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SKYCELL

LogiPharma

The **AI** Report 2024

WBR INSIGHTS

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Methodology

Despite the surging interest in AI within the life sciences supply chain, the industry lacks a clear understanding of AI's current capabilities and its potential to drive efficiency. This knowledge gap hinders the development of tangible solutions.

As a result, WBR Insights surveyed 100 supply chain leaders from various organisations in Q2 of 2024 to unpack the top challenges when integrating AI and innovative solutions to unlock the full potential of new technology.

The survey was conducted by appointment over the telephone. The results were compiled and anonymised by WBR Insights and are presented here with analysis and commentary by TraceLink, SkyCell and the LogiPharma community.

The WBR Insights topics detailed in this report will also be covered in the LogiPharma event: download the agenda **here**.

Which of the following best describes your job title?

Director of Supply Chain	**25%**
Director/Head of Logistics	**20%**
Global Head of Supply Chain	**15%**
Director/Head of Planning	**10%**
Director/Head/VP of Temperature Controlled Logistics/Supply Chain	**10%**
Director of Quality	**5%**
Director of IT	**5%**
Director/Head/VP of Temperature Cool Chain/Cold Chain	**5%**
Head of Business Processes	**5%**

Where is your organisation located?

Switzerland	**25%**
United Kingdom	**20%**
Germany	**20%**
Nordics (Denmark, Finland, Norway, Sweden)	**10%**
Belgium	**5%**
Netherlands	**5%**
Austria	**5%**
France	**5%**
United States and Canada	**5%**

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Key Findings

Beyond the Hype

Artificial intelligence (AI) has rapidly ascended from a niche technology to a boardroom imperative, fuelled by the rise of generative AI platforms. This evolution has sparked widespread interest regardless of industry or position. In fact, over half of supply chain leaders (51%) expect to see a return on investment in AI and machine learning (ML) initiatives in just 2-3 years. With AI so prominent in boardroom conversations, people are beginning to ask, is AI worth the hype?

Smarter Inventory, Greater Visibility

Excitement for AI continues grow and organisations are eager to understand its potential impact on their supply chains. Inventory management and optimisation emerged as the top priority for AI investment, closely followed by supply chain visibility and traceability. While concerns about AI's potential to replace jobs persist, our findings suggest its primary role could enhance operational efficiency and provide valuable insights, empowering workers to perform their tasks more effectively and with greater accuracy.

Planning for Progress

As digitalisation accelerates, 44% of our survey respondents report that their current strategy is focused on planning improvements or optimisations. The finding highlights the growing emphasis on refining processes to avoid common digital transformation pitfalls. This trend showcases a growing commitment to enhancing digital capabilities while also indicating that many are not yet fully mature in their digital efforts.

Revolutionalising with Purpose

The AI revolution is well underway, and developments go hand in hand with the industry's commitment to drive forward sustainability initiatives and a greener future. Tellingly, 52% of respondents revealed they use dedicated emissions calculation and reporting tools to report sustainability metrics for the pharma cold chain. This trend underscores the growing integration of technology to not only comply with regulatory demands but also to align with global sustainability goals.

Connecting the Dots

Innovation is not free of challenges. When asked about the biggest challenges supply chain leaders face in establishing credibility and control over their pharma cold chain, 55% identified disparate systems and data silos across partners as the primary issue. This finding underscores the importance of breaking down silos and improving data integration to enhance cold chain management, maintain drug efficacy, and meet regulatory standards.

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Unlocking the Value of AI in Supply Chain - Accessibility for Partners is the Key

Artificial Intelligence (AI) holds tremendous promise to rapidly transform how businesses approach supply management, production visibility, inventory optimisation, logistics orchestration, and the ability to serve customers at predictable and expanding margins. But, as businesses increasingly adopt AI strategies to drive efficiencies, one critical factor remains at the heart of success: the availability, quality, and recency of data that is cooperatively sourced from a company's end-to-end supply chain partners.

AI thrives – but is also fully dependent on – massive amounts of data for training algorithms and large language models. The insights AI can deliver – whether for demand forecasting, risk mitigation, supply chain optimisation, or a myriad of other use cases – are only as reliable as the data fed into it. Consequently, a robust AI-driven supply chain relies not only on advanced algorithms, but also on the richness, accuracy, and timeliness of the data available for continuous training and improvement in learning. So what is the business imperative?

Organisations that are first to fully embrace their reliance on partners' information exchange to fuel AI will be the leaders in modern supply chain network design. Instead of thinking "inside out" with an initial focus on enterprise systems, organisations will prioritise the availability of multi-modal, high-accessibility tools that enable flexible partner data sharing as a foundation of their digitalisation strategy.

Data Will Fuel Supply Chain AI - But Only If It's Clean, Real-Time, and End-to-End

For supply chain leaders, as well as the IT and business technology experts that support them, the cold, hard truth is clear: 90%+ of the data required for AI-driven innovation is not sitting in any internal enterprise resource planning (ERP) system, advanced planning, inventory management, or similar enterprise system. Instead, the required multi-enterprise data is flowing through systems, spreadsheets, and emails of suppliers, contract manufacturers, contract packagers, logistics service providers, and customers. But how can this data be unlocked in a scalable, democratised fashion that trading partners will embrace?

TraceLink is recognized as a pioneer and leading provider of track-and-trace orchestration solutions the requirements of pharmaceutical and medical device manufacturers, contract manufacturers, wholesale dispensers, retail pharmacies, and health systems. For more than 15 years, the company has been singularly focused on developing the most accessible, flexible, and scalable digital business network on the market so that hundreds of thousands of organisations – including many that do not possess mature enterprise systems – could be verified, digitally onboarded, and enabled to share data with trading partners in compliance with the governmental regulatory requirements.

How did TraceLink manage to onboard and engage 290,000+ trading partners that now transact on more than 250 billion uniquely serialised products? The secret ultimately resides in developing a scalable platform approach which does not embrace a single method of integration and information exchange, but instead welcomes and encourages any and all possible ways that an organisation could think of to share data.

How to Democratise Access to End-to-End Digitalisation and Partner Orchestration

AI's full potential in supply chains can only be truly realised when organisations move beyond isolated data silos to establish interoperable, end-to-end digital networks. But how can supply chain leaders and IT professionals identify a true digital network from point-to-point integration hubs or portals masquerading as networks?

After years of multi-enterprise solution and network development experience, the following capabilities emerged as the minimum requirements for creating a fully accessible environment that enables 100% of a company's trading partners to network on their own terms:

- **Common Network Data Model and Metadata-Driven Platform:** For leaders that want to execute on an AI-driven supply chain strategy rapidly, any delays created by the need for data cleansing are unacceptable. Instead, all orchestration data must be represented by underlying metadata as part of a shared, network-wide metadata model – this is the basis for an AI-ready supply chain strategy.
- **No-Code Solution Configuration:** No-code design environment to enable business users that do not possess deep technical expertise to configure complex business transactions and multi-enterprise solutions with flexible user experiences and workflows that partners can embrace.
- **Universal Integration:** B2N Integrate-Once™ model that enables a company to choose its own integration formats (e.g. API, B2B, EDI, or even a universal user interface [UI]) and still remain interoperable with different independent choices made by each individual member of their trading partner network.
- **Comprehensive Business Transaction Catalogue:** End-to-end supply chain digitalisation is only possible if every business process can be transacted, enabling leaders across any function (i.e. Procurement, Supply Management, Logistics, Transportation, Clinical, Commerce, etc.) to participate.
- **Integrated Supply Chain Reports and Dashboards:** Users must have a complete view of end-to-end transactions and supply chain business processes in a single location to enable comprehensive visibility.

With these capabilities fully enabled on a no-code network digitalisation platform, end-to-end, intelligent supply chain orchestration finally becomes viable – and with it, the ability to collect the valuable training data required to fuel proprietary AI strategies.

The Future of AI in Supply Chains

As supply chains become increasingly complex, the role of AI will continue to evolve. Businesses will move from predictive AI models, which help them anticipate challenges, to more advanced generative AI (and agentic AI), which can simulate various scenarios and provide recommendations in real-time. However, this shift will only be successful if organisations focus on improving data quality and collaboration across their networks.

AI is already driving significant improvements in inventory management, risk mitigation, and compliance. However, the path to more sophisticated AI tools depends on data standardisation and expanding collaboration across partners. Businesses that invest in developing their digital supply chain networks and building real-time data assets will reap the greatest benefits. Ultimately, a linked, comprehensive, and data-rich network is the foundation for unlocking AI's full potential in supply chain management.

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Using Technology to Drive Sustainability and Visibility

Sustainability and visibility are two of the most pressing challenges for the modern pharma supply chain. Rising regulations and carbon costs make sustainability essential, but it relies on accurate data. Without reliable tracking, sustainability efforts can become guesswork, missing chances to cut emissions.

Since its introduction by SkyCell at LogiPharma 2024, the Total Cost of Ownership (TCO) formula has gained industry-wide adoption, reshaping how TCO is considered for shipments. Traditionally, this focus was on balancing cost and risk. Now, pharma companies must also consider emissions in this delicate equation.

Factoring in emissions alongside cost and risk makes accurate tracking crucial for operational efficiency, and long-term sustainability. Without the right tools to monitor carbon footprints and supply chain operations, companies risk missing critical opportunities to cut emissions and optimize processes.

How Accurate is Your Carbon Reporting?

Tracking CO_2e emissions is becoming a standard practice across the pharmaceutical supply chain, yet accuracy is often overlooked. Current reporting frameworks such as ISO standards and GLEC, can lead to significant underreporting of CO_2 emissions. For instance, they primarily account for weight and neglect volumetric factors—meaning a plane filled with feathers could report almost zero emissions.

This lack of precision can lead to underestimating carbon emissions and costs, forcing companies to manually adjust their reported data to account for inaccuracies. Such manual interventions add complexity, increase the risk of errors, and highlight a systemic issue that needs to be addressed.

To overcome this challenge, frameworks like MIT incorporate volumetric weight, making them more accurate for pharmaceutical logistics, which often involve high-volume but lower-density shipments. Equally important is factoring in the weight of ULDs, currently not included in emissions calculations by ISO standards and the GLEC framework. For example, an RKN container typically weighs 635 kg, but this weight is consistently excluded, leading to significant underreporting of CO_2 emissions.

The Visibility Gap: Connecting Data to Sustainability

Fragmented data and lack of visibility make it impossible for pharma companies and their supply chain partners to take timely, effective action when issues arise. Disconnected systems and poor data collection hinder a clear and accurate view of the supply chain, leading to inefficiencies, delays, and product loss.

The issue is clear: without real-time visibility into the true state of operations, companies cannot effectively identify or resolve problems. Improved visibility addresses these blind spots, creating opportunities to enhance both operational efficiency and sustainability efforts simultaneously - achieving both goals with one solution.

Lead with Data and Technology

To stay ahead, pharma companies must adopt advanced technologies to accurately measure, report, and control CO_2e emissions. Recognizing the importance of precise tracking and reporting for both sustainability and operational success is key to driving meaningful change.

That's why we've launched DECARBONIZE, a free, self-service CO_2e reporting tool based on research from MIT's Center for Transportation and Logistics (MIT CTL). DECARBONIZE allows users to independently track and reduce CO_2e in their supply chain using the latest methodology. For those seeking additional support, we offer services to help pharma supply chain companies implement these methodologies and achieve their sustainability goals.

The tool is now available to be used for **FREE**. Sign-up here:

Harness AI and Automation for Supply Chain Control

SkyCell's platform, SkyMind, leverages AI, automation, and data analytics to bridge the visibility gap in the pharma supply chain. By integrating digital twins, track-and-trace systems, geo-fencing, and smart loggers, companies gain real-time insights for risk management, route optimization, and CO_2e reduction.

With accurate, real-time visibility, pharma companies can make informed decisions that align with their sustainability goals. SkyCell's unified approach automates processes, lowers costs, mitigates risks, and helps reduce emissions across the entire supply chain - giving businesses a competitive edge.

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Chapter One
Navigating the AI investment roadmap
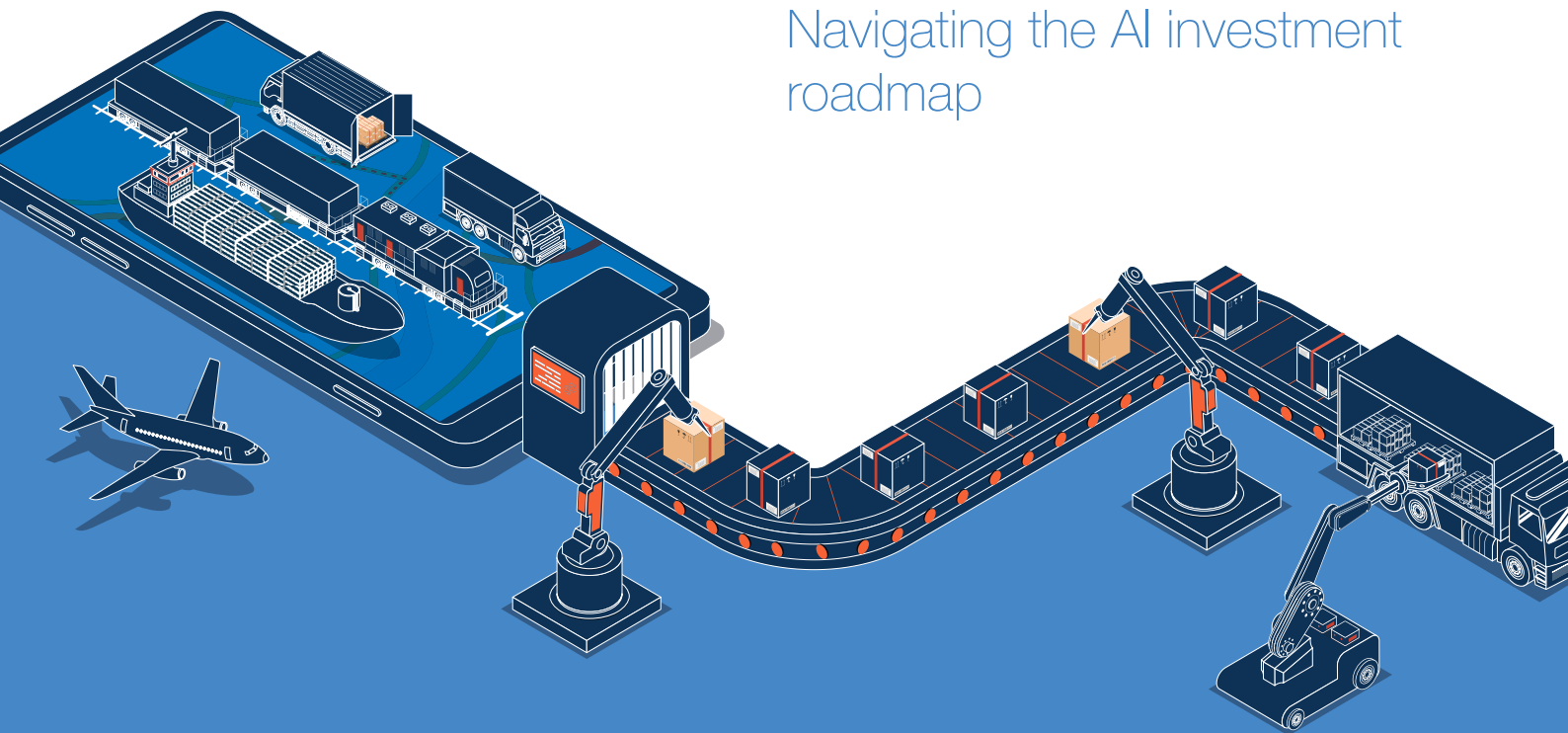
The life sciences supply chain industry stands at the cusp of a transformative era, with AI and ML poised to revolutionise operations. As we delve into the current state of AI adoption in this sector, our survey of 100 supply chain leaders provides crucial insights into the challenges and opportunities that lie ahead.

Our findings show that AI and ML investments in pharma supply chains are strategically focused. Inventory management and optimisation emerged as the primary area of investment, with 40% of respondents identifying it as a top priority.

This is closely followed by supply chain risk management, indicating a clear trend towards using AI to enhance efficiency and resilience in pharmaceutical supply chains. These priorities reflect the industry's need to balance cost-effectiveness with the critical requirement of maintaining uninterrupted supply in a sector where stockouts can have life-threatening consequences.

However, the path to AI integration is not without obstacles. Supply chain leaders are candid about the challenges they face, with the cost of integration, the need for extensive team training, and overall implementation expenses topping the list of
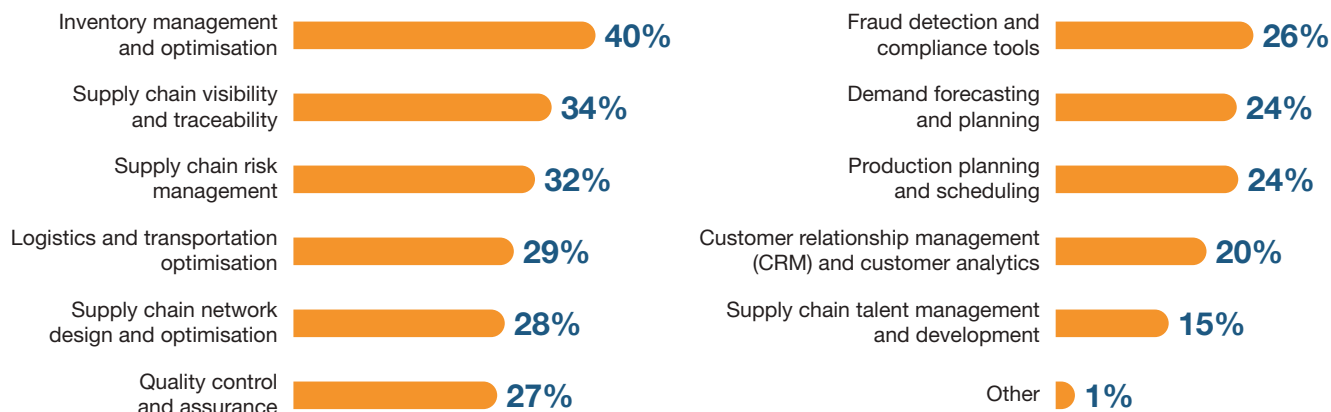
concerns. These hurdles underscore the significant upfront investment required to leverage AI effectively in supply chain operations. Despite these challenges, there is a strong belief in the long-term value of AI initiatives. More than half of our respondents (51%) expect a return on investment (ROI) within 2-3 years, suggesting a willingness to weather short-term difficulties for long-term gains.

This realistic outlook on AI adoption in pharma supply chains paints a picture of an industry that is cautiously optimistic. While recognising AI's potential to transform operations, particularly in critical areas like inventory management and risk mitigation, leaders are also pragmatic about the implementation challenges and the timeline for realising benefits.

This balanced approach indicates that the pharmaceutical supply chain sector is moving beyond the hype cycle, focusing on the practical, value-driven applications of AI that can deliver tangible improvements to their operations.

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What are the primary areas of investment for AI and ML in your organisation?
Respondents were asked to select their top three options

Area	%
Inventory management and optimisation	40%
Supply chain visibility and traceability	34%
Supply chain risk management	32%
Logistics and transportation optimisation	29%
Supply chain network design and optimisation	28%
Quality control and assurance	27%
Fraud detection and compliance tools	26%
Demand forecasting and planning	24%
Production planning and scheduling	24%
Customer relationship management (CRM) and customer analytics	20%
Supply chain talent management and development	15%
Other	1%

> Looking at this result, it is clear that the industry is going in the right direction. It is about forecasting, it's about inventory management and it's about optimisation of what you are purchasing.

> The point is, however, that for AI it's not one or the other, to get the most out of this tech, it has to be a mix.

Stefano Chiei
Director Operations EMEA/EE Advanced Bionics (Sonova Holding)

> I am not surprised that inventory management and optimisation received the highest response here. Speaking from experience and considering the challenges, this is the low-hanging fruit and easiest to implement as you don't need an advanced skillset in the technology. There is also an extensive discussion about data when it comes to AI. You are using customer data which is quite complicated when it comes to automation especially with data privacy and protocols.
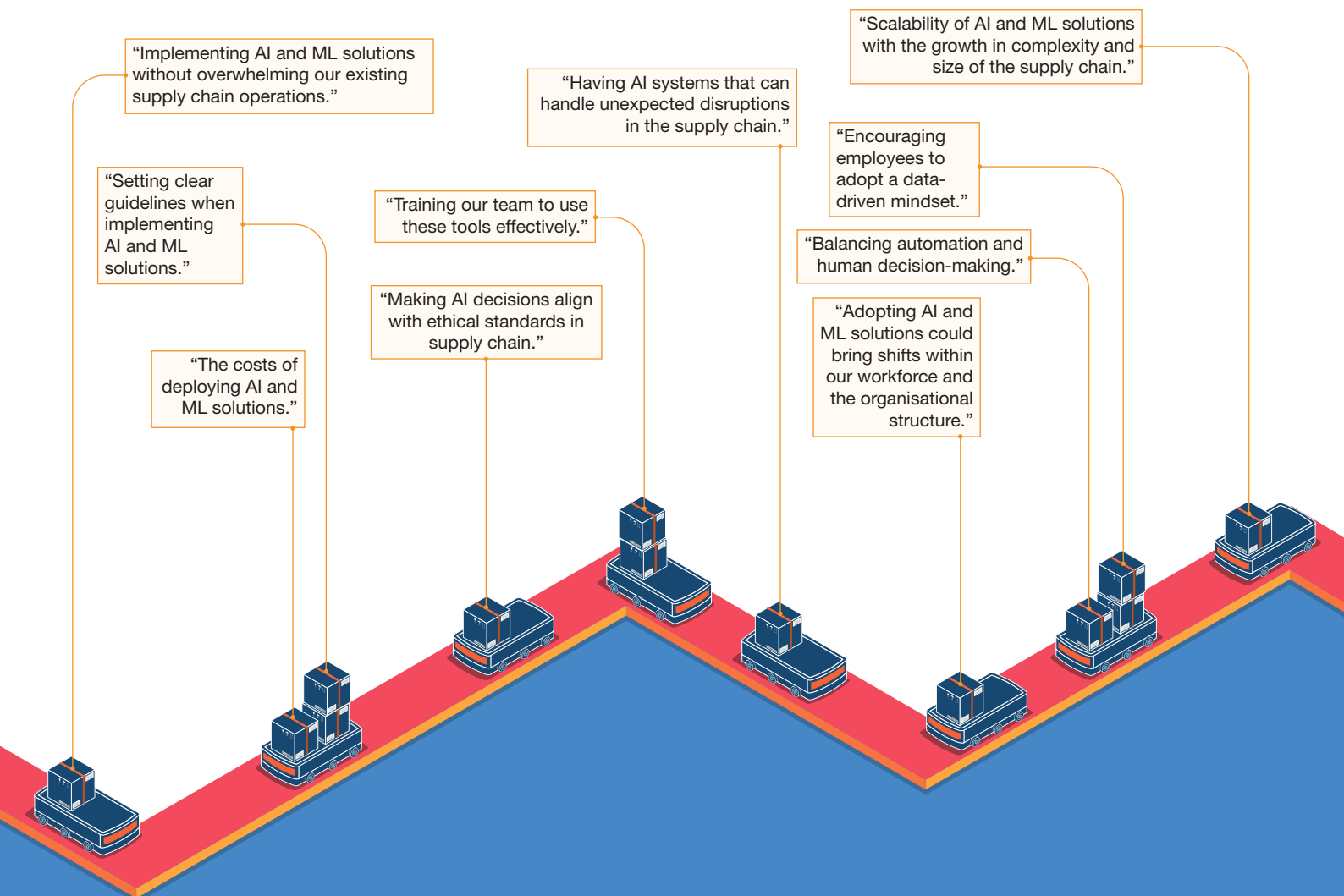
> I am somewhat surprised that 'supply network design' isn't ranked higher. This area is increasingly critical in today's uncertain supply chain landscape. Automation can significantly enhance flexibility and resilience, making it a prime candidate for AI applications.
>
> Ultimately, the successful integration of AI across both inventory management and supply network design will depend on our ability to effectively harness and utilise customer data while adhering to stringent privacy regulations.

Patrycja Lakomiak
Head, Global Manufacturing & Supply Enterprise Risk Management, Takeda

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We asked respondents to reveal the most significant challenges they anticipate when implementing AI and ML solutions in their supply chain. They candidly shared their responses here:

"Implementing AI and ML solutions without overwhelming our existing supply chain operations."

"Setting clear guidelines when implementing AI and ML solutions."

"The costs of deploying AI and ML solutions."

"Having AI systems that can handle unexpected disruptions in the supply chain."

"Training our team to use these tools effectively."

"Making AI decisions align with ethical standards in supply chain."

"Scalability of AI and ML solutions with the growth in complexity and size of the supply chain."

"Encouraging employees to adopt a data-driven mindset."

"Balancing automation and human decision-making."

"Adopting AI and ML solutions could bring shifts within our workforce and the organisational structure."

When you consider the challenges, you have to consider the pay-off of this new technology and how this can give you an advantage over other companies in both the short and long-term. Integrating any new innovation can feel like a bit of a sales pitch to begin with, and quite often, there will be differences between promises and reality, but you have to accept this and keep moving forward.

Stefano Chiei
Director Operations EMEA/EE Advanced Bionics (Sonova Holding)

Reading comments around training, ethical standards, workforce management, organisational structure and adopting new mindsets shows that many of the challenges associated with adopting AI are people and not technology based.

Ensuring that teams are fully versed in the opportunities associated with the technology and entering its adoption with the right mindset is crucial to the success or failure of these projects. According to a 2023 report (McKinsey), 70% of AI projects fail to meet their goals due to issues with data quality and integration.

Will Robinson
Conference Director, LogiPharma Connect

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What is your expected return on investment (ROI) timeframe for your AI and ML initiatives?

- 1-2 years
- 2-3 years
- 3-5 years

12%

37%

51%
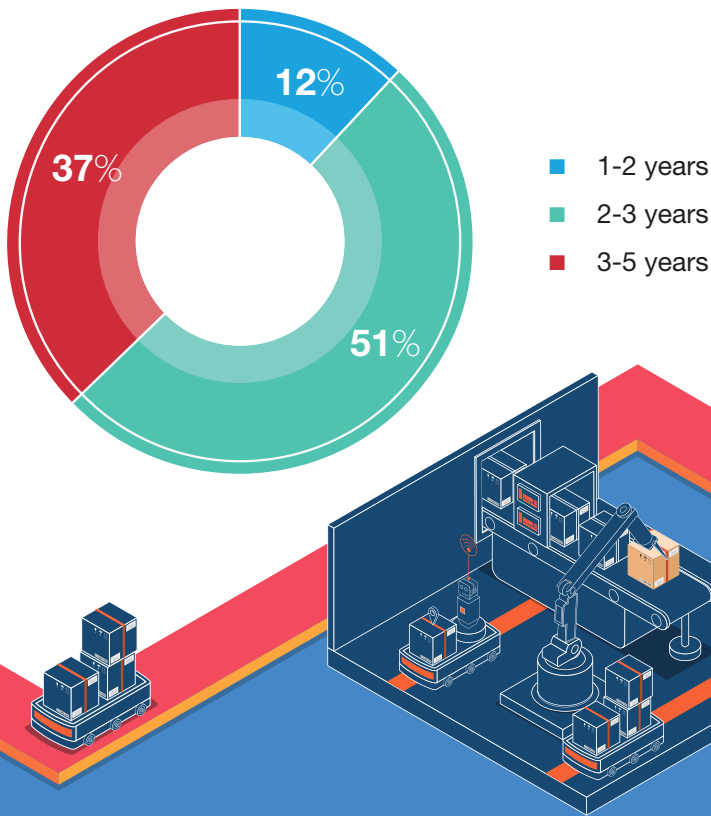
The fact that inventory management, supply network visibility, and risk management emerging are top of the list of key focus areas for the use of new capabilities like AI and ML across the pharmaceutical and life sciences supply chain is because they are critical to supply chain resilience and efficiency. A unified digital network through modern, flexible, integration technology, will gain the ability to collect vast amounts of clean, proprietary, real-time data. This data access is the prerequisite foundation that all companies need for AI-enabled supply chain operations.

Additionally, seeing that more than 80% of the respondents expect to realise the value of their AI and ML investments no sooner than in 2-3 years' time reflects both the inherent complexity of some AI strategy implementations as well as the lack of widespread understanding of immediately actionable opportunities to innovate with readily available platform technology, but only after the crucial step of real-time data sourcing into enterprise systems is accomplished. This further emphasises the criticality of end-to-end digital supply chain orchestration platforms, which enable companies and their partners to use flexible modes of integration and information exchange to create standardised data across all interactions, thereby creating a foundation for AI innovation.

Shabbir Dahod
President and CEO, TraceLink

When you invest in AI there is an element of not knowing whether you will see your money again in 2-3 years. It is a big investment and a long-term project, but I agree with the respondents that in 3 years' time, you should be able to see the benefits and pay-offs, particularly if you are focusing on standard AI tools that you know will be successful for your organisation.

Stefano Chiei
Director Operations EMEA/EE Advanced Bionics (Sonova Holding)

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Chapter Two

Building the foundation for your AI-driven supply chain: sourcing real-time data fuel from your end-to-end trading partner network
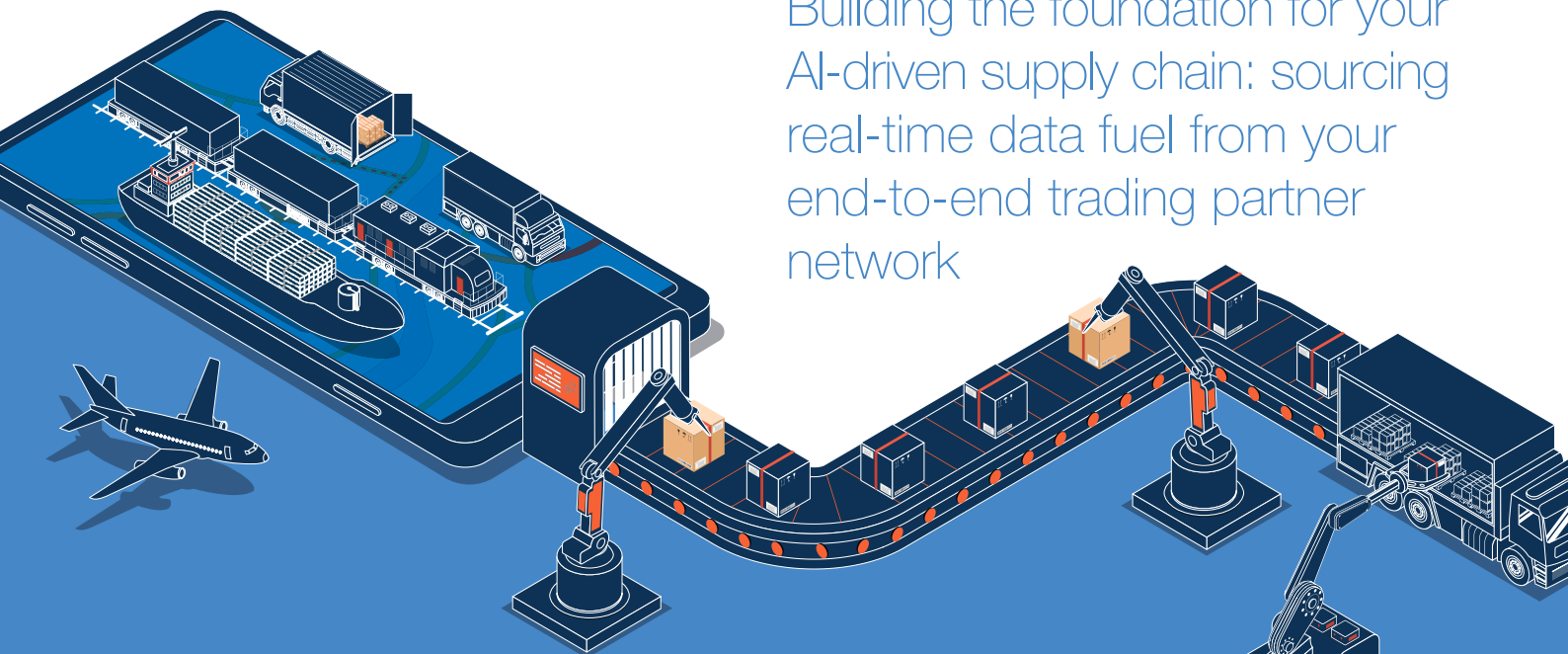
One of the most striking findings from our survey is the current level of real-time data integration with trading partners. A majority of respondents (55%) reported receiving continuous, real-time supply chain information from only 11-25% of their trading partners, while 39% indicated a slightly higher range of 26-50%.

This data suggests that while progress is being made, a significant gap exists in achieving comprehensive real-time visibility across the entire supply chain network. The limited integration of real-time data poses a challenge for companies aiming to leverage AI effectively, as the quality and breadth of data inputs directly impact the accuracy and utility of AI-driven insights and decision-making processes.

When asked about their current supply chain digitalisation strategies, 44% of respondents indicated that their primary focus is on planning improvements and optimisations, particularly in areas such as Sales and Operations Planning (S&OP). Closely following this, 38% of companies are prioritising the creation of collaborative relationships with trading partners through information sharing. This dual focus on internal planning capabilities and external collaboration highlights a growing recognition of the need for a holistic approach to supply chain digitalisation.

When it comes to prioritising specific segments of the trading partner network for rapid digitalisation, our survey revealed interesting preferences. The largest group of respondents (38%) would focus on third-party logistics providers to enhance metrics like inventory visibility and service levels through order-to-cash and inventory data orchestration. Close behind, 34% would prioritise contract manufacturers to optimise metrics such as working capital through product tracking orchestration.

This split highlights the diverse needs within the pharmaceutical supply chain and the recognition that different partner segments can provide unique value through digitalisation efforts. The survey results collectively paint a picture of an industry at a critical juncture in its AI and digitalisation journey.

While the potential of AI is recognised, many pharmaceutical companies are still building the necessary data infrastructure. By focusing on planning, collaboration, and strategic partnerships, they are laying the groundwork for future AI-driven supply chains. As these foundations strengthen, we can expect rapid advancements in visibility, agility, and efficiency.

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By partner count, from what estimated percentage of your supply chain trading partners (e.g. direct suppliers, contract manufacturers, third-party logistics providers, customers, etc.) do you receive continuous, real-time supply chain information directly integrated into your enterprise operating systems (e.g. ERP, S&OP, QMS, Inventory Management, CRM, etc.)?

1% 4%

39%

1%

55%

- 0%
- 1-10%
- 11-25%
- 26-50%
- >50%
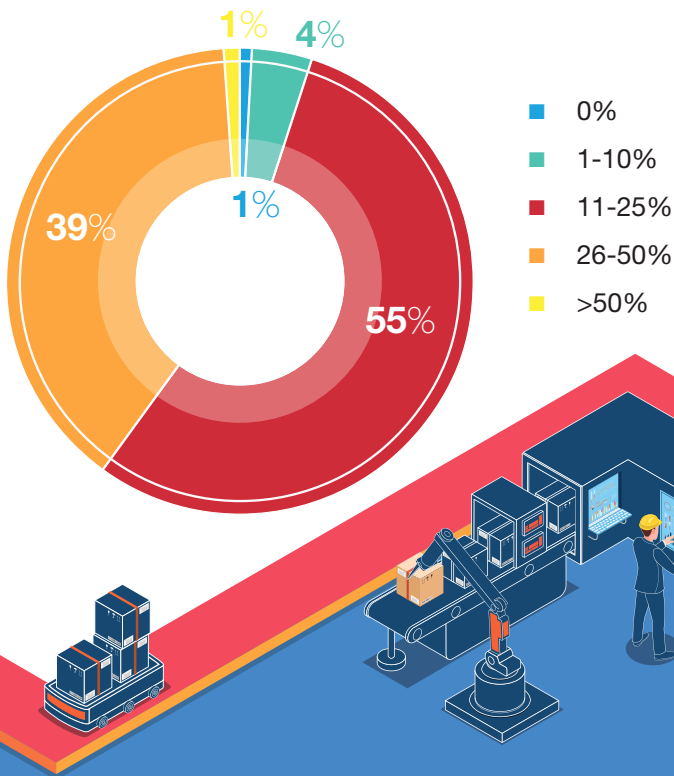
Without data, there is no AI. This fact is particularly impactful for supply chains, which operate in a state of perpetual change and are **always dependent** on partners to co-execute shared business processes. According to the survey of supply chain executives, 6 out of every 10 respondents indicate that they receive continuous, real-time supply chain information directly integrated into their enterprise operating systems **from only 25% or less of their supply chain partners**. Critically, only **1% of supply chain executives** indicated that real-time data is available from more than 50% of their partners. Given that a supply chain is only as strong as its weakest link, the overriding challenge for executives who hope to deploy an AI-driven supply chain strategy is clear: digital networks of **end-to-end** supply chain partners must be established to source the real-time data required for supply chain process orchestration.

Without this data, comprehensive supply chain visibility is impossible, and companies will continue to face paralysing challenges in anticipating disruptions, managing inventory efficiently, and responding to shifts in customer demand. This lack of transparency can lead to increased operational costs, delays, and missed opportunities to optimise logistics and fulfilment channels. Furthermore, gaps in data sharing limit an organisation's ability to meet regulatory requirements, particularly in industries like pharmaceuticals where traceability and compliance are critical. As supply chains become even more global and complex, the absence of clean, real-time data hinders an organisation's ability to foster collaborative business processes with partners and adapt to rapid changes, ultimately impacting its ability to predictably serve customers.

Shabbir Dahod
President and CEO, TraceLink

Given the growing demand for real-time, accurate data, I anticipate a significant uptick in adoption rates over the coming years. It is a no brainer; everyone wants more precise information in real-time. Having the ability to predict and scenario plan means we can manage risks in our organisation head on to improve our supply chain.

Patrycja Lakomiak
Head, Global Manufacturing & Supply Enterprise Risk Management, Takeda

Real-time supply chain visibility is more crucial now than ever before, and nowhere more so than in managing supply chain disruption. When shippers have the ability to see the status and condition of shipments in real-time, they and their partners have a much better chance of building agile operations into the supply chain and overcoming these disruptions.

This could be anything from shipment information from partners, such as the possibility for temperature deviation as a result of prolonged 'tarmac time', to external real-time information, such as hurricanes or geopolitical events as they unfold and potentially impact upon supply chains. All of this information must be shared in real-time across the integrated systems of producers and partners to drive supply chain reactivity and agility.

Will Robinson
Conference Director, LogiPharma Connect

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Which of the statements below best describes your company's current pursuit of an end-to-end supply chain digitalisation strategy?

2%
16%
44%
38%
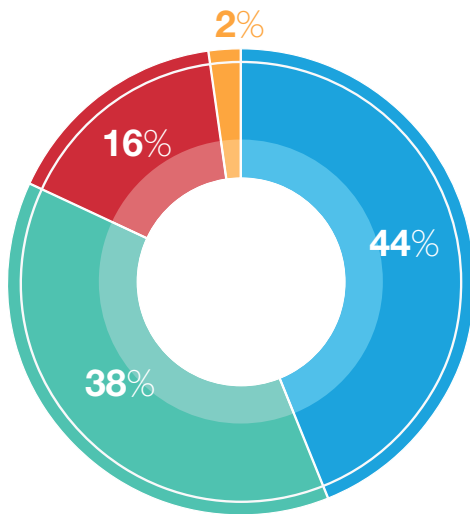
■ My company's current supply chain digitalisation strategy is primarily focused on planning (e.g. S&OP) improvements or optimisations

■ My company's current supply chain digitalisation strategy is primarily focused on creating collaborative relationships with trading partners through information sharing

■ My company's current supply chain digitalisation strategy is primarily focused on an ERP implementation or upgrade

■ My company does not currently possess an end-to-end supply chain digitalisation strategy
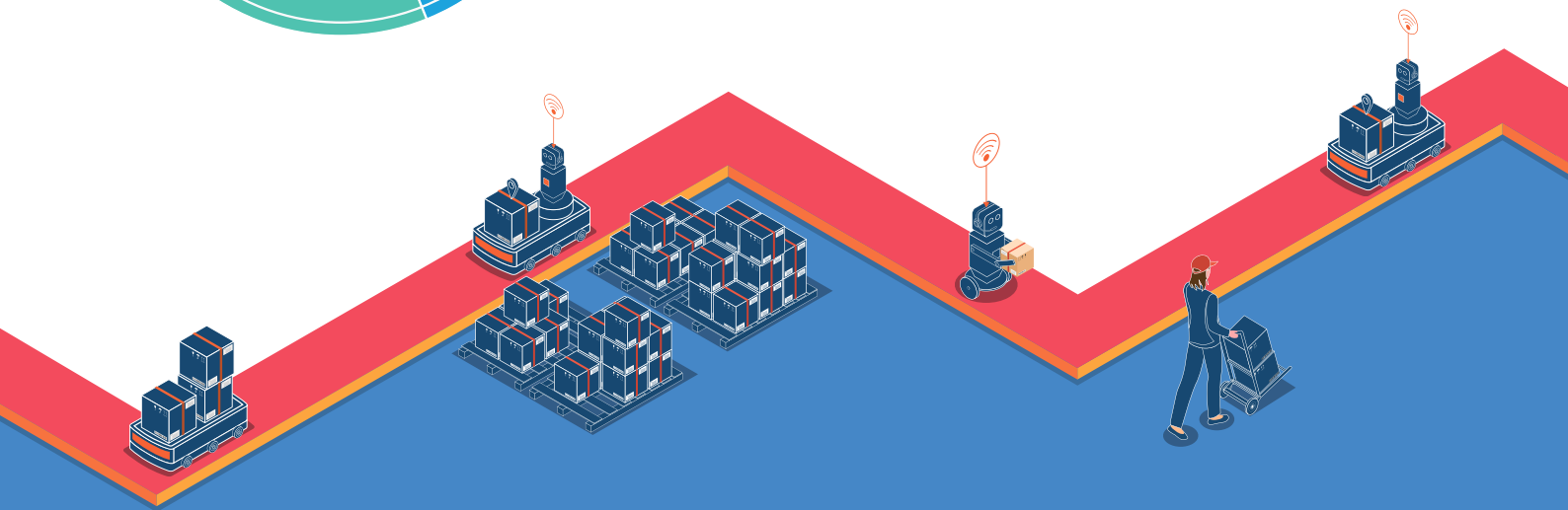
The results above highlight that more than 80% indicate that their supply chain digitalisation strategy is focused on either enhancing S&OP capabilities through real-time data, or on creating collaborative relationships with trading partners to enhance shared operations. For the supply chain leader determined to succeed in either goal, the implication is clear: while enterprise systems remain important investments for digitalisation, the intentional addition of modern, multi-enterprise integration and orchestration technology to fuel enterprise capabilities like ERP and advanced planning systems with real-time supply chain data are imperative.

Today, the number of innovative entrants to the enterprise technology market continues to accelerate in areas like inventory management, production tracking, financial reconciliation, planning and forecasting, warehouse management, and more. For companies that want to build sustainable competitive advantages for launching new products, entering new markets, improving service levels, and establishing new commerce channels, the business capability of sourcing real-time, end-to-end supply chain information from trading partners to fuel their enterprise systems will become a standard evaluation requirement.

**Shabbir Dahod**
President and CEO, TraceLink

I agree here that digitalisation strategies will primarily focus on improvements or optimisations. AI is not reinventing the wheel but offering new solutions for efficiency and helping the industry unlock new opportunities.

Stefano Chiei
Director Operations EMEA/EE Advanced Bionics (Sonova Holding)

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If my company could rapidly and cost-effectively digitalise information sharing with any segment of our trading partner network, we would focus on:
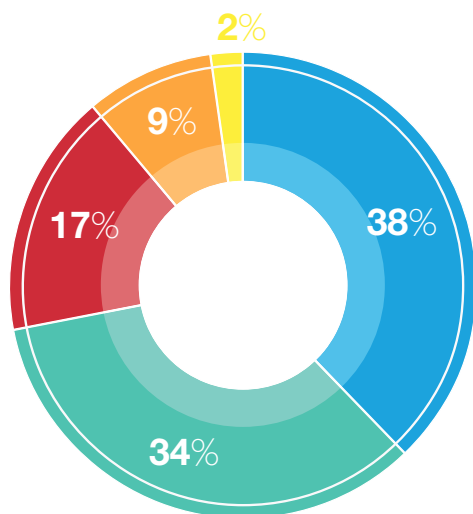
- 38%
- 34%
- 17%
- 9%
- 2%

■ Third-party logistics providers to enhance metrics like inventory visibility and service levels through order-to-cash and inventory data orchestration

■ Contract manufacturers to optimise metrics like working capital through product tracking orchestration

■ Carriers and freight forwarders to optimise costs through shipment tracking orchestration

■ Direct suppliers to improve metrics like lead time predictability through procure-to-pay data orchestration

■ Customers (retail pharmacies, hospitals, etc.) to increase demand visibility through direct commerce orchestration.
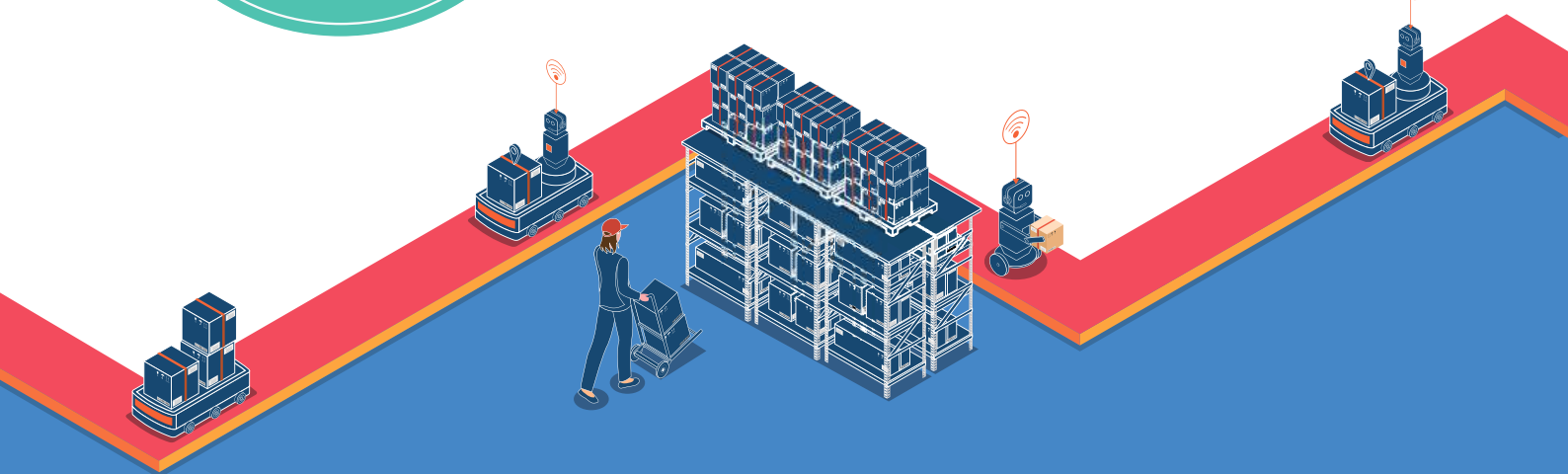
While the business benefits of **end-to-end supply chain digitalisation** are becoming increasingly clear, many companies struggle with determining where to start their initial journey. Looking at the results, the vast majority (72%) would prioritise their initial engagement strategy on "one-back" or "one-forward" relationships with their contract manufacturing or logistics partners. What can we learn from this data-driven insight?

As direct service providers to life sciences brand owners, contract manufacturing organisations (CMOs) and third-party logistics providers (3PLs) play critical roles in how a company's physical (inventory), planning (supply forecasts, demand forecasts), and transaction (procure-to-pay, order-to-cash, logistics, etc.) flows are managed. It is only by marrying these flows in real-time that

brand owners can effectively attain desired goals like enhancing working capital through better inventory visibility/control or production tracking.

Critically, accessing that flow of transaction information from trading partners, continuously and in real-time, is a prerequisite to enabling truly data-driven, shared business processes with partners. Companies that aspire to fully operationalise their relationships with CMOs, 3PLs, direct suppliers, and their customers must adopt new capabilities for digitally onboarding those partners and providing flexible, multi-modal methods of integrations to ensure that trading partners maintain universal accessibility for sharing that data in whatever method works best for them.

Shabbir Dahod
President and CEO, TraceLink

I think this is a really interesting result. Even though a majority say third-party logistics, I think there is a great importance for carriers and freight forwarders to optimise costs through shipment tracking
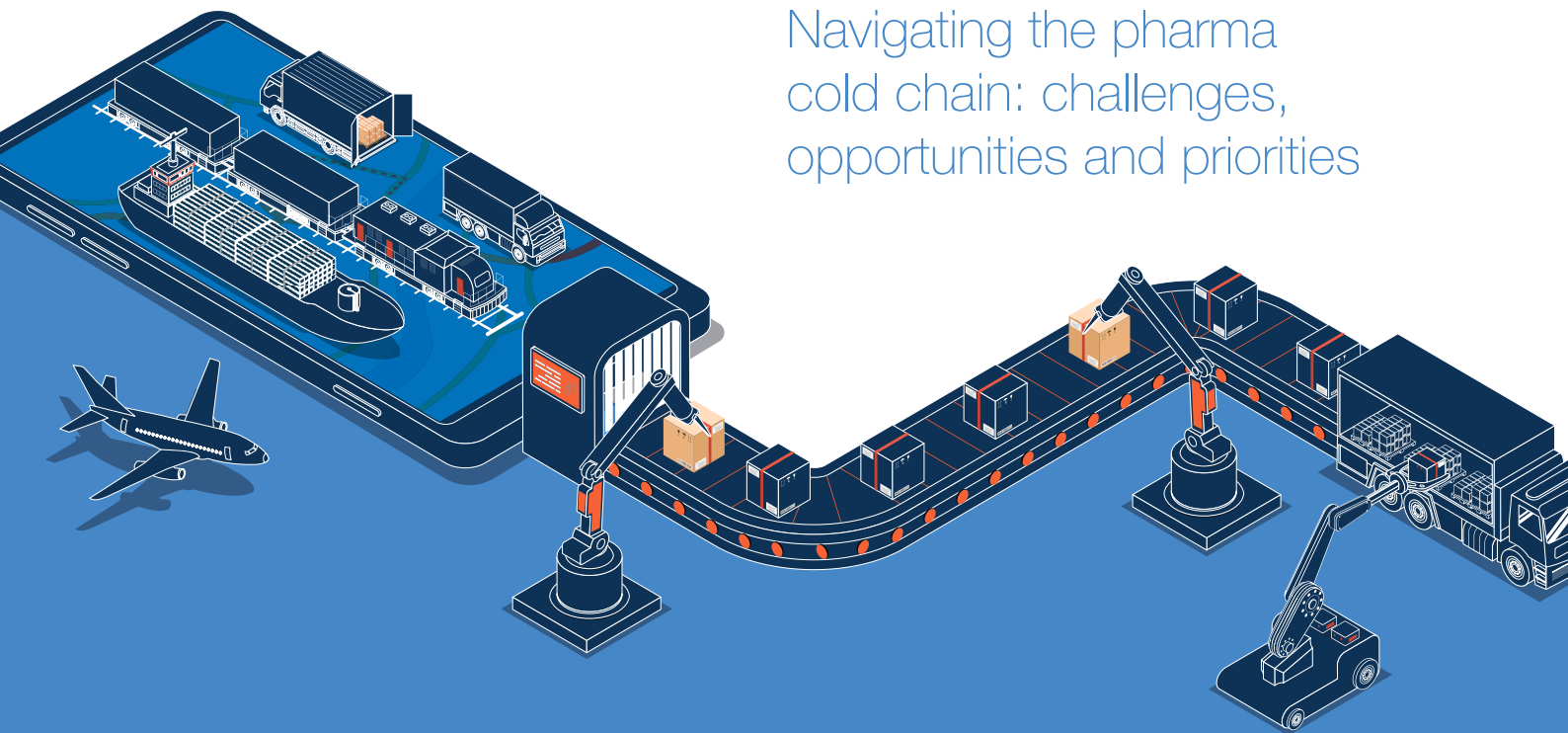
orchestration. Transport is such a big subject for the industry so any way to make this more transparent and cost effective is a bonus.

Stefano Chiei
Director Operations EMEA/EE Advanced Bionics (Sonova Holding)

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Chapter Three
Navigating the pharma cold chain: challenges, opportunities and priorities

The pharmaceutical cold chain industry is at a pivotal point, balancing sustainability, visibility, and control. A growing focus on tracking carbon emissions reflects the industry's commitment to environmental responsibility.

While only 5% of companies are highly confident in their emissions calculations, 78% express some confidence, and all surveyed firms are engaged in emissions tracking. More than half (52%) are using dedicated emissions tools, indicating a trend toward more standardised sustainability metrics.

The industry is also making strides in real-time monitoring and control. Automated alerts for temperature excursions or delays are in place for 69% of respondents, while 59% report centralised visibility across shipments, modes, and partners. These advancements are key to maintaining product integrity and efficiency, signalling strong investment in technologies that enhance control over temperature-sensitive pharmaceutical transportation.

However, challenges persist. More than half (55%) of respondents face issues with disparate systems and data silos, and 44% cite the lack of predictive analytics as a major hurdle. These gaps highlight

the need for more integrated solutions that improve data-driven decision-making and risk management. In the future, seamless data integration, advanced analytics, and comprehensive sustainability tracking will likely drive the next wave of innovation in the pharma cold chain industry.

The survey results suggest that there are significant opportunities for technology providers to develop more integrated solutions that can bridge data silos and enhance predictive capabilities. As the industry moves forward, a focus on seamless data integration, advanced analytics, and comprehensive sustainability tracking will likely define the next phase of innovation in the pharma cold chain.

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How confident are you in accurately calculating the CO_2 emissions from your cold chain operations?

5%

17%

78%
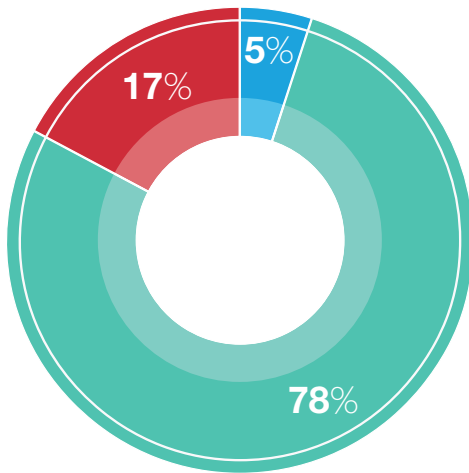
- ■ Very confident: We use advanced tools and methodologies and are aware of the limitations of ISO and GLEC norms

- ■ Somewhat confident: We use advanced tools, but are unaware of the limitations of ISO and GLEC norms

- ■ Not very confident: We rely on rough estimates and data provided by the freight forwarder
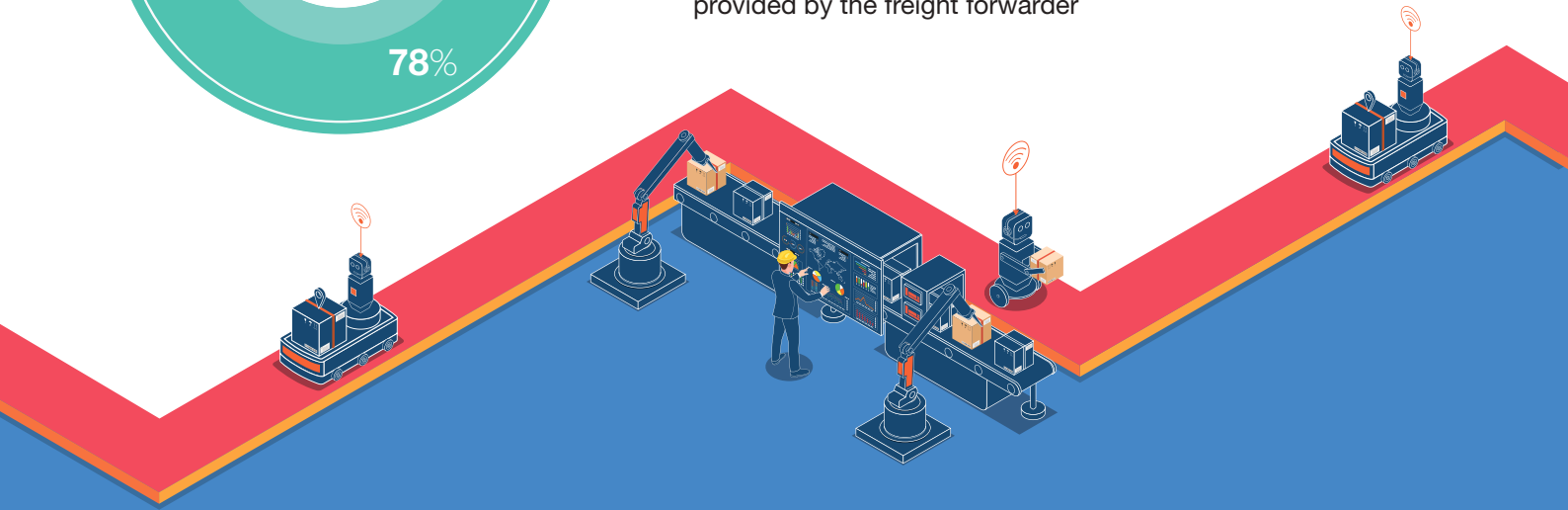
It's encouraging to see that all surveyed organisations recognise the importance of calculating CO_2 emissions, a crucial step towards reducing their environmental impact. This shows that organisations understand the need to make these positive changes, and calculating CO_2 emissions is part of that. There is a lot of work to do, and new regulations are being published all the time.

Patrycja Lakomiak
Head, Global Manufacturing & Supply Enterprise Risk Management, Takeda

It is great to see organisations at the start of this journey getting more comfortable with tools, and leaders need the correct data in place. AI tools are not regulated, and there are still grey areas, so it is great to see people becoming more confident.

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How do you currently monitor and report on sustainability metrics like carbon emissions for your pharma cold chain?

- Using a dedicated emissions calculation and reporting tool
- Integrated into our overall supply chain management system
- Manual tracking in spreadsheets
- Reported to us by our logistics service providers
- We don't currently measure or report on emissions

1%
14%
4%
52%
29%

The saying "You can't manage what you can't measure" is a cornerstone of management theory, and it applies just as much to CO_2 emissions. To gain visibility into their environmental impact, companies often rely on external tools to calculate emissions. However, this creates a risk: without internal expertise to fully understand the tools and methodologies behind these calculations, organisations may misinterpret the data and make poor decisions.

A common oversight, for example, is that many CO_2 logistics calculators exclude rental packaging, such as pharma containers, leading to a significant underestimation of emissions in the cold chain. This can cause management to deprioritise logistics in their decarbonisation strategies; a costly mistake that will eventually need correction. To avoid this, it's essential for companies to build internal capabilities around CO_2 measurement, ensuring they can accurately assess their impact and make informed, strategic decisions for sustainable growth.

Michael Hegglin
Senior Global Sustainability Manager & Team Lead, SkyCell

It's great to see 78% of the industry utilising advanced tools to track CO_2 emissions. However, there is a significant gap in awareness regarding the ISO and GLEC calculation standards for the industry, which focus primarily on weight and do not reflect volumetric weight correctly. In the case of transporting pharmaceuticals—which are often lightweight compared to other products—by air, this leads to a massive underreporting of CO_2 emissions.

As pharma relies heavily on air freight, this means that the emissions data may be inaccurate by substantial margins. This discrepancy highlights the need for more tailored standards and insights to provide accurate emissions tracking for the pharma sector.

Nico Ros
CTO and Co-founder, SkyCell AG

Monitoring sustainability metrics is incredibly important to the industry going forward. We are not just using AI to calculate data but it would also add value to transportation or shipment data. It would help stay more connected, but it has to be of the highest quality available.

Stefano Chiei
Director Operations EMEA/EE Advanced Bionics (Sonova Holding)

The data shows that most of the industry is making significant steps towards accurately calculating their CO_2 emissions, which is the first step on their sustainability journey. However, one of the most significant challenges that all producers are seeing within this space is with Scope 3 emissions, which make up the majority of all emissions (e.g. GSK recently disclosed that approximately 92% of its footprint lies in Scope 3) from businesses and are significantly harder to target. Because Scope 3 encompasses the entirety of raw material production, distribution, product use, and end-of-

life disposal, it is a significantly complex picture, including the emissions of a myriad of partners.

These partners must have a clear picture of their emissions to report to the pharmaceutical or medical device producer for calculations. A growing number of novel software and data solutions, leveraging digital integration with an entire supply chain network, are emerging to assist companies with overcoming these challenges, but the challenge remains a complex one.

Will Robinson
Conference Director, LogiPharma Connect

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What capabilities do you currently have for real-time monitoring and intervention in your pharma cold chain? *Respondents were asked to select all options that applied*

Capability	Percentage
Automated alerts for temperature excursions or delays	69%
Centralised visibility across all shipments, modes and partners	59%
Ability to make real-time adjustments to routes or packaging	52%
Shipment tracking using IoT devices	45%
Proactive recommendations for optimising lane performance	41%
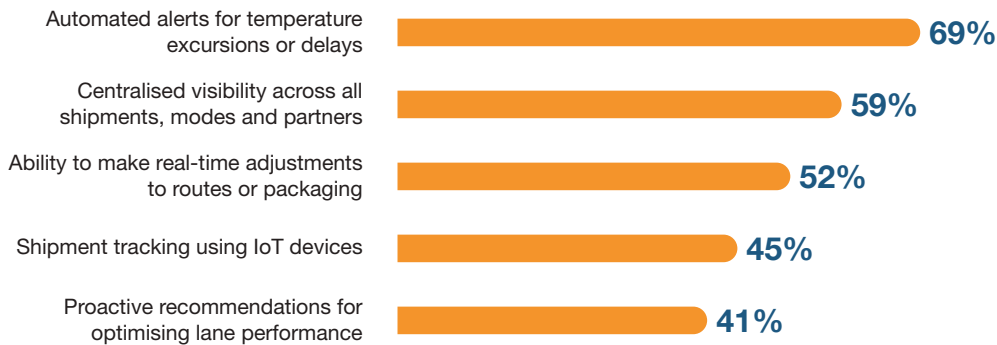
While I'm impressed by the enthusiasm of supply chain leaders to offer solutions, I'm surprised that more aren't proactively recommending lane performance optimisation. What I have observed from my side having worked closely with organisations is that they are all very passionate about providing solutions for a range of different supply chain models and genuinely want to know the needs of our customers and us. They want to provide us with the highest quality data and know how difficult it is to ship cold chain products. Having these tools and capabilities is essential.

To add to this, shipment tracking data will always be essential in our industry. When it comes to automated alerts, despite being important, this technology has been there for a few years now. Having the right data or visualisation tools, that will be the real challenge.
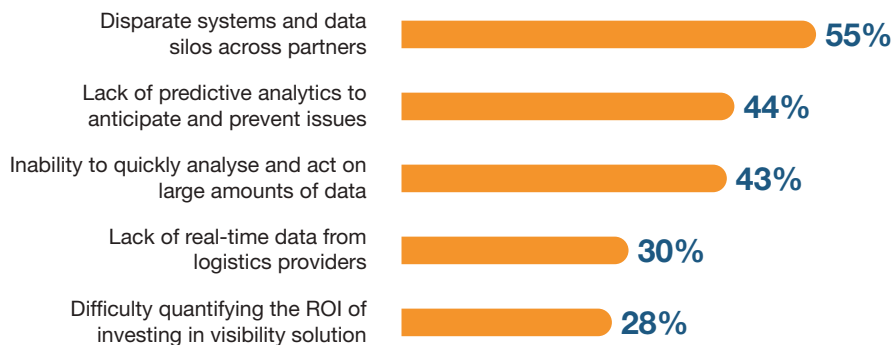
Patrycja Lakomiak
Head, Global Manufacturing & Supply Enterprise Risk Management, Takeda

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What are the biggest challenges you face in gaining full visibility and control over your pharma cold chain?

Respondents were asked to select two options that applied

Challenge	Percentage
Disparate systems and data silos across partners	55%
Lack of predictive analytics to anticipate and prevent issues	44%
Inability to quickly analyse and act on large amounts of data	43%
Lack of real-time data from logistics providers	30%
Difficulty quantifying the ROI of investing in visibility solution	28%

I am not surprised that industry leaders face these challenges, particularly when it comes to predictive analysis. The speed of analysing data is crucial for everyone regardless of the organisation or the level of integration. This is especially true on the predictive side which is something that all of us need to get better at.

This is something we need to consider and plan for. We tend to look at trends on a 2–3-year cycle but in actuality we need to start looking ahead by 10 years to grow stronger and becomes more resilient. There is so much room for new technology and we need to widen our grasp to unlock these opportunities.
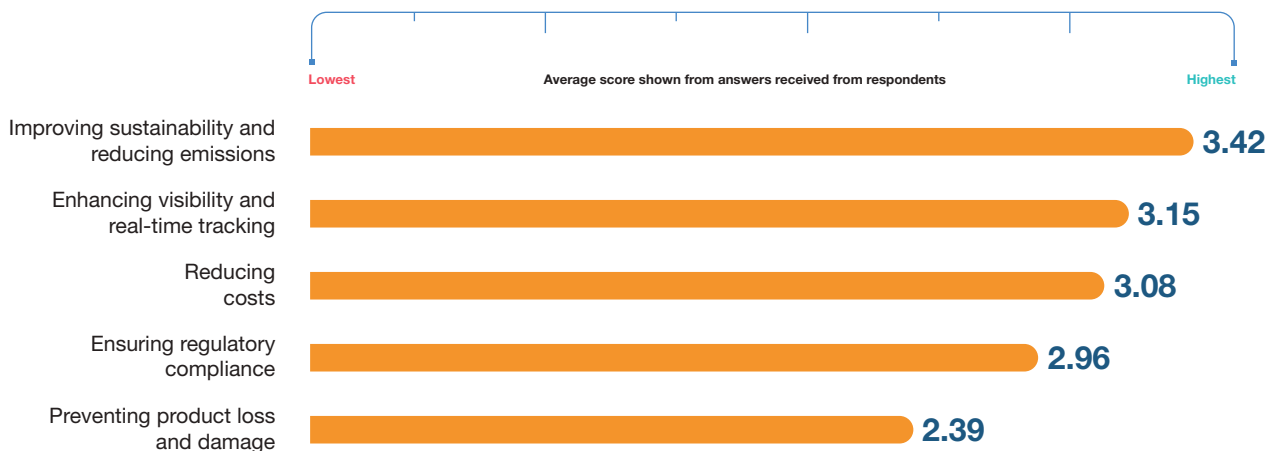
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What are the top priorities for your pharma cold chain over the next 3 years?

Respondents were asked to rank these in terms of importance, with 1 the least and 5 the most important

Lowest   Average score shown from answers received from respondents   **Highest**

Priority	Average score
Improving sustainability and reducing emissions	3.42
Enhancing visibility and real-time tracking	3.15
Reducing costs	3.08
Ensuring regulatory compliance	2.96
Preventing product loss and damage	2.39

A recent survey reveals that 67% of European citizens believe that their national government are falling short in addressing climate change. Slow political cycles and the influence of powerful interest groups often delay meaningful action. This opens a unique opportunity for corporate leaders to step up and take the lead.

With climate change emerging as the top priority for supply chain leaders over the next three years, pharmaceutical companies have the chance to become trailblazers in sustainability. By taking bold steps now, they can not only reduce cost and environmental impact but also attract top talent and solidify their roles as responsible corporate citizens of the future. The time to lead is now.

Michael Heggin
Senior Global Sustainability Manager & Team Leader, SkyCell

This is a very interesting result and showcases how important sustainability is to the industry. I think the industry as a whole should be looking at ways to prevent product loss and damage, but leaders have been looking at this for years.

These options are all interconnected. Managing costs plans into reducing CO_2 and achieving sustainability products while also preventing product loss. For every company, you need a balance of all of these things to achieve success. We strive to be the best at everything, and it is all about balance.

Patrycja Lakomiak
Head, Global Manufacturing & Supply Enterprise Risk Management, Takeda

As highlighted in this recent survey, pharmaceutical companies are increasingly prioritising efforts to reduce CO_2 emissions and enhance the sustainability of their packaging and transport systems. Furthermore, there is a clear dedication to investing in real-time tracking and visibility, which are viewed as essential for mitigating risk and cutting costs.

In my masterclass at LogiPharma 2024, I introduced the new TCO (Total Cost of Ownership) formula, which now incorporates emissions and has been picked up across the industry. This new approach is critical for pharma companies to align their operational practices with sustainability goals. However, achieving this will require all supply chain stakeholders to collaborate and break down silos, ensuring a unified approach.

Nico Ros
CTO and Co-founder, SkyCell AG

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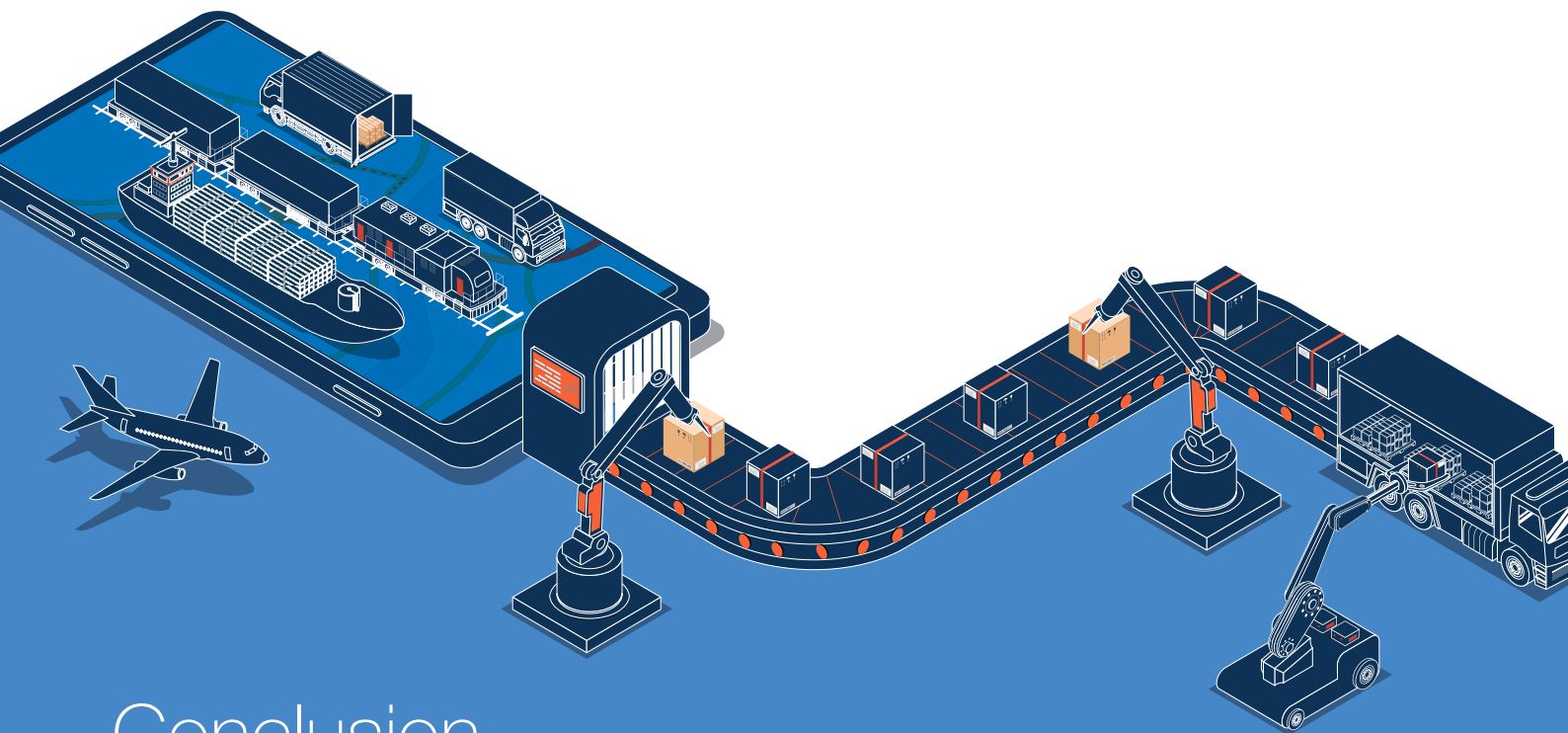
Conclusion

The LogiPharma AI report highlights an industry on the brink of major transformation, with AI and ML becoming integral to reshaping pharmaceutical supply chains. With more than half of supply chain leaders expecting returns on AI investments within 2-3 years, AI is quickly moving from experimental stages to essential, mission-critical applications.

While AI offers solutions to challenges like inventory optimisation and supply chain visibility, the journey is not without obstacles. Data integration remains a significant hurdle, as many companies struggle with real-time visibility across fragmented systems and partner networks. Additionally, the skills gap in AI expertise specific to pharma supply chains presents a challenge that needs addressing.

Despite these barriers, AI's potential in cold chain management, sustainability, and predictive analytics is driving continued innovation and investment. The increasing use of automated alerts and centralised visibility systems shows that pharma companies are already seeing tangible benefits, with even more sophisticated AI applications expected in the future.

As AI adoption accelerates, companies that successfully integrate these technologies will gain significant competitive advantages. AI promises not only to optimise current processes but also to fundamentally transform how pharmaceutical supply chains operate, enhancing resilience, efficiency, and sustainability in an increasingly complex global market.

The coming years will be critical as companies navigate the challenges of implementation and work to fully leverage the power of AI. Those who successfully harness this technology stand to gain significant competitive advantages in an increasingly complex and demanding global market.

As AI continues to evolve, it promises not just to optimise existing processes but to fundamentally reimagine how pharmaceutical supply chains operate in the 21st century.

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Key Suggestions

1

While many anticipate significant returns from AI within the next few years, supply chain leaders face challenges in integrating it. From costs to implementation guidelines and team training, the key is to view AI as a tool, not a replacement. Organisations should focus on their specific needs and strategically adopt AI to enhance efficiency. Blindly following competitors can lead to suboptimal results.

2

The survey findings showcased that supply chain leaders' digitalisation strategies are focused on planning, improvements and optimisation. However, for this to have the desired effects, it is crucial to adopt a holistic and agile approach that incorporates real-time data, advanced analytics, and AI-driven tools. Supply chain leaders can enable proactive, data-driven decision-making by unifying data from production, inventory, logistics, and demand forecasting into a centralised platform.

3

Pharmaceutical supply chain leaders should adopt a structured approach to bolster confidence in calculating CO_2 emissions from cold chain operations. This involves mapping the entire cold chain, utilising CO_2 and data analytics tools, and collaborating with logistic partners. By combining these elements, leaders can better understand their environmental impact and make informed decisions.

4

As pharma supply chain leaders prioritise integrating AI to improve sustainability over the next three years, a strategic approach is essential to maximise impact. AI's ability to anticipate trends, streamline operations, and track sustainability metrics will be critical in creating a more sustainable, transparent, and efficient pharma supply chain.

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About SkyCell

SkyCell is a purpose-led technology company transforming the pharmaceutical supply chain through a combination of proprietary software, hardware, and big data. It is the leading manufacturer of hybrid temperature-controlled door-to-door container solutions. These allow pharma companies to optimize their supply chain by reducing, and even predicting, the risks associated with delivering sensitive drugs by air.

Its SaaS solution, SkyMind, combines simulation data with operational data (S+O data), enabling pharma companies to have real-time, end-to-end oversight of every shipment around the world. Its automated approval capability reduces quality approval time from an average of days to just hours, getting life-changing drugs to consumers faster.

Designed with sustainability as a core principle, SkyCell is climate-neutral in its own direct operations (Scopes 1&2 reduced and removed) today and has committed to the goal of end-to-end net-zero emissions by 2040.

About TraceLink

TraceLink Inc. is the largest end-to-end intelligent supply chain platform for life sciences and healthcare, enabling end-to-end orchestration by connecting more than 291,000 healthcare and life sciences entities through its B2N Integrate-Once™ network. Leading businesses trust TraceLink to deliver complete global connectivity, visibility, and traceability of healthcare products, ensuring that every patient gets the medicines they need when needed, safely and securely.

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