

Just-in-Time: Demand-driven procurement without inventory

Just-in-Time (JiT) is a procurement and production strategy in which materials are delivered exactly when they are actually needed. The aim is to minimise inventory, tied-up capital and waste along the entire value chain. For technical buyers, JiT means a high degree of coordination with suppliers, precise planning processes and active management of delivery risks. The approach originated in Japanese automotive manufacturing and is now an integral part of modern lean supply chains.

Key facts

- Just-in-Time procures material only at the point of actual need and significantly reduces warehousing.
- Typical implementation forms are call-off contracts, Kanban and supplier logistics zones at the manufacturing site.
- Success depends decisively on delivery reliability, process stability and short, reliable transport routes.
- Low inventories increase vulnerability to disruption – delivery fluctuations immediately affect production.
- Key metrics are delivery reliability (On-Time In Full), inventory coverage and delivery window spreads.
- In practice, a trend towards 'Just-in-Time resistant' concepts is emerging, such as medium-level buffers and multiple sourcing.

Definition: Just-in-Time

Just-in-Time refers to a principle of material flow-driven procurement and production in which material deliveries are timed exactly to match production requirements. The aim is to avoid inventory along the supply chain almost entirely. In contrast to classical demand-driven purchasing, control is not via static order quantities but via continuous consumption reporting.

Distinction from conventional planning

With classical planning methods, the optimal order quantity together with associated safety stock determines material receipt. With Just-in-Time, safety stock is largely eliminated; instead, contractually agreed response times, defined delivery intervals and stabilised processes ensure availability. Planning therefore shifts from quantity to reliability.

- Order quantity instead of batch size: consumption controls replenishment
- Safety stock is replaced by process and logistics quality
- Responsibility for provision partly shifts to the supplier

Origin and intellectual background

The concept was developed primarily in Japanese automotive manufacturing as part of the Toyota

Production System and follows the logic of eliminating waste (Muda) in all its forms – in particular superfluous inventory, waiting times and transports. JiT is therefore not merely a logistics method but part of a holistic lean philosophy.

Methods and approach: How Just-in-Time is implemented in procurement

Implementing Just-in-Time requires closely coordinated processes between procurement logistics and the supplier. The central instrument is the framework agreement with call-off character, supplemented by standardised signalling mechanisms for consumption-based replenishment.

Call-off contracts and framework agreements

The basis is typically call-off contracts over a defined period, usually twelve months, with fixed prices and price adjustment rules such as the raw material sliding price clause for metallic materials. The volume is stated as a forecast band; only short-term withdrawals are binding. In parallel, contracts clarify generic framework conditions such as liability, delivery readiness and Incoterm interpretation via a Master Service Agreement (MSA), for example DDP goods delivered directly to the production line.

- Clearly separate forecast band from binding call-off
- Contractually fix delivery windows and response times
- Agree price adjustment mechanisms early on

Kanban and e-Kanban

Kanban controls replenishment via consumption signals: empty containers or digital cards automatically trigger the subsequent order. E-Kanban systems transmit these signals to the supplier in real time and avoid manual media breaks. The number of Kanban loops, i.e. circulation containers, determines the buffer size and can be adjusted systematically.

- Number of loops = function of consumption rate, replenishment time and failure risk
- Digital signals reduce sources of error and process times
- Regular review of planning parameters (parameter maintenance)

Supplier logistics zones and consigned stock

In supplier logistics zones (Supplier Logistics Center), the supplier holds material in its own responsibility close to the factory; ownership transfers only upon withdrawal. Consignment stock works similarly, but on the factory premises. Both variants shift inventory and tied-up capital from the buyer to the supplier – correspondingly higher are the demands on its financing and process quality.

Important KPIs for controlling Just-in-Time

Without robust KPIs, Just-in-Time cannot be operated. Control is via delivery reliability, inventory metrics and process stability, which are regularly discussed in supplier management.

Delivery reliability and OTIF

On-Time In Full (OTIF) is the lead KPI for JiT-controlled supply: what percentage of line items were delivered complete and within the defined time window? Also relevant are the average delivery window spread, schedule variance and the number of short-notice rescheduling events. Deviations are frequently incorporated into Service Level Agreement (SLA) arrangements and escalation levels.

- OTIF as the basis for supplier evaluations and award decisions
- Evaluate time windows gradually, e.g. in half-day increments
- Causal analysis for every missed window

Inventory and process metrics

Further control variables are inventory coverage in days, turnover rate, capital tied up in inventory as well as the rate of phantom stock and inventory count discrepancies. For services and processing steps, process costing reveals which ancillary processes actually become cheaper through JiT integration. These KPIs belong in regular audit plan runs at the supplier.

- Inventory coverage as an early indicator of disruption risk
- Document the ratio of handling effort to savings
- Evaluate KPIs against defined target bands

Risks and controls in Just-in-Time

Just-in-Time shifts risk: instead of capital tied up in inventory, sensitivity to supply chain disruption arises. Anyone wishing to operate JiT must address risks systematically – conceptually through a risk policy and operationally through clearly regulated emergency and fallback processes.

Supply chain risks and contingency readiness

Typical risks include strikes, natural disasters, transport failures, geopolitical restrictions including supplier sanctions screening and blocked raw material imports – keyword CBAM reporting obligations for emissions-intensive preliminary products. A viable risk policy defines for which critical goods JiT is excluded, which dual sourcing strategies apply and how Supply Chain Resilience Management is organised with buffers and alternative routes.

- Categorise criticality by impact on production
- Examine dual sourcing for A-parts despite standardisation
- Deliberately reactivate storage strategy in part

Contractual and regulatory safeguards

In addition to SLAs, social and ethical obligations are contractually safeguarded: the Supply Chain Due Diligence Act extends audit obligations along the supply chain, which also applies to JiT suppliers. For international procurement, certificates of origin for customs benefits and clean import management are also relevant. In terms of quality, inspection instructions and outgoing inspection ensure that defect generation through accelerated logistics processes does not go unnoticed.

- Negotiate quality, compliance and logistics contracts as a package
- Conduct logistics process audits regularly
- Handle special characteristics (Special Characteristics) with particular care

Current developments: From Just-in-Time to resilient systems

The experiences of the pandemic, port congestion and the energy crisis have put the industry's relationship with the pure JiT idea into perspective. Hybrid concepts are now being discussed: JiT where possible, precautionary stock where necessary – a development towards 'Just-in-Case' for critical areas.

Resilience through hybrid procurement models

In practice, two-stage approaches are establishing themselves: for C-parts and robust materials, JiT with low planning costs remains a good choice, while critical parts are procured with safety stock or larger order cycles, possibly using a volume discount in procurement. The economic order quantity approach partially returns – always weighed against the risk of total failure.

- Criticality matrix for segmenting part categories
- Carry out inventory reduction only for non-critical items
- Regular re-evaluation of the strategy every 12 to 24 months

Digitalisation and synchronised supply chains

Digital platforms, EDI and API connections as well as improved real-time data exchange considerably facilitate synchronised call-off processes. The market also demands greater verifiability: sustainable procurement aspects, for example in the sustainable commodity group packaging, and transparency requirements make coordination with suppliers more complex. All of this presupposes modern capabilities – connectivity, data quality and a clean market model become fundamental prerequisites for efficient JiT processes.

- API connections instead of manual data transfer
- Integrate packaging and sustainability requirements into JiT concepts
- Regularly carry out market models for logistics services

Typical metrics

On-Time In Full (OTIF): > 98 %

Common practical target for JiT suppliers; below this level, supply disruptions loom.

Inventory coverage: 1–5 days

Typical range under JiT control; strongly dependent on transport route and process stability.

Delivery window spread / schedule variance: < 1 day

Measures the variation in lead times; important for dimensioning Kanban loops.

Inventory turnover rate: 12–30 per year

Usual guideline for optimised JiT implementation; depends on the material class.

Capital tied up in inventory: 30 % to 50 % compared with conventional stock planning

Practical guideline; achieved by shifting inventory to suppliers and logistics zones.

Practical example

A medium-sized mechanical engineering company supplies complete modules to the automotive industry. Continuously rising inventory costs and space problems lead to the introduction of Just-in-Time for standard base panels and fasteners. Procurement switches to e-Kanban, concludes call-off contracts with raw material sliding price clauses with two steel suppliers and sets up a supplier logistics zone on the factory premises.

- E-Kanban with automated call-off for four main material groups
- OTIF target of at least 98 per cent contractually enshrined in the SLA
- Alternative supplier qualified for critical components, particularly in the area of Special Characteristics

- Inventory coverage significantly reduced within twelve months

Conclusion

Just-in-Time is a proven instrument for reducing inventory, tied-up capital and handling effort – provided it is built on a stable, transparent supply chain. Success depends less on the concept itself than on discipline in processes, data quality and communication with suppliers. Given increased disruption risks, a differentiated approach is recommended: JiT for robust, standardised materials, buffers and resilience mechanisms for critical items. This keeps the benefits of the approach usable even in volatile market phases.

Frequently asked questions

What does Just-in-Time mean in procurement?

Just-in-Time means that materials are delivered only at the point of actual need – not earlier and not later. The aim is to minimise inventory levels, tied-up capital and unnecessary handling effort. Control is typically achieved via call-off contracts, Kanban signals or supplier logistics zones located near the production line.

What are the differences between Just-in-Time and Just-in-Sequence?

With Just-in-Time, material is delivered at the required date but still provided as batches. Just-in-Sequence goes further: parts arrive directly in the exact assembly or production sequence in which they are needed. JIS requires significantly closer digital integration with the supplier and is typically reserved for automotive final assembly.

What prerequisites does a company need for Just-in-Time?

Decisive factors are reliable suppliers with high delivery reliability, short and stable transport routes, precise consumption data and robust IT connections for call-off signals. In addition, contracts with clearly defined response times, SLAs and pricing mechanisms must be in place. Without these foundations, production stoppages loom despite nominally low inventories.

Is Just-in-Time still fit for purpose after the supply chain crises?

Yes, but in a more differentiated way than before. In practice, a trend towards hybrid models is emerging: for standardised C-parts, JiT remains sensible and cost-effective, while critical A-parts are increasingly safeguarded with safety stock or multiple sourcing. Resilience is now an objective on a par with efficiency.

What risks does Just-in-Time procurement involve?

The main risk is high sensitivity to disruption: with low inventories, delivery fluctuations have an immediate impact on production. Typical incidents include transport failures, raw material shortages, geopolitical restrictions or quality defects. Countermeasures are risk policy, dual sourcing and defined emergency processes within Supply Chain Resilience Management.

How is delivery reliability measured in Just-in-Time?

The key metric is On-Time In Full (OTIF): the proportion of line items received complete and within the defined delivery window. Supplementary metrics used are delivery window spread, schedule variance and the frequency of short-notice rescheduling. These KPIs are usually incorporated into supplier evaluations and SLA frameworks.