




Optimizing supply chains with AI,
cloud and data lakes



Building a better
working world



Introduction

The advent of digitalization in supply chain operations has unveiled numerous opportunities for efficiency increases and cost reduction. While these advantages are laudable, there are several limitations to the holistic adoption of supply chain digitalization, necessitating the exploration of other potential value-enhancing technologies. This paper examines the potent collaboration of data lakes and generative artificial intelligence (GenAI) in remodeling supply chains for stronger performance and profitability.

Traditional IT-based digital supply chain models often fall short in achieving scalability, accessibility, real-time data processing and meaningful data analysis due to outdated technologies and infrastructures. This not only curbs the potential for streamlined operations, but it also limits the possibility for data-driven decision-making and predictive analytics. Data lakes and GenAI, when properly utilized, can profoundly enhance the efficiency of supply chain operations.

Data lakes enable organizations to store unstructured and semistructured data at any scale, thereby going beyond the scope of traditional data warehouses for more agile and real-time data access of massive data sets. This increased accessibility and the synergy of cloud-based supply chain models further add to the promise of data lakes. GenAI, on the other hand, can help derive meaningful insights, make predictions and automate processes from the large volumes of data typically collected by an organization.

This white paper provides insights into the implementation of data lakes and GenAI into supply chain operations. Moreover, it underscores the realization of intelligent supply chains, where decision-making can be supported by data and operations can be optimized for superior efficiency and profitability.



Supply chain digital transformation

Supply chain digitalization involves the integration of digital technologies to streamline processes, reduce costs and enhance overall operational efficiency. The journey toward full-scale digitalization can be difficult; however, for most organizations, the benefits outweigh the risks.

The promise of supply chain digitalization

1

Streamlined operations: the digital backbone

- ▶ An end-to-end network to optimize processes from procurement to delivery
- ▶ Real-time visibility into inventory, production and logistics
- ▶ Automation of routine tasks minimizing errors

2

Data-driven insights: unleashing strategic potential

- ▶ Harnessing big data analytics unlocking actionable insights
- ▶ Predictive analytics anticipating market trends
- ▶ Deep understanding of consumer behavior facilitating the creation of products and services in highest demand

3

Sustainability revolution: greening the supply chain

- ▶ Tracking and reporting on the environmental footprint of your company
- ▶ Optimization algorithms minimizing waste and energy consumption
- ▶ Collaboration platforms facilitating partnerships for sustainable sourcing and ethical practices

Despite investing millions in data lakes, companies have gained little value from supply chain digitalization

Which organizations are reaping the anticipated benefits of supply chain digitalization, and which ones are merely riding the wave without harnessing value?

Supply chain digitalization stands as a pivotal strategy, promising a plethora of benefits ranging from enhanced efficiency to improved visibility and agility. However, a closer examination uncovers the underlying reality behind the adoption of digital solutions in supply chain.

In fact, we find that most organizations are struggling to embrace digital transformation and are unable to strategically harness their capabilities to drive tangible value and sustainable growth in today's competitive landscape.



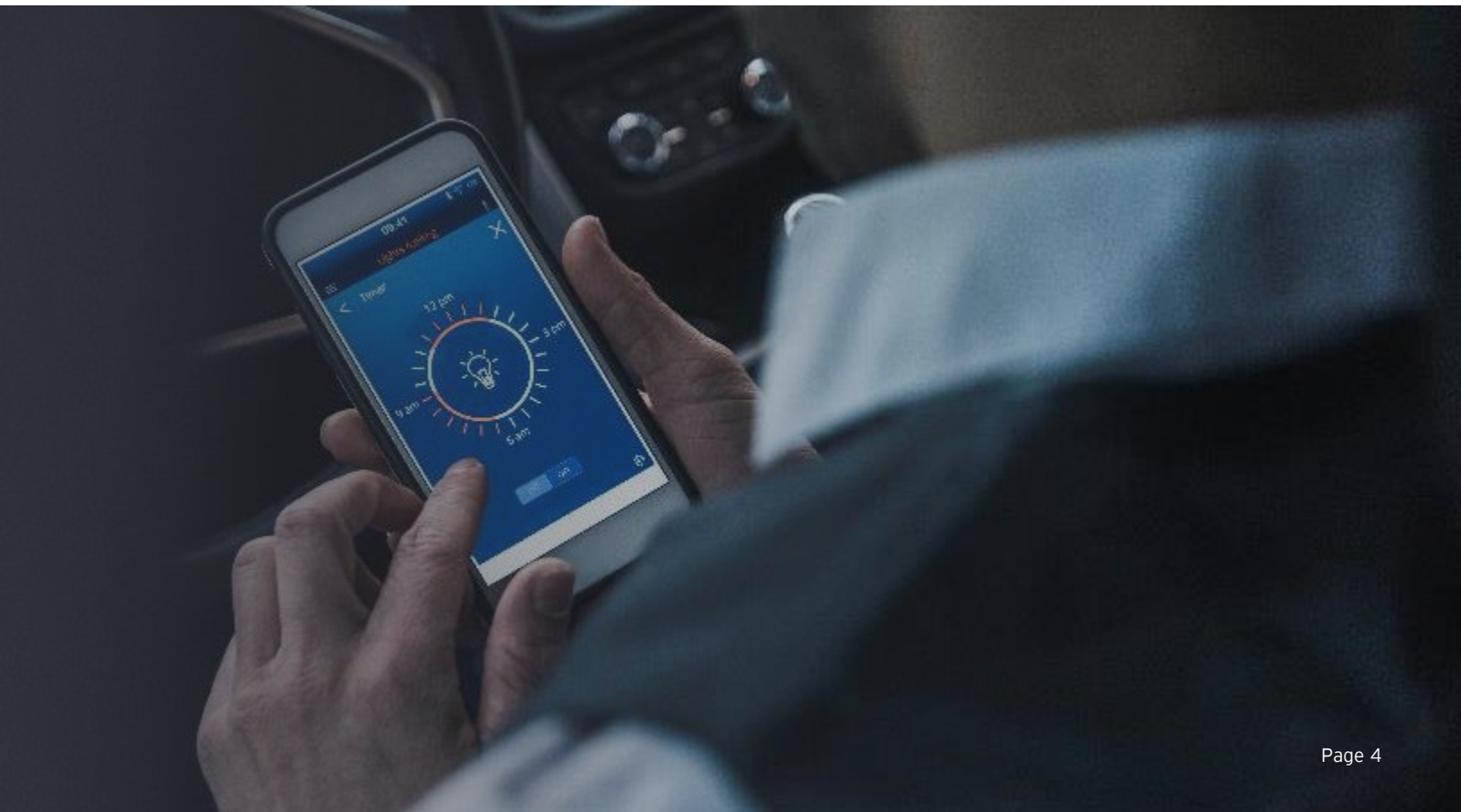
Sources:


¹ "Are Investments in Supply Chain Technologies not Delivering to Expectations? Part 2," Dan Gilmore, *Supply Chain Digest*, April 14, 2023, https://www.scdigest.com/firstthoughts/23-04-14_Supply_Chain_Technology_ROI.php?cid=20745.

² Ibid.

³ Ibid.

⁴ "It's high time to go beyond visibility," Shardul S. Phadnis and Paul J.H. Schoemaker, *Supply Chain Management Review*, March 4, 2024, https://www.scmr.com/article/its_high_time_to_go_beyond_visibility.





Deeper look into leading challenges and root causes

Despite investing millions of dollars, companies often struggle due to the fragmented implementation of technology in supply chain functions. For instance, planning receives focus, without understanding the impact on manufacturing. A lack of integrated data hampers digitalization, resulting in suboptimal outcomes despite substantial investments.

Leading challenges and limitations

1 Functional focus

2 Interoperability Issues

3 Lack of unified approach

4 Lack of integrated data

5 Poor data quality and standardization issue

6 Complex and expensive deployments

Impact on the organization

- ▶ Inefficiencies and missed opportunities for optimization
- ▶ Interdependencies not understood among various supply chain functions
- ▶ Undermined trust in the organization's management information systems

Impact on the user

- ▶ Fragmented user experience leading to poor decision-making
- ▶ Incompatibility between different systems forcing users to find workarounds
- ▶ Inaccurate insights and subpar decision-making causing users to question the reliability of digital tools

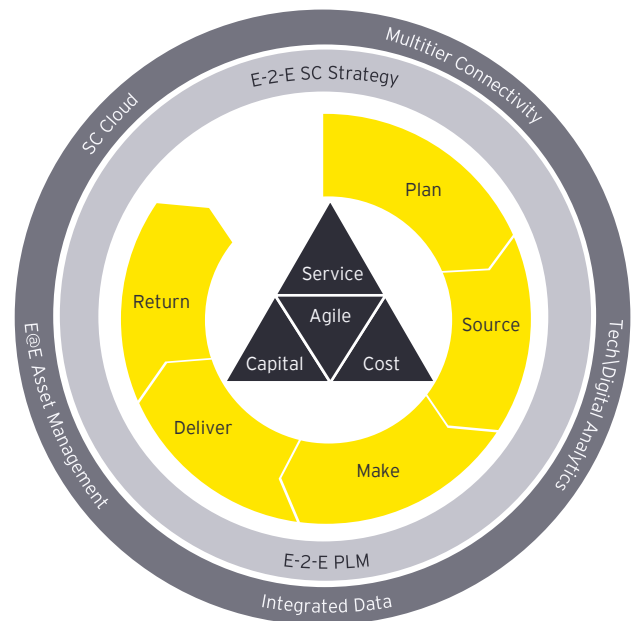
Impact on the customer

- ▶ Poor operational efficiency leading to poor service quality to customers
- ▶ Mistrust and security concerns regarding customer data
- ▶ Delays or errors in processing orders, shipping or tracking leading to a poor customer experience

New digital operating model – improve cost and resiliency by harnessing data and AI

Companies should synchronize their supply chains using advanced digital technologies, multitier connectivity, improved processes and integrated data for improved collaboration across all supply chain functions and into the supplier ecosystem. These elements can help create the transformation from linear to autonomous supply chains with substantial business benefits.

A synergistic digitalized supply chain refers to a fully integrated and interconnected network that leverages advanced technologies to optimize efficiency, resilience and value creation.



Expected benefits

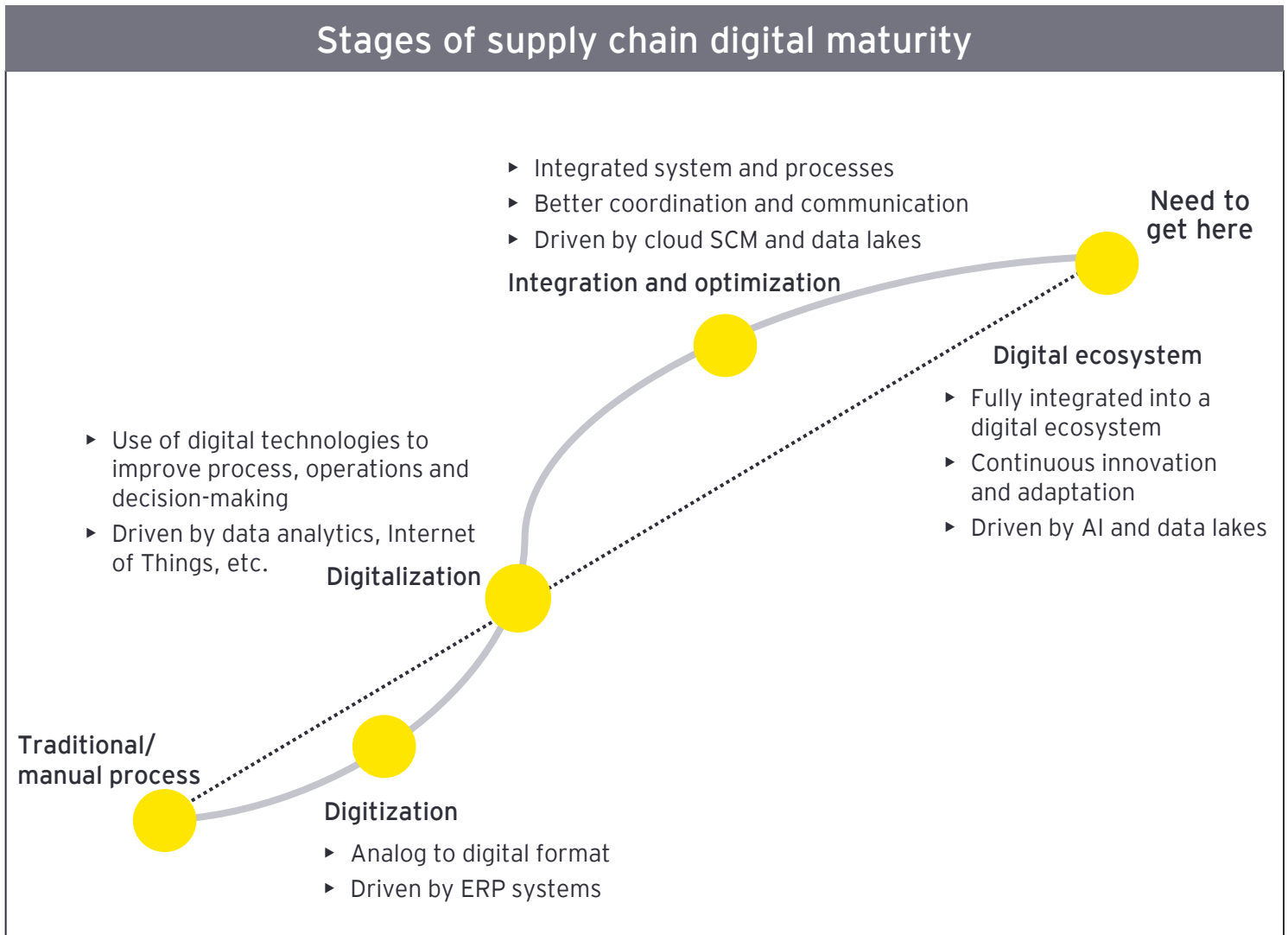
- ▶ Revenue increase of **2%-3%**⁵
- ▶ Working capital reduction (through inventory optimization) by **5%-10%**⁶
- ▶ **1%-3% EBIDTA** improvement⁷
- ▶ Comprehensive view of data across the supply chain
- ▶ Simulations that empower confident decision-making
- ▶ Improved risk management

⁵ EY analysis based on data from client engagements. Your results may vary.

⁶ Ibid.

⁷ Ibid.

Understanding digital supply chain maturity



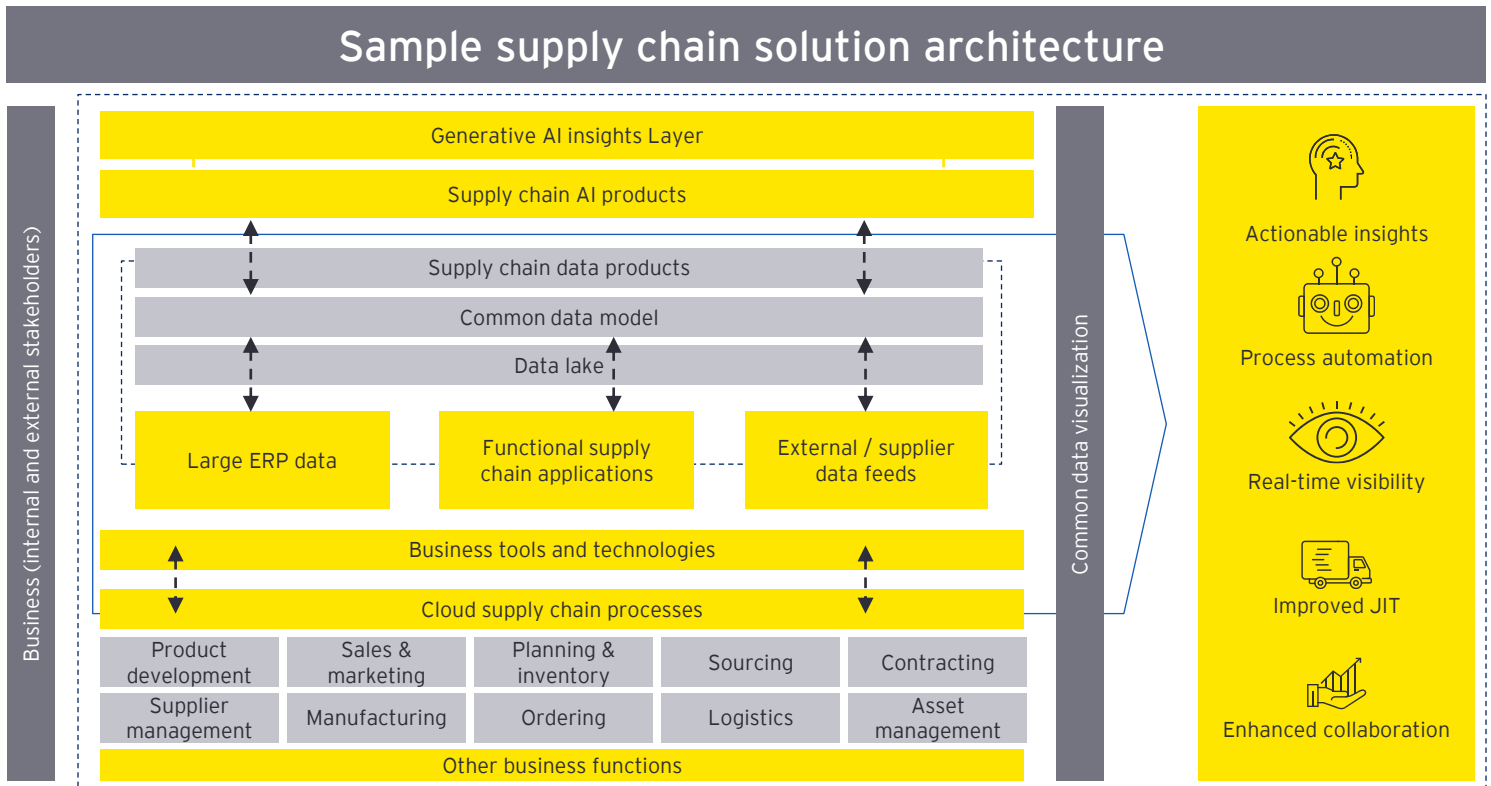
The journey toward supply chain digital maturity needs a synergistic approach to move from traditional, manual processes to a highly integrated and data-driven autonomous ecosystem

In the current scenario, organizations are often struggling at the digitalization stage of their supply chain and are not able to harness the value of their investments.

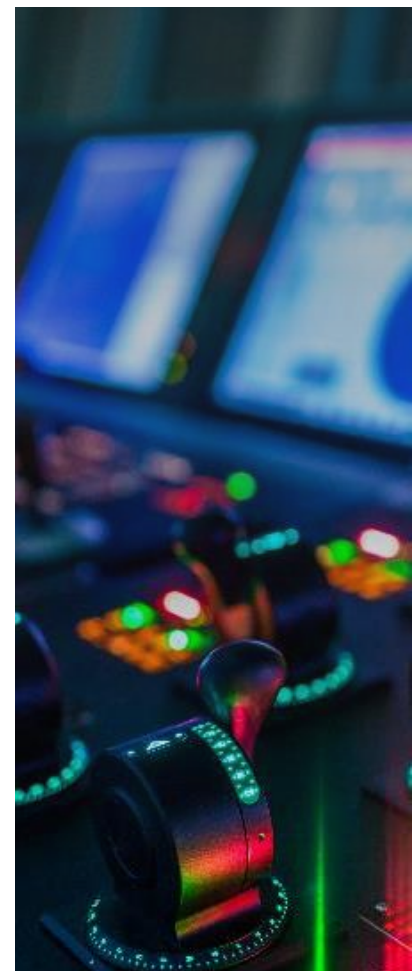
Key technologies, such as AI, cloud-based supply chain platforms and data lakes, are instrumental in advancing digital maturity and ascent to the next level.

For most businesses, progression through these stages does not always follow a strict sequence. With advanced technologies and tools, companies can advance swiftly through stages or sometimes jump S-curves on their way to improved business performance.

Powering tomorrow's supply chain with digital products using data lakes, AI and cloud



- ▶ **An intelligent cloud supply chain solution**, powered by AI and GenAI, can significantly enhance efficiency, reduce costs and improve overall operations. Utilizing these technologies, we helped a global food manufacturer to develop customized models to enable real-world simulations for each plant and network.
- ▶ **By employing a cloud-based platform**, companies can facilitate seamless data integration and real-time visibility of supply chain operations, fostering more proactive and agile decision-making. Leveraging this technology, we assisted a US retailer in predicting up-to-date product demands per store and reducing working capital costs by over \$100 million.⁸
- ▶ **The usage of data lakes** aids in storing and harmonizing vast sets of data from various sources, which can be further analyzed and processed by AI for valuable actionable insights.
- ▶ **GenAI can generate multiple potential scenarios** and solutions to improve processes, manage risks and optimize resource allocation, thereby making the supply chain more resilient and agile.



⁸ EY analysis based on client engagement data.

Impacts on end-to-end supply chain processes

AI, cloud technology for supply chains and data lakes are revolutionizing the entire supply chain process – from planning, sourcing and manufacturing to logistics, asset management and return management. This can lead to optimization of each component with seamless interconnectivity, resulting in significant benefits, such as cost savings, heightened operational agility, advanced asset usage, improved logistics, productive collaboration with vendors and efficient handling of returns.

End-to-end supply chain productivity, agility and resiliency improvement

Plan	Source	Make	Deliver	Return
<ul style="list-style-type: none"> ▶ Enhanced forecast accuracy ▶ Automated planning processes for replenishment ▶ Agility and flexibility against market dynamics ▶ Efficient inventory management 	<ul style="list-style-type: none"> ▶ Reduced supplier fragmentation ▶ Improved predictability ▶ Enhanced supplier collaboration ▶ Reduced supplier risk ▶ Cost reduction 	<ul style="list-style-type: none"> ▶ Increased operational efficiency ▶ Reduced downtime with predictive maintenance ▶ Enhanced production reliability ▶ Improved quality control ▶ Reduced production waste 	<ul style="list-style-type: none"> ▶ End-to-end visibility for order to delivery ▶ Improved space utilization for inventory ▶ Optimized lead time for just in time ▶ Enhanced compliance of items ▶ Reduction in delivery errors 	<ul style="list-style-type: none"> ▶ Improved asset utilization ▶ Improved lifespan of assets ▶ Efficient tracking and management ▶ Expedited returns of faulty items ▶ Improved product circularity

Approaches to harnessing the value of digitalization

Embarking on the path to a fully digital supply chain that is equipped to tackle the most pressing challenges, consists of a three-phased process. This approach, comprising define, design and deploy stages, is engineered to expedite value realization across the interconnected supply chain.

Stage	Process	Technology	Example use cases
<p>1</p> <p>Define</p>	<ul style="list-style-type: none"> ▶ Assess end-to-end processes to identify digitalization opportunities ▶ Prioritize areas with maximum potential for value creation 	<ul style="list-style-type: none"> ▶ Understand your current systems and data generated ▶ Identify gaps in your technology ▶ Analyze proposed technologies and potential use cases 	<ul style="list-style-type: none"> ▶ AI can be used to analyze sales data and market trends to create real-time demand models. ▶ With GenAI, inventory levels, production schedules and distribution plans can be optimized. ▶ Bots powered by GenAI can be used to negotiate cost and purchasing terms with vendors.
<p>2</p> <p>Design</p>	<ul style="list-style-type: none"> ▶ Develop a transformation roadmap, including: <ul style="list-style-type: none"> ▶ Intended goals ▶ Process changes ▶ Change management ▶ Timelines 	<ul style="list-style-type: none"> ▶ Choose specific technologies and use cases that can transform the end-to-end supply chain ▶ Include an integrated data lake ▶ Develop a detailed implementation plan 	<ul style="list-style-type: none"> ▶ GenAI in the supply chain can accelerate the time from design to commercialization. ▶ Digital manufacturing simulation and optimization can unlock capacity, reduce costs, and enable faster and better decision-making.
<p>3</p> <p>Deploy</p>	<ul style="list-style-type: none"> ▶ Implement the process changes ▶ Maybe involving pilot projects or a full-scale transformation ▶ Monitor projects closely to ensure that they align with your intended goals 	<ul style="list-style-type: none"> ▶ Start the integration of new technologies in line with process transformations ▶ Possible regular testing and adjustments needed to ensure optimal functionality 	<ul style="list-style-type: none"> ▶ GenAI can continually update and optimize delivery or pickup routes based on changing factors (traffic conditions, weather, etc.). ▶ AI can prioritize deliveries, leading to increased efficiency, reduced fuel costs and improved customer satisfaction.



Next steps

The triumph of digitalization in the supply chain is about more than just incorporating modern ERP systems and technologies. Success also hinges on an organization's capability to evaluate, consolidate, enhance and optimize various supply chain systems so that they work together harmoniously with humans at the center of your efforts.

It's time to embrace AI-powered tools and technologies and step into a future of advanced supply chain management.

Six considerations for supply chain technology deployments

- 1 Consider ROI at every step to continually justify your investments.
- 2 Refrain from trying to tackle everything at once – slow and steady wins the race.
- 3 Treat data as an asset and build digital products incorporating risk and security into every solution.
- 4 Ensure seamless stakeholder collaboration to improve end-to-end visibility.
- 5 Focus on implementing environmentally sustainable solutions and reducing waste.
- 6 Avoid functional excellence trap and focus more on cross-functional value generation.



Conclusion

The process of supply chain digitalization has its own challenges, and most organizations have yet to fully understand and utilize the potentials of this digital revolution as a strategic tool for achieving competitive advantage.

The role of emerging technologies, such as data lakes, cloud and GenAI, in transforming supply chains cannot be overstated. These technologies have proven instrumental in streamlining operations, improving efficiency and enhancing decision-making processes. For organizations to gain a competitive edge and maintain a sustainable value chain, they must aim to overcome these challenges and fully incorporate the technological advancements into their supply chain processes. With technology moving at an unprecedented pace, and consumer preferences changing at a moment's notice, there is no time to delay your digital transformation.

How can we assist on your digital transformation journey?



Implementation of data-focused solutions, such as data lakes, data fabric and analytics



Cloud strategy, cloud deployment, architecture and ecosystem management



Integration of innovative solutions in AI, machine learning, blockchain and advanced analytics

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