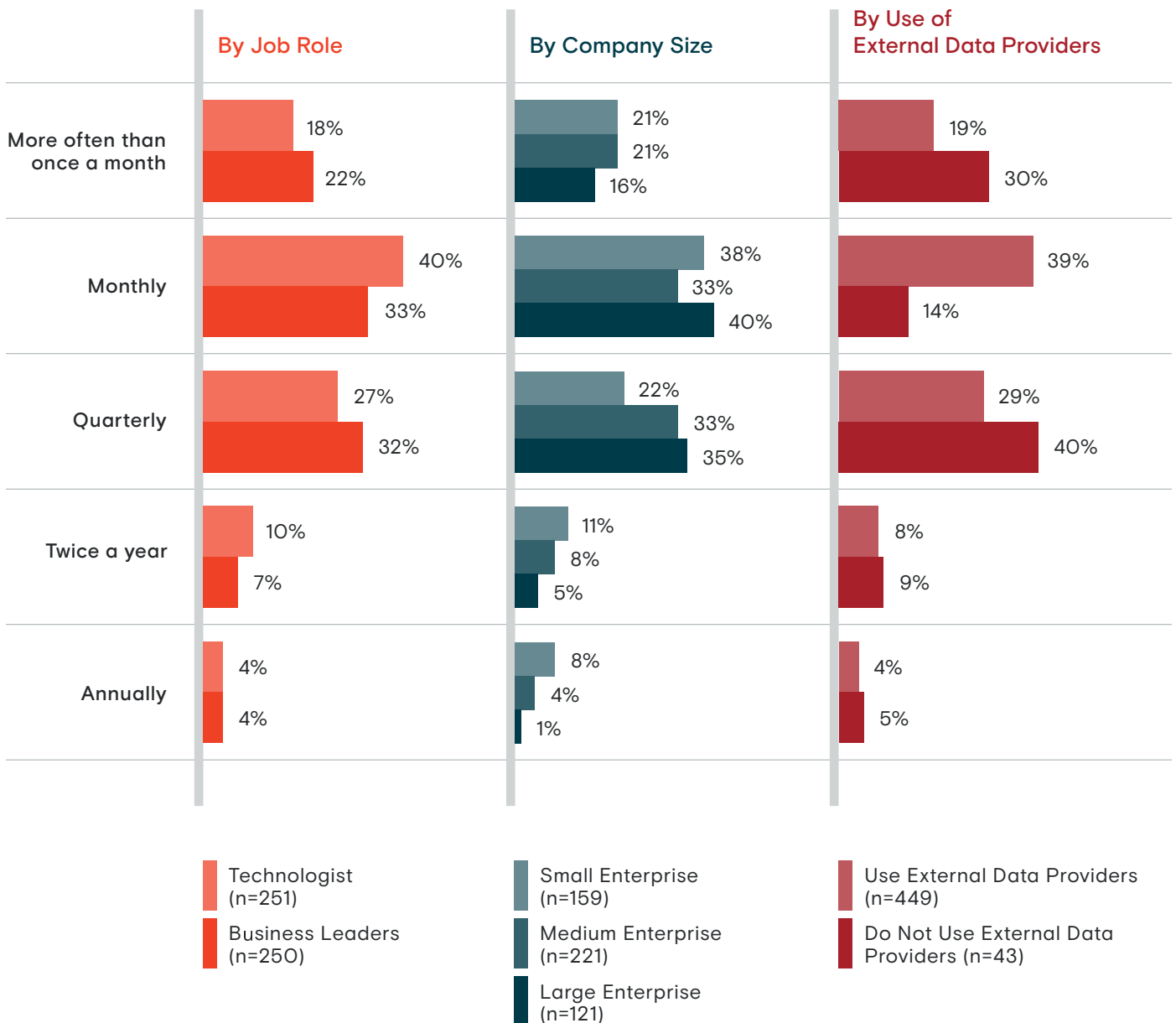
AI deployment is a continuous process, not a set and forget. This is reflected in the high number of organizations leveraging training data providers, as well as in the data points we have measured regarding the need to update models on an ongoing basis. Last year, 80% of organizations updated their models at least quarterly, with an increase to 87% this year. In 2021, 57% reported they update their models at least monthly, growing from 45% in 2020.

Figure 11: Model retraining frequency comparing this year and last

■ Trended 2020 (n=290)
■ Trended 2021 (n=501)

More often than once a month
- 0%
- 20%

Monthly
- 45%
- 37%

Quarterly
- 35%
- 30%

Twice a year
- 0%
- 8%

Annually
- 15%
- 4%

Never / Have not updated
- 5%
- 0%

Organizations of all sizes update their models regularly, and larger organizations are more likely to update their models than smaller companies with 91% updating on at least a quarterly basis. We also found that organizations using external data providers are most likely to update their models on a monthly basis.

**Figure 12:** How often are you retraining/updating your machine learning models?

	By Job Role	By Company Size	By Use of External Data Providers
More often than once a month	18% / 22%	21% / 21% / 16%	19% / 30%
Monthly	40% / 33%	38% / 33% / 40%	39% / 14%
Quarterly	27% / 32%	22% / 33% / 35%	29% / 40%
Twice a year	10% / 7%	11% / 8% / 5%	8% / 9%
Annually	4% / 4%	8% / 4% / 1%	4% / 5%

Legend:
- Technologist (n=251)
- Business Leaders (n=250)
- Small Enterprise (n=159)
- Medium Enterprise (n=221)
- Large Enterprise (n=121)
- Use External Data Providers (n=449)
- Do Not Use External Data Providers (n=43)

AI priorities vary by organization size, with scaling notably more important for larger enterprises while data diversity is more important among small and medium organizations.

As ethics and fairness topics gain more traction in the public domain, and the industry is having important conversations, we are seeing a clear focus on data diversity, bias reduction, as well as scalability. While data bias and scaling are strong concerns, especially in larger companies, data diversity is the top need across organizations. For medium and large organizations, bias reduction—while still important—is the least important of the three surveyed features, with the exception of small organizations, where it's tied with scaling in importance (Figure 13).

When we look at how respondents who use external data providers versus those who don't rank these features, we saw that data diversity is significantly more important to those who use external data providers. Likewise, bias reduction and scaling are of greater importance to those who use external data providers. This focus on data diversity and bias reduction signals the maturity of organizations working with data partners (Figure 14).

Figure 13: To what extent are the following AI features important to you?
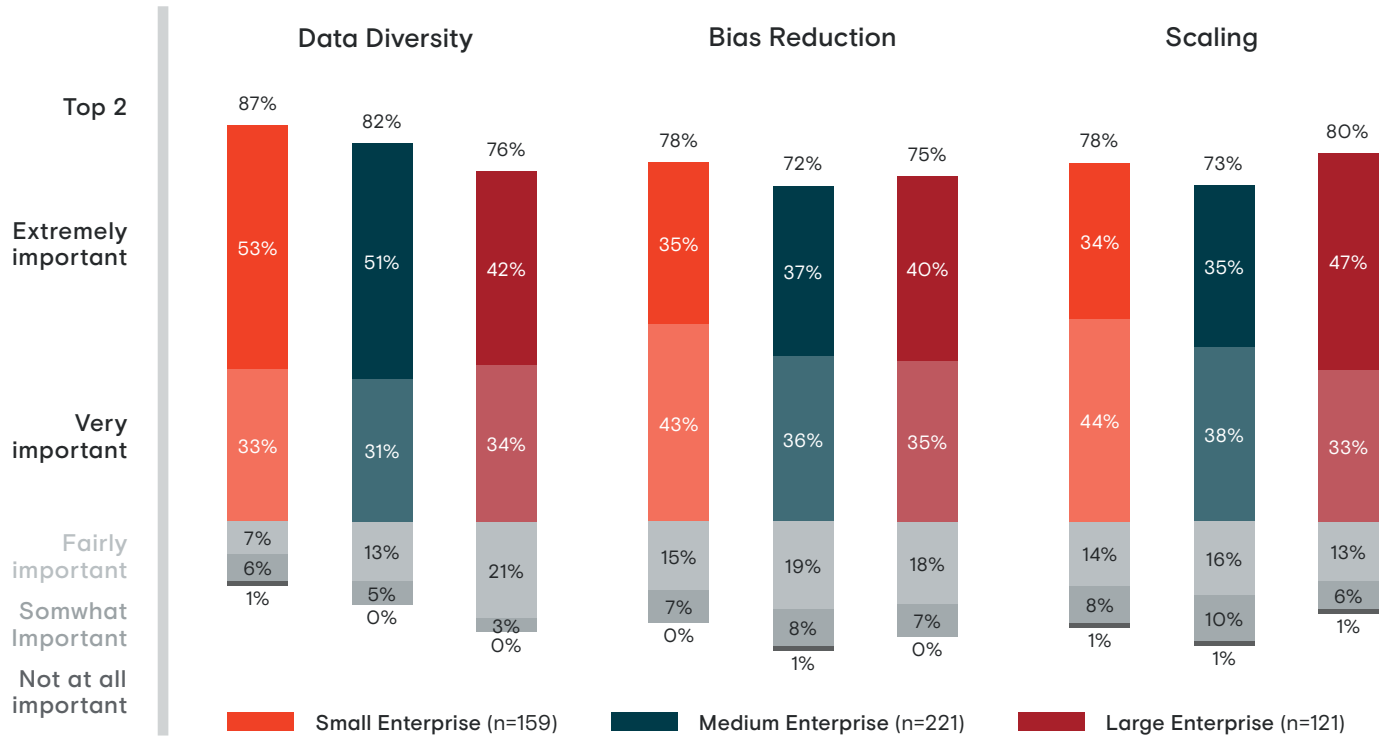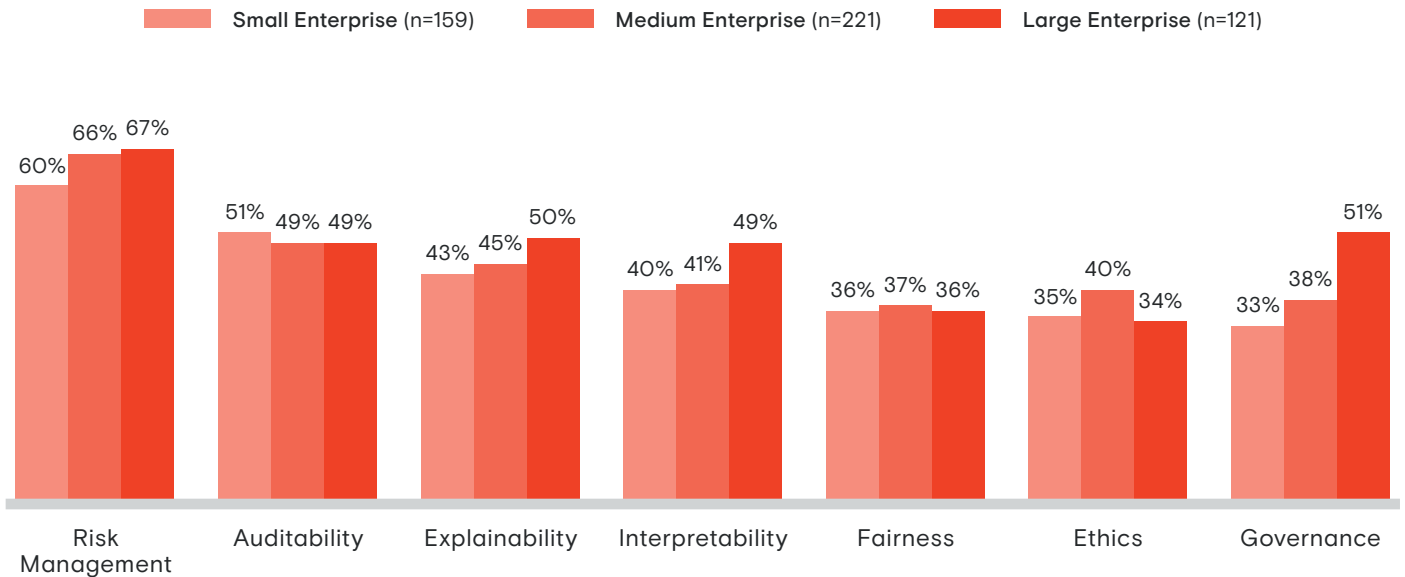

Figure 14: Important features differentiated by whether company uses external data provider
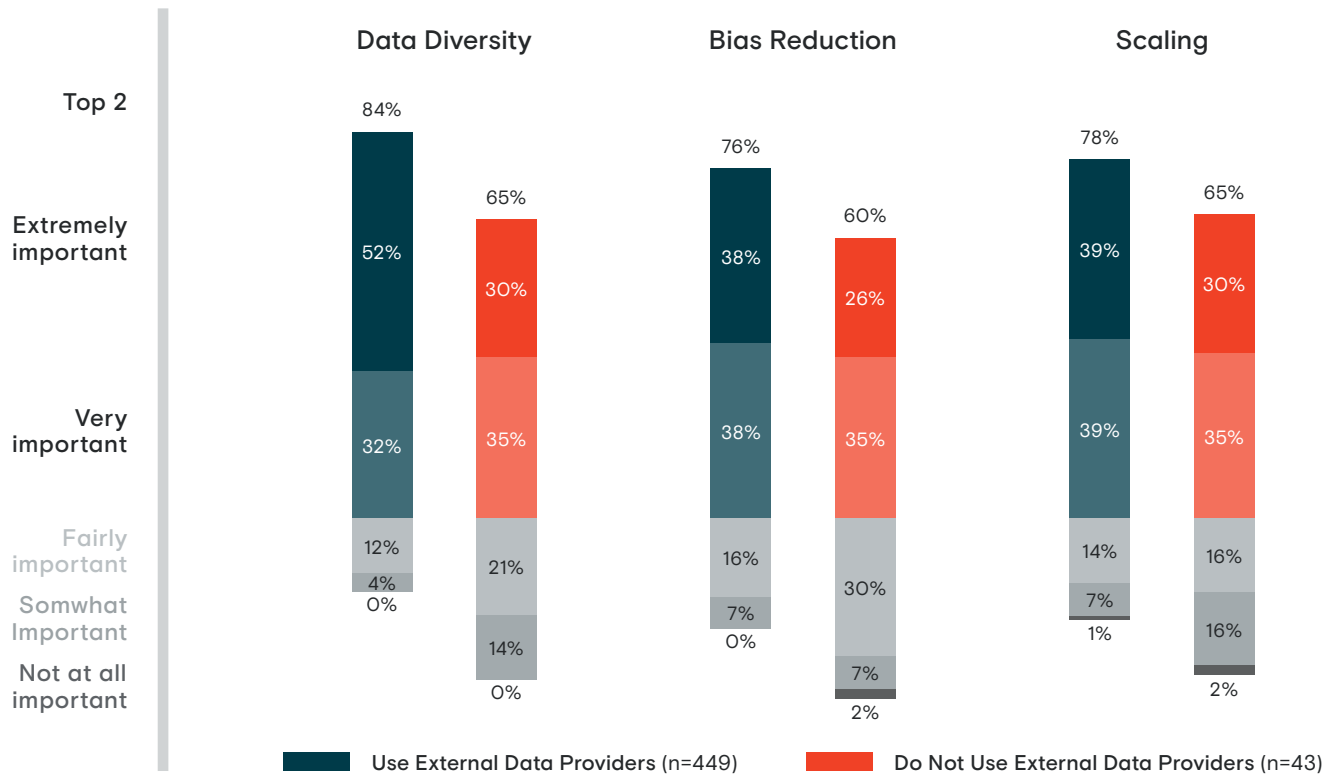
While there are many concerns about responsible AI, risk management is the primary lens through which responsible AI is viewed across all company sizes. Only about one third of companies cite fairness and ethics as top of mind when it comes to building responsible AI. Notably, governance is significantly more important for large organizations.

Figure 15: When you think about responsible AI, what lenses are you using?

Small Enterprise (n=159)   Medium Enterprise (n=221)   Large Enterprise (n=121)

	Small	Medium	Large
Risk Management	60%	66%	67%
Auditability	51%	49%	49%
Explainability	43%	45%	50%
Interpretability	40%	41%	49%
Fairness	36%	37%	36%
Ethics	35%	40%	34%
Governance	33%	38%	51%

AI Ethics in 2021

Appen Partner Spotlight

"

We give ethical AI equal weight to other AI benchmarks. Our AI is designed to gauge the most appropriate solution with ethical, non-biased results being an important factor. This approach, alongside other metrics, offers customers sound AI solutions."

Mohamed Elbadrashiny
NLP Applied Scientist, aiXplain

"

Our AI teams work hand in hand with our User Experience teams, where we have been deliberately expanding our definition to "Person Experience" by adding in research on personal resiliency. The empathy stages of our design thinking process ensure that we understand the breadth of people that will be affected by the data/AI products that we build."

Ryan Gross
Vice President, Pariveda

"

We […] believe people will benefit if we can accelerate the adoption of human-centric AI and human-machine cooperation for collective intelligence. This implies humans being at the very center by creating training data, developing algorithms, and making decisions based on AI-driven recommendations."
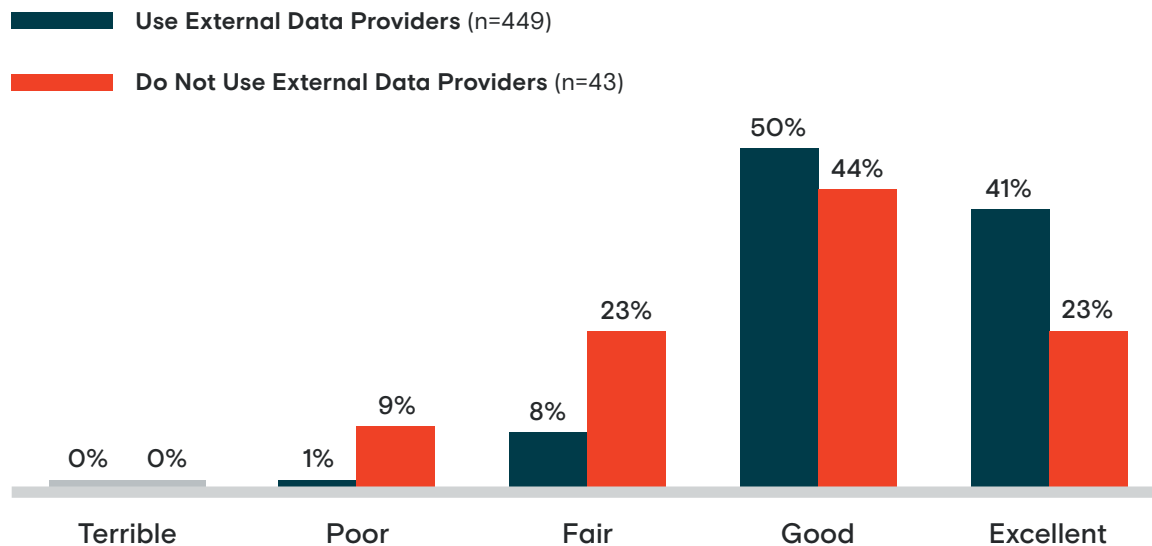
Peter Sarlin
CEO and Co-Founder, Silo AI

Companies report a high commitment to data security and privacy, and are open to sharing their data with others.

Nearly 9 out of 10 respondents state their company is excellent or good about addressing privacy and security issues related to AI. Companies that use external data providers are 1.8 times more likely to say their company is excellent in this area, and 9 times less likely to say they're poor at it. Many data providers include security and compliance checks and tools to ensure data privacy, so it's unsurprising that the survey reflects this as an area of priority.

Figure 16: How would you rate your company when it comes to addressing privacy/security issues related to AI?

■ **Use External Data Providers** (n=449)

■ **Do Not Use External Data Providers** (n=43)

	Terrible	Poor	Fair	Good	Excellent
Use External Data Providers	0%	1%	8%	50%	41%
Do Not Use External Data Providers	0%	9%	23%	44%	23%

There is a significant difference in the appetite for sharing training data outside the organization, both when it comes to companies using data providers, and depending on the size of the organization. While over 75% of respondents are open to sharing data with the right protocols, less than half of those who are not using external providers are willing—suggesting that they are using more sensitive data sets—which meet their specific needs as well as their expectations for accuracy and cost.

Figure 17: What is your viewpoint about sharing your AI training data with other organizations?

We are open to others using our training data
29%
14%

With the right security and privacy in place (e.g., anonymization, federated model building) we would consider making our data available to others
51%
33%

We prefer not to share data — we consider it too confidential
13%
33%

We prefer not to share data — too much risk of a compliance violation
5%
19%

We prefer not to share data — just too much hassle for the benefit
1%
0%

Not sure/Have not decided
0%
2%

Use External Data Providers (n=449)
Do Not Use External Data Providers (n=43)

We also found that larger companies are much less likely to share data than smaller due to compliance concerns.
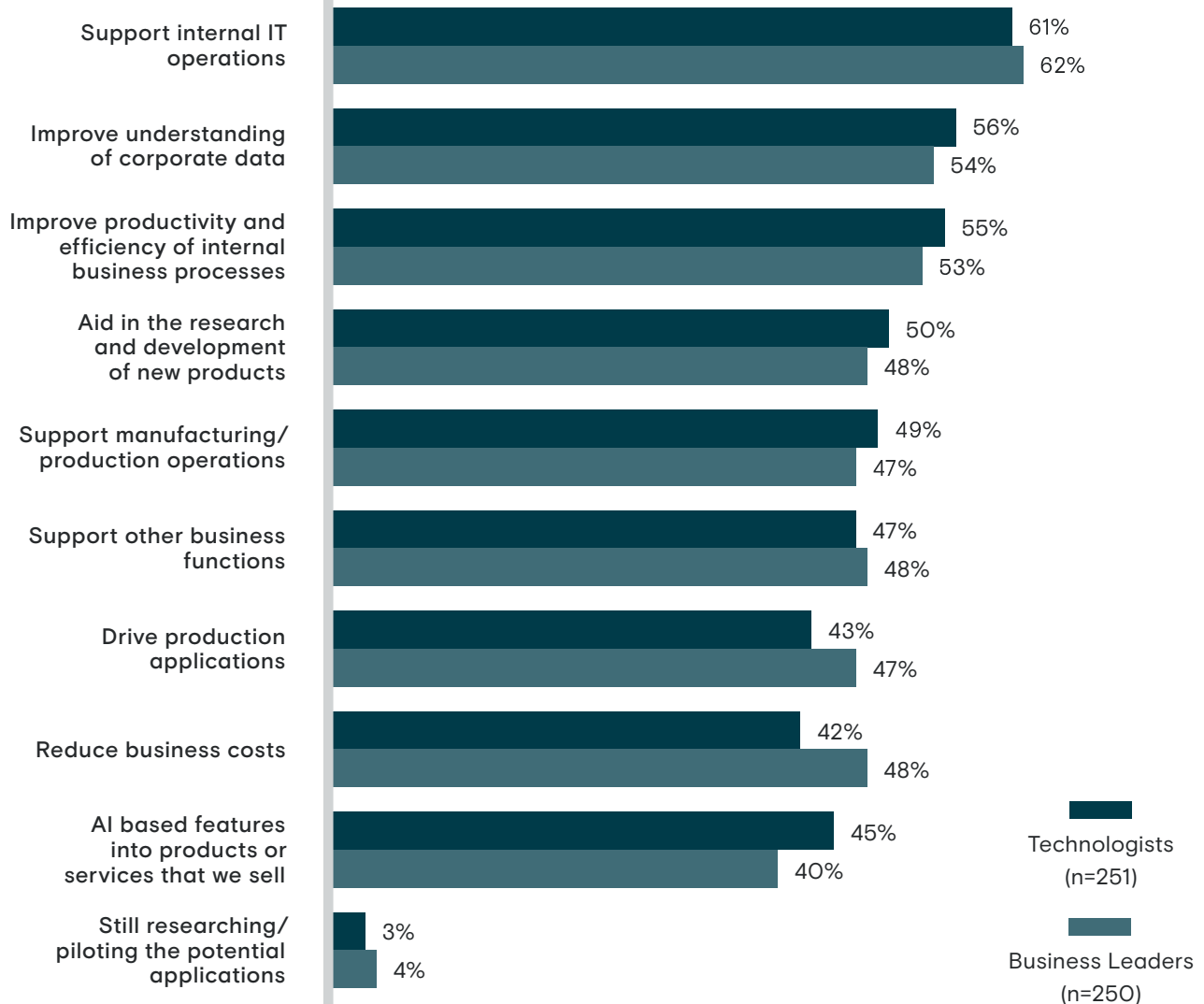
Figure 18: Viewpoint on sharing data differentiated by company size

We are open to others using our training data	30% / 28% / 27%
With the right security and privacy in place (e.g., anonymization, federated model building) we would consider making our data available to others	50% / 52% / 41%
We prefer not to share data — we consider it too confidential	16% / 13% / 16%
We prefer not to share data — too much risk of a compliance violation	4% / 5% / 14%
We prefer not to share data — just too much hassle for the benefit	0% / 1% / 2%
Not sure/Have not decided	1% / 1% / 0%

Small Enterprise (n=159)

Medium Enterprise (n=221)

Large Enterprise (n=121)

Business leaders and technologists tend to agree more in 2021, with some core disconnects

This year, we continued to investigate how business leaders and technologists differed in their viewpoints on AI priorities and bottlenecks. We found that compared to 2020, the two groups tend to align in more areas, such as the usage of AI and data vendors, but gaps still remain in key areas like ethics and interpretability.

Figure 19: Which of the following best describes the use of AI in your organization?

Category	Technologists (n=251)	Business Leaders (n=250)
Support internal IT operations	61%	62%
Improve understanding of corporate data	56%	54%
Improve productivity and efficiency of internal business processes	55%	53%
Aid in the research and development of new products	50%	48%
Support manufacturing/ production operations	49%	47%
Support other business functions	47%	48%
Drive production applications	43%	47%
Reduce business costs	42%	48%
AI based features into products or services that we sell	45%	40%
Still researching/ piloting the potential applications	3%	4%

■ Technologists (n=251)

■ Business Leaders (n=250)

There is still a disconnect between business decision makers and technologists when it comes to the percentage of AI projects deployed that have seen meaningful ROI. While they generally tend to agree on the deployment numbers, business leaders report more ROI from AI in production than technology leaders.

Figure 20: What percentage of your AI projects make it to deployment and of those, what percentage have shown meaningful ROI?

Percentage of AI projects **making it to deployment**

Percent of deployed projects that have **shown meaningful ROI**

Technologists (n=251)

Business Leaders (n=250)
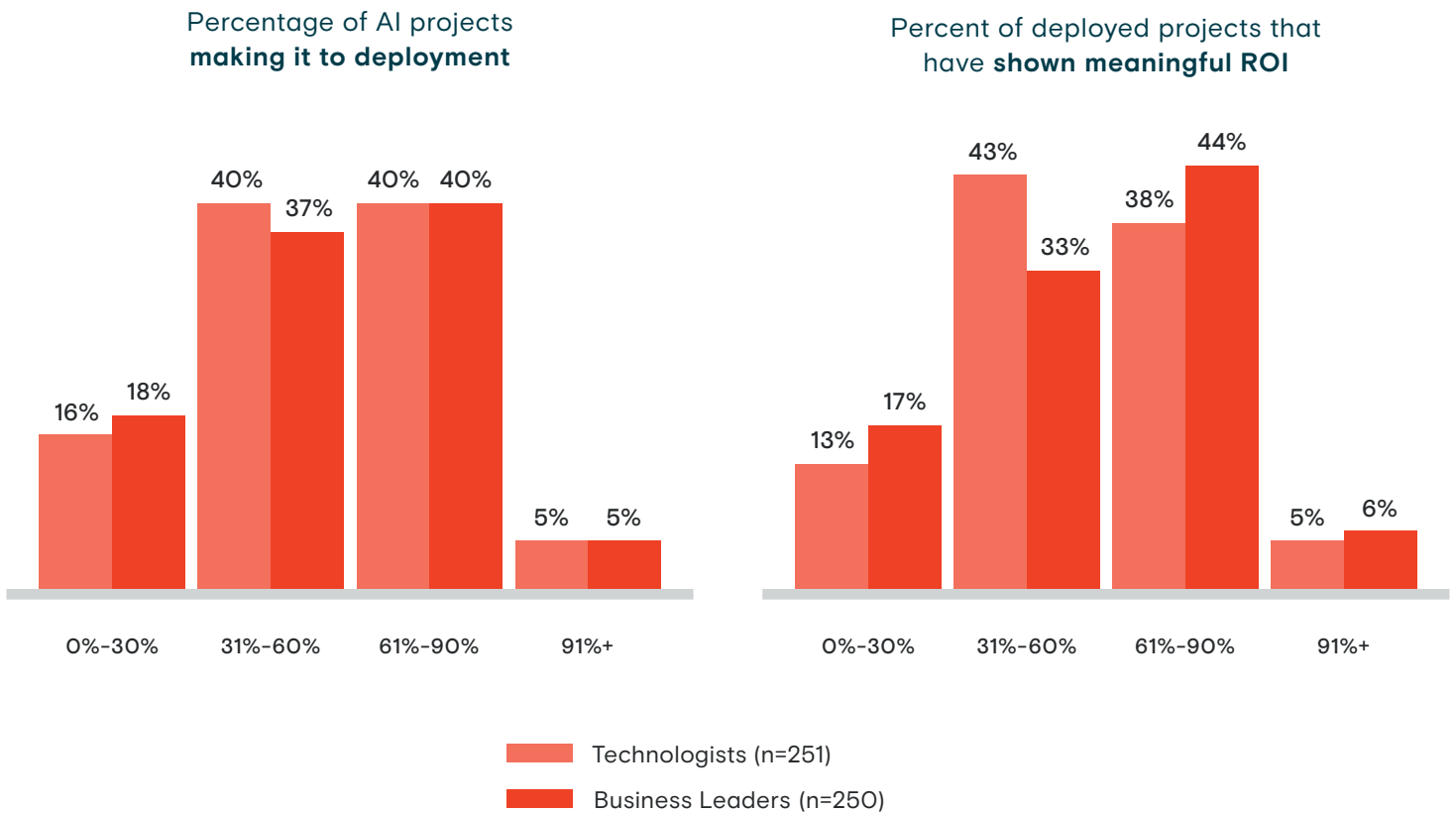
Both business leaders and technologists cite risk management as the top lens they're using to think about responsible AI. Organizations agree that AI projects need to be launched with a risk management approach. Ethics is of higher concern among technologists, with 41% versus 33% rating it as a priority. For business leaders, interpretability is more important with 47% rating it as a priority.
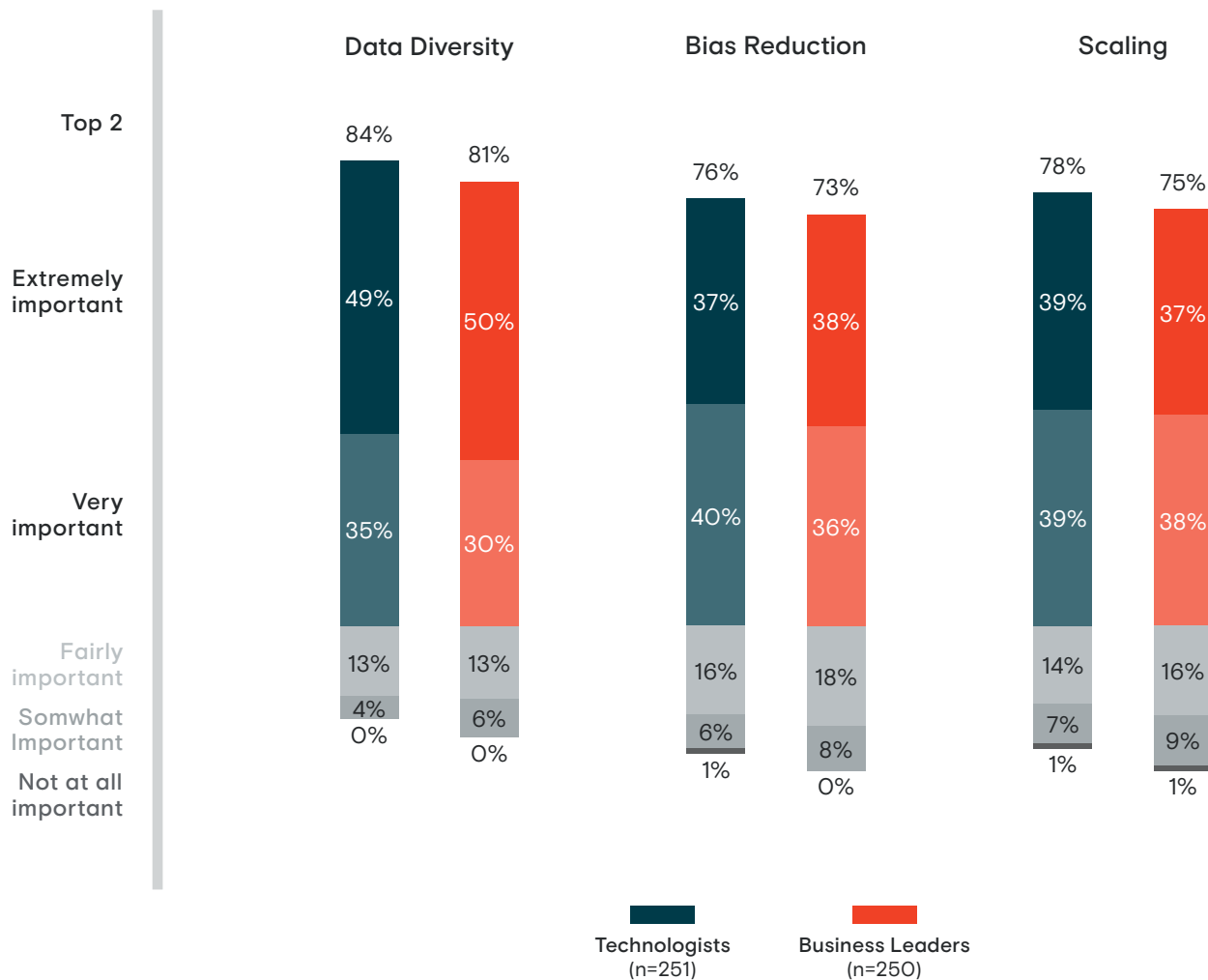
Figure 21: When you think about responsible AI, what lenses are you using?
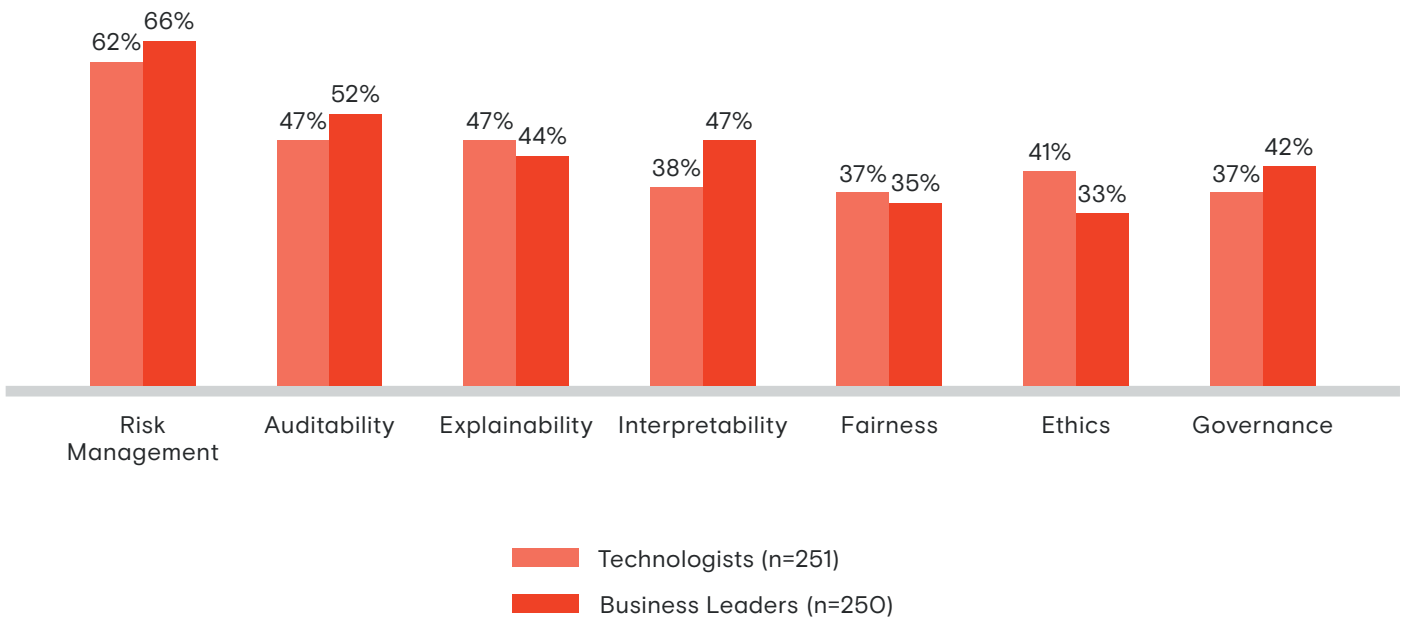
Technologists (n=251)
Business Leaders (n=250)

Generally, business leaders and technologists agree on the importance of data diversity, bias reduction, and scaling in their organizations. Data diversity in particular is rated highly by both, with nearly half of each group rating it as "extremely important."

Figure 22: To what extent are the following AI features important to you?

	Data Diversity		Bias Reduction		Scaling	
Top 2	84%	81%	76%	73%	78%	75%
Extremely important	49%	50%	37%	38%	39%	37%
Very important	35%	30%	40%	36%	39%	38%
Fairly important	13%	13%	16%	18%	14%	16%
Somwhat Important	4%	6%	6%	8%	7%	9%
Not at all important	0%	0%	1%	0%	1%	1%

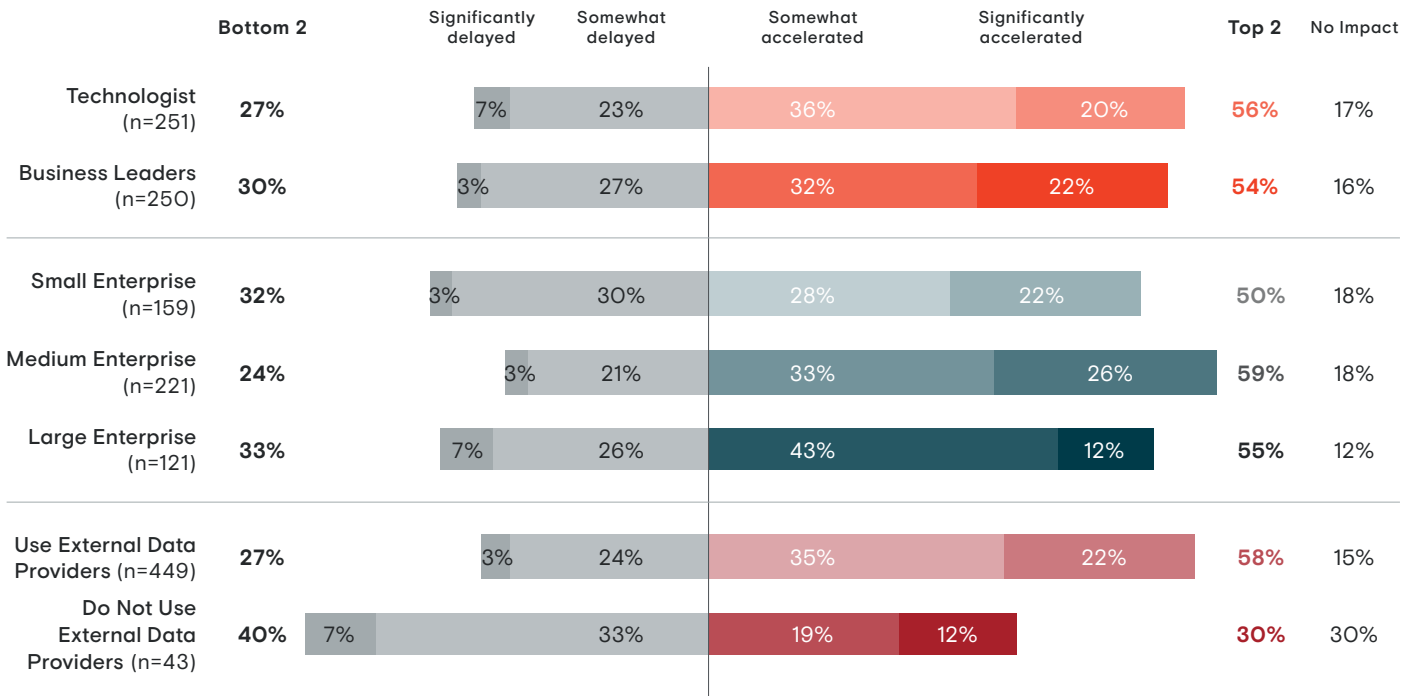Technologists (n=251)   Business Leaders (n=250)

Enterprises of all sizes confirmed they accelerated their AI strategy as a result of COVID-19 in 2020 and will continue to do so in 2021

On-balance, Covid-19 has had an accelerating effect on AI efforts — small companies were the most likely to have been negatively impacted, but the majority still felt things continue apace or speed up. Nearly 75% of those using external data providers saw an acceleration.

Figure 23: To what extent did COVID impact your AI strategy in 2020?

	Bottom 2	Significantly delayed	Somewhat delayed	Somewhat accelerated	Significantly accelerated	Top 2	No Impact
Technologist (n=251)	**27%**	7%	23%	36%	20%	**56%**	17%
Business Leaders (n=250)	**30%**	3%	27%	32%	22%	**54%**	16%
Small Enterprise (n=159)	**32%**	3%	30%	28%	22%	50%	18%
Medium Enterprise (n=221)	**24%**	3%	21%	33%	26%	**59%**	18%
Large Enterprise (n=121)	**33%**	7%	26%	43%	12%	**55%**	12%
Use External Data Providers (n=449)	**27%**	3%	24%	35%	22%	**58%**	15%
Do Not Use External Data Providers (n=43)	**40%**	7%	33%	19%	12%	**30%**	30%

Generally, business leaders and technologists agree on the importance of data diversity, bias reduction, and scaling in their organizations. Data diversity in particular is rated highly by both, with nearly half of each group rating it as "extremely important."
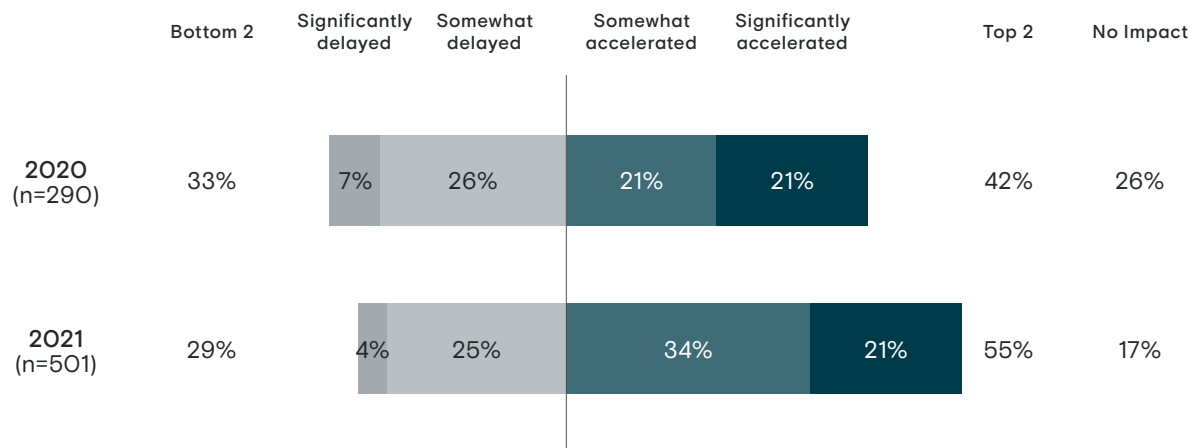
Figure 24: What extent do you foresee COVID impacting your AI strategy in 2021?

	Bottom 2	Significantly delayed	Somewhat delayed	Somewhat accelerated	Significantly accelerated	Top 2	No Impact
Technologist (n=251)	12%	1%	11%	39%	31%	71%	17%
Business Leaders (n=250)	12%	1%	11%	36%	28%	64%	24%
Small Enterprise (n=159)	14%	1%	14%	31%	30%	61%	25%
Medium Enterprise (n=221)	10%	1%	8%	39%	31%	70%	20%
Large Enterprise (n=121)	14%	2%	12%	41%	28%	69%	17%
Use External Data Providers (n=449)	11%	1%	9%	39%	32%	71%	18%
Do Not Use External Data Providers (n=43)	26%		26%	14%	16%	30%	44%

The pandemic prompted the shift to more remote and virtual interactions between businesses and customers; it seems businesses are accordingly accelerating their development of AI to meet increasing customer demands in a more technologically-savvy world. In comparing 2020 to 2021, we can see the overall extent COVID-19 impacted and is anticipated to impact AI strategy. Evidently, companies are optimistic that 2021 will foster even faster development in the AI space.

Figure 25: COVID-19 Impact on AI Strategy in 2020 vs. 2021

	Bottom 2	Significantly delayed	Somewhat delayed	Somewhat accelerated	Significantly accelerated	Top 2	No Impact
2020 (n=290)	33%	7%	26%	21%	21%	42%	26%
2021 (n=501)	29%	4%	25%	34%	21%	55%	17%

Conclusion

The AI industry continues to grow rapidly year-over-year, to the point where organizations that haven't yet invested in their own AI initiatives are at risk of being left behind. Companies are still challenged by data acquisition and data management, but are working through these bottlenecks with external data providers and investing more capital in AI projects. The benefits of these actions are evident: more successful deployments are reported from companies that allocate enough resources.

We noted in last year's report that COVID-19 appeared to be an accelerator rather than a setback, and in 2021, that remains true. In fact, changes brought by the pandemic are driving leading advances in AI as business-to-consumer interactions are forced to evolve.

AI priorities continue to shift across all companies as greater investments of money and other resources enable the deployment of more AI projects, and therefore better blueprints for success when looking to scale. Growing budgets and the shift towards practical applications

demonstrate that more organizations are learning how to make AI work—both for external and, increasingly, internal use cases. Business leaders and technologists are increasingly aligned on priorities around data diversity, bias reduction, and scaling, although the push for more responsible AI seems to be led largely by technologists.

Nonetheless, what seems clear is that AI is becoming less optional for businesses looking to gain a competitive edge in their respective industries. While AI may not be a critical offering for all organizations yet, those hoping to obtain market leader status will likely depend on the success of their AI initiatives. Fortunately, the database of AI success stories to learn from is larger than ever—and growing.

Our goal in developing this report is to provide the current state of AI and machine learning from the perspective of top decision-makers across industries and companies. If you have any questions on the information presented here, please feel free to reach out.

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>
> It is critical to update and retrain AI models to have a successful model and avoid data drift. 87% of organizations are updating their models regularly with 91% of large organizations updating at least once a quarter. When data is always changing and use cases are evolving, this becomes a big part of maintaining the accuracy of your model. A data provider can help ensure the data is constantly being updated with new models. Over 90% of decision makers have reported using a data provider for training data and 69% of them feel they are ahead of others in their AI journey because of it.❞
>
> **Wilson Pang**
> *Chief Technical Office, Appen*

Methodology

The objective of the State of AI 2021 survey was to evaluate AI implementation across organizations by gathering responses from business leaders and technical practitioners.

The Harris Poll, our research partner, surveyed 501 respondents through an online survey between March 1 to March 19, 2021. The random sample consisted of 251 business leaders and managers and 250 data scientists, data engineers, and developers. All respondents worked for companies with 100+ employees based in the US market.

The results reflect the real population within a **margin of error** of ~5%. Our qualification questions ensured that 32% of responses came from organizations under 1,000 employees, whereas 68% represent organizations with more than 1,000 employees, 17% being greater than 25,000 full-time employee companies.

Industry	Role	Company Size
Advertising & Marketing	Data Scientists	1 – 50
Airlines & Aerospace (including Defense)	Data Engineer	51 – 100
Automotive & Transportation	Data Analyst	101 – 500
Business Support & Logistics	DevOps / Developers	501 – 1,000
Construction, Machinery, and Homes	AIOps Engineer	1,001 – 5,000
Education	Technical Manager Data Engineering	5,001 – 10,000
Entertainment & Leisure	Data Architect/ Applications Architect / Enterprise Architect	10,001 – 25,000
Finance & Financial Services	Machine Learning Engineer	25,001 +
Food & Beverages	Software / App Developer	
Healthcare & Pharmaceuticals	Software / SaaS Engineer	
Insurance	Data and analytics manager	
Manufacturing	Program Manager / Director	
Retail & Consumer Durables (including E-Commerce)	Business Analyst / Intelligence	
Real Estate	VP/C-Level Executive - technical	
Telecommunications, Technology, Internet & Electronics	VP/C-Level Non-technical	
Utilities, Energy, and Extraction	Business Process / Dept Owner (i.e., Product Manager, Program Manager, Procurement Manager, etc.)	
	Training Data Acquisition Management	

About Us

Appen collects and labels images, text, speech, audio, video, and other data used to build and continuously improve the world's most innovative artificial intelligence systems. Our expertise includes having a global crowd of over 1 million skilled contractors who speak over 235 languages, in over 70,000 locations and 170 countries, and the industry's most advanced AI-assisted data annotation platform. Our reliable training data gives leaders in technology, automotive, financial services, retail, healthcare, and governments the confidence to deploy world-class AI products. Founded in 1996, Appen has customers and offices globally.

- Experience working in **170+ countries**

- Expertise in **235+ languages**

- Access to a curated crowd of over **1 million** flexible contractors worldwide

- Over **1.125 employees** located in offices around the globe

- Nearly **1 billion** judgments made and **3 million** images and videos collected in 2020

- **25+ years working** with leading global technology companies

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