EFQM

Process Survey Tool for Supply Chain Management

Process Survey Tool For

Supply Chain Management

EFQM and Philips

Philips is one of the founding members of EFQM and has been a member ever since. A long-standing relation with the EFQM evolved which resulted in many forms of co-operation. Philips is strongly involved in the model development as well as the design of the award process. One the members of the Group Management Committee of Philips is Governor of the EFQM and year on year several Philips employees take part in EQA assessments and other activities like study groups. Philips uses the EFQM Excellence Model as their prime assessment and improvement methodology in all parts of the organisation worldwide.

The company wide improvement program in Philips is called "BEST" (Business Excellence through Speed and Teamwork). This program consists of several approaches and tools and is strongly embedded in the business processes. One of the most important tools used in the BEST program are the Process Survey Tools (PST) that are meant to assess the maturity of a process. As part of its strategic commitment to helping organisations generally improve their performance, Philips has decided to make some of the PSTs available widely through EFQM and its partners network.

About EFQM

EFQM® is a membership based not for profit organisation, created in 1988 by fourteen leading European businesses, with a Mission to be the driving force for sustainable excellence in Europe and a Vision of a world in which European organisations excel.

EFQM has promoted the concept of partnership with similar National organisations in Europe and its members to help promote sustainable excellence in European organisations. All of these National organisations have worked with EFQM to develop the Fundamental Concepts of Excellence and to promote the EFQM Excellence Model. Contact details for our partners can be found at http://www.efqm.org

By January 2004, EFQM membership had grown to around 700 organisations from most European countries and most sectors of activity. Together with the National organisations the membership network runs to thousands of organisations with several million individuals employed in those organisations.

In addition to being the owner of the EFQM Excellence Model and managing The European Quality Award, EFQM also provides a portfolio of services for its members.

About Koninklijke Philips Electronics

Koninklijke Philips Electronics of the Netherlands (NYSE: PHG, AEX: PHI) is one of the world's biggest electronics companies and Europe's largest, with sales of EUR 29 billion in 2003. With activities in the three interlocking domains of healthcare, lifestyle and technology and 165,600 employees in more than 60 countries, it has market leadership positions in medical diagnostic imaging and patient monitoring, color television sets, electric shavers, lighting and silicon system solutions. News from Philips is located at www.philips.com/newscenter.

Introducing Process Survey Tools

Process Survey Tools (PSTs) are maturity grids designed for specific processes or functions. PSTs help to assess the maturity of a process or function and give clear indications on how to improve to reach next levels of maturity. Each process is broken down into a number of " elements" or sub-processes that make up the entire process. Typically there are 10 to 15 elements in each of the PST processes.

For each of the elements, a maturity scale has been created – ten levels of maturity starting from basics in step 1 and culminating in worldclass performance in step 10.
By assessing their position against the maturity scales for each of the elements, organisations can establish a "maturity profile" for a particular process and gain an insight into the steps they need to take to move in the direction of world class. The procedure clearly provides a basis for benchmarking progress with others within or outside the organisation.

The level descriptions in the elements are based on various sources and own Philips' experience. They all reflect expert knowledge on the road to worldclass for the described processes.

Software will be made available to facilitate the assessment process as well as for presenting results as bar charts, spider diagrams and for analysing performance over time. This software will be known as the **PST supporting e-Tool**
For more information on how to apply the PSTs, please use the separate **PST Guide** that accompanies each PST.

Positioning against the EFQM Excellence Model

For any organisation, improving performance from self-assessment or other approaches usually means working for improvement in the whole network of processes through which the organisation's goods and services are produced and delivered. Processes lie at the heart of the EFQM Excellence Model.

There are clear links between the criteria of the EFQM Excellence Model and processes for which there are PSTs - for example:
"Marketing and Sales" links into criterion part 5c
"Manufacturing" links into criterion parts 4e and 5d.
"HRM" links into criterion 3.
Thus the PSTs will be of assistance and provide guidance to organisations, using self-assessment against the EFQM Excellence Model, wishing to improve their processes.
Clearly the maturity steps for each of the elements are specific to the process under consideration and therefore are defined differently for different elements. However the logic of the PDCA cycle is built into the levels of the maturity scales for each of the elements of all of the processes and, to a substantial degree, these levels reflect the RADAR tool of the EFQM Excellence Model.

Content overview

Introduction to Process Survey Tool for Supply Chain Management

Supply Chain Management and the SCOR model

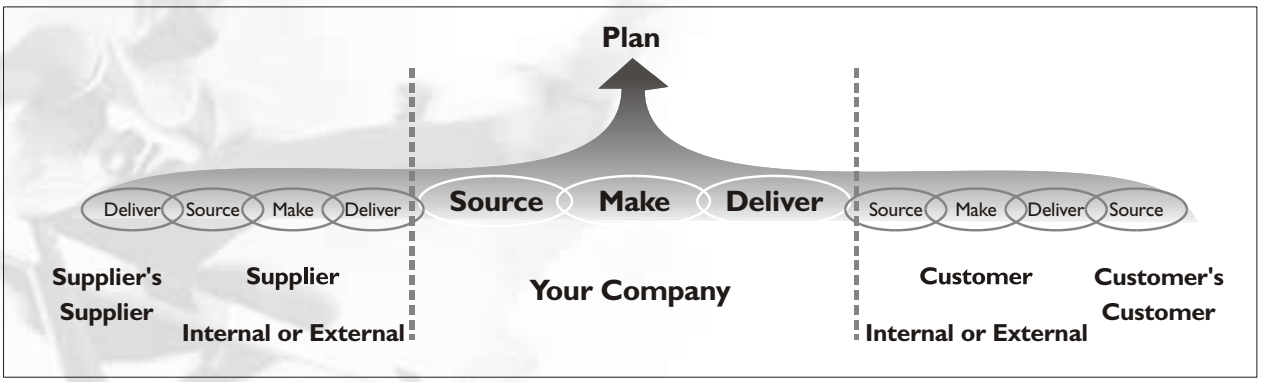
This Process Survey Tool is based on the SCOR (Supply Chain Operations Reference) model. Supply-Chain Council (SCC) members support SCOR as the standard process-reference model for supply-chain management. The Council was formed as a grass roots initiative by forward-thinking individuals representing companies including Advanced Manufacturing Research (AMR), Bayer, Compaq Computer, Pittiglio Rabin Todd & McGrath (PRTM), Procter & Gamble, Lockheed Martin, Nortel, Rockwell Semiconductor, and Texas Instruments. (www.supply-chain.org)

Members of the Council work together to develop, maintain, communicate, and support the Supply-Chain Operations Reference-model (SCOR). To our knowledge, SCOR is the only, cross-industry supply-chain reference model in existence. SCOR contains standard process definitions, standard terminology, standard metrics, supply-chain best practices, and enabling information technology when applicable.

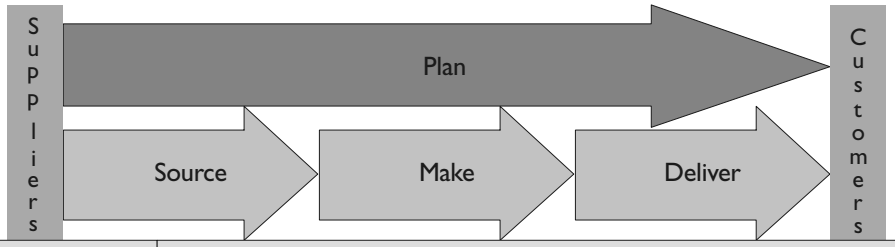
SCOR enables the next generation of integrative supply-chain management, thereby allowing SCC members, their suppliers, and their customers to build inter-enterprise supply-chains. When linked with associated benchmarks and best practices, SCOR provides a common toolkit for describing supply-chain configurations and for evaluating, positioning, and implementing supply-chain applications software.

The Supply-Chain Council is the world's premier, not-for-profit, trade association organized to serve the interests of companies wishing to improve their competitiveness by implementing best practice supply-chain management techniques.

The basic SCOR model* of Plan, Source, Make, Deliver is shown below. The Supply-Chain Operations Reference-model isolates key supply-chain management processes and matches these process elements against industry-specific best practices, benchmarking performance data, and appropriate software applications, providing users with a framework for understanding where they need to make improvements. Such a model builds on the concepts of business process re-engineering, benchmarking, and process measurement by integrating these techniques into a cross-functional framework.



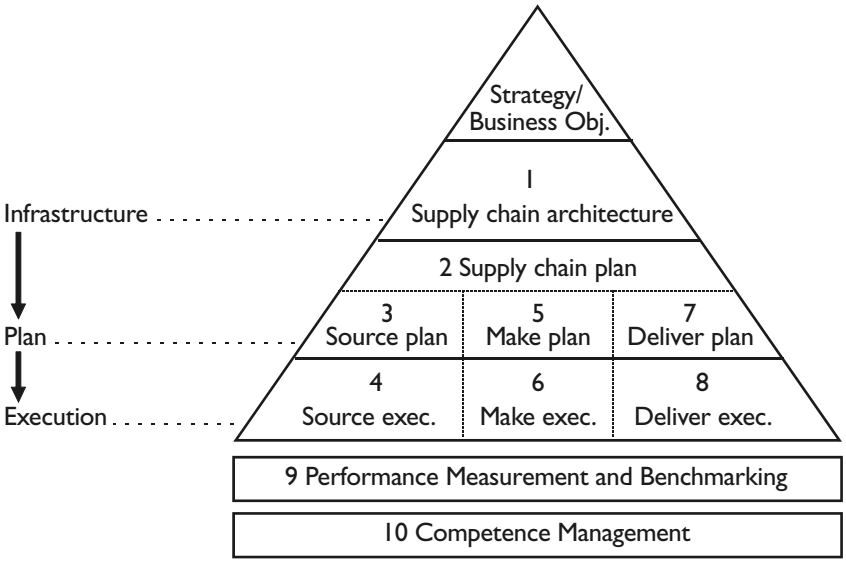
* © Copiright Supply-Chain Council, Inc.



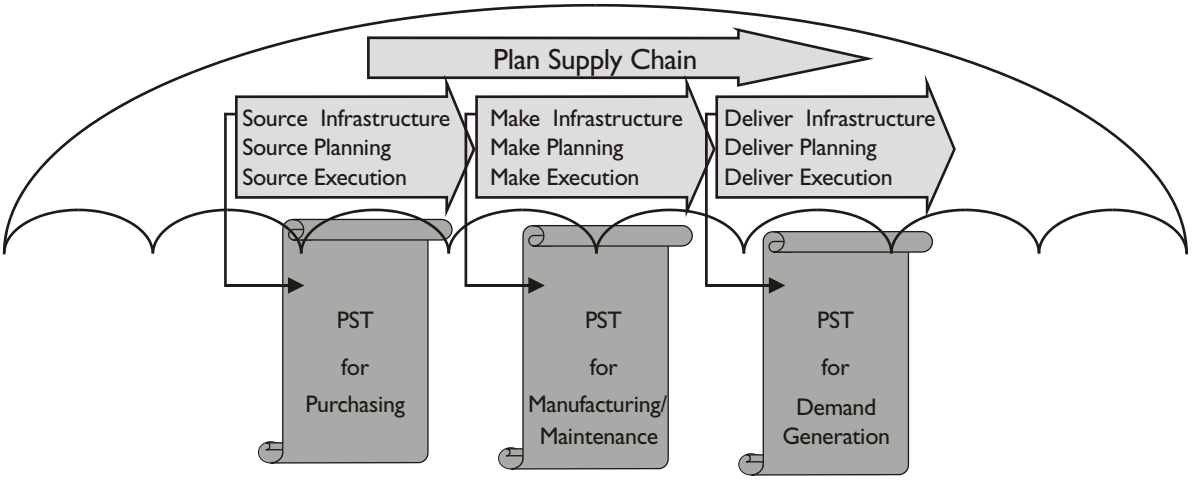
Process	What it represents
Plan	Which execution process is being planned
Source	How materials are obtained
Make	Manufacturing products
Deliver	Market channel through which products are delivered to customers

Within each building block - Plan, Source, Make and Deliver - there are three sets of complementary processes: Infrastructure, Planning and Execution. This results in 12 SCOR building blocks.

Supply-Chain Process Survey Tool: Element Definition
Based on the SCOR building blocks, 10 elements are defined that need to be assessed. A new element about Competence management is added.



The Supply-Chain Process Survey Tool, by the nature of the subject, is cross-functional



The Infrastructure chapters for Source, Make and Deliver are not assessed in this PST. The PST for Purchasing covers most items defined in the SCOR model under Source Infrastructure. The PST covers the Make Infrastructure elements for Manufacturing and Maintenance Processes. Finally, the PST for Demand Generation covers the elements of Deliver Infrastructure.

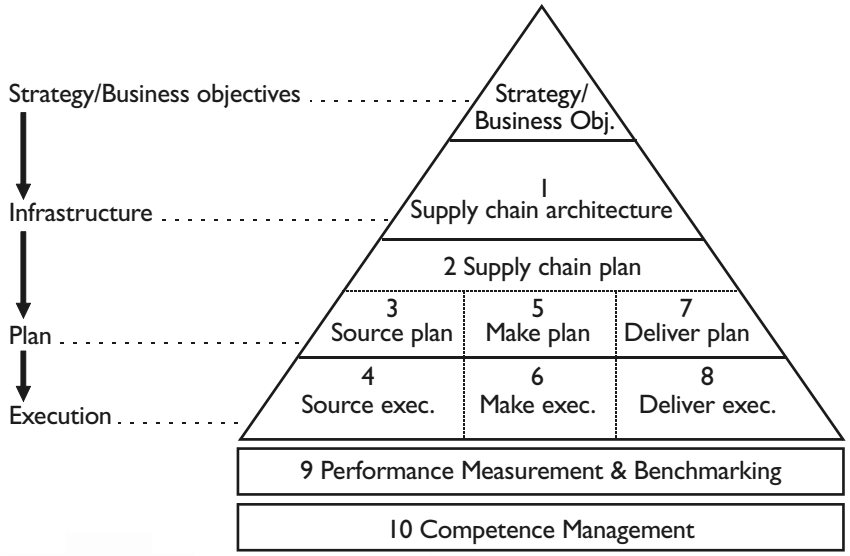
1 Use of the Process Survey Tool

Before the actual assessment of the ways of working in the supply chain can take place, there are 2 preparatory steps to be taken:

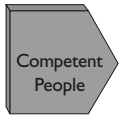
1. Translating the business objectives into supply-chain management performance targets to determine the performance gaps.
2. Determining and visualising the supply-chain characteristics.

1.1 Translating business objectives into targets for Supply-Chain Management

Supply-chain management starts with a clear definition and understanding of the business strategy and the business objectives. A supply-chain management strategy can be derived from the business objectives. This strategy consists of a supply-chain architecture, a supply -chain control model and Source, Make and Deliver planning and execution.

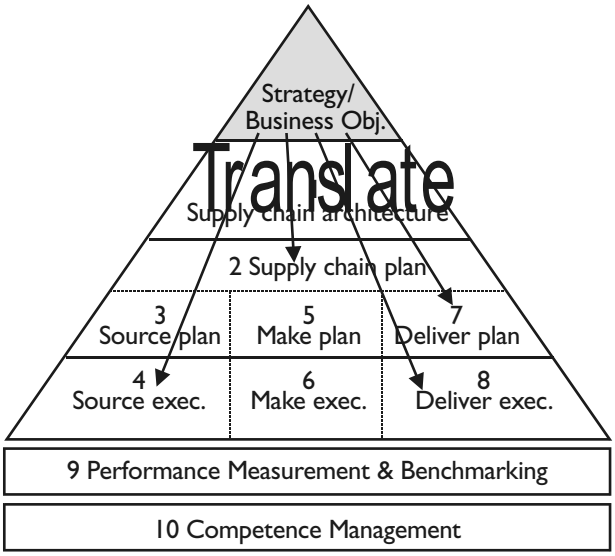


Improving supply-chain management performance must be in line with the business objectives. The SCOR model provides a consistent framework of performance indicators for supply-chain management.



SCOR Level 1 Supply Chain Management Overview Metrics	*Delivery performance (Reliability)*	*Flexibility and responsiveness*	*Cost*	*Asset management*
➤ Delivery performance	✔			
➤ Order fulfilment performance				
- Fill rate (Make-to-stock)	✔			
- Order fulfilment lead time (ETO, BTO, CTO)	✔			
➤ Perfect order fulfilment	✔			
➤ Supply chain response time		✔		
➤ Production flexibility		✔		
➤ Total supply-chain management cost			✔	
➤ Warranty cost			✔	
➤ Cash-to-Cash cycle-time				✔
➤ Value-added productivity				✔
➤ Inventory Days of Supply				✔
➤ Asset turns				✔

With a selection of these supply-chain management performance indicators, a comprehensive set of performance targets for the supply chain can be set, based on the business objectives.
The next step is translating these performance targets into lower-level operational performance indicators with targets for the different elements in the supply chain.



If, for example, a supply-chain management has a targetsetting for "Inventory Days of Supply" of 20 days. These 20 days then need to be translated into targets for operational performance indicators like component stock, WIP and goods in transit, for example, 4, 2,and 4 days of stock, respectively.

The translation into lower-level performance targets is needed because this is where the organisation can actually improve its performance. The higher-level performance indicators are lagging indicators that

can only measure the result of what is achieved in the operation.
The performance gap can be determined after setting the operational performance targets and comparing them with the actual performance.
To improve the operational performances, the activities in the supply chain need to be assessed. Before the actual assessment can take place, the scope of the assessment needs to be determined and the supply-chain characteristics need to be determined.

1.2 Characterising the supply chain

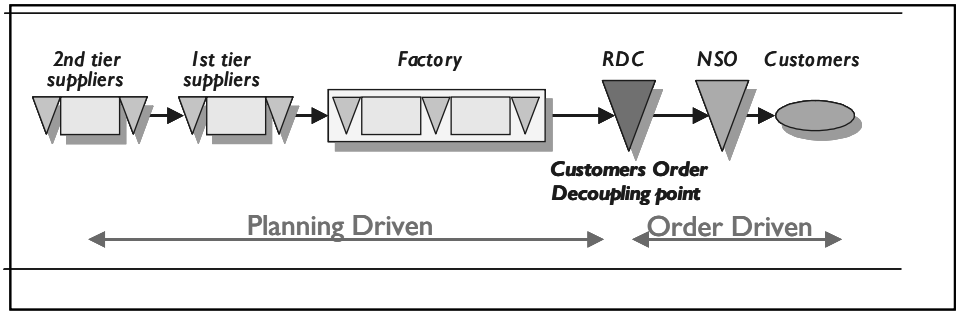
Before the assessment of supply-chain processes can take place, an overview of the supply-chain structure and control should be created. This places the assessments of the sub-processes in a total supply-chain perspective.

The following items need to be clarified:

- physical structure of the supply chain
  - main 1st and 2nd tier suppliers and their location
  - manufacturing locations
  - distribution channels
  - main customer groups
  - goods flows and volumes
- stocks and lead times in the supply chain
- location of the customer order decoupling point in the supply chain.

The picture below give some examples of formats that can be used for characterising your supply chain.

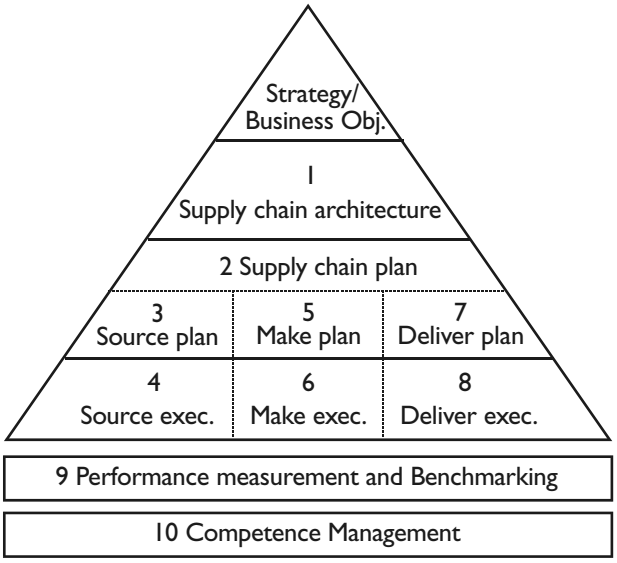
Supply chain characteristics: logistic concept



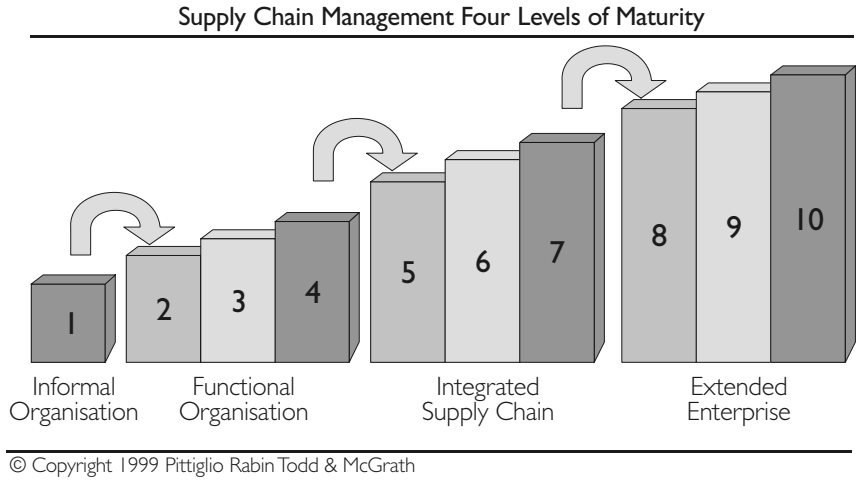
1.3 Performing the assessment of the processes

After determining the performance gaps and characterising the supply chain, the actual assessment of the ways of working in the supply chain can take place.

The survey tool consists of 10 elements - see the picture below.



Each element in the survey can be scored on a ten-point scale. There are four major, well-defined levels of maturity within the ten levels on the survey scale:



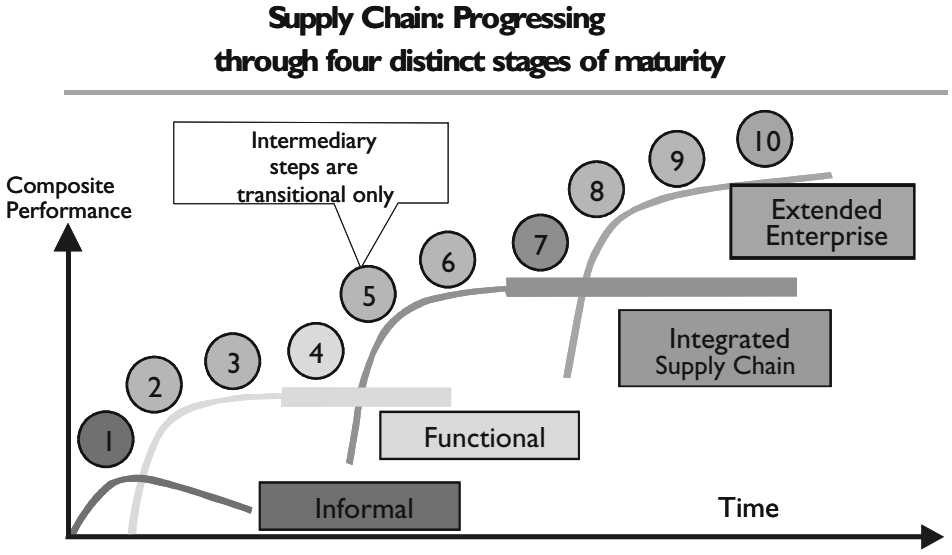
Level 1 is Informal: a company doing business, but without formalised procedures or processes. Management is characterised by fire fighting. The lack of formalised policies/processes and basic operations management results in unpredictable quality and supply.
Keywords: no formal plans, no forecast, no balancing of supply and demand.

Level 4 is Functional: a company with good functional management, which is optimising the performance of its own function without reference to what is happening in other areas of the business. Processes are typically carried out sequentially with information being passed "over the wall" from one function to the next. Functional orientation sub-optimizes enterprise performance in asset management, cost and customer satisfaction.
Keywords: cost driven, reactive, monthly processes, push, standard services.

Level 7 is The Integrated Supply-Chain: processes are cross-functional and optimised for the whole organisation. Processes are carried out in parallel by cross-functional teams and information flows freely around the organisation. Some integration with major suppliers and customers. With alignment across all sub-processes and levels of management, operational processes are integrated and display world-class and continuous performance, and continuous improvement.
Keywords: flexibility, responsiveness, pro-active, weekly/daily, pull, differentiated services, cross-functional decision making.

Level 10 is The Extended Enterprise: a company that is on the leading edge of all emerging practices. It is highly internally and externally integrated, working with enterprises ranging from suppliers' suppliers to customers' customers. There is internal and external process integration, allowing each enterprise to focus on its customers, core competencies and creating value.
Keywords: real time full visibility, event driven, JIT, joint optimisation, customised services.

Levels 2,3,5,6,8 & 9 are transitional stages.



1.4 Assessment criteria

Each element in the survey can be scored on a ten-point scale. Scoring guidelines are given for each element. These guidelines should be interpreted within the spirit of what is meant rather than by the exact wording.
Only one score should be given per element. Several activities belonging to the element are described per element to clarify the content of the elements

Scoring is on a strict "step" principle, i.e. conditions for level 1 must be completely satisfied before moving to level 2. Your organisation will score 3 if level 4 is not completely satisfied, even if you have some aspects of level 5 and 6 already in place.
After the assessment, you will have 10 elements with a score between 1 and 10. The overall score of your organisation for this PST is defined as the average of the 10 scores. This overall score determines if your organisation can be characterised as an Informal, Functional, Integrated or Extended organisation.

1.5 Determine improvement actions

After the assessment of the ways of working in the supply chain, a process survey tool score between 1 and 10 per element is determined. The higher the score, the more "good-practices" are implemented for a certain element.
The next step is to determine in which elements there is a performance gap and also a low PST score. In these cases, it should be analysed whether or not implementing a better practice will help to close the performance gap. From this analysis, improvement actions should be defined and prioritised.
The aim of the improvements should not be a higher process-survey-tool score, but to improve business performance. The PST should be used to support improvements of the related business-performance indicators on the balanced scorecard.

Element 1: Supply-Chain configuration

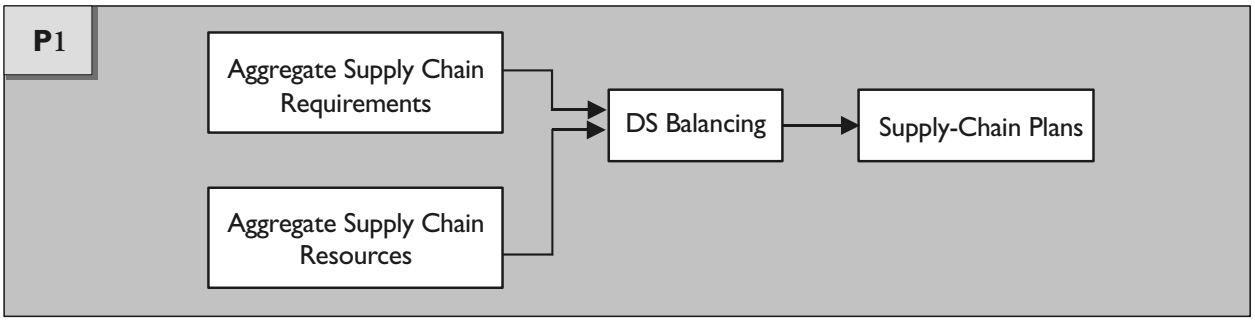
Definition:
This element deals with the configuration of the integral supply chain, including suppliers and distributors. The scope of supply-chain configuration is setting up and maintaining an integral supply chain from first and second-tier suppliers to main customer groups.
Supply-chain configuration includes decisions on:

- the number and location of manufacturing sites.
- the number of and location of distribution centres.
- outsourcing, selection of key-suppliers and supplier contracts.
- the distribution structure with regional and local warehouses, or direct shipments from factories to customers.

1	**Informal** - Supply-chain configuration is neither designed nor managed, but has evolved without formal planning processes or strategy, or the linking of processes together, and no clear supply chain concept.
2	**Transitional** - Supply chain actions are driven by the annual budget cycle.
3	**Transitional** - Supply chain re-configuration contributes to cost savings.
4	**Functional** - The overall supply-chain (re-) configuration plans or actions are part of a cost-based manufacturing or distribution strategy. - Improvement actions optimise the functional performance of independent supply-chain entities. - Main decoupling points are defined per supply-chain entity individually (e.g. a decoupling point per factory).
5	**Transitional** - In the supply-chain configuration process, key suppliers and key customers are taken into consideration.
6	**Transitional** - Supply-chain strategy is directly derived from the business strategy and not focussed only on manufacturing or distribution.
7	**Integrated Supply Chain** - The supply chain is configured to optimise integral supply-chain costs and performance and meeting market needs. - Some key suppliers and key customers are involved in the supply-chain configuration process, resulting in SLA's.
8	**Transitional** - Supply-chain configuration also considers responsiveness and flexibility of key partners in the supply chain.

9	**Transitional** - Supply-chain configuration is a key business process. Competitive supply-chain advantages are recognized and effectuated in the supply-chain configuration.
10	**The Extended Enterprise** - Supply-chain configuration is a dynamic process continuously optimising costs, flexibility and responsiveness throughout the total supply chain. - The supply-chain configuration process is agile, assuring swift channel changes for outperforming competitors.

Element 2: Supply-Chain planning



Definitions:
Supply-chain planning is the process of balancing end-customer demand with supply and resources throughout the chain.

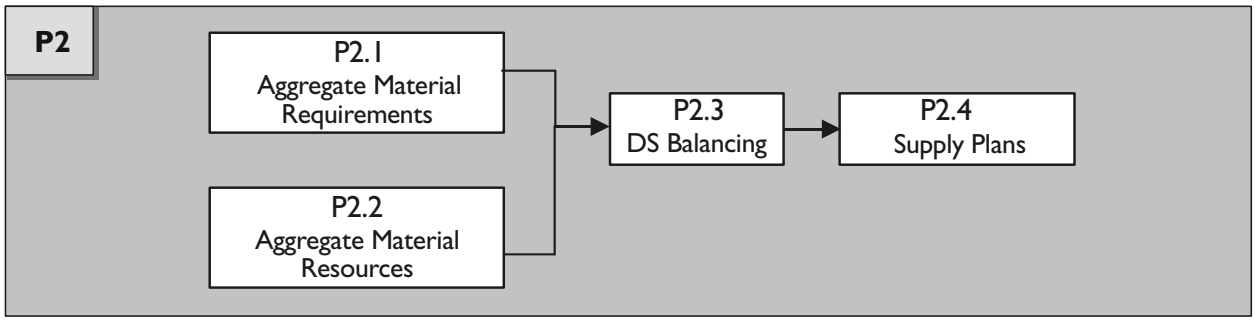
For definitions of building blocks - see annex 2 (element 2).

Supply-Chain planning

1	**Informal** - Demand, inventory, production and supply-planning processes are done on an ad-hoc basis and generally un-synchronised with suppliers and customers (often generating a high level of inventories and shortages).
2	**Transitional** - The supply-chain planning process focuses on the budget forecast of own supply-chain entity.
3	**Transitional** - Key suppliers are periodically informed with forecast information.
4	**Functional** - Planning process is cascaded with planning information flowing from the one supply-chain entity to the next supply-chain entity (resulting in information delays). - Key suppliers are periodically informed with planning information comprising a binding fixed time period. - Plans are changed without consultation as unplanned orders are expedited.
5	**Transitional** - Demand/supply balancing occurs monthly with all necessary decision makers in the supply chain. - Plans are changed in consultation with other supply-chain entities.
6	**Transitional** - Demand/supply balancing occurs weekly with all necessary decision makers in the supply chain. This results in one agreed supply chain plan.

7	**Integrated Supply Chain** - Supply-chain plans (including a Goods Movement Plan) are formalised and available to all supply-chain functionaries and top-tier partners. - The supply-chain planning is robust and therefore not disrupted by ordinary events that can be anticipated (customs clearance, production stops, planning changes, cycle counts, etc.). - The planning rhythm is in compliance with customers' requirements (e.g. bucket sizes or planning milestones, if applicable). - Different planning cycles for the long, medium and short term are in place.
8	**Transitional** - Collaborative supply-chain requirements and resource planning is done with supply-chain partners. This is made possible through shared visibility of end-customers' demand, channel stocks, supplier capacities, supplier's suppliers capacities, flexibilities and resources. - Collaborative supply-chain requirements and resource planning is done with supply-chain partners. Information on end-customers' demand, channel stocks, supply chain capabilities and capacities, is available to all parties in the chain.
9	**Transitional** - Demand and supply balancing is supported by integrated systems covering the total supply chain (including all key suppliers and main customer groups).
10	**The Extended Enterprise** - The supply-chain planning process extends across supply-chain partners and actively balances all planning processes over the entire supply chain. - Supply-chain plans are visible to all partners in the supply chain and updated in real time.

Element 3: Source Plan



Definition:
Source plan is the process of fulfilling the component requirements based on the supply-chain planning.

For definitions of building blocks see annex 2 (element 3).

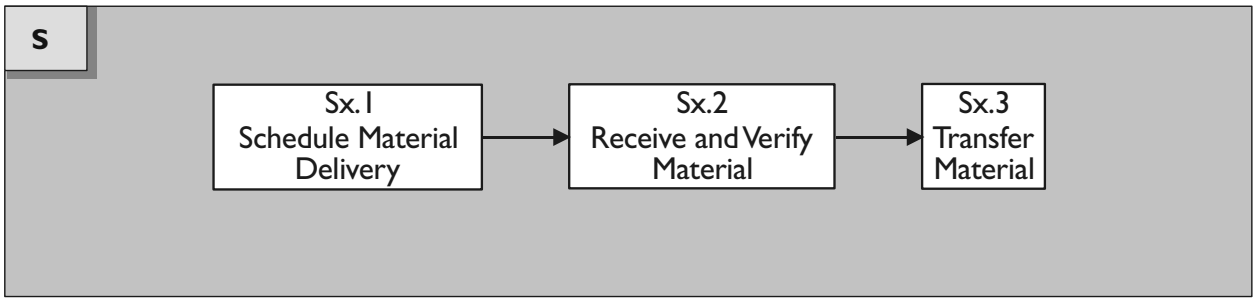
Source Plan

1	**Informal** - Material requirements are derived from manufacturing works orders multiplied by the bills of materials. - Material resources are unclear, stock records are often incorrect. - There are no formal supply plans.
2	**Transitional** - Inventory control procedures, inventory plans and supply plans (based on budget) are formalised.
3	**Transitional** - A monthly-created master production schedule is derived from the sales forecast. Demand is netted against supply (inventory, outstanding orders) through an MRP-like process and additional balancing judgment by Purchasing.
4	**Functional** - A monthly master production schedule and MRP system are in place. - The visibility of material resources is restricted to on-hand plus open PO's. Suppliers' resources are unknown. - Supply plans are updated monthly to reflect operations assessment; they are only communicated to those suppliers directly concerned and are changed without consultation as unplanned orders are expedited.
5	**Transitional** - A monthly cross-functional demand/supply balancing meeting gathers all necessary decision makers to agree plans and inventory levels.
6	**Transitional** - Demand/supply balancing occurs weekly, with demand and resource requirements refreshed weekly.

7	**Integrated Supply-Chain**
	- The materials requirements plans are closely integrated and synchronised with PLAN MAKE and PLAN Deliver.
	- The Planning is split over two differentiated and complimentary processes:
	  - Medium-to-long-term horizon: Forecast in monthly buckets.
	  - Short to medium term horizon: Demand in weekly buckets.
	- All supply resources, including suppliers' capacities and flexibilities, are considered.
	- Supply plans are formalised and distributed to all supply-chain functionaries and top-tier partners. Significant changes are agreed between Supply, Production and Sales Managers.

8	**Transitional** - Collaborative supply planning is carried out as PLAN SUPPLY increasingly integrates with the supplier's PLAN DELIVER. This is made possible as visibility of both end customers demand and supplier's resources increase.
9	**Transitional** - Supply resources are balanced collaboratively across the supply chain.
10	**The Extended Enterprise** - The PLAN SOURCE process is highly integrated with supplier's PLAN DELIVER (our plan is their plan). Material requirements are generated using full and detailed customer-demand visibility and material-resource planning includes suppliers' suppliers' inventories, capacities and flexibility. - Real-time supply plans give visibility to all partners in the supply chain (internal and external).

Element 4: Source Execute



Definition:
The procurement, receipt and transfer of raw material items, and sub-assemblies.

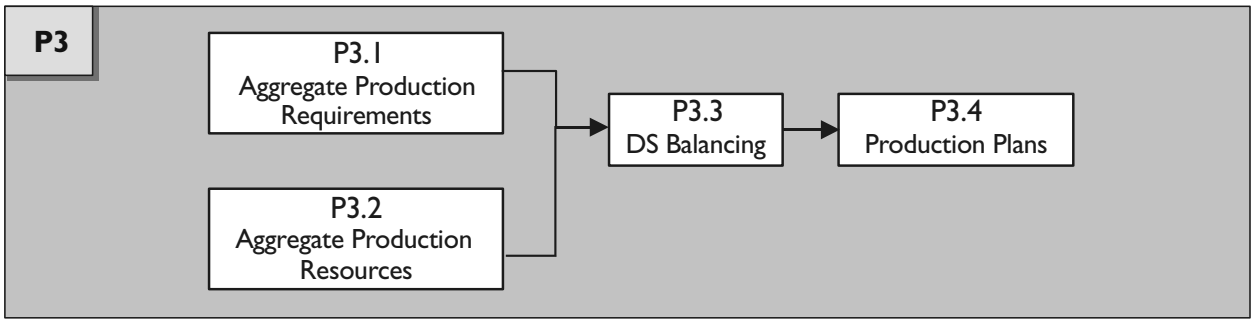
For definitions of building blocks - see annex 2 (element 4).

Source Execute

1	**Informal** - No formal processes in place for source execute; schedule material, receive & verify material and transfer material. - There are no standard rules for incoming inspection; level of attention depends on historical or current known production or supplier problems.
2	**Transitional** - Procedures are in place for the receipt and verification of material and material transfer.
3	**Transitional** - Material scheduling techniques are differentiated by commodity type (e.g. based on an ABC analysis of the purchased value). - Scheduling procedures are formalised, with the material planner using an MRP schedule and judgement to generate purchase orders. Usually purchase orders need to be expedited to meet requirements.
4	**Functional** - MRP and re-order point methodology are working appropriately. Expediting is exceptional. - A full documentation check, parts count and visual check is still carried out on all materials.
5	**Transitional** - Transfer material is optimised with the key suppliers (minimal handling; avoiding re-packing or re-palletising).
6	**Transitional** - Material receiving, inspection and transfer procedures are differentiated to align with the different scheduling techniques. Ordinary supply volume changes (e.g. seasonality) do not disrupt the reliability of the make and delivery processes.

7	**Integrated Supply Chain** - The schedule material delivery process (procurement) differentiates by purchasing value and purchasing risk. The source execute process is integrated with the delivery execute process of the supplier. Concepts like vendor hubs, consignment stocks, ship to line, Vendor Managed Inventory (VMI), JIT delivery and self-filling are effectively implemented. - Administrative processes are integrated with suppliers (cost and service optimised). - In the process of receiving and verification of material, vendor certification is used for key components. - Transfer material allows for ship to line by supplier.
8	**Transitional** - Vendor certification provides verification of quantity and quality; therefore no receiving inspection is required.
9	**Transitional** - Scheduled material delivery is in collaboration with vendors, with responsive deliveries based on real-time visibility of manufacturing-line consumption and stock on-hand.
10	**The Extended Enterprise** - Suppliers execute scheduled material delivery. - Deliveries are based on real-time visibility of manufacturing-line consumption and stock on-hand, (in accordance with Service Level Agreements - SLA).

Element 5: Make Plan



Definition:
Make plan is the process of planning production and allocating material and capacity resources to fulfil the supply-chain plan.

For definitions of building blocks - see annex 2 (element 5).

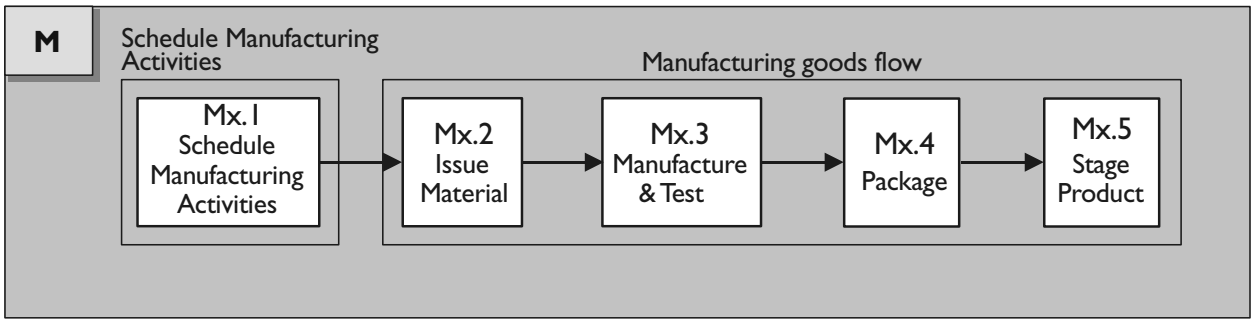
Make Plan

1	**Informal** - No regular forecasting of production requirements is carried out. - There is no rough-cut capacity planning and there are no formal production plans.
2	**Transitional** - Capacity plans and production plans are formalised (based on the budget).
3	**Transitional** - Sales produce a monthly requirements forecast. Demand is netted against supply (material, capacity) through an MRP-like process and additional balancing judgment by Manufacturing.
4	**Functional** - A monthly Master Production Schedule (MPS) process is in place. - Production resources are based on the Capacity Resource Plan (CRP). - Production plans are updated monthly to reflect operations assessment. They are only communicated to the facilities directly concerned and are changed without consultation as unplanned orders are expedited.
5	**Transitional** - A monthly cross-functional demand/supply balancing meeting gathers the necessary decision-makers to agree on plans, inventory levels etc.
6	**Transitional** - Demand/supply balancing occurs weekly, with demand and resource requirements refreshed weekly.

7	**Integrated Supply-Chain**
	- The PLAN MAKE, and PLAN SOURCE processes are closely integrated and synchronised with the PLAN DELIVER Process.
	- The planning is split over two differentiated and complimentary processes:
	  - Medium-to-long-term horizon: Forecast in monthly buckets.
	  - Short-to-medium-term horizon: Demand in weekly buckets.
	- Key supplier's capacities, with flexibility, are included in determining productions resources.
	- Production plans are formalised and distributed to all supply-chain functions and top-tier partners (within 24 hours). Significant changes are agreed between Supply, Production and Sales Managers.

8	**Transitional** - Collaborative production planning is done with supply-chain partners as visibility of end-customer's demand increases.
9	**Transitional** - Production resources are balanced collaboratively across the supply chain.
10	**The Extended Enterprise** - Production requirements are generated using full and detailed customer demand visibility. - Suppliers' suppliers' capacities and flexibilities are included in determining production resources. - Demand/supply balancing process is event driven and carried out with key partners. - Real-time visibility of production plans to all partners in the supply chain.

Element 6: Make Execute



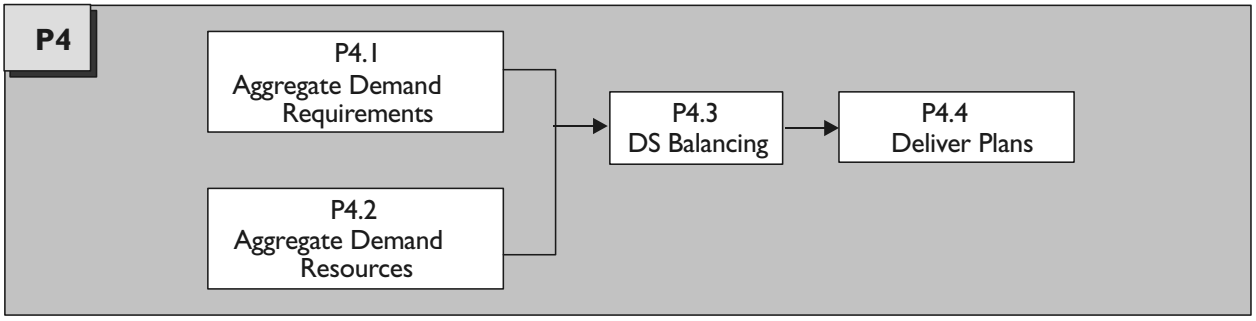
Definitions:
Mx: The process of manufacturing products.
Main processes:
1. Schedule manufacturing activities.
2. Manufacturing goods flow.

For definitions of building blocks - see annex 2 (element 6).

1	**Informal** - No formal production scheduling process.
2	**Transitional** - Procedures for material issue, manufacture, testing and packaging are formalised.
3	**Transitional** - Scheduling is formalised and uses a level schedule approach (long-term volume, short-term mix) with frozen zones.
4	**Functional** - Manufacturing scheduling is optimised for asset utilization. Large-batch-size planning is common. - Manufacturing schedules contain frozen zones allowing some flexibility for rush orders to accommodate changing customer demand.
5	**Transitional** - Product or product market combinations differentiate production techniques with an emphasis on reducing set-up and cycle times.
6	**Transitional** - Goods flow from one process step to the next without unnecessary delays in buffers. - Shift-based production scheduling includes preventative maintenance, when applicable, and uses optimisation programs for job sequencing, when applicable.

7	**Integrated Supply Chain** - Manufacturing scheduling is flexible and responsive. Schedules are based on customer demand (pull mechanism). - Frozen zones in the manufacturing schedule are reduced to a minimum level. - Status on the manufacturing goods flow is made visible to all other relevant parties in the supply chain. - Materials are issued based on a pull signal to production line. Some material is delivered direct to the line by suppliers with re-usable packaging acting as a kanban.
8	**Transitional** - Suppliers are involved in the production process: issuing material to the line and suggesting manufacturing improvements.
9	**Transitional** - Scheduling is carried out by shift, in collaboration with customers, using demand-pull mechanisms and customer's scheduling data as basis for the production schedule.
10	**The Extended Enterprise** - Vendors manage issue of all material to production lines on a "just-in-time" basis.

Element 7: Deliver Plan



Definition:
Deliver plan is the process of fulfilling the customer requirements on deliveries.

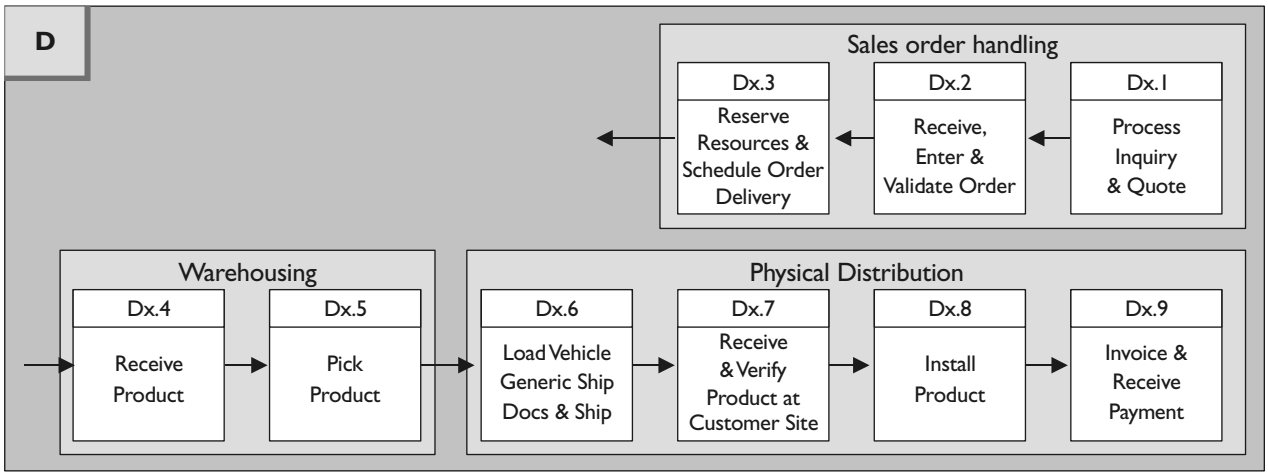
For definitions of building blocks see annex 2 (element 7).

Deliver Plan

1	**Informal** - Demand requirements derived from order book with sales plan adjusted to match the budget. There is no regular forecasting. - No distribution or installation capacity planning.
2	**Transitional** - Distribution capacity plans and deliver plans (based on Budget) are formalised.
3	**Transitional** - Sales produce a monthly requirements forecast. Demand is netted against supply (material, capacity) through a DRP-like process and additional balancing judgment by Logistics.
4	**Functional** - Processes work in a sequential fashion: PLAN DELIVER, PLAN MAKE/SOURCE. - Plans are to achieve budget, accuracy is good at revenue but poor for mix. - Sales plan is reviewed at a monthly meeting, and then demand is netted against supply (material, capacity) through a DRP-like process. - Deliver plans are updated monthly and distributed to Operations for execution. Plans are changed without consultation, as unplanned orders are expedited. Orders above the agreed plan are accepted and scheduled without understanding the impact on already committed customer orders.
5	**Transitional** - A monthly cross-functional demand/supply balancing meeting gathers all necessary decision-makers to agree plans, inventory levels etc.
6	**Transitional** - Demand/supply balancing occurs weekly, with demand and resource requirements refreshed weekly.

7	**Integrated Supply Chain** - PLAN DELIVER is actively co-ordinated and balanced with PLAN MAKE/SOURCE. - Forecasts are replaced with actual customer replenishment signals and orders, where possible. - Demand/supply balancing uses two differentiated and complementary processes, a monthly one and a weekly one. Both reconcile internal and external resources with (modified) demand. - Customer class and product class differentiate Service levels. The constraints to be optimised are clearly identified and monitored. The decision-making process is cross-functional and formalized. It includes exceptions, allocation rules, product phase-in / phase-out, inventory targets and flexibility. - Deliver plans (including a goods-movement plan) are formalised and distributed to all supply-chain functionaries and top-tier partners. Soft and hard allocated resources are clearly identified. Unplanned orders are accepted and scheduled only when there is no impact on the overall deliver plan, whilst any significant changes are agreed between Operations, Warehouse, Distribution or installation and Sales Managers. Plans are reviewed regularly with major customer's representatives (supply-chain and sales/purchasing).
8	**Transitional** - Collaborative demand planning is in place. - End-customer demand is visible to all partners in the supply chain. - PLAN DELIVER is integrated with the customer's PLAN SOURCE.
9	**Transitional** - Delivery or installation resources are balanced collaboratively across the Supply-Chain.
10	**The Extended Enterprise** - The PLAN DELIVER process is highly integrated with customers' PLAN SOURCE (their plan is our plan). Demand requirements include full visibility of end customer's demand (orders, plans, inventory etc.) with knowledge of promotions and projects/bids. Scenarios and collaborative forecasting with major customers/channel partners is used. The requirements plan is updated frequently to reflect actual consumption in the case of a business-to-consumer type-of channel (using point-of-sale data). - Event-driven demand/supply balancing process includes major customers in setting priorities and making trade-offs. - The short-term plan consumes the mid-term plan based on market pull.

Element 8: Deliver Execute



Definitions

The deliver execute process is the process that takes care of the execution of customer orders, from the fist inquiry to the payment of the invoice. It involves 3 key processes:

1. Sales order handling.
2. Warehousing.
3. Physical distribution.

Sales order handling deals with customer-triggered transactions and controls all deliveries. It comprises similar activities: process inquiring, order receipt, configuration, order acceptance, order entry, inventory availability, credit check and control order release, order confirmation, and order status control.
Warehousing deals with the receipt, storage, physical inventory management, picking and packing of goods ready for shipment to the customers.
Distribution comprises shipping, customer receipt control, installation on-site (if applicable) and invoice generation.

For definitions of building blocks - see annex 2 (element 8).

1	**Informal** *Sales order handling* - Customer-order inquiries and quotes require research and call back. Price and lead-times are quoted order by order. - Quoting and order /entry use the same processes and people. - Order scheduling is a FIFO process. Resource reservation is not possible. *Warehousing* - Orders are picked individually with the pickers determining the picking order. *Distribution* - Trucks are loaded upon arrival. Shipping documents are issued to support shipping. - Shipment tracking is not a standard practice. - The final installation schedule (if applicable) is prepared after actual delivery on site. - Shipping triggers invoicing. Credit control is manual.
2	**Transitional** - A clear physical distribution process is in place and executed in accordance with scheduled deliveries and promises to customers.

3	**Transitional** - Procedures have been defined and introduced formalizing the outbound logistic process. Reliable delivery on promised dates is, therefore, possible.
4	**Functional** *Sales order handling* - A quotation process with a standard process lead-time is in place. Service levels are monitored and targets are set. Quoted delivery dates are realistic and result in the required service levels. - The order-entry process is controlled. Order acceptance is based on a valid quotation or catalogue. *Warehousing* - Activities are executed according to clear work instructions. - Goods receipt is generally processed within 24 hours. - The order-picking process is in a logical order and in accordance with the order of scheduled shipments. *Distribution* - Trucks are loaded according to the issued shipping documents. The driver, as well as the loader, check the load against the shipping documents. - Goods receipt at customers' location is controlled. E.g. by goods receipt verification with proof of delivery or by the tracking and tracing facility of the freight forwarder. - An effective customer-complaint-handling procedure is in place with respect to deliveries. - Scheduled shipment dates are reliable. - Where applicable, advice of shipment date triggers installation schedule. - Invoicing is compliant with the terms of delivery.
5	**Transitional** - Order handling allows for differentiation in service level per customer and/or product groups. - Available-to-promise / capable-to-promise logic is applied for a limited amount of products and customers.
6	**Transitional** - Quotes rely on available- to-promise / capable-to-promise logic, without firm reservation of inventory.

7	**Integrated Supply Chain** *Sales order handling* - Capability to generate quotes relying on available/capable-to-promise logic, without firm reservation of inventory. Quotes and tender bids are reflected in the forecast. - Quotes are convertible to orders in a single step. - Available/capable-to-promise information and delivery time-slots immediately available to the single point of contact. The single point of contact is empowered to provide the committed delivery date of order. - Customer orders can be received by e-commerce with automatic credit checking. *Warehousing* - Automatic product identification at goods reception (e.g. using barcodes) with dynamic location assignment. - The order-picking process is optimized for labour cost and time (e.g. using simulation). *Distribution* - Automated, flexible customer labeling and advanced shipping notices are available. - Shipment tracking and tracing is comprehensive and verifies customer receipt and date/time info. Order fulfillment lead-time is monitored from order receipt to goods receipt at customer. - Installation (if applicable) is managed as an integrated part of "order fulfillment".
8	**Transitional** - Integral inventories and physical distribution cost are optimized in collaboration with customers and third-party logistics service providers. - For key accounts, concepts like Vendor Managed Inventories (VMI), Just-In-Time (JIT), Ship-To-Line, Self-Filing and Self Billing are implemented where appropriate.
9	**Transitional** - Collaborative order entry is developed (self-quoting, differentiated order entry, VMI etc.).
10	**The Extended Enterprise** *Sales order handling* - Full pricing and availability is available electronically to the customer for self quoting. - Customer and product segmentation differentiates process of order entry. Concepts like Vendor Managed Inventories (VMI), Just-In-Time (JIT), Ship-To-Line, Self-Filing and Self Billing are implemented where appropriate. - Committed delivery dates are available at time of order. Order status and committed delivery dates are electronically available to customers. *Warehousing* - Electronic goods-movement tracking assures real-time status visibility to customers. - Cross-docking merges product on the dock from different suppliers. *Distribution* - Electronic generation and download of shipping documents, including advance shipping notices is available. - Applying customer bar-codes before delivery enables customer to provide vendor receipt note. - Customer receipt automatically triggers payment process per agreed payment terms. - JSA's with third-party transportation and installation providers allow consistent service.

Element 9: Performance Measurement and Benchmarking

Definition:
The measurement of performance and comparison with competitors or firms that display "best-in-class" achievements. This is done both for the individual elements of the supply chain and its overall performance in order to guide decision-making and activity.

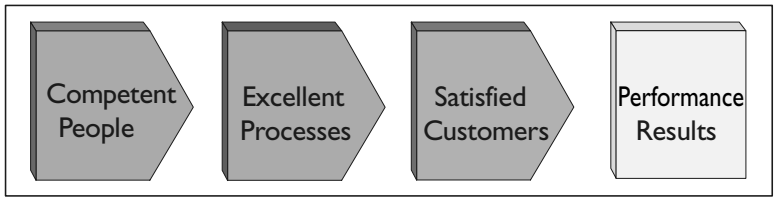
1	**Informal** - Measures (where they exist) focus on cost, stock levels and internal service levels. - Measures are not part of the management process except in "problem" situations.
2	**Transitional** - Some measurements are made to evaluate assets as well as levels of customer service (mainly focusing on fulfilment of committed date). - Measurement takes time and is often inconsistent.
3	**Transitional** - Metrics are in place to measure assets and customer-service levels. Measurement is regular and reported at least on a monthly basis. - Order fulfilment lead-time is measured from order receipt to ready for shipment (i.e. does not include actual shipment lead-time and receipt at customer).
4	**Functional** - Service-performance indicators as described in SLA (Service Level Agreements) are measured. - Targets are set on key performance indicators to support continuous improvement. - Functional measures are maintained and regularly reported. - Benchmarking is done in isolation by the functions and is purely numerical.
5	**Transitional** - Metrics are in place to measure supply-chain management costs (inventory, inventory-carrying costs and material acquisition costs). - Order-fulfilment lead-time is measured consistently from order receipt to product –receipt –by customer. - Service levels are measured against customer requested date and committed date.
6	**Transitional** - Metrics are in place to measure flexibility and responsiveness of the supply chain. - One scorecard for supply-chain management is in use.
7	**Integrated Supply Chain** - Metrics reflect how customers perceive your performance. - Performance is benchmarked against external firms with comparable processes. - Compensation is tied to performance metrics, enforcing accountability.
8	**Transitional** - A set of common real-time metrics is shared and regularly reviewed with suppliers, and serves as the basis for joint actions.

9	**Transitional** - A set of common real-time metrics is shared and regularly reviewed with customers, and serves as the basis for joint action.

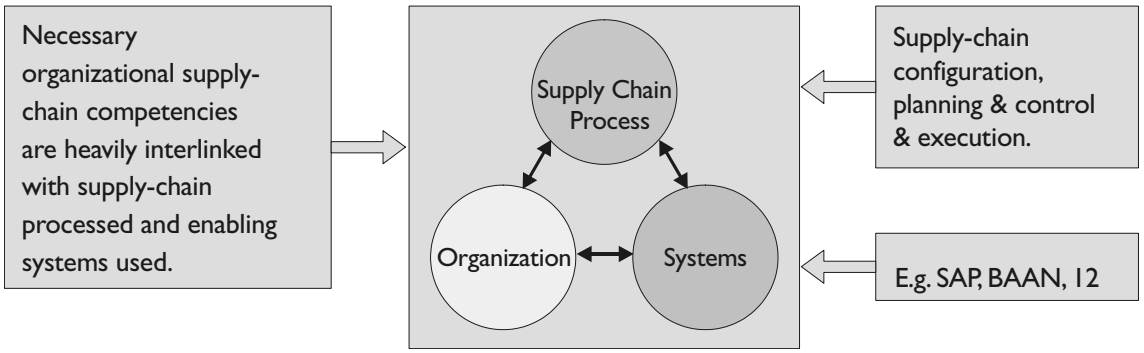
10	**The Extended Enterprise** - The extended supply chain shares a common set of performance metrics and goals that cascade downward and which are fully deployed and meet common set targets through the supply chain. - Performance metrics are updated in real-time and visible where needed. - Performance is regularly benchmarked against world-class supply-chain processes.

Element 10: Competence management

The right organisational competencies & capabilities are a crucial enabler for making supply-chain processes work. In the rapidly changing world of supply-chain management, not having the right competencies in time may prevent an organisation from improving fast enough.



A competent organization is the basis for an excellent organization. Supply-chain process, organization and enabling systems are heavily interlinked. In order to achieve business excellence, a competent supply-chain organization must be able to set-up, maintain and improve supply-chain processes as well as the enabling systems.



Definition:
Competencies: Competencies are a set of behaviours, knowledge, and personal characteristics that contribute to individual and organizational performance.

1	**Informal** - No formal supply-chain competence management process in place. - No education plan in place. - No methods in place for people-performance measurement.
2	**Transitional** - Main supply-chain competencies are listed (recognized as important).
3	**Transitional** - Main supply-chain competencies are listed and described: there is an agreed and formalized understanding of main supply-chain competencies needed for the functional supply-chain organization. - Education and training on ad hoc basis.

4	**Functional** - Competencies are described and managed within the context of the functional organization. - Competence managers are assigned to manage main supply-chain competencies. - Personnel in the supply-chain organization are trained in accordance with a formalized education plan.
5	**Transitional** - Supply-chain competencies are described to come to an integrated supply chain (to integrate SOURCE, MAKE and DELIVER processes).
6	**Transitional** - Competencies described to support the integrated supply chain. - Education plan in place to come to enhance supply-chain competencies for the integrated supply chain.
7	**Integrated Supply Chain** - Supply-chain competencies described and managed in accordance with the integrated supply-chain organization. - Education plan in accordance with competence roadmap. - Regular alignment of required supply-chain competencies with the business strategy.
8	**Transitional** - Supply-chain competencies listed and described to come to an extended supply chain. - Awareness of supply-chain competencies of supply-chain partners.
9	**Transitional** - Supply-chain competence development involves main supply-chain partners.
10	**The Extended Enterprise** - Available extended supply-chain competencies are world class. Continuous competence improvement contributes to industry leadership. - Competence development is flexible and aligned with business strategy and sets targets for supply-chain partners.

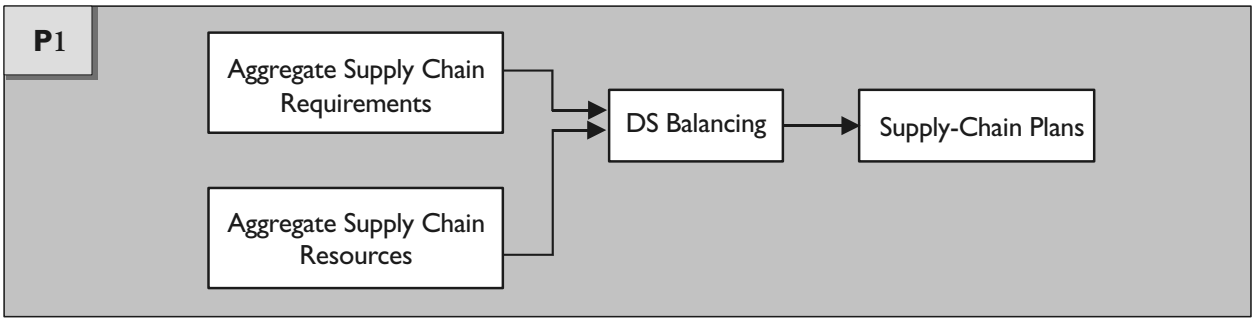
Annex 1: Clarification of specific terms and abbreviations used

The following terms and abbreviations need clarification (more specific terms are defined before each element):

APS	Advanced Planning System
ATP	Available to Promise (promising at Finished Good level)
BOM	Bill of Materials
CEO	Chief Executive Officer or Managing Director
CFO	Chief Financial Officer or Financial Director
CODP	Customer Order Decoupling Point
CRP	Capacity Requirements Planning
CSO	Customer Service Offering
CTO	Configure to Order
CTP	Capable to Promise (promising based on all aggregated supply-chain resources: raw material, WIP, FG, capacities)
DRP	Distribution resources planning
DSB	Demand/Supply Balancing
EC	Engineering Change
ERP	Enterprise Resource Planning
ETO	Engineered to Order
FG	Finished Goods
FIFO	First In First Out
JIT	Just In Time
JSA	Joint Service Agreement
KPIs	Key Performance Indicators
MPS	Master Production Schedule
MRP	Materials Requirements Planning
MTO	Make to Order
MTS	Make to Stock
NPI	New Product Introduction
PD	Product Development
PO	Purchase Order
POD	Proof of Delivery
PST	Process Survey Tool
R&D	Research & Development
SCM	Supply Chain Management
SCOR	Supply-Chain Operations Reference Model
SKU	Stock Keeping Unit
SLA	Service Level Agreement
SMED	Single Minute Exchange of Die
SPC	Statistical Process Controls
T&Cs	Terms & Conditions
TOCO	Total Cost of Ownership
UMC	Unit Manufacturing Costs
VMI	Vendor Managed Inventory
WIP	Work In Progress

Annex 2: Clarification of element building blocks

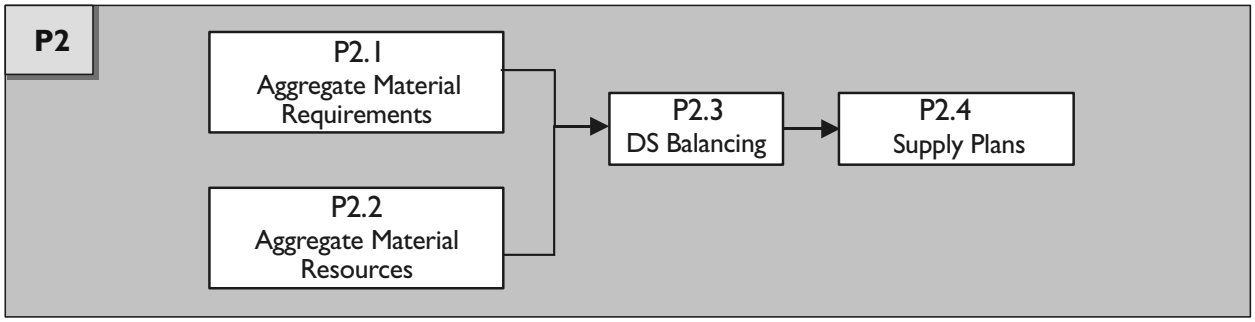
Element 2: Supply-Chain planning



Definitions:
To convert product and demand information into reliable material and product availability throughout the supply chain. To use the demand data to drive capacity planning, inventory management and purchasing decisions in order to match demand and supply.

Activity Name	Description
Identify, prioritise, and aggregate supply-chain requirements	The process of identifying, prioritising, and considering parts, all sources of demand in the supply chain of a product or service.
Identify, assess, and aggregate supply-chain resources	The process of identifying, evaluating, and considering, as in whole with constituent parts, all things that add value in the supply chain of a product or services.
Balance supply-chain resources with supply-chain requirements	The process of developing a time-phased course of action that commits supply-chain resources to meet supply-chain requirements.
Establish supply-chain plans	The establishment of courses of action over specified time periods that represent a projected appropriation of supply resources to meet supply-chain plan requirements.

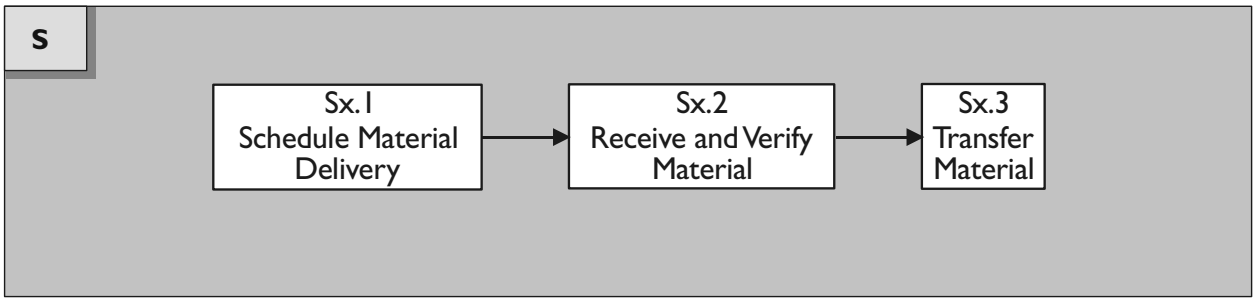
Element 3: Source plan



Definition:
The development and establishment of courses of action over specified time periods that represent a projected appropriation of material resources to meet supply-chain requirements.

Number	Activity Name	Description
P2.1	Identify, prioritise, and aggregate material requirements	The process of identifying, prioritising, and considering parts, all sources of demand in the material of a product or service.
P2.2	Identify, assess, and aggregate material resources	The process of identifying, evaluating, and considering, as in whole with constituent parts, all things that add value in the material of a product or services.
P2.3	Balance material resources with material requirements	The process of developing a time-phased course of action that commits material resources to meet material requirements.
P2.4	Establish sourcing plans	The establishment of courses of action over specified time periods that represent a projected appropriation of supply resources to meet sourcing plan requirements.

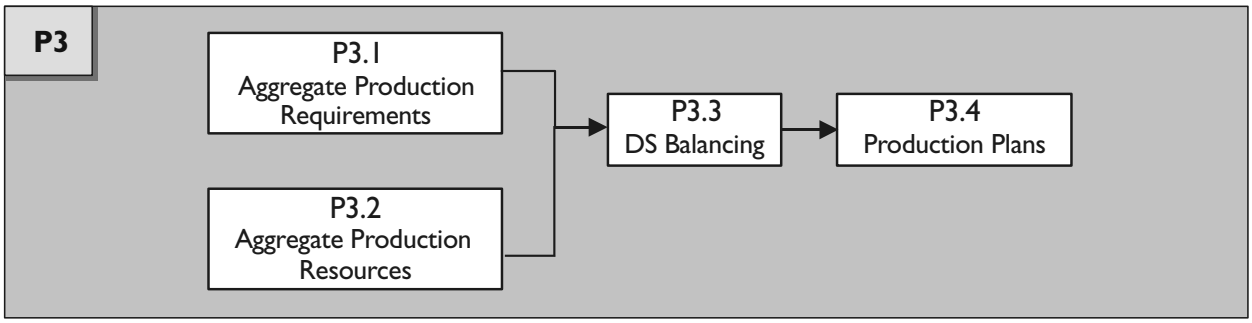
Element 4: Source execute



Definition:
The procurement, receipt and transfer of raw material items, and sub-assemblies.

Number	Activity Name	Description
Sx.1	Schedule material deliveries (procurement)	Scheduling and managing the execution of the individual deliveries of material against an existing contract or purchase order. The requirements for material releases are determined based on the detailed sourcing plan or other types of material pull signals.
Sx.2	Receive & verify materials	The receipt and acceptance of material deliveries. This includes all of the activities associated with receiving, verifying and accepting material deliveries.
Sx.3	Transfer material	The transfer of accepted material to the appropriate stocking location and to the point of use. This includes the activities associated with repackaging, staging, transferring and stocking material.

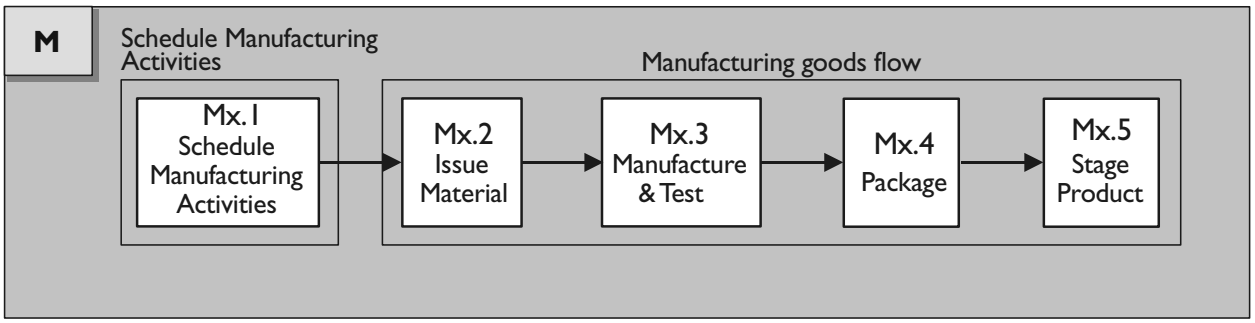
Element 5: Make plan



Definitions:
P3: The development and establishment of courses of action over specified time periods that represent a projected appropriation of production resources to meet production requirements.

Number	Activity Name	Description
P3.1	Identify, prioritise, and aggregate production requirements	The process of identifying, prioritising, and considering parts, all sources of demand in the production of a product or service.
P3.2	Identify, assess, and aggregate production resources	The process of identifying, evaluating, and considering, as in whole with constituent parts, all things that add value in the production of a product or services.
P3.3	Balance production resources with production requirements	The process of developing a time-phased course of action that commits production resources to meet production requirements.
P3.4	Establish production plans	The establishment of courses of action over specified time periods that represent a projected appropriation of supply resources to meet production plan requirements.

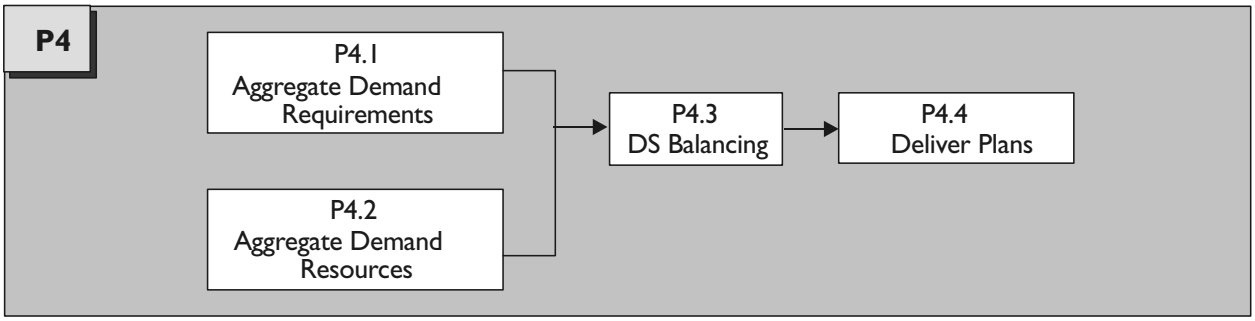
Element 6: Make execute



Definitions:
Mx: The process of manufacturing products.

Number	Activity Name	Description
Mx.1	Schedule manufacturing activities	Given plans for the manufacture of specific parts, products, or formulations in specified quantities and planned availability of required materials, and the firm order book, the scheduling of the operations to be performed in accordance with these plans and order-delivery dates. Scheduling includes sequencing, and, depending on the factory layout, any standards for set-up and run. In general, intermediate manufacturing activities are coordinated prior to the scheduling of the operations to be performed in producing a finished product.
Mx.2	Issue material	The physical movement of material from a stocking location (e.g., stock-room, a location on the production floor, a supplier) to a specific point of use location. Issuing material includes the corresponding system transaction. The bill of materials/routing information or recipe/production instructions will determine the materials to be issued to support the manufacturing operation(s).
Mx.3	Manufacture and test	The series of activities performed upon material to convert it from the raw or semi-finished state to a state of completion and greater value. The processes associated with the validation of product performance to ensure conformance to defined specifications and requirements.
Mx.4	Package	The series of activities that containerize completed products for storage or sale to end-users. Within certain industries, packaging may include cleaning or sterilization.
Mx.5	Stage product	The movement of packaged products into a temporary holding location to await movement to a finished-goods location. Products that are made to order may remain in the holding location to await shipment per the associated customer order. The actual move transaction is part of the Deliver process.

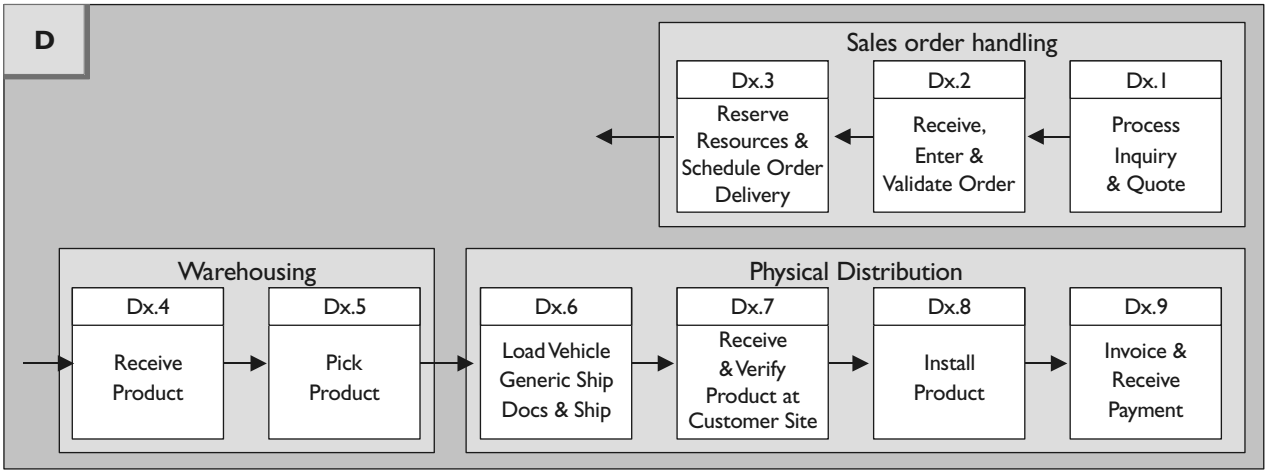
Element 7: Deliver plan



Definition:
The development and establishment of courses of action over specified time periods that represent a projected appropriation of delivery resources to meet delivery requirements.

Number	Activity Name	Description
P4.1	Identify, prioritise, and aggregate delivery requirements	The process of identifying, prioritising, and considering parts, all sources of demand in the delivery of a product or service.
P4.2	Identify, assess, and aggregate delivery resources	The process of identifying, evaluating, and considering, as in whole with constituent parts, all things that add value in the delivery of a product or services.
P4.3	Balance delivery resources with delivery requirements	The process of developing a time-phased course of action that commits delivery resources to meet delivery requirements.
P4.4	Establish delivery plans	The establishment of courses of action over specified time periods that represent a projected appropriation of supply resources to meet delivery requirements.

Element 8: Deliver execute



Definition:
The process of taking orders and delivering products.

Number	Activity Name	Description
Dx.1	Process inquiry & quote	Receive and respond to general customer inquiries and requests for quotes.
Dx.2	Receive, configure, enter and validate orders	Receive orders from the customer and enter them into a company's order processing system. Configure your product to the customers' specific needs, based on standard available parts or options. "Technically" examine order to ensure an orderable configuration and provide accurate price. Check the customer's credit.
Dx.3	Reserve resources & schedule order delivery	Resources (both on hand and scheduled) are reserved for specific orders and delivery is confirmed and scheduled.
Dx.4	Receive product	The activities such as receiving product, verifying, recording product receipt, determining put-away location, putting away and recording location that a company performs at its own warehouses. May include quality inspection.
Dx.5	Pick (staged) product	The series of activities including retrieving orders to pick, determining inventory availability, building the pick wave, picking the product, recording the pick and delivering product to shipping performed in the distribution centre in response to an order.
Dx.6	Load vehicle, generate ship documents & ship	The series of tasks including placing product onto vehicles, generating the documentation necessary to meet internal, customer, and government needs, and sending the product to the customer.
Dx.7	Receive & verify product at customer site	The process of receiving the shipment at the customer site and verifying that the order was shipped complete and that the product is of sufficient quality.
Dx.8	Install product	When necessary, the process of preparing and installing the product at the customer site. The product is fully functional upon completion.
Dx.9	Invoice and receive payment	A signal is sent to the financial organisation that the order has been shipped and that the billing process should begin. Payment is received from the customer within the payment terms of the invoice.

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