

Digital Supply Chain 101



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Executive summary

COVID-19 related supply chain disruption in 2020 cost \$4 trillion according to research from GEP.¹ This cost was not just due to disruption to the delivery of physical goods but also the need to pivot between product lines and to introduce new supply relationships to meet entirely new business models.

The pandemic highlighted a fact that many had known for some time: traditional supply chain structures and operations lacked agility and resilience in a world where disruption has become increasingly commonplace.

In fact, in 2023, KPMG found that 70 percent of organizations expected upstream supply disruptions, and 87 percent now see supply chain visibility as critically important for their business.²

Traditional supply chain models do not have the visibility, flexibility and adaptability necessary for success in modern business. Continuous disruptions have shown just how much they can limit speed and innovation. This is expected to lead to accelerated digital transformation, with the digital supply chain market poised to reach \$13.68 billion by 2030.³

The digital supply chain enables a shift from traditional, linear supply chain processes into a collaborative network that constantly optimizes operations based on timely insights shared across the connected ecosystem. It is based around a “digital backbone” that integrates new disruptive technologies—IoT, digital twin, AI and machine learning—with established supply chain solutions to automate processes and improve their quality. Where traditional supply chains plan and react, the digital supply chain is designed to predict and prescribe the actions to take.

Traditionally viewed as a cost center, digitally transforming the supply chain helps make it a profit center, driving business value through increased information sharing, collaboration and innovation. Despite these benefits, many organizations are still on their journey towards a truly digital supply chain.

How can an organization, whether small, medium or large, take full advantage of the digital supply chain? What are the key use cases? What technologies underpin the transition to a digital supply chain?

This Digital Supply Chain 101 paper answers these important questions.



1 Supply Management, Total cost of supply chain disruption in 2020 'was \$4tn. (2021)

2 KPMG, The future of supply chain. (2023)

3 Allied Market Research, Digital Supply Chain Market. (2022)

What is the digital supply chain?

Today's most successful companies have all reached a higher level of digital sophistication and maturity within their supply chains. In fact, according to data from IDC, there is a clear correlation between digital maturity and better business performance, both in terms of higher revenue growth and higher profitability.⁶

Traditional supply chains are mostly linear with steps that are disconnected and largely independent. These supply chains function on legacy systems and are guided mainly by historical transactional inputs. Supply chain digitization is the process of fully or partially automating manual supply chain processes using digital technologies.

Unlike traditional supply chains, digital supply chains function in real time, are dynamic and can adapt to changing circumstances. Relying on ecosystems of interconnected and integrated partner and supplier communities, they connect internal systems and data with external information to facilitate information sharing and collaboration and deliver end-to-end visibility (See Table 1).

Digital supply chains require a "digital backbone" that enables all supply chain transactions to occur digitally and facilitates efficient and effective collaboration between supply chain partners. This creates a central foundation, which organizations can then extend with diverse technologies to pursue business goals and seize new opportunities.

The real power of the digital supply chain lies in its ability to deliver insights to improve decision-making to ensure business effectiveness, reduce costs, better manage supply

Table 1: Traditional supply chain vs. digital supply chain models

	Traditional supply chain	Digital supply chain
Orchestration	Linear	Networked
Administration/KPI tracking	Highly manual, slow and inaccurate	Highly automated, real-time and accurate.
Communication/transactions	Highly manual with heavy reliance on telephone, fax and email	Highly automated with broad use of EDI/B2B integration, portals and/or automated data capture
Nature of collaboration	Reactive, periodic	Proactive, continuous
Visibility	Limited, historical	End-to-end, near realtime
Decision-making	Based on incomplete, historical information	Based on end-to-end, real-time information

⁶ IDC, Next-Generation B2B Integration Enables a Digital-First, Resilient Supply Chain. (2023)

Digital supply chains overcome some of the most pressing challenges for organizations and help them achieve strategic goals by:

- Replacing paper documents with digital information processing.
- Complementing or replacing manual data entry with highly automated data entry and management.
- Enabling efficient data sharing and collaboration between previously disconnected business departments, such as procurement, logistics, planning, accounting, etc.
- Improving visibility and transparency across the entire supply chain.
- Enabling increased and more efficient information sharing and collaboration across the external ecosystem, including suppliers, customers and partners.
- Increasing supply chain adaptability and resilience by improving trading partner onboarding and performance management.
- Supporting more effective supply, demand and inventory planning and fulfillment.
- Enabling better tracking of inventory and assets throughout the supply chain.
- Reducing supply chain risk by facilitating better information security, regulatory compliance and risk insights.

As a result, organizations with highly effective digital supply chains can manage their assets, employees, resources and trading partner communities more effectively. They gain an advantage over their competitors and can better serve their customers.



Key benefits of the digital supply chain

Digitization of the supply chain enables better use of resources, optimized production, stronger supplier relationships, increased visibility and a healthier bottom line. Key benefits include:

Reduced cost and improved revenue

By virtually eliminating manual tasks, the digital supply chain dramatically reduces human error and input time while freeing staff for higher value activities. According to one study, the average annual cost for organizations to manually enter data into ERP and back-end systems alone was more than \$1 million.⁷ At a strategic level, improving the speed, quality and accuracy of tasks, such as demand forecasting, inventory management and order fulfillment, directly drives revenue and profitability (See Table 2).

Increased supply chain visibility

In a recent survey, addressing supply chain visibility gaps was prioritized as a top area for investment, reported by 68 percent of the respondents.⁸ The problem is the vast number of disconnected legacy systems used to address each stage in the traditional supply chain process.

This includes a lack of integration between information technology (IT) and operational technology (OT) systems.

⁷ Supply Chain Management Review, Study: 85 Percent of CFOs Expect Digitization to Improve Cash Flow,

⁸ Reuters Events, The state of European Supply Chains 2024. (2024)

Digitizing the supply chain creates opportunities for breaking down these barriers and connecting disparate systems both internally and externally. As a result, data can pass quickly and securely across the entire supply chain, enabling near real-time visibility. Employees can instantly see the current status of any activity and make informed decisions.

Improved decision-making

For most businesses, decisions need to be made quickly, and agility is vital. Basing decisions on historical reports and spreadsheets is far from optimal. Research has shown that more than two thirds of supply chain managers still use Microsoft® Excel® as an inventory management tool.⁹ This is simply not tenable in the world of big data.

A digitized supply chain allows organizations to gather and analyze massive amounts of data with far less effort and in far less time. The ability to gain insight from real-time data generated anywhere in the supply chain offers significant benefits in every aspect of the business, from product development to sales and marketing to customer experience.

Building supply chain resilience

The COVID-19 pandemic revealed serious and systematic weaknesses in supply chains. Global supply chains had become extended and complex to take advantage of low-cost sourcing, lean inventories and manufacturing practices, such as “Just in Time.” When supply chains became disrupted, organizations found it difficult to maintain logistics routes or switch to alternative suppliers.

IDC found that diversifying their sourcing strategies, along with improving supply chain visibility, were the most important focus areas for organizations to mitigate the impacts of disruption.¹⁰ Digital supply chains allow for deeper connections between trading partners, as well as an ecosystem of suppliers, which makes alternative sourcing arrangements faster and more effective. Overall, digitization helps build resilient and sustainable supply chains that increase mobility and accountability while enabling proactive responses to emerging problems.

Supply chain automation

Automation improves overall supply chain performance by eliminating friction and choke points between functions. In addition, it creates new business opportunities and better customer experience through enabling innovative self-service options. However, most organizations have still not experienced the full benefits of supply chain automation. With increasing use of AI and the need to automate more complex processes, the underlying process digitization capabilities and data quality enforcement play an increasingly crucial role in delivering the desired outcomes.

Driving collaboration and innovation

The digital supply chain enables multi-enterprise collaboration by breaking down data silos between organizations. It allows seamless and secure integration between the systems of the organization and its suppliers, customers, logistics and other partners.

9 Zippia, 17 stunning supply chain statistics. (2022)

10 IDC, Rethinking the supply chain to enable a more resilient business. (2020)

Digitizing the supply chain creates opportunities for breaking down these. Through digital enablement, data becomes actionable; workflows are streamlined; and critical information such as order milestones and inventory statuses can be shared securely and instantly. Organizations and their partners can quickly establish shared responsibilities and accountability and track them in real time.

As organizations look towards their partners to improve their competitiveness in the market and drive increased collaboration in product design and development, a digital supply chain is the foundation of success.

Enhancing sustainability

With consumers increasingly favoring companies and products they perceive as sustainable, brands are seeking external partners with good sustainability records and may require their existing partners to address identified gaps.

The digital supply chain has a major role to play in helping businesses reduce their impact on the environment through efficient management of stock and avoidance of waste. Digitization enables improved inventory and materials management, ensures accurate tracking of goods in transit and helps avoid materials shortages, all of which leads to more efficient use of resources. It also improves visibility into the supply chain, which helps organizations to better identify and address risks related to sustainability and ethical business practices.

Table 2: In figures: Key benefits of the digital supply chain

Cost reduction	Up to 20%
Revenue growth	Up to 6%
Customer satisfaction improvement	Up to 30%
Perfect order rate improvement	Up to 40%
Inventory turns improvement	Up to 40%
Plant productivity improvement	Up to 25%
Plant productivity improvement	Up to 60%

(Sources: BCG¹² and Bain & Co.¹³)

Enabling technologies

An organization will increase revenue, save expenses, reduce risk and boost customer experience by developing digital supply chain capabilities to improve operations and make smarter decisions faster. There are a number of complementary digital technologies that enable this approach, including:

Multi-enterprise cloud networks

Crucial to any effective digital supply chain is what Gartner describes as the Multi-Enterprise Collaboration Network (MCN).¹⁴ These cloud-based networks act as a central, end-to-end platform that connects the enterprise with its customers, suppliers, distributors and other partners.

¹² BCG, Digital supply chain. (2022)

¹³ Bain & Co., Supply chain lessons from Covid-19. (2020)

¹⁴ Gartner, Market Guide for Multienterprise Collaboration Networks (2023)

Cloud-based networks allow organizations to quickly and securely scale as supply chain operations change to meet new market conditions or expand into new sectors. A multi-enterprise platform—such as OpenText™ Trading Grid™—allows individuals and organizations to make use of shared data infrastructure to facilitate and drive improved information sharing, collaboration and decision-making within a unified, flexible ecosystem. With multi-party platforms, an organization can easily build resilience and agility into its digital supply chain.

Internet of Things

Internet of Things (IoT) benefits the supply chain through increased visibility, real-time tracking of assets and shipments, better collaboration and enhanced customer service. It provides an important link between the physical and digital worlds through tags and sensors that can monitor a wide range of goods and assets as they pass through the supply chain.

For example, using OpenText™ Aviator IoT integrated with a multi-enterprise cloud platform, data from IoT devices can be aggregated and shared with employees along the supply chain for improved operations and decision-making. IoT enriches and complements traditional supply chains, allowing the right information to reach the right people to help them to collaborate on potential supply chain issues and bottlenecks.

AI and machine learning

AI and machine learning, through solutions such as the OpenText™ Aviator portfolio, build on analytics capabilities to inform real-time decision-making. Their ability to analyze huge volumes of data, understand relationships, provide visibility into operations and support better decision-making makes them a potential game changer for the supply chain. Effective AI-enabled systems rely on high degrees of control over data management to identify, aggregate and harmonize the data so that AI capabilities can be successfully applied.

McKinsey research suggests that companies that have adopted AI-driven Supply chain management have improved logistics costs by 15 percent, inventory levels by 35 percent and service levels by 65 percent.¹⁵ A more recent McKinsey survey shows that with the rise of generative AI, overall adoption rate for AI technologies spiked up to 72 percent among the surveyed organizations.¹⁶

Digital twins

A digital twin uses IoT, AI and other technologies to construct a virtual model of a physical product or a process. It allows the enterprise to run scenarios and simulations based on real world—and real-time— data to perform predictive modelling and make recommendations on how to respond to the changing conditions of supply chain activities or assets.

¹⁵ Forbes, Artificial Intelligence: Not A Panacea For Supply Chain Issues, But Extremely Helpful. (2022)

¹⁶ McKinsey, The state of AI in early 2024: Gen AI adoption spikes and starts to generate value. (2024)



Digitizing the supply chain creates opportunities for breaking down these or example, supply chain digital twins can provide instant and actionable insights into both planned and accomplished work and sales orders, demand and supply, product lifecycles and much more. With digital twins, businesses can build a clearer picture of their internal and external operations, reimagine supply chain processes and enhance communication across their entire ecosystem of trading partners.

Supply chain command centers

The supply chain command center essentially centralizes supply chain data insights across functions to better manage the complexity of modern, global supply chains. According to Gartner, “supply chain command centers can provide additional visibility, understanding of implications for supply chain operations and response to signals and events.”¹⁸

However, a supply chain command center is not a single solution, it is a modular toolkit of data integration, data management, supply chain application and analytics solutions that help solve supply chain problems, sometimes even before they arise.

Blockchain

Blockchain technology can be used to record sequential transactions to track the progression of assets through the supply chain or electronically initiate and enforce contracts. It acts as a public, immutable ledger to provide high levels of transparency and integrity in operations and fast, secure and low-cost transactions. Each stage of the transaction is created as a separate block in the chain so it can be tracked and monitored in real time.

Blockchain can also help remove intermediaries from supply chain processes. For an organization with multiple manufacturers and carriers across the globe, blockchain technology can replace the need for costly third parties to control the provenance and track goods and assets in the supply chain. For example, it can record essential information of conditions, such as temperature and humidity, under which a product is transported and delivered, as well as location and other associated shipment information.

Identity and access management

As complexity and use of digital technologies increase, robust identity and access management becomes a central tenet of the digital supply chain. An organization can have thousands of users accessing data and millions of IoT devices embedded. Governance over activity and security must be pervasive, covering both internal personnel and external partners to enable fast and effective provisioning and de-provisioning of access.

Some cloud-based identity management systems—such as OpenText™ Core Secure Access—include “delegated administration” to allow authorized third parties to manage their own access requirements. This can improve performance of identity management in the digital supply chain and greatly reduce the administrative burden.

Top use cases for the digital supply chain

The digital supply chain is evolving into an interdependent ecosystem with a strong emphasis on co-creation and collaboration across a large and diverse range of suppliers, customers, logistics providers and other partners. Deploying disruptive technologies enables the development of innovative use cases across the extended enterprise, including:

Financial management

Digital supply chains have the power to considerably reduce wait times and facilitate the execution of orders, invoicing and payments to increase financial performance. Both the accounts payable (AP) and accounts receivable (AR) processes can be optimized by automating many financial tasks and gaining visibility into real-time supply chain data. For example, electronic invoicing reduces costs by more than 60 percent²⁰ and speeds up the cash settlement process.

By accelerating payments, organizations can take advantage of attractive incentives, such as early payment discounts. For buyers spending millions or billions of dollars on goods and services each year, these discounts can represent significant cost savings.

Inventory management

The first step in inventory optimization is to reliably establish what assets the organization has. That means how much is in inventory, where it resides and its status. Previously, inventory management revolved around inefficient and error-prone paper forms and spreadsheets. This led to under-utilization and poor maintenance of assets, production bottlenecks and unplanned downtime.

With a digital supply chain, organizations can automate manual processes and provide real-time visibility into their entire asset portfolios. Driven by data from IoT devices, digital inventory management systems help decrease costs, reduce inventory levels, improve inventory turns and decrease time to cash.

Logistics/asset tracking

Effective track and trace capabilities are becoming increasingly vital for organizations in a wide range of industries. Real-time location—and in some cases condition—information from IoT sensors and devices allows all assets to be tracked as they move within production spaces, warehouses and delivery routes. This helps optimize inventory, reduce time wasted to locate missing assets, reduce shrinkage and theft and increase workplace safety while minimizing risk.

This information can be combined with other sources of supply chain data within a digital twin to optimize performance and minimize disruption. For example, weather and travel data can help optimize logistic route planning and even delivery vehicle selection to help control conditions for food or pharmaceuticals in transit.

²⁰ Billentis, The e-invoicing journey 2019-2025. (2019)

Supply/demand forecasting

Organizations had to rely on incomplete or inaccurate historical data in the past to conduct supply or demand forecasting and planning. A digital supply chain provides organizations with real-time data on the amount of inventory needed, the amount of inventory currently in transit and where that inventory is. Organizations can use this information to not only optimize inventory levels but also to quickly identify demand signals for new or existing products.

The pandemic showed the pressing need for these capabilities. In fact, US retail operations have a supply chain accuracy of only 63 percent, meaning a third of the time they do not know their stock levels or where it is.²¹ Research suggests that only about one-fifth of organizations have the digital supply chain capabilities to effectively address shifts in supply or demand before they become critical.²²

Supply chain risk management

Companies operating global supply chains face a compliance and regulatory environment that is complex and constantly changing. For example, the German Supply Chain Due Diligence Act requires businesses to monitor their entire supply chains for human rights violations and compliance with environmental standards. Penalties can be as severe as two percent of annual turnover.²³

The scale of legislation and regulation has never been so broad or impactful. The EU has introduced similar due diligence legislation and Scope 3 emissions reporting requirements are challenging manufacturers' ability to capture data from their operations. And it is not just about sustainability. There are now more than 180 jurisdictions that have or are planning to introduce e-invoicing mandates to improve efficiency and address problems with tax evasion. Digitizing their supply chain is essential for organizations to have the visibility and control needed to meet compliance requirements and reduce risk.

This is equally true in the sphere of cyber security, where supply chain attacks are increasingly common. Hackers target third- or fourth-tier suppliers and use their connected networks to gain access to the target company. According to research, 85 percent of organizations report at least one attack on their supply chain every year.²⁴ Building digital security throughout the supply chain takes collaboration and coordination that extends beyond the enterprise and involves identity management, as well as cyber security solutions.



21 Procurement Tactics, Supply chain statistics. (2022) 22 Ibid.

23 Forbes, Supply chain compliance is about to get a whole lot tougher. (2022)

24 Supply Chain Digital, The importance of managing risk in the supply chain. (2022)

Getting started

Digitally transforming supply chains is now crucial for most organizations. It is an increasingly important step to ensure long-term business success, drive efficiency, deliver sustainability and, most importantly, create better customer experiences.

However, this is no simple undertaking. It is unlikely that any business can implement a “rip and replace” strategy when digitizing their supply chain. Instead, an incremental, planned approach designed to produce tangible benefits early is more appropriate.

How can an organization begin its journey? Here are some key questions to ask:

Do I have a clear vision guiding my digital supply chain?

The first step in the journey to a digital supply chain is to align desired supply chain capabilities with the organization's overall vision and strategy. This must extend beyond the supply chain organization and encompass leaders from across the business to define goals and targets. It is important that the initial vision is flexible to accommodate a rapidly changing business environment and future developments in planning, technology, operations and customer experience.

Do I have a clear view of my current situation?

To effectively apply the digital supply chain vision, the organization needs to fully understand the current state of its supply chain. It needs visibility into its resilience, flexibility and risks. It is important to start by identifying where there are issues with supply chain performance and understand where digital technologies can lead to improvements. By objectively evaluating digital capabilities, it becomes clear where gaps exist and how best to bridge them.

Do I have the right skills?

In almost every case, a digital supply chain will require new skills that are lacking in the current organization. More than half of organizations say a lack of staff with new technology skills, such as software design, data integration and AI and analytics, is holding back their digital transformation initiatives.²⁵ This challenge is exacerbated in the supply chain, where there is also a need for new skills to meet changes in processes across different functional areas. Organizations need to audit their skills base, identify where new skills are required and ensure that they fully understand how applying these new skills will help deliver their business goals.

Do I have the right people involved?

It is clear that digital transformation of the supply chain will span—or affect—virtually every functional area within the organization. It is essential that all relevant staff are involved from the outset. Everything must be driven by functional requirements and knowledge.

²⁵ Computer Weekly, Lack of tech skills is delaying projects. (2022)

Organizations can start by ensuring high levels of competency and performance around basic, traditional supply chain functions. This must encompass suppliers, customers and other partners as well. The organization must also be aware that one goal for any digital supply chain is to break down traditional functional silos, such as those between procurement, planning and operations, to transform business performance. These functional silos reach beyond the four walls of the organization.

What is the role of my suppliers and customers?

Suppliers and customers are key participants, but they are also much more. Digital supply chains will increase information sharing and collaboration throughout the new ecosystem. It is essential to understand the process, structures and technical infrastructure that suppliers and customers are using and identify how best to integrate with them. These participants also provide valuable sources of supply chain data, which the organization can use to identify improvement areas and optimize performance. It is worth remembering that suppliers and customers are experiencing digital supply chain transformation movements from multiple partners.

How should I involve my technology partners?

There are so many facets to digitally transforming a supply chain that, even where the organization can recruit the necessary skills, it is still challenging to properly staff each element of the program. Working closely with technology partners can help develop a successful and sustainable supply chain strategy that meets the specific goals of the enterprise.

Technology partners not only bring a digital solution toolkit but also industry expertise and vast experience in transformation program delivery. The best partners offer proven solutions but also understand where the organization can wisely innovate to bring maximum results with minimal risk.

How should I prioritize projects?

Technology programs are often driven by identifying the lowest-hanging fruit that will produce quick wins. While it is important to establish early momentum, it is equally important that the program does not get locked into short-term thinking.

Digital transformation of the supply chain will not happen overnight and it is essential that the projects selected at each stage form a recognizable part of the long-term strategy. Working with the right technology partner can help identify projects and accelerate program elements.



Resources

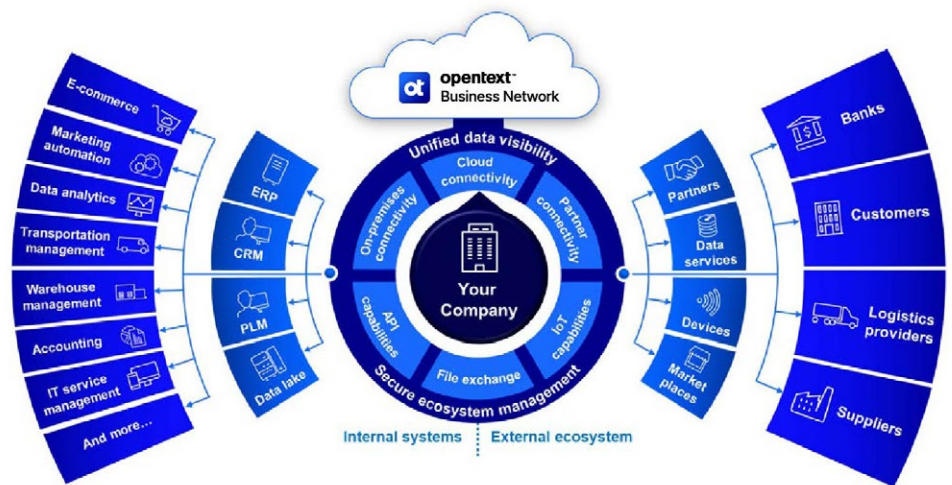
[Learn more about digitizing supply chains](#) >

OpenText powers digital supply chains

OpenText is a recognized leader in delivering supply chain solutions that help companies digitize information flows across their supply chain operations.

[OpenText™ Business Network](#) integrates people, systems and things across a secure common platform that can underpin digital transformation initiatives.

In addition to automating internal and external processes to drive greater process efficiencies and business optimization, companies can leverage a powerful suite of cloud applications, which allows internal and external participants to gain visibility and collaborate across the supply chain. They can also control access to information and applications across the business ecosystem with advanced identity and access management capabilities.



Connect once, reach anything with OpenText Business Network

With OpenText Business Network, companies can power their digital supply chain with a scalable integration platform that meets changing business needs, provides insights to automate and optimize processes and supports regional and industry compliance requirements.