

Digital Supply Chain: Digital networking of the entire supply chain

The Digital Supply Chain refers to the end-to-end digital networking of all processes, data flows and actors along the supply chain – from demand planning through procurement and manufacturing to delivery. It replaces isolated system silos and media disruptions with integrated, often cloud-based platforms and real-time data. For industrial buyers, it is today a central lever for measurably reducing lead times, inventories and supplier risks. The term describes less a single technology than an integrated concept of system architecture, data model and process organisation.

Key facts

- The Digital Supply Chain connects planning, procurement, production, logistics and administration via a shared digital data basis.
- Typical building blocks are ERP and ERP-adjacent systems, supplier portals, e-procurement, transport and warehouse systems as well as analytics and AI applications.
- In practice, a phased introduction is often chosen – for example with Catalogue Buying, goods receipt or transport data – rather than an all-encompassing large-scale project.
- A central prerequisite is a consistent data model, especially for items, suppliers and purchase orders.
- Digital supply chains improve responsiveness to disruptions, but do not replace functioning inbound delivery concepts and supplier management.
- As a guideline, a PO share via electronic interfaces of well above 50 % is considered a realistic target for mid-sized companies in practice.

Definition: Digital Supply Chain

A Digital Supply Chain is a supply chain whose planning, procurement, production and logistics processes are digitally integrated and based on continuously available, preferably real-time data. It connects internal systems (ERP, MES, PPC) with external partners such as suppliers, freight forwarders and customers via interfaces, portals or marketplaces.

Distinction from the classic supply chain

The classic supply chain works with batch processing, e-mail coordination and paper-based documents; feedback between the stages often takes days. The digital variant, by contrast, is characterised by a continuous data flow that makes status changes immediately visible. This changes the role of procurement: from reactive order processing to data-driven steering. It is important that digitalisation here does not mean automation without process orientation – a poorly defined fulfilment process cannot simply be “digitalised” but must be cleaned up first.

- Continuous data flow instead of media disruptions
- Real-time or near real-time visibility

- Automated standard processes, manual exceptions

Key building blocks

Typical components are an ERP system as the backbone, a supplier portal for enquiries, confirmations and invoices, an e-procurement module with Catalogue Buying for catalogue goods as well as transport management and goods receipt systems. In addition come analytics and forecasting tools that derive planning recommendations from inventory, movement and market data. Those buying subcontracted services such as components or contract manufacturing additionally connect these building blocks with drawing and document processes, for example within the framework of PPAP or APQP for series parts.

- ERP as the central system
- Supplier portal and e-procurement
- Transport, warehouse and goods receipt systems
- Analytics, forecasting and AI applications

Data model and master data as the foundation

Without clean master data, no digital supply chain works. Item numbers, plant details, packaging markings, lead times and minimum order quantities must be maintained consistently and kept up to date in the data model. In practice, a considerable share of errors in digital processes stems from inconsistent master data – for example when an A-supplier is stored in the system with deviating data. Data quality is therefore not an IT side issue but a procurement task with clear responsibility.

- Consistent item and supplier master data
- Maintenance of lead times and minimum quantities
- Clear data responsibility between procurement and IT

Methods and approach for building a Digital Supply Chain

In practice, the build-up rarely succeeds with one large-scale project. A phased approach has proven successful, ranging from process analysis via pilot areas to the roll-out phase and honestly taking into account the organisation's sourcing maturity.

As-is analysis and process clean-up

First, processes, interfaces and media disruptions are documented: how do enquiry, ordering, confirmation, goods receipt and invoice processing currently work? Where does duplicate work arise? Process mapping and an operating organisation with clearly defined roles have proven methodically effective. Systems should only be selected afterwards – not the other way round. A common mistake is simply transferring existing inefficiencies into new systems.

- Process map with interfaces and media disruptions
- Prioritisation by effort and leverage
- Definition of the target operating organisation before tool selection

Phased introduction with pilot areas

It has proven effective to start with a clearly delimited area, such as C-parts via Catalogue Buying or approval invoices via PO-Flip, where an invoice draft is generated directly from the purchase order. After a successful pilot phase, more critical processes follow, such as supplier integration via EDI or API. Before each step, it should be checked whether the respective fulfilment process is standardised enough to be automated.

- Start with simple, high-volume processes
- EDI/API integration of A-suppliers as the next step
- Training and change support from the outset

Supplier integration

The Digital Supply Chain does not end at the factory gate. A-suppliers are typically connected via EDI or API, smaller suppliers via a web portal. A tiered strategy is important: not every supplier needs the same depth of integration. Within a Preferred Supplier Programme, the integration of strategic partners can be established as a joint development project, complemented by elements such as co-creation with suppliers for new products.

- Tiered integration according to supplier relevance
- Portal for SME suppliers
- Integration of strategic partners as part of the supplier programme

Key KPIs of the Digital Supply Chain

Digitalisation justifies itself through measurable effects. Reliable metrics make progress visible and help justify investments. The following KPIs have established themselves in industrial practice as powerful steering variables.

Process and automation levels

Key metrics are the share of electronically triggered purchase orders (PO share via catalogue or interface), the automation rate of invoice processing and the share of purchase orders without manual rework. In addition, Spend under Management shows which procurement volume is actively and systematically managed at all. Higher automation is intended to free up capacity for strategic tasks here – this can be measured over time in advisory effort per purchase order.

- Electronic PO share
- Share of automatically posted invoices
- Spend under Management

Delivery and inventory metrics

On Time In Full (OTIF), lead time from enquiry to confirmation as well as inventory coverage and stock values show whether the networking actually works. Delivery reliability is typically evaluated per supplier and plant and feeds into supplier evaluation, often together with a scoring matrix for quality, delivery reliability and service. Falling inventories with unchanged availability are a good sign of successful data transparency.

- OTIF per supplier and plant
- Lead time from enquiry to order confirmation
- Inventory coverage and capital tie-up

Data and risk metrics

Master data quality (e.g. share of complete item master records), interface availability and the number of open shortage risks complete the picture. Within Supplier Risk Management, it can additionally be measured how quickly risk reports are recorded and alternative qualifications are completed. Metrics without referenced targets, however, are ineffective – target lines and responsibilities must always be included.

Risks and controls of the Digital Supply Chain

Digitalisation creates new dependencies: on systems, data quality, interfaces and providers. Those who identify and control these risks early avoid expensive misdevelopments.

Cyber risks and resilience

The more strongly supply chain and production are networked, the larger the attack surface. Relevant are access and authorisation concepts, encrypted interfaces, contingency plans and defined fallback processes if systems fail – for example a manual ordering procedure for critical parts. Supplier failures can be systematically assessed with methods such as the Bow-Tie Analysis and safeguarded with measures such as dual sourcing or a Milk Run for consolidating transport.

- Authorisation concept and encryption
- Fallback processes for system failures
- Risk assessment of critical suppliers

Data quality and media disruptions

The most common practical mistake is maintaining data in parallel in legacy systems and new platforms. This creates discrepancies that in the extreme case lead to incorrect orders or production stoppages. Controls include master data audits, reconciliation between purchase order and confirmation as well as clear rules on which data source is leading in which case. Goods receipt must also be reported back digitally against the purchase order, otherwise the chain falls apart downstream again.

Contractual and legal issues

Data protection, order processing, cloud clauses and liability issues in the event of system failures must be regulated contractually. In international business, classic payment and hedging mechanisms remain relevant: cash against documents (CAD) and letters of credit can be digitally supported but do not replace a verified contractual basis. Legal details – for example on liability for disruptions in networked systems or on data transfers abroad – must always be assessed on a case-by-case basis with expert review.

- Data processing agreements and data protection review
- Clear SLAs with system and portal providers
- Individual legal review on a case-by-case basis

Current developments and outlook

The Digital Supply Chain continues to evolve: from process automation to forward-looking steering with AI, standardised data exchange concepts and stronger networking across company boundaries as well.

AI and forward-looking planning

Artificial intelligence increasingly supports demand forecasting, the detection of supply risks from early indicators and the automatic enrichment of tender documents. In strategic procurement, AI tools support, for example, Should-Costing analyses with which target costs for components are derived, as well as negotiation management through price analyses. The results remain decision support – responsibility lies with the buyer.

- Forecasts and early warning indicators
- Automated price analyses

- Support with Should-Costing

Standardisation and data exchange

Across industries, standards are emerging for the electronic exchange of product and supplier data in order to reduce interface costs. At the same time, digital marketplaces are gaining importance, through which buyers can compare and directly commission subcontracted services – for example for manufacturing processes such as machining or sheet metal working. The sourcing maturity of the organisation determines how quickly such channels can be used productively; a non-open procedure under procurement law, by contrast, primarily concerns public clients and can be digitally accompanied.

Resilience and sustainability as drivers

Supply chain disruptions of recent years have put resilience on the agenda: more transparency down to the sub-supplier level, alternative qualifications and more flexible inbound delivery concepts such as Cross Docking or Milk Run are gaining weight. In parallel, customers and regulators increasingly demand proof of origin and production conditions; digital supply chain systems make such evidence considerably easier – the specific compliance obligation must be examined on a case-by-case basis.

- More transparency down to Tier 2/Tier 3
- Flexible inbound delivery concepts and Cross Docking
- Digital evidence for sustainability requirements

Typical metrics

Electronic PO share: > 50 % (guideline value)

Share of purchase orders placed via catalogue or interface; mid-sized company targets are often considerably higher.

OTIF (On Time In Full): > 95 %, for A-suppliers > 98 %

On Time In Full, depending on industry and part criticality.

Invoice automation rate: > 70 %

Share of invoices posted automatically, e.g. via PO-Flip.

Spend under Management: > 80 %

Share of procurement volume under active, system-supported control.

Practical example

A mid-sized machinery manufacturer with around 400 employees had previously handled purchase orders by fax and e-mail; confirmations were transferred manually into the ERP and invoices were checked twice. Within around 18 months, the company built a Digital Supply Chain in three stages and noticeably reduced the effort per purchase order.

- Stage 1: C-parts via Catalogue Buying with approvals in the specialist department instead of procurement; invoices generated directly from the purchase order via PO-Flip.
- Stage 2: EDI connection of the five A-suppliers for order, confirmation and delivery note; digital goods receipt with scanning of packages.
- Stage 3: Supplier evaluation based on OTIF and quality data in a scoring matrix, linked to the Preferred Supplier Programme and a structured Supplier Risk Management.
- Result according to internal review: significantly less rework in procurement, shorter lead times and better inventory transparency – with moderate investment costs.

Conclusion

For industrial buyers, the Digital Supply Chain is not an end in itself but a tool for measurably reducing process costs, inventories and supply risks. Clean processes and master data before system selection as well as a phased approach with clear pilot areas are decisive. Supplier integration – differentiated by supplier relevance – determines the actual benefit. Those who consistently track KPIs such as OTIF, electronic PO share and Spend under Management make progress visible and are not blinded by software promises. In the end, what counts is the combination of technology, operating organisation and lived collaboration with suppliers.

Frequently asked questions

What does Digital Supply Chain mean?

Digital Supply Chain refers to the end-to-end digital networking of all processes and data flows along the supply chain – from demand planning through procurement and manufacturing to delivery. Instead of isolated systems and media disruptions, all parties work on a shared, as up-to-date as possible data basis. This includes ERP systems, supplier portals, e-procurement as well as transport and analytics solutions.

What benefits does a digital supply chain offer procurement?

Typical benefits include lower process costs through automated ordering and invoicing processes, faster feedback from suppliers and better inventory transparency. Procurement teams gain capacity for strategic tasks such as supplier development and negotiation management. In addition, supply risks can be identified earlier because status and market data are available in real time.

How do you start a Digital Supply Chain in a mid-sized company?

A phased approach has proven effective: first clean up processes and master data, then start with a simple, high-volume area – such as C-parts via catalogue ordering. This is followed by interface connections to key suppliers and digital goods receipt confirmation. In practice, one large-scale project all at once is usually riskier than gradual implementation with quick wins.

Which systems belong to a Digital Supply Chain?

The core is usually an ERP system, complemented by supplier portals, e-procurement modules with catalogue functionality, transport and warehouse management systems as well as analytics tools. What matters is not the number of systems but seamless integration via interfaces such as EDI or API. A consistent data model across all systems is the real prerequisite.

What does it cost to build a digital supply chain?

Costs depend heavily on company size, the system landscape and the depth of supplier integration. In practice, first stages such as catalogue ordering and digital approval workflows can be realised with licence, implementation and training costs in the medium range. Larger cost items often arise from interface connections and master data cleansing – detailed planning before project start pays off here.

What role do suppliers play in the Digital Supply Chain?

Without supplier integration, a digital supply chain remains incomplete: confirmations, delivery notes and invoices must flow back digitally. Strategic A-suppliers are typically connected via EDI or API, smaller suppliers via a web portal. The integration can be combined well with a Preferred Supplier Programme and joint development projects.