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Gen AI transforming transportation

Lessons from the frontier of an emerging technology

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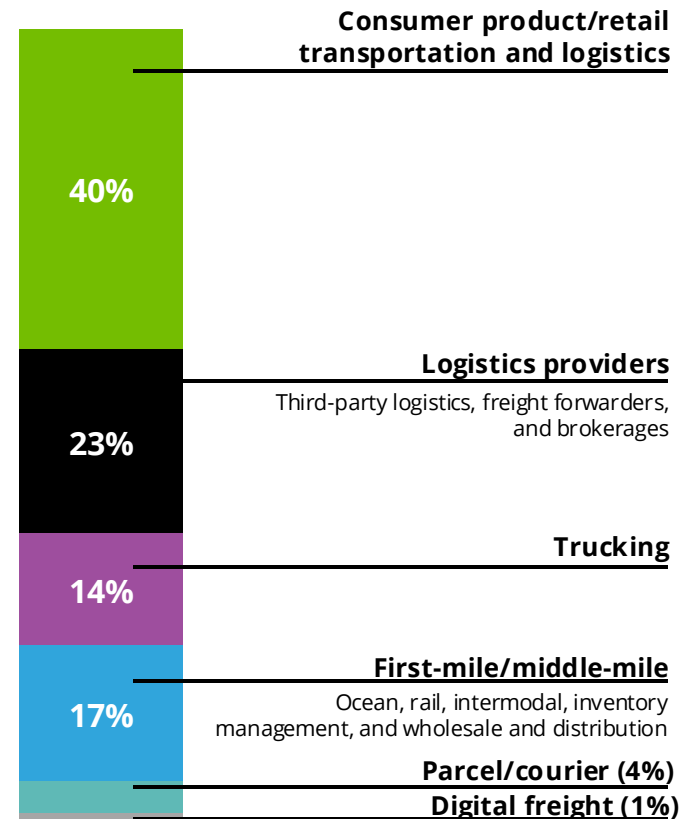
Overcoming barriers: Learning from leaders

Methodology

This research relies on a July 2024 survey of 210 executives with strategic oversight (directors, vice presidents, and C-suite executives) at transportation and supply chain companies. Most of the report focuses on perspectives of 186 executives working at companies with at least one generative AI (gen AI) use case in implementation. The questionnaire they completed was designed to better understand the extent and focus of gen AI adoption in the transportation industry, the value generated, challenges faced, and how gen AI leaders in the industry set themselves apart from the rest of the pack.

Nearly one-third of the executives (30%) represent transportation companies with over \$10 billion in revenue. Over half represent companies with \$1 billion to \$10 billion in revenue (37% with \$1 billion to \$5 billion, and 15% with \$5 billion to \$10 billion) and 18% are from companies with revenues under \$1 billion.

Please refer to source lines for clarification on questions asked and sample sizes.



Key findings

1. Many adopting, but few do so broadly

Fifty-four percent of respondents have at least one gen AI implementation, while another 21% have pilots only. Only one in five companies have at least one broad implementation of gen AI in their supply chain or strategy and operations. Even fewer have any broad implementation in supporting functions like finance, information technology, human resources, or legal.

2. Signals of acceleration

Adoption looks poised to accelerate in some key areas. Most companies surveyed have at least one limited implementation or pilot in supply chain (73%) or strategy and operations (64%).

3. Logistics providers lag other transportation players

Logistics providers (third-party logistics, freight forwarders, and brokerages) are significantly less likely than other transportation players (trucking, first- and middle-mile providers, and retail and consumer product supply chain/logistics) to have at-scale gen AI implementations in all functions aside from strategy and operations.

4. Early implementations seeing a wide range of economic value

Route optimization, asset management, and warehouse operations are leading use cases, with relatively high adoption as well as economic impact. Demand planning, inventory management, and fleet management are also seeing high adoption but less economic value. Virtually no respondents have applied gen AI to frontline workforce productivity or recruitment and retention.

5. Finance is a missed opportunity for most

Only 30% of respondents have a mature finance implementation. But among those that do, 93% report high economic impact—the highest of any use case.

6. High expectations, low success for big bottom-line outcomes

Most respondents expect that gen AI can bring greater efficiency and higher revenue. However, few say they are achieving those aims. Among the 56% who hoped to increase revenue through gen AI, only 13% say they've succeeded.

In contrast, fewer are aiming gen AI at targets such as encouraging innovation, enhancing client relationships, and uncovering new insights. However, more than half with those ambitions say they've succeeded.

7. Generated insights focus on core transportation processes; less so in key enabling areas

About three in four respondents say gen AI is driving insights that help improve traceability or enable dynamic supply chain decisions. Two in three say insights help inventory efficiency. Fewer than half say gen AI is generating helpful insights in customer relationship management, digital commerce and distribution, consumer insights, asset utilization, finance, and talent.

8. Risk and governance and talent are transportation's biggest barriers to gen AI adoption—even among large companies

Companies are moderately confident about their preparedness to adopt gen AI in strategy and operations. Confidence in tech varies with company size, but only half of companies with over \$10 billion in revenue are confident in their technology infrastructure.

9. Data concerns top gen AI risk factors

Forty-one percent cited a data-related concern as their top risk (unauthorized use of organizational data: 21%; misuse of client data: 20%). One in five cited unintended outcomes as a key data-related concern of gen AI's rapid adoption.

10. Transportation companies believe it will take more than three years for gen AI to transform their industry. Other sectors expect to feel the impact much sooner

Seven in 10 transportation companies expect it to take more than three years for gen AI to transform the transportation industry. Other sectors like financial services, energy, health care, and others think they'll feel the impact much sooner.

Wide (but shallow) adoption

Despite strong early momentum, generative AI implementations in the transportation sector remain limited in scale, with most efforts still in the proof-of-concept stage



Gen AI implementations, although showing strong early momentum, remain limited in scale. Widespread pilots and early deployments indicate potential acceleration.

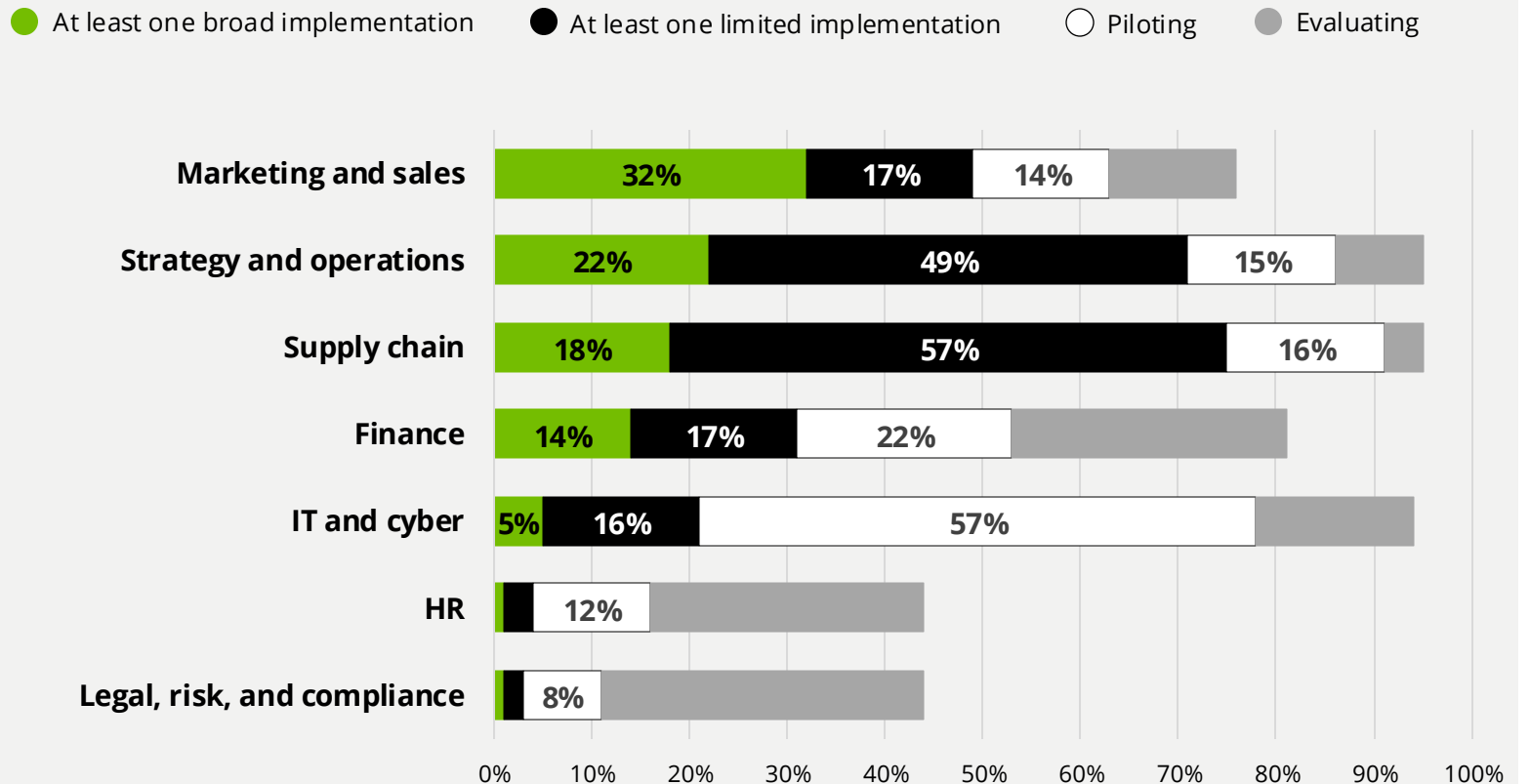
Most companies surveyed are running at least one gen AI pilot or limited implementation. But efforts are largely in the proof-of-concept realm (pilots or limited implementations).

Transportation companies seem to be struggling to scale, as just one in five surveyed have matured to broad implementations.

Broad implementations focus primarily on core functions (strategy and operations; supply chain) rather than enabling functions like finance, IT, HR, and risk.

With more than half of respondents reporting limited implementations in strategy and operations and supply chain, adoption in these areas could accelerate quickly over the next few years.

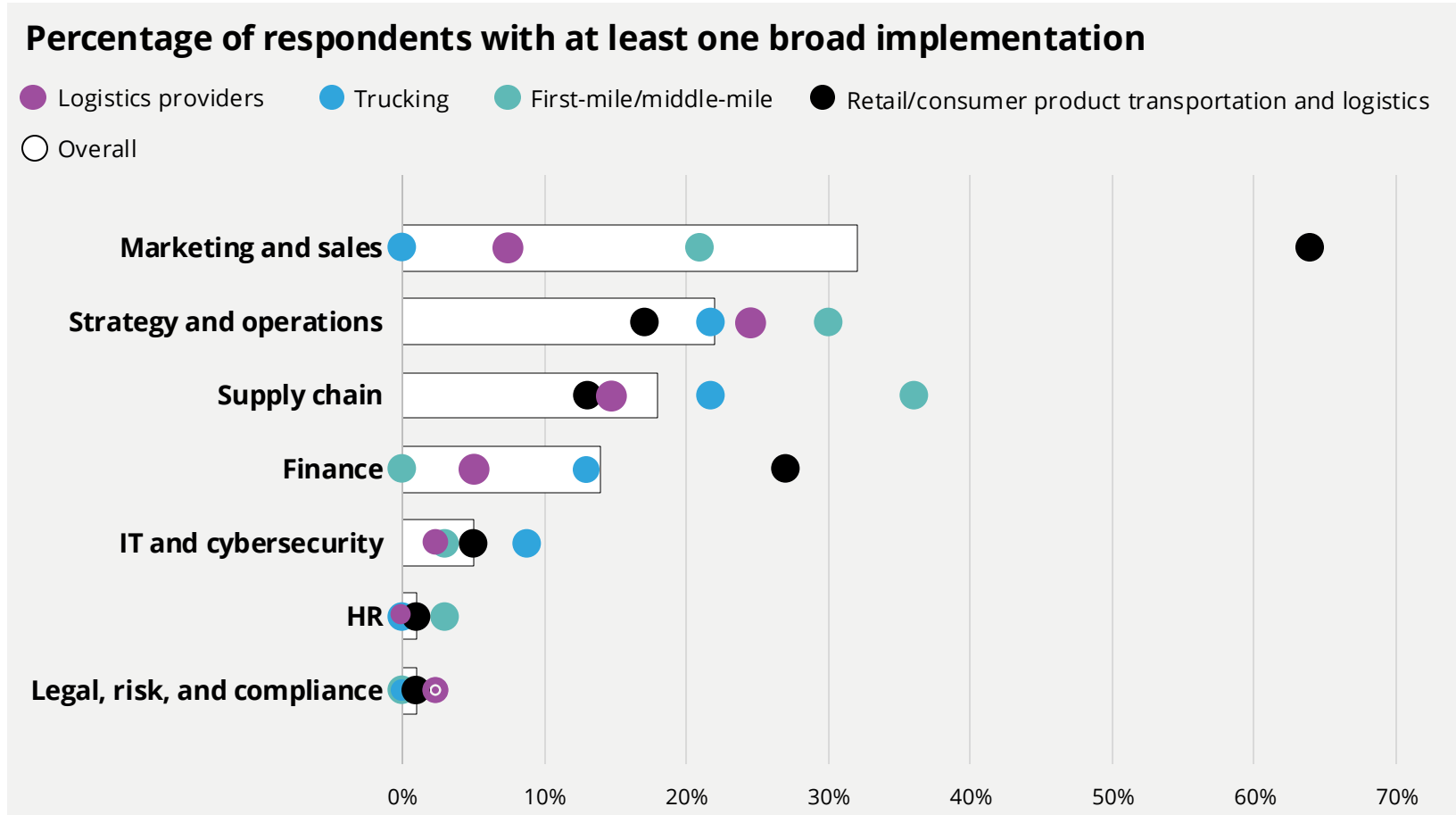
Percentage of companies adopting gen AI across different functions



Question: What is your organization's current adoption level of generative AI across the following functions? If the function does not apply to you, choose "N/A."

Notes: Marketing and sales implementation skews heavily toward retail and consumer products respondents. Three in five say they have broadly adopted gen AI in this area, versus one in 10 transportation companies. n = 186 transportation and supply chain executives with at least one gen AI implementation within their organization.

The focus of broad gen AI adoption varies significantly by transportation subsector.



Retail and consumer product respondents are a major outlier in gen AI implementation for marketing and sales.

For all other transportation subsectors, supply chain and strategy and operations are the functions with the highest adoption rates of broadly applied generative AI. First- and middle-mile players are leading adopters in these areas. Trucking companies are relatively proactive in IT/cybersecurity and finance.

Across all transportation sectors, legal, risk, and compliance, and human resources have the lowest adoption rates.

Question: What is your organization's current adoption level of generative AI across the following functions? If the function does not apply to you, choose "N/A."

Notes: Logistics providers include third-party logistics, freight forwarding, and brokerages; first-mile/middle-mile includes ocean and rail freight, intermodal, inventory management, and wholesale and distribution.

n = 186 transportation and supply chain executives with at least one gen AI implementation within their organization.

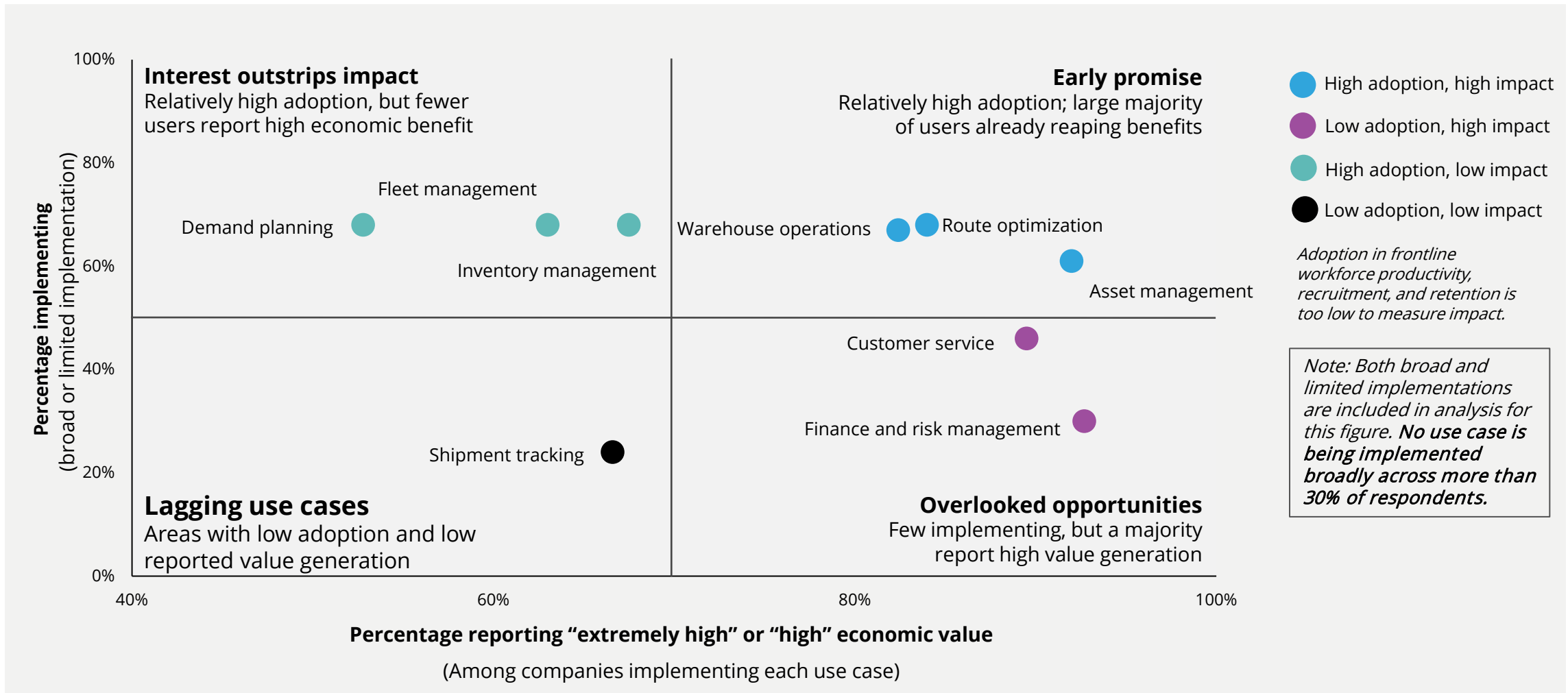
Value creation

As transportation leaders move from possibilities to practicalities, choosing the right use cases, selecting appropriate tools, getting to scale, and accurately measuring progress will all be important steps.

In this early phase of adoption, understanding where gen AI tools are beginning to create new value can offer critical insight.



As transportation experiments with gen AI, core operational areas attract the most attention, and a few use cases show more early potential than others.



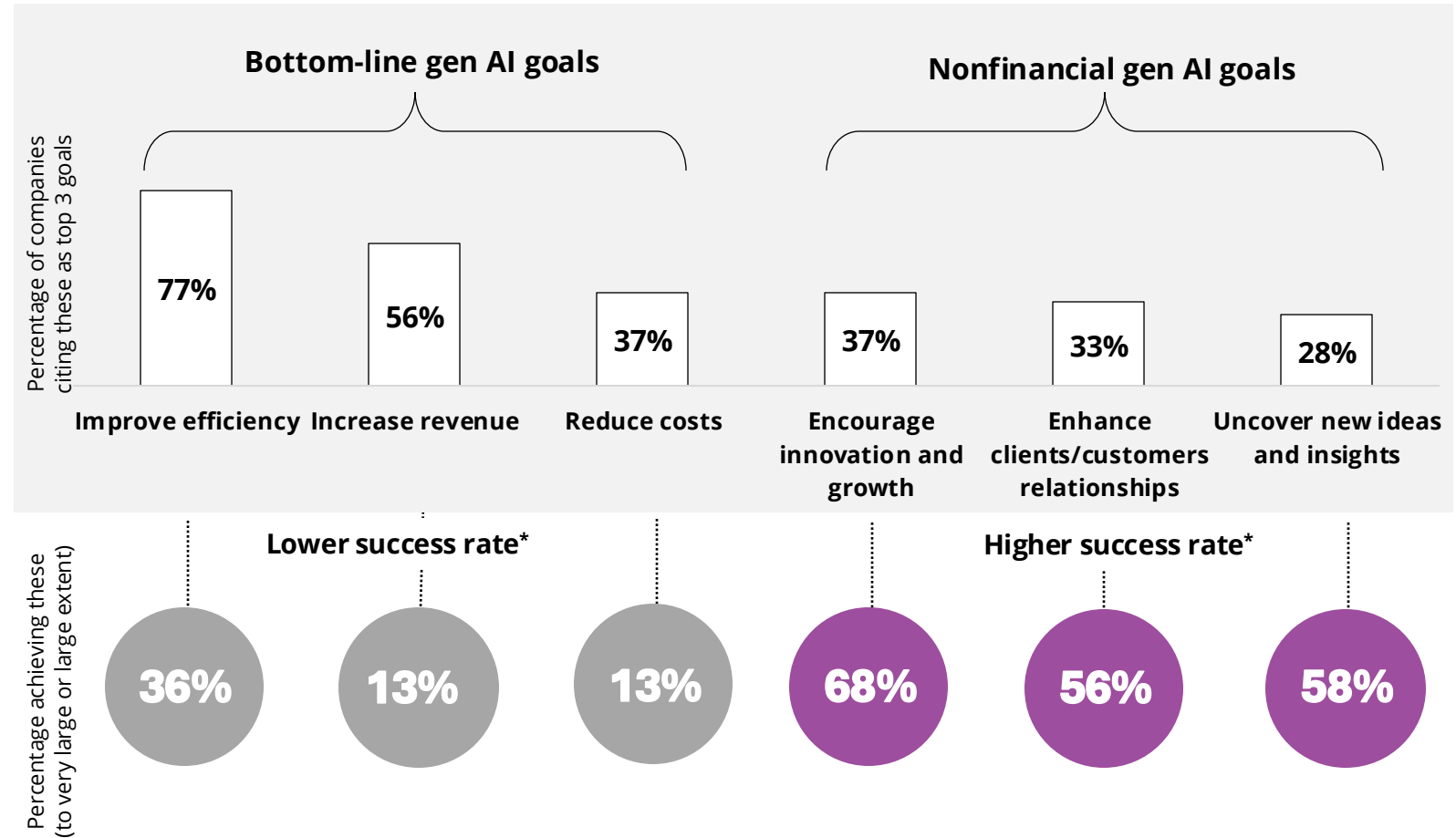
Questions: What is your organization's current level of adoption of generative AI in the following areas? How much tangible economic value is generative AI currently creating for your organization in the following areas?
 Note: n = 186 transportation and supply chain executives with at least one gen AI implementation within their organization.

Higher success is reported for qualitative goals, while more sought-after financial benefits remain elusive in realization or measurement.

Many may still be working out how to quantify gen AI's benefits or connect the technology to revenue and margin metrics.

As they work toward rigorous accounting of financial impact, organizations should also consider the value of nonfinancial outcomes that nonetheless can yield significant competitive advantage.

More respondents are focused on efficiency, revenue, and cost reduction, but only a small percentage report achieving these goals. Over half of companies focused on innovation, improving client relationships, and uncovering insights report success in those areas.



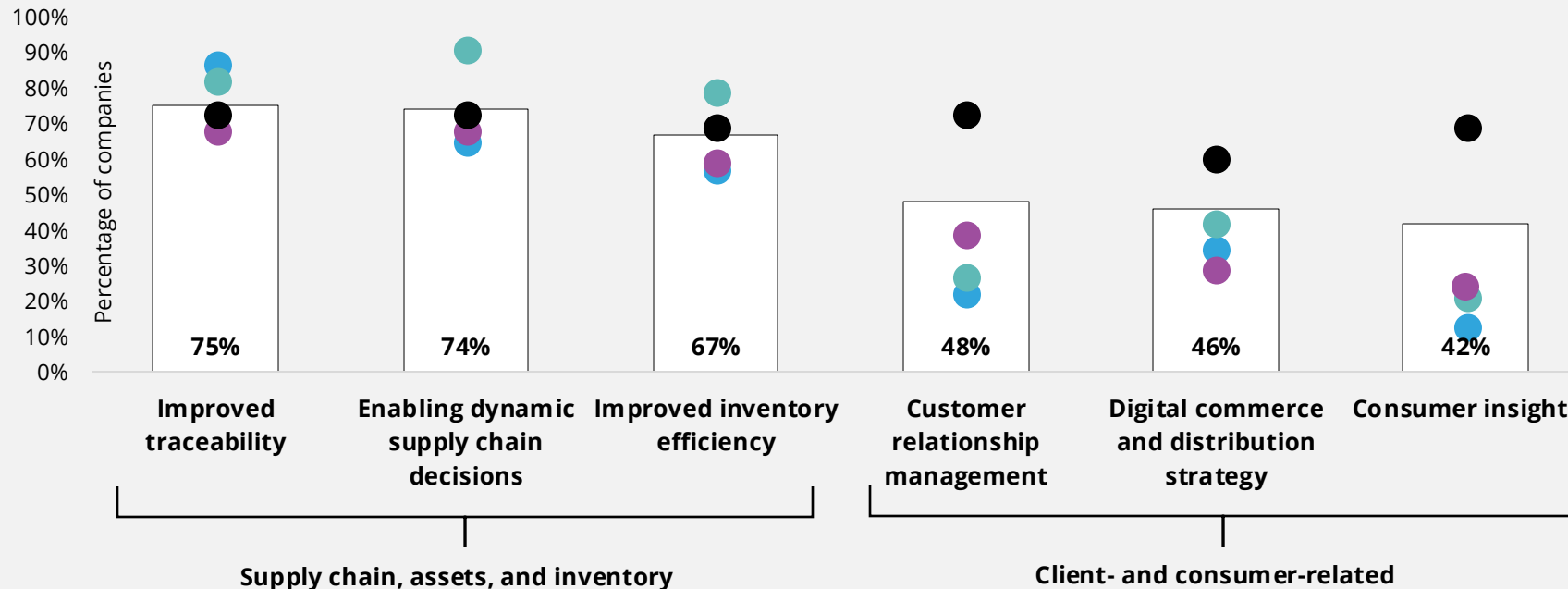
Question: What are the top three overall benefits your organization hopes to achieve through generative AI efforts? To what extent are you achieving those benefits to date?
 Notes: n = 186 transportation and supply chain executives with at least one gen AI implementation within their organization; *success rates among companies with each specific goal.

The focus of gen AI-backed insights varies by company type, and most focus on operations and assets over clients and consumers.

First- or middle-mile companies are the biggest users of insights around dynamic supply chain decisions and inventory efficiency. Trucking companies report the most use of traceability insights. Retail and consumer products organizations, not surprisingly, leverage customer-centric and digital-commerce insights more heavily than others. Broadening the business outcomes targeted for insights could be an opportunity for organizations to realize industry advantage.

Insights driven by gen AI, by company category

● Logistics providers
 ● Trucking
 ● First-mile/middle-mile
 ● Retail/consumer product transportation and logistics
 ○ Overall



Very few respondents deriving insights related to:

- Asset utilization (25%)
- Financial settlement and payments (13%)
- Dynamic pricing (12%)
- Workforce (9%)

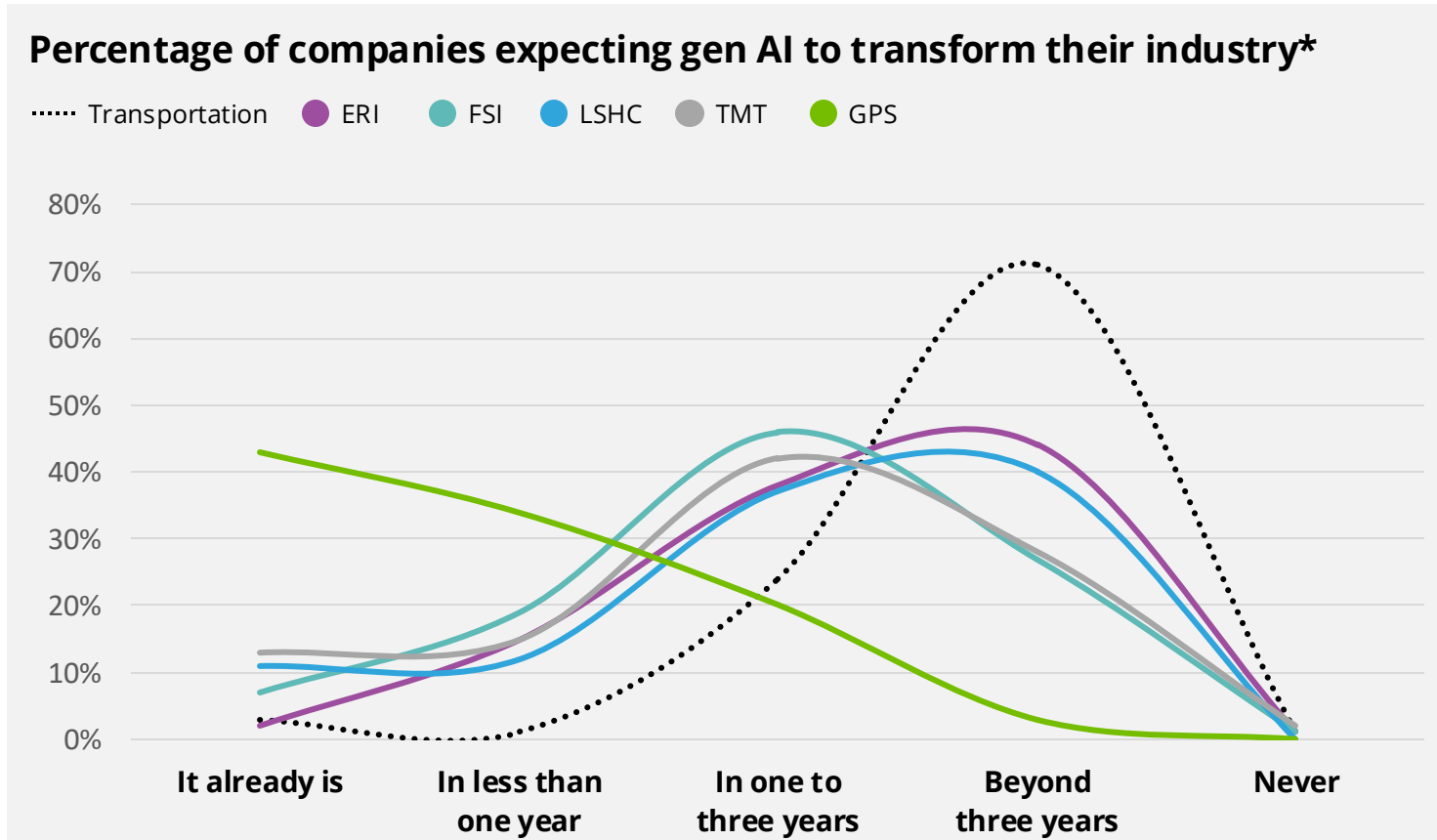
Question: What types of business insights is generative AI helping to drive in your organization? Please select all that apply. (Note: First- and middle-mile includes ocean, rail freight, intermodal, inventory management, and wholesale.)
 Note: n = 186 transportation and supply chain executives with at least one gen AI implementation within their organization.

Clear challenges

New technologies often need time to mature, and transportation leaders are confronting some hard realities as they seek to deploy gen AI to gain advantage in a fast-changing industry. Transportation leaders' assessment of their companies' readiness for broad AI adoption reveals some key barriers that are likely slowing the progression from proof of concept to large-scale deployment.

By understanding and addressing the biggest hurdles, barriers, and risks, organizations can pave the way for smoother gen AI integration, unlocking its transformative potential and driving innovation in the industry.

Most transportation companies expect gen AI-driven industry transformation to take over three years to occur, lagging other industries where the impact is expected sooner.



Seven in 10 transportation companies believe it will take gen AI more than three years to transform their industry.

Other sectors like financial services, energy, and health care expect to feel the impact much sooner.

Question: When is generative AI likely to substantially transform your organization and the broader industry, if at all?

Notes: n = 210 transportation and supply chain executives; *industries are energy, resources, and industrials (ERI); financial services industry (FSI); life sciences and health care (LSHC); technology, media, and telecommunications (TMT); and government and public services (GPS).

Source: Deloitte's State of AI Quarterly Pulse survey; n = 1,982.

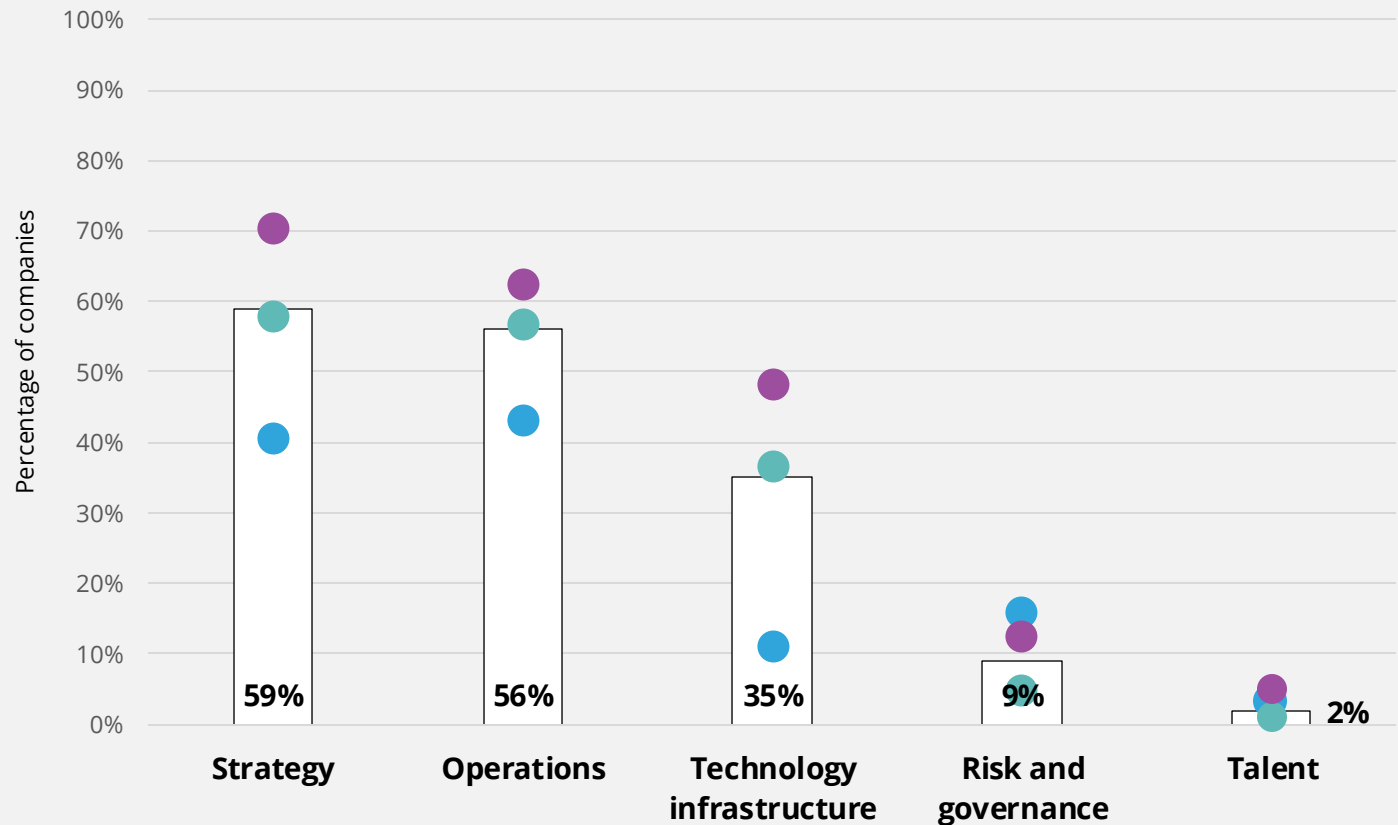
Large companies feel more prepared from strategy, operations and tech perspectives. Low confidence in risk and governance and talent is common across company sizes.

Only half of respondents with annual revenues over \$10 billion feel their technology infrastructure is ready for widespread gen AI adoption. But that is five times the share of companies that fall between \$500 million and \$999 million.

Percentage of companies rating their organization’s preparedness as “very high” or “high” in each function

Annual revenue

● Over \$10B ● \$1B to \$9B ● \$500M to \$999M ○ Overall



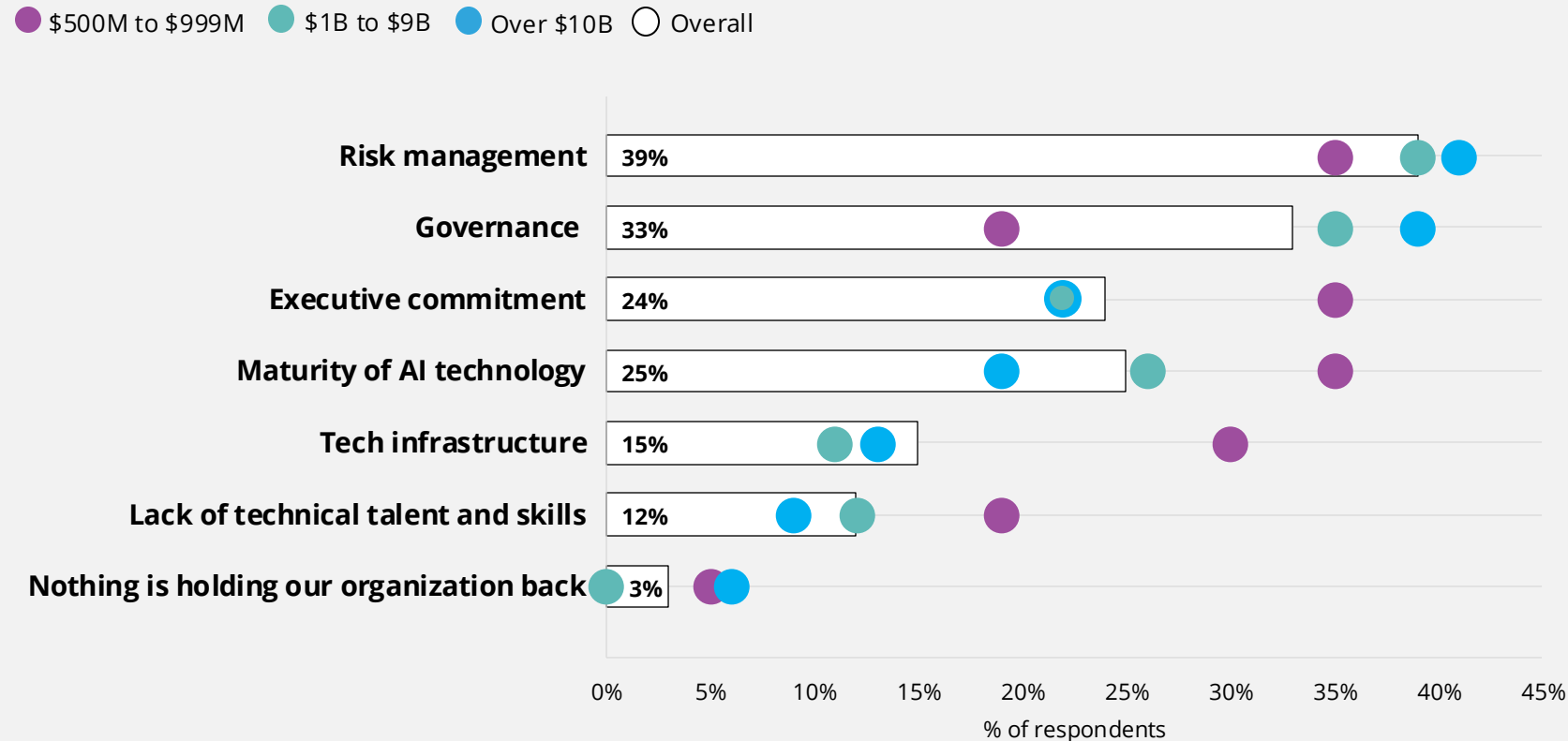
Question: Consider the following areas. For each, rate your organization’s level of preparedness with respect to broadly adopting generative AI tools/applications.

Notes: See slide 19 for findings on how leaders in gen AI adoption in the transportation sector report levels of preparedness across functions.

n = 210 transportation and supply chain executives.

Given low preparedness in risk management and governance, it is not surprising that these are the most widely reported barriers to gen AI deployment.

Biggest barriers: Nearly all respondents report something holding them back



Larger companies especially cite risk management and governance as barriers, while tech infrastructure and tech talent garner less concern.

For the smallest companies surveyed, executive commitment, maturity of AI technology, and tech infrastructure all stand out as bigger hurdles than for their peers whose revenue is over \$1 billion.

Questions: What, if anything, has most held your organization back in developing and deploying generative AI tools/applications? What challenges is your organization experiencing, or concerns do you foresee in using new types of data in generative AI initiatives? Please select all that apply.
 Note: n = 210 transportation and supply chain executives.

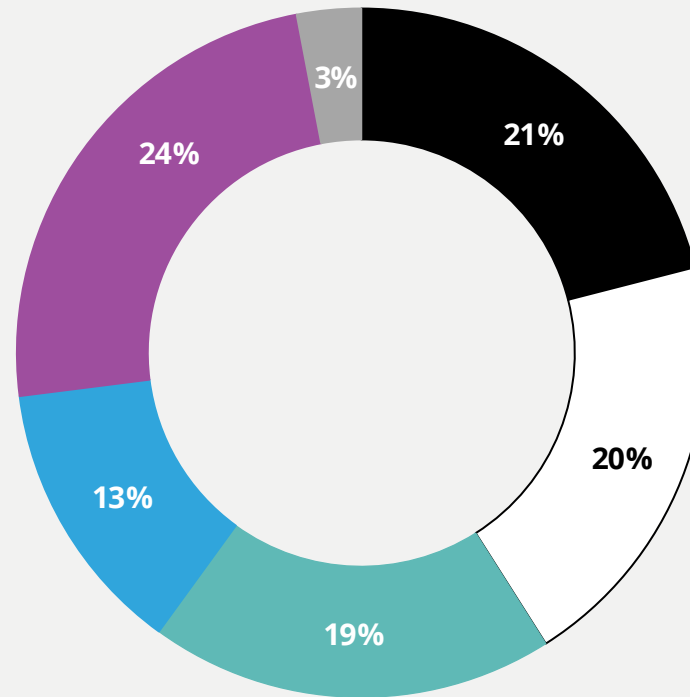
While there is no consensus on gen AI's biggest risk, four in 10 respondents say data-related concerns are primary.

Top gen AI-associated risk (percentage of companies)

- Unauthorized use of organizational data
- Misuse of client or customer data
- Rapid adoption causing unanticipated outcomes
- Intellectual property issues
- Other risks
- No concerns about potential gen AI risks

Other risks

Lack of confidence in results	7%
Noncompliance with regulations	6%
Lack of explainability and transparency	6%
Elimination of jobs due to automation	3%
Use of prohibited gen AI tools	2%



Question: Which of the following risks related to generative AI tools/applications is your organization most concerned about?

Note: n = 210 transportation and supply chain executives.

Overcoming challenges: Learning from leaders

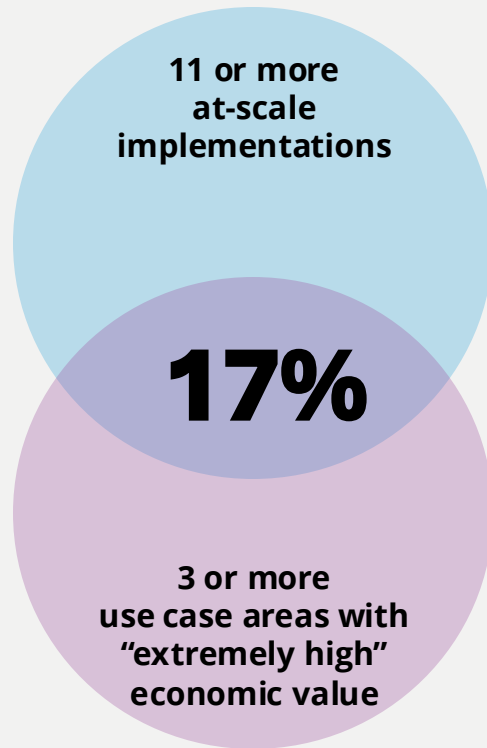
Despite the many challenges transportation companies face—from risk and governance to tech and talent—some transportation companies are finding early success around generative AI.

Leaders are not luminaries. They report some of the same gaps in functional readiness as everyone else and cite some of the same challenges and risks. But given their early success, there are lessons to learn from how they navigate.



Despite barriers, some are finding success with gen AI already. Transportation and logistics functions in retail and consumer products companies see much more success than traditional transportation players.

Defining leaders



Gen AI leaders were defined as transportation companies with 11 or more generative AI implementations, reporting high economic value in at least three use case areas.

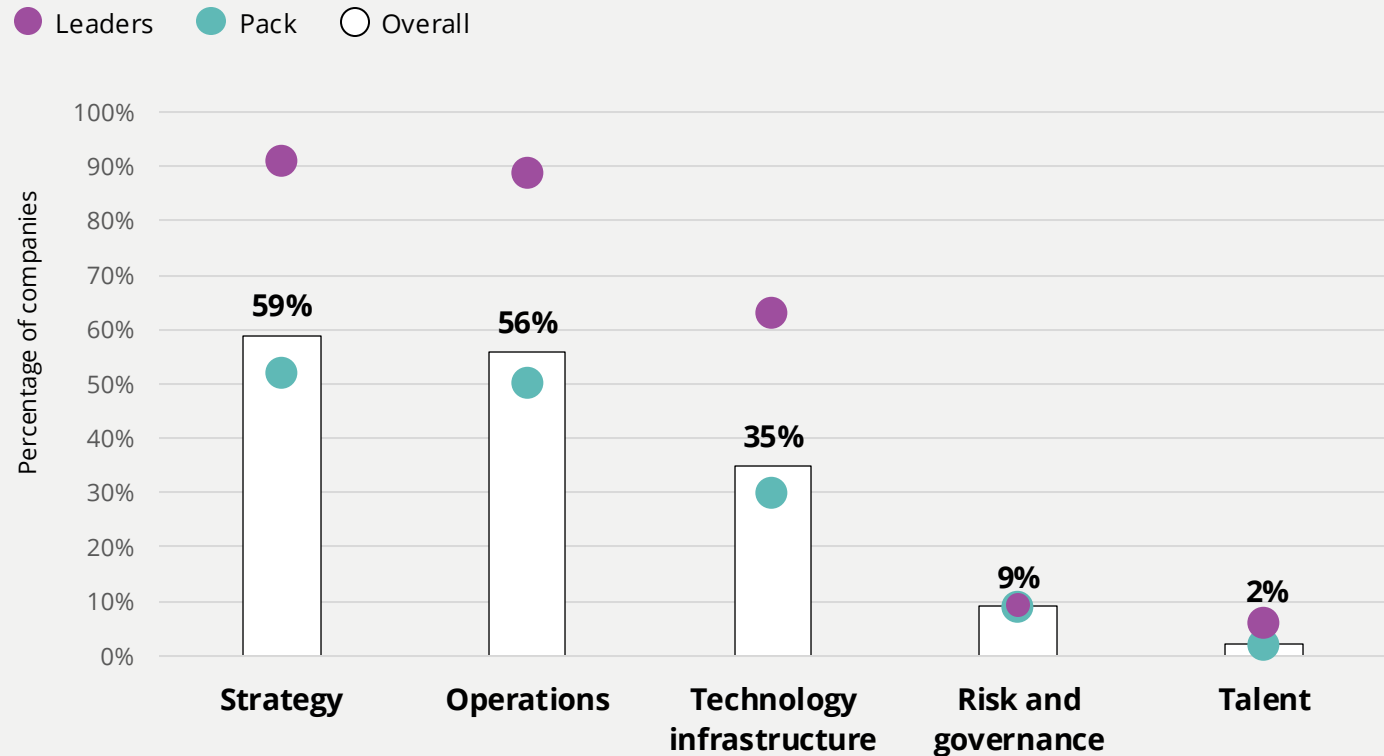
74% of gen AI leaders fell within retail, consumer products, or wholesale transportation and logistics.

Only **26%** are traditional transportation companies (that is, logistics providers, trucking, first-/middle-mile providers)

Note: n = 210 transportation and supply chain executives.

Functional preparedness for broad gen AI adoption: Leaders separate from the pack on strategy, operations, and tech infrastructure. In talent, risk, and governance, they report similar gaps as everyone else.

Percentage of companies rate their organization's preparedness as 'very high' or 'high' in each function



More than nine in 10 gen AI leaders feel their strategy and operations are ready for broad adoption of gen AI tools and applications. They may feel less confident about technology infrastructure, but still rate their preparedness significantly higher than the rest of the pack.

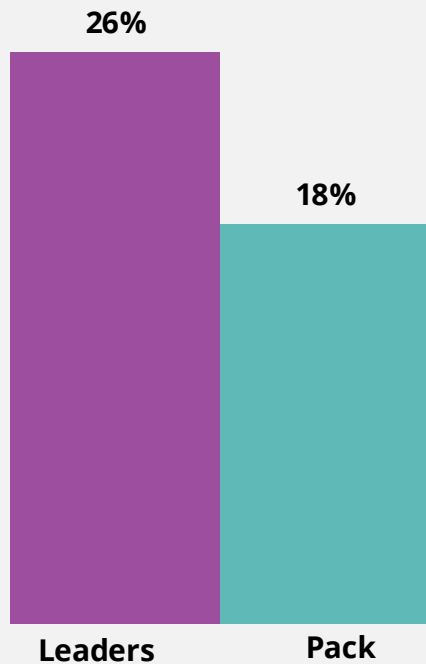
However, in risk and governance, only one in 10 leaders say their companies are prepared. **Almost nobody reports high preparedness for gen AI implementation from a talent perspective.**

Question: Consider the following areas. For each, rate your organization's level of preparedness with respect to broadly adopting generative AI tools/applications.
Note: n = 210 transportation and supply chain executives.

With talent being a universal challenge, leaders intend to address it sooner.

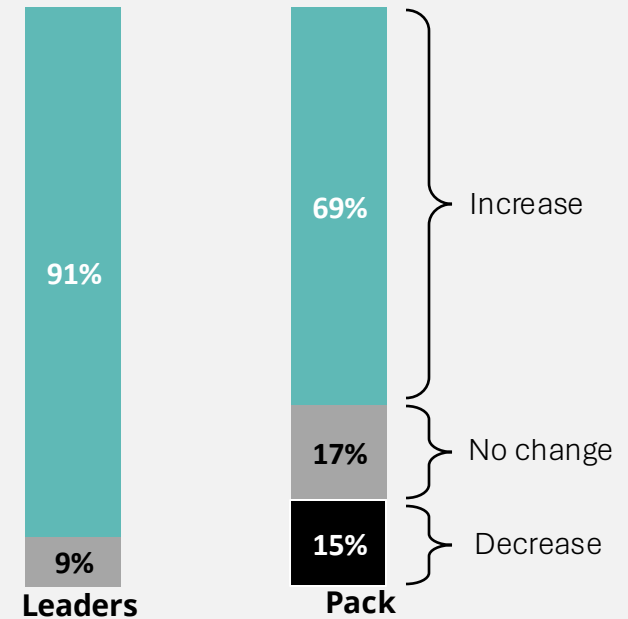
Most recognize the need for a new talent strategy due to gen AI, and **one in four** leaders expect that shift within a year

Share of respondents expecting to shift their talent strategy *within the next year* due to gen AI



How do you expect your organization's head count to change in the next 12 months because of gen AI?

Leaders also are significantly more likely to say they expect to *increase* head count because of gen AI.

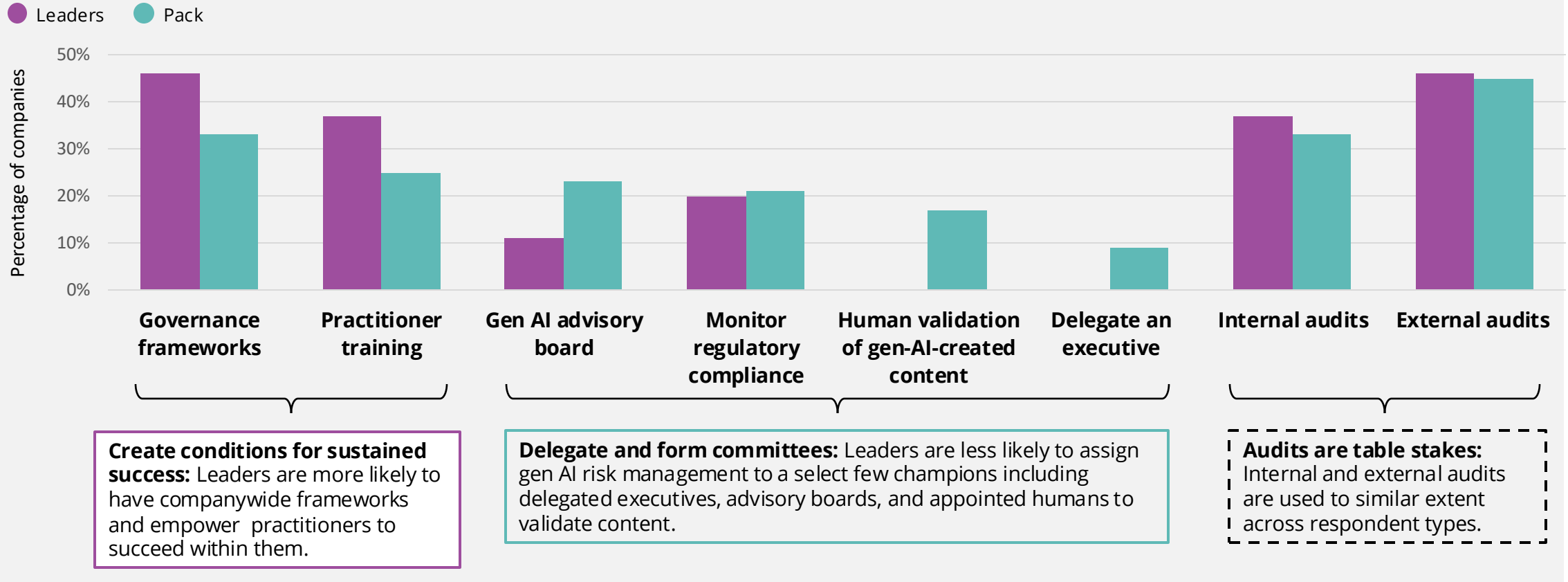


Questions: When do you expect to make changes to your talent strategies because of generative AI? Which of the following best describes the full-time employee head count change you anticipate will result over the next 12 months due to the implementation of your organization's generative AI strategy?

Notes: n = 210 transportation and supply chain executives; n = 186 transportation and supply chain executives with at least one gen AI implementation within their organization.

Leaders approach risks by setting up larger training and governing programs, while others are more likely to concentrate responsibility among a select few.

Risk mitigation tactics



Question: What is your organization currently doing to actively manage the risks around your generative AI implementations?

Note: n = 186 transportation and supply chain executives with at least one gen AI implementation within their organization.

Charting a powerful path forward ...

While the transportation industry has embraced gen AI technology, adoption remains shallow, with most efforts still in the proof-of-concept stage. Gen AI can be a powerful tool for leaders navigating a fast-changing industry environment marked by shifting trade flows, margin pressures, and increasing demand from shippers and regulators. As the technology matures across and beyond transportation, stakeholders will increasingly demand return on investment.

Our research indicates three key approaches that could help place a transportation company on the path to gen AI industry advantage:



Note: n = 186 transportation and supply chain executives with at least one gen AI implementation within their organization.

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