

Value Stream Analysis: Making Waste Visible and Optimising Processes Along the Supply Chain

Value stream analysis (VSA) is a lean management method used to capture, map and evaluate all process steps of a material or information flow. Its aim is to distinguish value-adding from non-value-adding activities and to systematically eliminate waste. In industrial procurement, it helps to make lead times, inventories and interfaces along the supply chain transparent and to improve them in a targeted manner.

Key facts

- Value stream analysis maps material and information flows from supplier to customer in a value stream map (Value Stream Mapping).
- It distinguishes value-adding activities from waste (muda) such as waiting times, stock levels or rework.
- Typical metrics are lead time, process time, share of value-adding time and OEE.
- The approach originates from lean production and is increasingly applied to procurement and logistics processes as well.
- A value stream analysis is the foundation for a target state (Future State Map) and a prioritised improvement programme.
- In procurement, it connects with topics such as order process optimisation, capacity planning and delivery schedule call-offs.

Definition: value stream analysis

Value stream analysis is a structured method for capturing and evaluating all process steps that contribute to the creation of a product or service. It documents both the physical material flow and the associated information flow, and quantifies the share of value creation of each step. It thereby forms the analytical foundation for all further lean activities such as waste elimination and flow orientation.

Distinction from classical process analysis

Unlike a conventional process description, value stream analysis does not consider isolated functions but the entire stream from raw material to the end customer. It focuses on handovers, waiting times and inventories between process steps, which often remain invisible in organigrams and procedural instructions. In practice, it is precisely these intermediate times that frequently account for the largest share of total lead time.

Historical origins

The methodology has its roots in the Toyota Production System and was popularised in the 1990s under terms such as Value Stream Mapping. Originally focused on manufacturing processes, it is now also

used for administrative workflows, for example in the ordering process, materials planning or goods receipt. Procurement benefits in particular because information flows play a central role there.

Methods and procedure of value stream analysis

A value stream analysis typically follows a fixed sequence: select the product family, record the current state, assess the waste, design the target state and prioritise improvement measures. The recording ideally takes place at the Gemba, i.e. on the shop floor, in the warehouse and at the interfaces with the supplier. In addition, data from the ERP system – such as delivery times, inventories and quantities – provides the quantitative basis.

Recording the current state

The team follows a representative product or product family through all stations and records for each step the process time, set-up time, number of operators, changeover frequency and waiting times. In parallel, the information flow is documented: who triggers an order, a delivery schedule call-off or a change request, and when? Typical findings are long lead times with comparatively short actual process times.

Identifying waste

Using the seven types of waste – overproduction, waiting times, transport, overprocessing, inventories, unnecessary motion and defects – the team evaluates each step. In addition, it asks the eight guiding questions of an effective process, for example whether the step is necessary, performed correctly and always available. This produces concrete starting points rather than generic improvement wishes.

Deriving the target state and measures

From the current-state picture, a Future State Map is developed: pull principles, takt alignment, levelled flows (levelling) and waste-free methods are designed. The difference between the current and target state yields a prioritised portfolio of measures with responsibilities and deadlines. Common levers in procurement are smaller order quantities, faster information sharing, integrated delivery schedule call-offs and reduced inspection and approval loops.

Value stream analysis in procurement and the supply chain

In a procurement context, the scope of analysis extends beyond the factory gates: supplier processes, transport routes and trading stages also belong to the value stream. The analysis reveals where delivery time variability, high minimum order quantities or slow approval processes burden inventories and responsiveness. It thereby becomes the link between lean production and strategic procurement management.

Considering supplier-side value streams

For A-parts and long procurement lead times, a joint value stream analysis with the supplier is worthwhile, often within the framework of a supplier development programme. This makes the supplier's set-up and production times, one's own intermediate inventories and information gaps in call-offs visible. On this basis, capacity planning, delivery schedule call-offs and transport consolidations can be negotiated fairly and on a data-driven basis.

Optimising administrative processes

The internal ordering process – from requisition via approvals to invoice processing – is itself a value stream. Waiting times caused by multiple approvals, paper files or unclear responsibilities can be uncovered here, as can sources of error that later lead to complaints. Value stream analysis is thus also a tool for order process optimisation and indirectly reduces administrative procurement effort.

Taking a closer look at logistics and transport

Transport routes, load space utilisation, transshipment points and packaging processes are value stream segments in their own right. Transparent cost structures, for example via a freight cost breakdown, help to separate value-adding from pure additional costs and to avoid unnecessary freight surcharge items. The choice of container types and packaging design (linked to the packing list) also directly affect handling effort and inventories.

Key KPIs and metrics of value stream analysis

Without metrics, a value stream analysis remains a snapshot. Key figures are lead time, process time (cycle time), the share of value-adding time, inventory coverage, and the punctuality and reliability of upstream deliveries. These values are recorded in the current state, defined as target values and checked regularly.

Lead time and share of value-adding time

Lead time describes the time from order receipt or the requirement date to the availability of the part; process time measures only the actual processing. The ratio of the two – the share of value-adding time – is often in the low single-digit percentage range in administrative processes, making it a powerful lever. In procurement, this corresponds to metrics such as procurement lead times and delivery time variability, which reflect planning reliability.

Process quality and availability

OEE (Overall Equipment Effectiveness) aggregates availability, performance and quality of a station; in the guiding questions of value stream analysis it is captured per process step. The first-time-right rate and defect rates per step also show where rework occurs. Such metrics complement quality management in procurement and feed into assessment tools such as a supplier rating model or supplier monitoring.

Inventories and planning adherence

Inventory coverage, inventory turnover and inventory reduction after measures demonstrate financial success. In addition, adherence metrics such as on-time delivery in full and call-off accuracy show whether the streamlined information flow actually works. These values can be safeguarded via a data quality score for master data, because without clean data quality every value stream analysis is misleading.

Risks, limitations and controls

A value stream analysis is effective when it is carried out realistically, holistically and with a focus on follow-through. Typical sources of error are recording exceptional conditions instead of the norm, ignoring information-side constraints, and action plans without implementation ownership. Supplier-side constraints – such as capacity bottlenecks or unclear data – must also be addressed.

Avoiding a flawed data basis

Anyone who runs shop floor walks purely by script or adopts historical ERP data unchecked produces a flattering map. Control instruments include spot checks at the Gemba, reconciliation with the parts catalogue and the actual call-off data, and verification of data quality before evaluation. Where suppliers cannot provide reliable data, the work begins with a structured qualification assessment and defined data delivery requirements.

Quick expected results without sustainability

Value stream analyses often produce quick wins through the elimination of obvious waiting times. Without anchoring in routines – regular review meetings, clear owners, measurement of KPI development – the effects quickly lose substance. Value stream analysis should therefore be part of a continuous improvement process, not a one-off project.

Risks at the supplier interface

When purchased components are part of the value stream, dependence on the supplier increases. Here, a clear risk policy, the classification of suppliers into risk classes and ongoing risk management in the supply chain help. In the event of acute disruptions, defined escalation mechanisms up to a stop shipment can take effect, so that defects do not enter the value stream.

Current developments: digitalisation and data-driven value streams

Classic value stream maps on flipcharts are increasingly being supplemented by digital tools: process mining tools reconstruct current value streams automatically from ERP and system data, and digital shore-based planning links value stream data with capacity and demand planning. In procurement, marketplaces and platform solutions make it possible to shorten procurement times and standardise processes.

Process mining and automated value stream measurement

Event logs from ERP systems allow real lead times, loops and waiting times to be derived without manual observation. This improves data quality and enables continuous monitoring instead of point-in-time audits. Validation remains important: algorithms recognise patterns but do not automatically assess what constitutes genuine value creation.

Digital marketplaces and standardised procurement

Platform-based procurement reduces administrative lead times because enquiry, quotation, order and documentation run digitally and traceably. For suppliers, the effort involved in participating in competitive tenders and enquiries decreases; for buyers, the sourcing cycle shortens. Where a sourcing wave plan additionally bundles and calls off requirements, a calmer, more predictable value stream is created on both sides.

Resilience and sustainability in the value stream

Modern value stream perspectives ask not only about efficiency but also about robustness: how quickly is the stream restored after a disruption? Emissions and energy flows are also increasingly analysed alongside, in order to reflect sustainability goals in lean decisions. The value stream thus evolves from an efficiency tool to a holistic supply chain steering instrument.

Typical metrics

Lead Time: typically a reduction of 20–50% after measures

Time from requisition to availability; indicative value, strongly dependent on product type

Share of value-adding time: typically below 10% in administrative processes

Ratio of process time to lead time; the aim is continuous improvement

OEE (Overall Equipment Effectiveness): typically 65–85% in well-managed operations

Product of availability, performance and quality per process step

Supplier on-time delivery in full: > 95% targeted

Proportion of punctual and complete deliveries; input metric of the value stream

Inventory coverage: individual per material class

Days of inventory in the process; the aim is reduction without loss of supply security

Practical example

A mid-sized mechanical engineering company with around 300 employees had a long lead time for customer-specific special machinery: from approval date to dispatch, twelve weeks often elapsed in practice, even though the actual processing time of the components was only a few days. A value stream analysis of the frame components product family revealed that around 70% of the time resulted from waiting times between stations, long approval loops in procurement and uncoordinated call-offs with the steel supplier.

- Recording of the current value stream over two weeks at the Gemba, including the shop floor, procurement, warehouse and transport, supplemented by ERP data on delivery time variability.
- Joint value stream analysis with the key steel supplier as part of a supplier development programme, with an agreement on delivery schedule call-offs at weekly intervals.
- Reduction of approvals in the ordering process from four to two stages and introduction of framework agreements for series components.
- Introduction of a monthly KPI review covering lead time, inventory coverage and delivery reliability, with a target corridor for the share of value-adding time.

Conclusion

Value stream analysis makes visible where time, material and labour are lost in the process – across departmental and company boundaries. For technical procurement, it is an effective instrument for reducing procurement lead times, inventories and process costs, and for basing collaboration with suppliers on data rather than negotiating positions. Success depends less on the perfection of the map than on discipline in data collection, prioritisation and implementation. Those who embed value stream analysis as a continuous routine and steer it with metrics such as lead time, share of value-adding time and delivery reliability create lasting effects. Combined with digital procurement platforms and sound master data management, this forms a solid foundation for competitive supply chains.

Frequently asked questions

What is value stream analysis in simple terms?

In a value stream analysis, you record all the steps a product goes through – from raw material to finished part – and measure for each step the actual processing time and the waiting time in between.

The comparison shows how much time is genuine value creation and how much is waste. On this basis, targeted improvements can be derived.

Which steps are part of a value stream analysis?

Typically there are five steps: selecting a product family, recording the current state on the shop floor, assessing the waste, designing a target state and deriving prioritised measures. The methodology is often referred to as Value Stream Mapping. It is crucial that the information flow – such as call-offs and approvals – is also documented.

What is the difference between Value Stream Mapping and value stream analysis?

Value Stream Mapping is the graphical mapping method used to visualise the value stream as a map. Value stream analysis is the overarching process that creates the map, evaluates it and translates it into measures. In practice, the terms are often used synonymously.

How does procurement use value stream analysis?

Procurement uses the method to scrutinise sourcing processes from requisition to goods receipt and to reduce waiting times, approval loops and inventories. It can also apply it jointly with suppliers to the purchased value streams, for example as part of a supplier development programme. The results are shorter lead times, lower inventories and more predictable processes.

Which KPIs does a value stream analysis measure?

Key metrics are lead time, process time, share of value-adding time, inventory coverage and the OEE of individual stations. In addition, defect rates, on-time delivery in full and call-off accuracy are recorded. These figures form the basis for the target state and for monitoring improvement progress.

What are typical types of waste in value stream analysis?

The classic seven types of waste are overproduction, waiting times, transport, overprocessing, inventories, unnecessary motion and defects. Some approaches add an eighth: unused employee potential. In a procurement context, these often manifest as long approval times, duplicate data entry and high safety stocks.