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Operations Practice

# Digital logistics: Technology race gathers momentum

A survey of more than 250 global shippers and logistics providers reveals that technology investments are set to increase, with numerous companies already piloting advanced use cases.

*This article is a collaborative effort by Sandy Gosling, Jason D. Li, Arsenio Martinez, Marcela Miguel, and Fernando Perez, representing views from McKinsey's Operations Practice.*

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**Turbulent market forces** are compelling companies to transform their logistics functions for greater flexibility, predictability, efficiency, and resilience. A new McKinsey survey of more than 250 logistics leaders, representing both shippers and providers, confirms that companies are increasingly turning to technology to solve their many challenges.[1]

The survey's most important message is that now is the time to invest in logistics technology. Even under difficult market conditions, most respondents said their companies have sustained or grown their technology investments since 2020. That leaves laggards with less and less room to maneuver.

Yet for shippers and providers alike, the technology landscape has become increasingly complex and crowded. Companies face questions about not only what value they expect from a technology but also how that technology will fit into their enterprise-level technology landscape, their day-to-day operating models, and their underlying logistics processes. Data and technology integration is typically required as well.

The survey shows that both shippers and providers are moving beyond foundational technology and turning to leading-edge solutions to gain or maintain a competitive advantage. Moreover, the results highlight substantial common ground between shippers and providers, implying that closer collaboration could unlock new solutions to shared challenges.

Together, the survey findings suggest that if a company isn't reimagining the way it works in conjunction with technology—all while building newer breakthrough capabilities—achieving the expected ROI from technology commitments may become harder than ever.

## Shippers and providers share common pain points

Shippers and providers continue to face challenges in their operating environment: namely cost management and labor shortages. Cost management, driver management, and productivity improvement were the top three pain points reported in transportation. In warehousing, survey respondents identified labor management, productivity improvement, and performance management as the most pressing issues (Exhibit 1).

Interestingly, the pain points for shippers and providers are similar—and, in some cases, they affect providers more acutely. In the short term, driver and staffing shortages are not expected to significantly improve; however, shippers and providers have an opportunity to address other shared challenges, particularly wherever they can coordinate and complement each other's capabilities. This could lead to improved efficiency, reduced costs, and increased customer satisfaction for both parties.

Unsurprisingly, logistics companies are turning to technology to reduce costs and improve productivity in transportation and warehousing. Tools that support real-time transportation, visibility planning, and telematics for fleet management are seeing above-average adoption and investment rates.

As companies plan their future investments, they can shape their decisions around the solutions that will address their top challenges and help them develop or sustain a competitive advantage, while also building internal capabilities to ensure sustainable change.

## Technology investments continue to grow

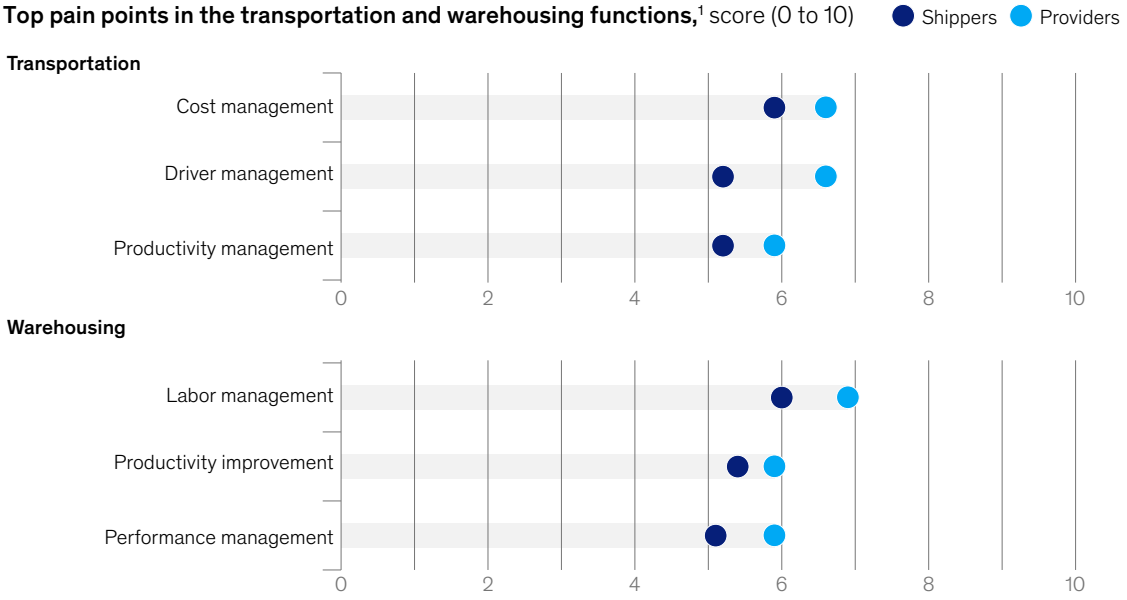
Both shippers and providers have grown their investments in digital logistics since 2020, across all technologies (see sidebar, "The transformational power of digital logistics"). Some 87 percent of shippers reported maintaining or growing their technology investments since 2020, and 93 percent said they plan to maintain or increase their spending over the next three years (Exhibit 2).

[1] 2023 McKinsey Logistics Survey, conducted May 5–20, 2023 (n = 258).

Exhibit 1

## Cost management and labor remain top pain points for shippers and providers.

**Top pain points in the transportation and warehousing functions,**[1] score (0 to 10)




[1]Ranked by shippers' and providers' average pain point ratings. Ratings range from 0 ("Not at all a pain") to 10 ("Critically impacting our business daily").
Source: McKinsey Logistics Survey, conducted with 258 respondents (220 shippers, 38 providers), May 5–20, 2023

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## The transformational power of digital logistics

**Expanding digital** logistics capabilities can generate significant value with regard to cost and service delivery, boosting operational performance, sustainability, customer satisfaction—and revenue in some cases.

On the operations side, digital tools are optimizing logistics across planning, execution, and settlement. Leading logistics players are already seeing performance improvements of 10 to 20 percent in the short term, and 20 to 40 percent within two to four years.

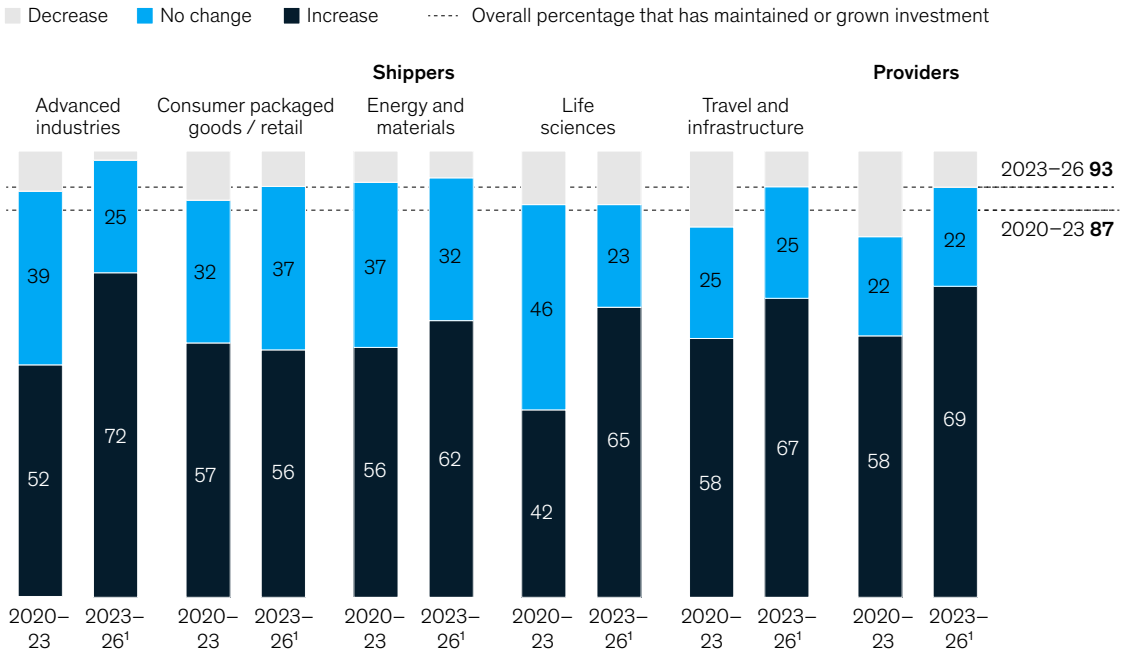
By integrating resilience into core business decision making through digital logistics tools, businesses can derisk their EBITDA by up to 60 percent and boost company valuations by up to 20 percent, as customers increasingly show preference for companies boasting green-shipping credentials and stable service levels.

In tandem, carriers and warehouse providers can often see revenue uplift of 5 to 10 percent within two years of a successful transformation, thanks to efforts like pricing optimization, tailored value propositions at the customer level, and integrated omnichannel sales and customer service.

Exhibit 2

## Investment in digital logistics has been strong across all sectors, and this trend is expected to continue.

**Actual and expected investment in logistics technology type and shipping sector,**[1] % of respondents




Note: Figures may not sum to 100%, because of rounding.
[1]Expected change in investment in logistics technology by 2026 by respondent type and sector.
Source: McKinsey Logistics Survey, conducted with 258 respondents (220 shippers, 38 providers), May 5–20, 2023

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## Foundational technologies achieve mainstream adoption

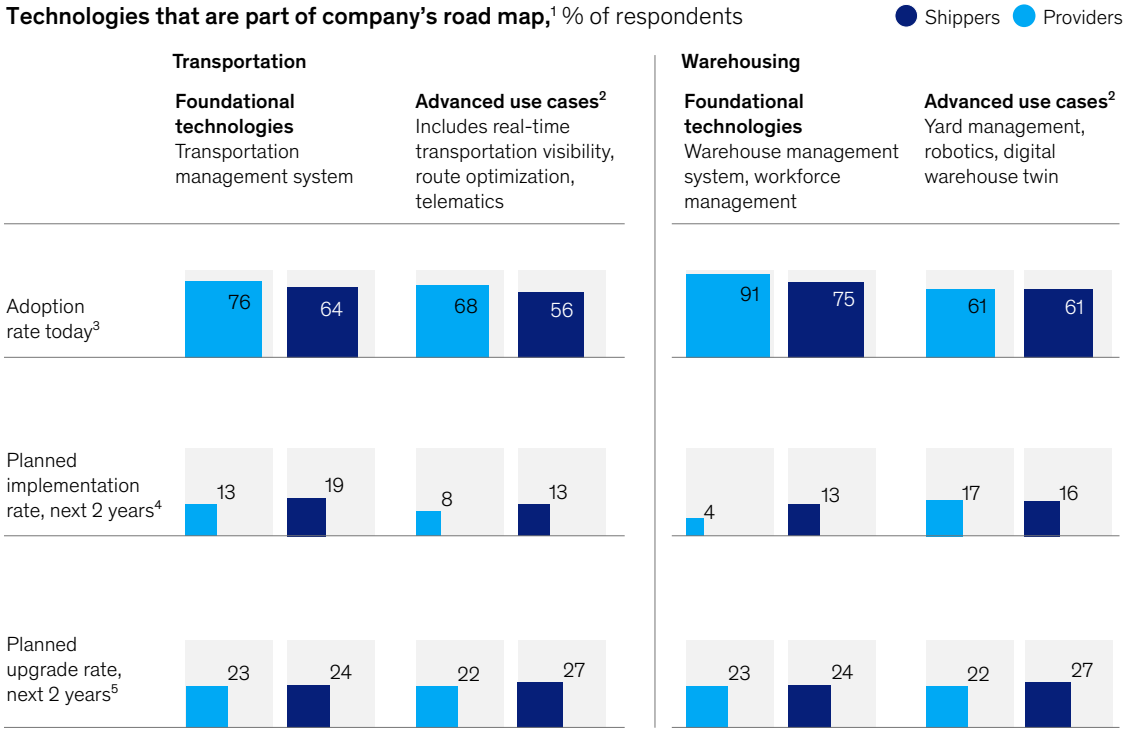
Providers have been leading in investment over the past few years, showing higher adoption rates across both transportation and warehousing technologies. But shipper companies are planning to close the gap, reporting strong investment plans for the next two years (Exhibit 3).

The survey also reveals that foundational technologies like warehouse management systems and transportation management systems are now mainstream. Companies that have not invested in these systems could be at risk of falling behind their competitors.

Exhibit 3

## Shippers lag behind providers in technology adoption but are closing the gap with planned investment.

**Technologies that are part of company's road map,**[1] % of respondents




Note: Figures may not sum to 100% because of overlap between categories.
[1]Question: Which of the following technologies are part of your company's road map? [2]Average metric (adoption, implementation, upgrade rate) across advanced use cases surveyed. [3]Percentage of respondents who are using the technology today and those who plan to upgrade in the next 2 years. [4]Percentage of respondents who do not have the technology but plan to implement it in the next 2 years. [5]Percentage of respondents who plan to upgrade the technology in the next 2 years.
Source: McKinsey Logistics Survey, conducted with 258 respondents (220 shippers, 38 providers), May 5–20, 2023

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## Shippers and providers are moving beyond foundational technology

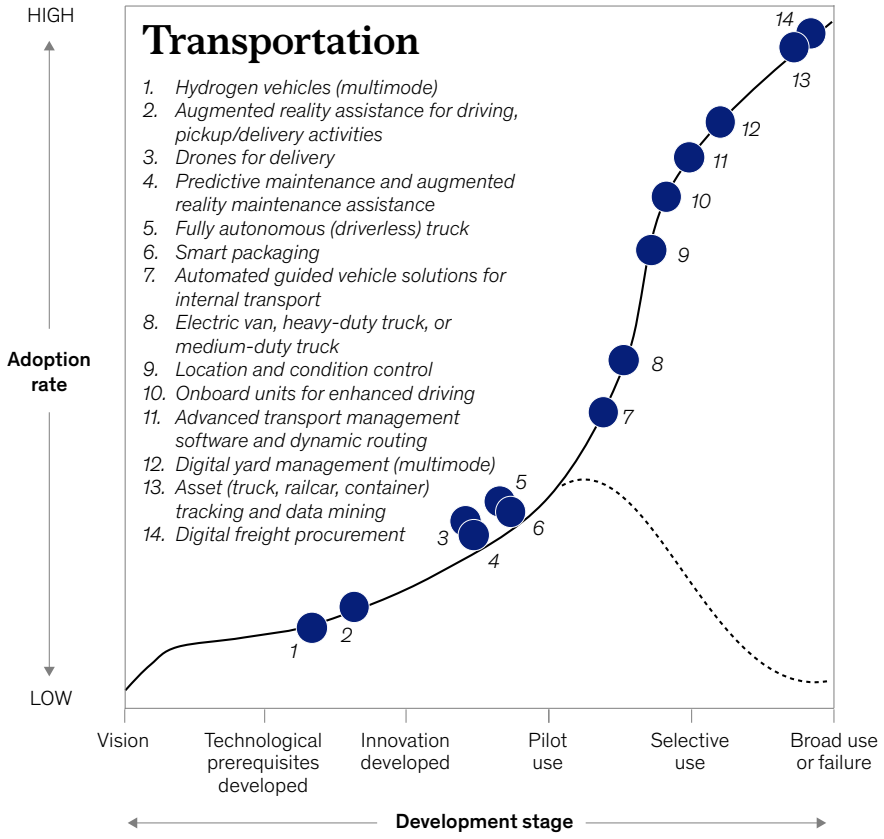
With foundational technology adoption now commonplace, the next frontier of productivity could come from leading-edge solutions, such as robotics, network digital twins, and real-time insights.

As the technology landscape matures, shippers and providers can assess where they are in their transformation journeys in relation to the wider logistics sector to identify which capabilities and technologies will make the difference (Exhibit 4). The multitude of use cases makes it challenging for companies to know which ones to invest in and how best to ensure value capture, particularly if there's a relatively innovative use case that has not been widely adopted.

Exhibit 4a

## Tech-enabled use cases are changing the future of logistics, but they are at various stages on the innovation curve.

**Technology solutions,[1] by development stage and adoption rate,** expert assessment (illustrative)




[1]List not exhaustive.

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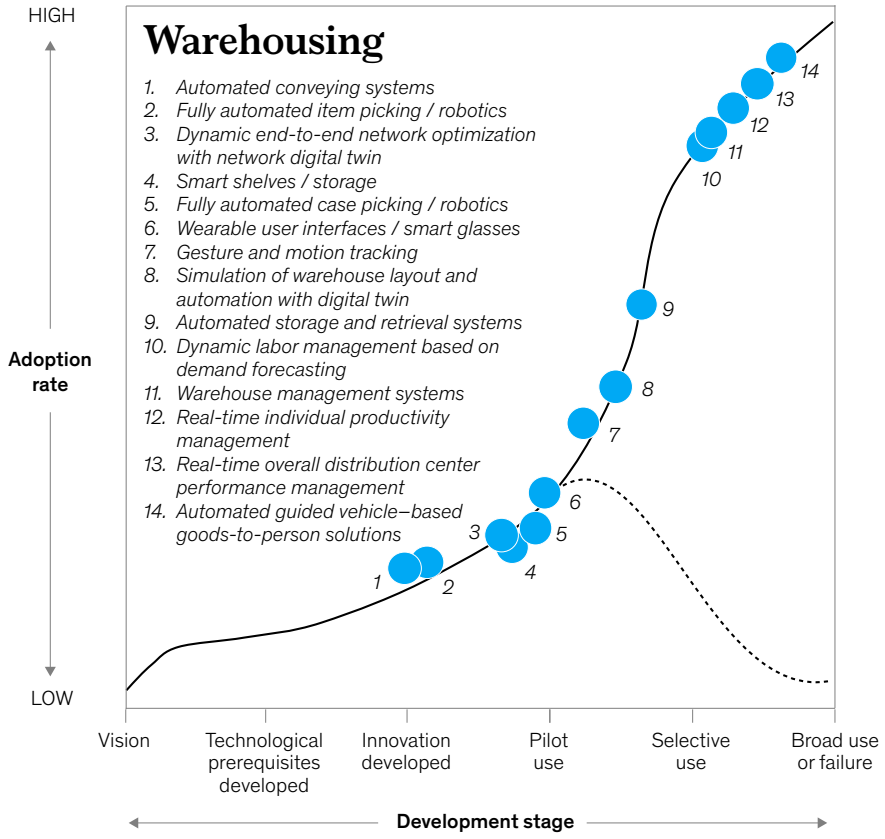
In transportation, digital freight procurement (14) and asset tracking and data mining (13) are in broad use. Automated guided vehicles (AGVs) for internal transport (7), enhanced driving solutions (10), and digital yard management (12) are starting to scale up. Cutting-edge technologies, such as delivery drones (3) and hydrogen vehicles (1), are at much earlier stages of development.

Exhibit 4b

## Tech-enabled use cases are changing the future of logistics, but they are at various stages on the innovation curve.

**Technology solutions,[1] by development stage and adoption rate,** expert assessment (illustrative)




[1]List not exhaustive.

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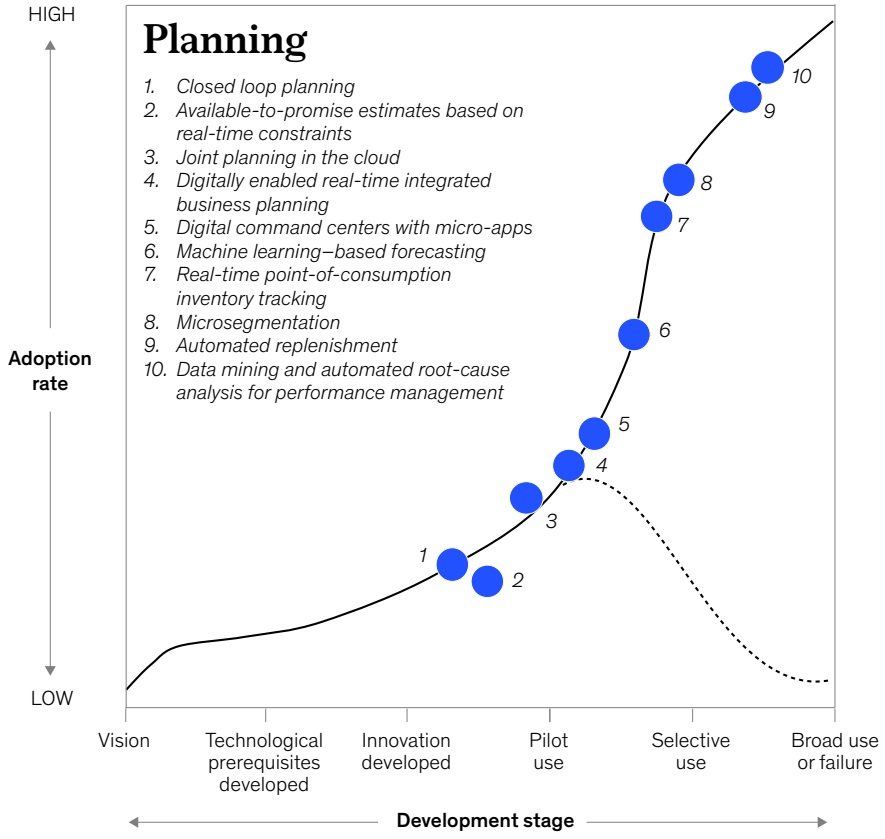
A cluster of warehousing technologies, including real-time distribution center performance management (13), AGV-based goods-to-person solutions (14), and warehouse management systems (11), are already in (or nearing) broad use. Digital warehouse twins (8), dynamic labor management (10), and gesture and motion tracking (7) have proven themselves in piloting, while fully automated item picking (2), network digital twins (3), and smart shelves (4) are demonstrating feasibility.

Exhibit 4c

## Tech-enabled use cases are changing the future of logistics, but they are at various stages on the innovation curve.

**Technology solutions,[1] by development stage and adoption rate,** expert assessment (illustrative)




[1]List not exhaustive.

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In planning, technologies in wide use include automated replenishment (9) and data mining and automated root-cause analysis for performance management (10). Machine learning–based forecasting (6) and microsegmentation (8) are now in selective use.

Digital command centers with micro-apps (5), which are moving out of the pilot stage, enable oversight of the entire logistics system: transportation, warehousing, and planning, all in one place.

## The technology landscape is increasingly complex

As well as having to select the right use cases and navigate an increasingly complex landscape, shippers and providers are under pressure to ensure seamless integration of their numerous transportation and warehousing solutions. A plurality of providers (34 percent) now have as many as eight or nine different technology solutions in their transportation tech stacks, and 37 percent have five or more solutions in warehousing (Exhibit 5).

With the logistics technology landscape becoming increasingly complex, effective integration of data flows and complexity management will be critical to achieving optimal performance and ROI.

## Cost and change management continue to prove difficult

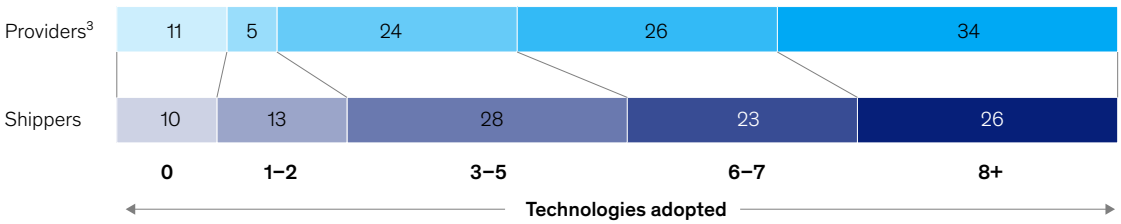
Integrating and embedding new technologies is not easy, and most companies called out ROI, change management, and training as the main challenges they face when implementing new solutions. Around 68 percent of shippers and 80 percent of providers cited cost as the biggest challenge for transportation transformations; for warehousing, a majority of shippers and providers also cited cost (Exhibit 6).

Exhibit 5

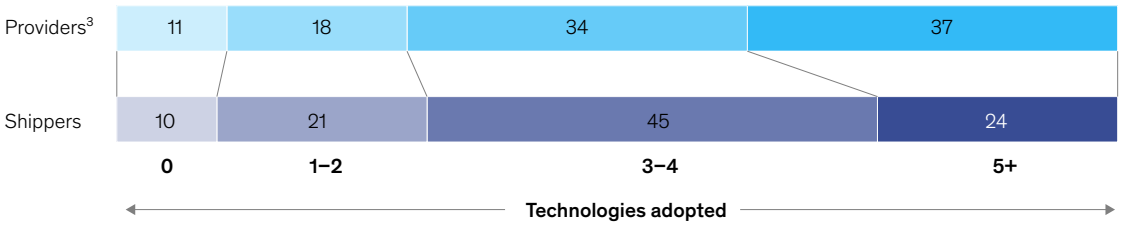
### Shippers and providers already have complex tech stacks, making integration and complexity management critical.

**Comparison of shippers and providers on technology adoption,**[1] number of adopted technologies

**Share of transportation technologies,**[2] % of respondents in each range




**Share of warehousing technologies,**[4] % of respondents in each range




[1]Respondents whose organizations either use the technology today or plan to upgrade to it in the next 2 years.
[2]Out of 9 total listed.
[3]Adoption rates are based on either transportation-focused providers or warehouse-focused providers, depending on technology type.
[4]Out of 5 total listed.
Source: McKinsey Logistics Survey, conducted with 258 respondents (220 shippers, 38 providers), May 5–20, 2023

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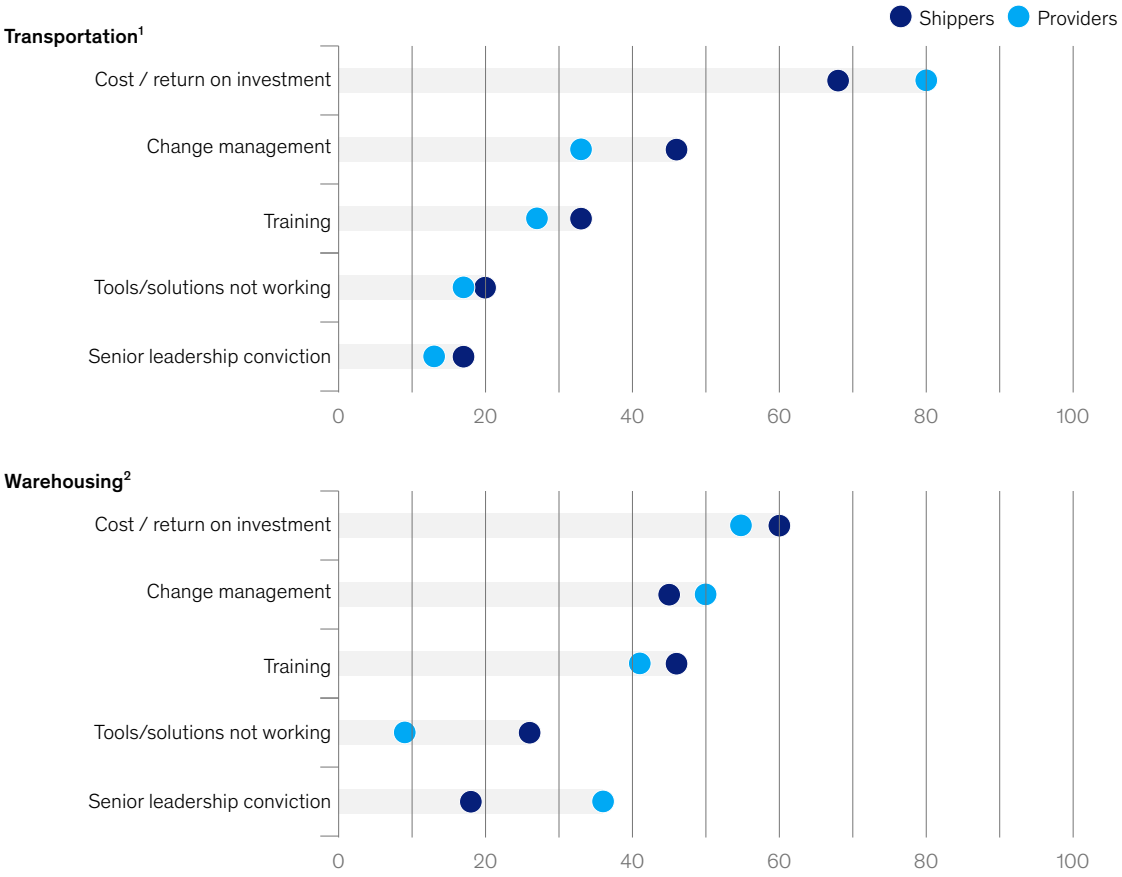
Exhibit 6

## Both shippers and providers struggle with returns on investment, change management, and training.

**Biggest challenges implementing digital logistics in transportation and warehousing,** % of respondents




[1]For providers: includes respondents who selected sectors that relate to transportation (multiple responses allowed): 3PL (air, ground, multimodal, ocean, rail), freight forwarder/broker, parcel; 4PL, distributor, logistics labor outsourcing.
[2]For providers: includes respondents who selected sectors that relate to warehousing (multiple responses allowed): 3PL/warehousing, warehousing lessor; 4PL, distributor, logistics labor outsourcing.
Source: McKinsey Logistics Survey, conducted with 258 respondents (220 shippers, 38 providers), May 5–20, 2023

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To get ahead in the digital logistics race, companies need to understand not only where to invest but also how to transform their operating models through a multipronged approach that encompasses the following:

— creating a vision of the future state, including the from–to transformations needed in processes, systems, and capabilities

— building capabilities to scale and sustain specific use cases across business units

— developing change management programs and defining new ways of working to achieve a high-performing organization

— getting the right systems and data infrastructure in place to support new technology

— adapting processes with an eye toward value to ensure chosen solutions are sustainable and scalable

— measuring regularly and adapting early, with real-time performance management and decision-making support

— conducting proof of concept sprints to iterate and learn

By investing in digital logistics technology—and the operating model changes needed to embed it and capture value—shippers and providers can harness the competitive advantage increasingly needed to outperform under tough market conditions. As the digital logistics technology race gathers pace, foundational technology is becoming the absolute minimum needed to remain competitive. Those providers and shippers that go beyond their competitors to integrate leading-edge solutions into their tech stacks could be the ones that pull ahead of the pack.

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